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MACHINE TRANSLATION VS HUMAN TRANSLATORS

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Today, with the advancement of international communication, we interact with numerous languages on a regular basis. We can employ machine and human translators to translate information from one language to another and back because, obviously, we cannot learn all of them. But who is superior, and in what circumstances? The widespread usage of computers in modern society has made life without them impossible to fathom. Language barriers have been eliminated through machine translation, which has transformed communication on a worldwide scale. There are websites that can instantly translate text, apps that can simultaneously translate what is being said, and technologies that can translate any language. Yet, a machine translator can't resolve a problem as well as a human.

In order to achieve the best translation that makes sense and appeals to the reader, words and sentences must frequently be changed and rearranged. A good translation should sound natural and fluid. Above all, a good translation should maintain the text's original meaning. A computer cannot do this since only a human translator can be sensitive to cultural differences and has a working knowledge of language, tone, and idioms.

The ability to use machine translation tools anywhere, even without an Internet connection, is their greatest benefit. The sole prerequisite is a functional computer that comes pre-installed with a translation program or a computer with an Internet connection. Speed is another perk. They translate quite quickly.

As the most popular machine translation technology, Google Translate can be used as an illustration of other benefits of machine translation. The first benefit is that it is free, which is significant for most individuals. When translating documents that are highly technical or specialized, human translators can be fairly expensive. Moreover, Google Translate can recognize the language you are translating into and provide quick translations into that language. It does not, however, exist in all languages; the majority of the time, you just receive a wordfor-word translation. Despite the fact that this offers you a rough notion of the text's subject matter, we frequently experience issues with the translation's accuracy rate. Machines merely employ specialized algorithms that are deficient in our languages. The most serious issue with machine translation is therefore mistakes in the meaning of the sentences that are produced. In other words, human translators are often pricey and more time-consuming than machine translation. Also, real people can analyse every word and phrase they are working with.

In conclusion, machine translations may be useful when we need to quickly and cheaply or for free understand the essence of a document. Nevertheless, stick with genuine people you can work with to guarantee that you transmit the message you want to your audience and create a professional, high-quality, and naturalsounding translation.

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USING OF MILITARY ALPHABET

The military alphabet is a set of 26 words that are used to spell out letters when communicating over the radio or telephone. This system helps to ensure clarity and accuracy in communication, especially in noisy or difficult environments. This alphabet consists of the standard English alphabet, plus a few extra words that are specific to military use.

Special words are used to ensure oral communication is clearly understood: A is for Alpha, B is for Bravo, C is for Charlie, D is for Delta, E is for Echo, F is for Foxtrot, G is for Golf, H is for Hotel, I is for India, J is for Juliet, K is for Kilo, L is for Lima, M is for Mike, N is for November, O is for Oscar, P is for Papa, Q is for Quebec, R is for Romeo, S is for Sierra, T is for Tango, U is for Uniform, V is for Victor, W is for Whiskey, X is for X-ray, Y is for Yankee, and Z is for Zulu.

The military alphabet and NATO phonetic alphabet are the same alphabet. It used by the armed forces of the United States, North Atlantic Treaty Organization (NATO), and International Civil Aviation Organization, and even by civilians to spell out words and phrases or communicate in code.

Miscommunication can cause loss of lives and other tragic circumstances.

Lots of English letters sound the same. It's easy to mistake "B" for "P," or "C" for "E". Wrong spellings might cause a mislabeled package shipment or a misspelled dinner invitation. For a soldier, miscommunication can spell disaster.

Radio operators in the armed services use this alphabet when sending codes or relaying important messages. A spelling alphabet ensures clear communication even when there's heavy background noise or severe radio interference.

The military alphabet is the foundational piece of the military's codified communication procedure. This procedure helps regulate communication over the radio and other communication platforms used by the military. This system helps soldiers by restricting the flow of information, emphasizing clarity, and instituting norms for orders, updates, and important information.

There are three guiding principles for Military Communication: Accuracy, Brevity, and Clarity. Whether you are communicating via radio, in person, or on any other platform, all tactical communication should adhere to these criteria. Need to keep tactical messages short and to the point, and limit communication to essential items. need to keep messages under 30 seconds as a rule. This way the message will be easily understood, even under duress and chaos.

According to the International Telecommunication Union the "Military Alphabet" is not just for the armed forces. This alphabet was actually developed by the International Civilian Aviation Organization (ICAO) as a set of terms that would be mutually comprehensible across the international community. The Able Baker Alphabet, like Morse Code, was designed to minimize miscommunication and is used in non-military settings where codes and clarity are key.

Flight coordinates and passenger names are communicated using the Military Alphabet.

Pilots rely on the Automatic Terminal Information Service (ATIS), which provides a continuous broadcast of weather information, runway logistics, and other vital information. Updates are assigned different Military Alphabet letters so pilots know how current its updates are. ATIS also features a lot of Military letters and numbers to communicate logistical data.

Banks use the military phonetic alphabet to communicate security codes and to verify customer information.

Banks, traders, and financial institutions use the military alphabet when trading or ordering large transactions.

The military alphabet is used in the military to prevent miscommunication and to communicate in code.

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BIOSYNTHESIS OF THERAPEUTICALLY IMPORTANT METAL NANOPARTICLES USING FUNGI OF THE GENUS *PLEUROTUS*

Biosynthesis of metal nanoparticles using cell cultures of different organisms has attracted significant attention in recent years due to its eco-friendly, costeffective, and sustainable nature. Various bioorganisms such as bacteria, fungi, algae, and plants have been used for the biosynthesis of metal NPs.

In terms of enzymatic and environmental adaptability, stability, and biological activity, fungal cells are preferred agents for NP synthesis than other organisms. Fungi have a more extensive enzymatic system that can produce a wide variety of secondary metabolites, including reducing agents and stabilizers. These metabolites can be used to reduce metal ions and stabilize the resulting NPs. Furthermore, fungal-derived NPs have shown to have better stability, uniformity, and reproducibility than bacteria-derived NPs. Fungal-derived NPs have also shown to have more significant antimicrobial, antioxidant, and anticancer activities than bacteria-derived NPs [1, p. 2].

The integration of nanotechnology with fungi to biosynthesize nanomaterials is known as fungal nanobiotechnology (FNBT) which has resulted in development of novel diagnostic and analytical tools and nanodrugs for therapy and prevention of many chronic diseases such as cancer, kidney diseases, multiple sclerosis, microbial infections, and chronic pain.

Fungi of the genus Pleurotus have been shown to be effective in biosynthesizing metal nanoparticles with potential therapeutic applications. Several studies have reported the biosynthesis of various metal nanoparticles using Pleurotus fungi, including silver, gold, copper, iron and other nanoparticles

Various studies on the biosynthesis of AgNPs using powdered basidiocarps and mycelia of different oyster mushroom species, such as *P. ostreatus*, *P. sajor-caju*, *P. florida*, *P. cornucopiae var. citrinopileatus*, *P. giganteus*, *P. platypus*, and *P. eous* have been reported. Synthesis of AgNPs was carried using P. tuber-regium mushroom extract and 1 mM AgNO3 solution. The mixture of solutions was stirred at 90 °C for 2 h. Cubical and spherical shaped AgNPs, with an average size of 50 nm, were obtained as a black powder. Debnath et al. synthesized spherical shaped AgNPs with the help of aqueous extract of mushroom (5 mL) and mixed with 95 mL silver nitrate (1 mM, AgNO3) solution to reduce Ag+ to Ago. This solution was kept in an incubator for 3 days at 37 °C, resulting in color change from light yellow to yellowish-brown. Similarly, the synthesis of predominantly spherical shaped AgNPs with a size ranging from 2 to 100 nm was carried by various researchers using mushroom extract and AgNO3 solution [2, p. 1].

For instance, silver nanoparticles synthesized using *Pleurotus ostreatus* have been shown to have potent antimicrobial activity against various pathogenic bacteria and fungi. Gold nanoparticles synthesized using *Pleurotus sajor-caju* have demonstrated antioxidant and anticancer activities [0, p. 1].

In conclusion, the fungal nanotechnology provides an updated and comprehensive knowledge dealing with the green and sustainable production of metal and organicbased nanostructures by various fungal species. The biosynthesis of metal nanoparticles using Pleurotus fungi offers an eco-friendly and sustainable approach for the production of therapeutically important NPs with potential biomedical applications. The use of fungi as a biosynthesis agent is a promising alternative to traditional chemical methods, which can be harmful to the environment and human health.

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T-VEC APPLICATION FOR THE PURPOSE OF CURING CANCER

T-Vec, also known as *talimogene laherparepvec*, is an oncolytic virus that has been genetically engineered to selectively target cancer cells. It is a modified herpes simplex virus that has been optimized to infect and kill cancer cells while leaving healthy cells unharmed.

The use of oncolytic viruses like T-Vec for cancer treatment is an exciting new development in the field of cancer therapy. These viruses have the ability to selectively infect and kill cancer cells, while at the same time activating the immune system to help fight the cancer.

T-Vec is an oncolytic virus that has been genetically engineered to selectively infect and kill cancer cells while leaving healthy cells unharmed. The virus is injected directly into the tumor, where it starts to replicate and infect cancer cells. Once inside the cancer cell, T-Vec replicates itself, causing the cancer cell to burst and die. This process releases tumor antigens and other molecules that activate the immune system, attracting immune cells to the site of the tumor.

The immune system then recognizes the tumor antigens as foreign and mounts an immune response against the cancer cells, helping to destroy them. This is known as an immune response or an anti-tumor immune response. In addition to killing cancer cells directly, T-Vec is thought to stimulate the immune system to attack the tumor and help prevent the cancer from spreading to other parts of the body.

T-Vec also contains a gene that codes for granulocyte-macrophage colonystimulating factor (GM-CSF), which is a protein that stimulates the production of white blood cells. This helps to further activate the immune system, which can help to enhance the effectiveness of T-Vec.

Overall, the mechanism of T-Vec application involves using a genetically modified virus to selectively target cancer cells, while also stimulating the immune system to help fight the cancer. This approach has shown promise in the treatment of advanced melanoma, and ongoing research is exploring the potential of T-Vec for other types of cancer.

Clinical trials of T-Vec have shown promising results in the treatment of advanced melanoma. In one study, patients who received T-Vec had a significantly higher overall response rate compared to those who received a control therapy. Additionally, T-Vec has been shown to produce durable responses in some patients, with some patients remaining disease-free for several years after treatment [1].

One of the advantages of T-Vec is that it can be administered directly to the tumor, allowing for precise targeting of the cancer cells. This also means that it can be used in combination with other treatments, such as surgery or radiation therapy, to enhance their effectiveness.

While T-Vec is currently approved for the treatment of advanced melanoma, there is ongoing research into its use for other types of cancer, including breast, lung, and pancreatic cancer.

Of course, as with any therapy, there are some potential side effects associated with T-Vec. These can include flu-like symptoms, fever, and chills. However, these side effects are generally mild and manageable, and the benefits of the therapy far outweigh the risks [2].

In conclusion, T-Vec represents an exciting new approach to the treatment of cancer. Its ability to selectively target cancer cells while activating the immune system makes it a promising therapy for a variety of cancers. While there is still much work to be done, the results so far have been very encouraging, and I believe that T-Vec will play an important role in the fight against cancer in the years to come.

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THE POSSIBLE BENEFITS AND DRAWBACKS OF THE ROTATION MODEL OF BLENDED LEARNING

The rotation model is a type of blended learning which combines and makes use of both face-to-face and online lessons. This provides students with much higher accessibility to learning in a wide variety of situations, which is relevant now more than ever, in a world of pandemics and wars. The rotation model can be combined with a variety of distance learning tools, such as eLearn, Kahoot, Khan Academy, Youtube, as well as a variety of available video conferencing tools, like Zoom, Google Meet and Teams. [1, p. 6]

The rotation model has several popular variations depending on the available tools, technology and types of activities involved. These variations include:

Station rotation. In this variation of the model, a teacher or lecturer divide the students into groups and have them engage in different activities on different stations depending on their knowledge and skill level, going through face-to-face instruction, personal or group assignments and online assignments.

This variation of the model is rather popular in well-equipped learning institutions which have ready access to technology within any given class or lecture room, as it presumes the availability of both enough space to effectively divide a group of students, as well as the availability of the technological equipment to engage the divided groups in different activities. Its benefits are great, as it can make learning interesting and, to an extent, personalized. However, its main drawback is the technological requirement for it to be possible in the first place.

Lab rotation. This variation of the model is similar to the previous, however, it focuses on rotating students through various computer or science labs in which they engage in activities focused on their specialty, possibly switching between active instruction and lab work. This variation is of the greatest benefit in face-to-face lessons in universities which have many available laboratories focused on the specialty of the student groups. In this model, as in the previous one, the students are divided into groups and put through a rotation, where one group engages in activities in one lab, while another undergoes instruction or is in another lab or part of the same lab.

This variation of the model can be very useful in strengthening theoretical knowledge with practical activities within the same lesson, as the teacher or lecturer can instruct a group before rotating them into a lab for a more practical lesson. The main drawbacks are similar to the last model, one needs to have several available labs for this model to even be possible in the first place.

Flipped classroom. This variation of the rotation model involves online instruction being carried out before students come to class. They then rotate through a variety of activities during the lesson in order to reinforce their previously gained theoretical knowledge with practical work, either individually or in groups.

This variation is by far the easiest to carry out without additional technology or laboratories present in the learning space, as it simply requires online instruction before moving on to practical assignments. It has many benefits, such as maximizing the time spent applying knowledge in various activities, providing knowledge even to those students who cannot come to an in-person lesson, giving more time to understand the theoretical knowledge before practice and so on. Its main drawback is requiring additional scheduling for the online instruction and the practical lesson, which may be difficult for busy students and teachers.

Individual rotation. This variation of the model has the students rotate on an individually customized, strictly fixed schedule, which is set by the teacher. The rotation is personalized to each student according to their needs or the availability of the stations.

This variation provides by far the greatest amount of personalization and allows the student to learn at their own pace, however, the fixed nature of the schedule can also be a drawback for students who learn better with a more flexible schedule.

The rotation model has immense potential to improve the quality of learning through engaging students in a variety of activities, as well as possibly improving their ability to work in a team by grouping students during the rotation between different modes of learning. The most commonly available forms of rotation can be accessed through educational apps and online assessment tools, such as Kahoot and Quizlet, which can be accessed even in an in-person lesson through mobile phones. Other stations, such as labs, can only be accessed under specific circumstances, and are only useful for those subjects that benefit from having a laboratory.

The main drawbacks of this model of blended learning is the management of the required stations and the rotational aspect. The availability of stations that are not easily accessible through a smartphone can be a great barrier for the rotation model, as it might simply not be possible to rotate between stations enough to justify utilizing it. Another issue is that it is incredibly taxing on the teacher or lecturer who uses the model, as they have to manage each group of students to make sure they receive equal support and attention, and that each station provides an appropriate level of instruction or practice for the students.

Overall, blended learning, and especially the rotation model, must be further researched and developed before it can truly become a cornerstone of modern learning methodology, but it is already showing great potential, as it can greatly increase the engagement, personalization and flexibility of learning for students in a wide variety of situations. Although the drawbacks are readily apparent, they can be mitigated with proper preparation and further development.

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APPLICATION OF BIOTECHNOLOGICAL METHODS TO IMPROVE ENVIRONMENTAL PROTECTION AND BIODIVERSITY

Environmental protection and biodiversity conservation are critical issues that the world is currently facing. Human activities and industrial processes have led to significant environmental pollution, which has caused harm to various ecosystems and species. Furthermore, the decline in biodiversity, particularly the loss of rare and endangered species, threatens the ecological balance of the planet. However, biotechnology offers innovative and sustainable solutions to these problems. By using living organisms and biological processes, biotechnological methods can help improve environmental protection and biodiversity conservation.

Biotechnological methods for improving environmental protection. One of the main problems of environmental protection is the air, water and soil pollution. The use of biotechnological methods can help in the fight against these problems. For example, microbiological processes can be used to purify water and soil from pollutants. Also, the use of biofilters can help reduce the content of harmful substances in the air. Biotechnological methods for maintaining biodiversity. [1, p.6] One of the main problems of biodiversity is the decrease in the number and diversity of plant and animal species. The use of biotechnological methods can help to solve these problems. For example, tissue culture technologies can be used to grow plants and restore rare and extinct species. [1, p.5] Also, with the help of genetic methods, it is possible to preserve the gene pool of rare and extinct species of animals. Use of biotechnology to solve energy problems. Application of biotechnologies can help solve problems related to energy conservation and production. For example, using biomass for energy can help reduce dependence on traditional energy sources and

reduce carbon dioxide emissions. Biotechnologies for increasing the productivity of agricultural crops. [4, p.9] The application of biotechnology can help increase the productivity of agricultural crops. For example, with the help of genetic modification, it is possible to create varieties of plants with increased yield, resistance to pests and diseases. In addition to creating more productive and resilient crop varieties, biotechnology can also help reduce the environmental impact of agriculture. For instance, genetically modified crops can be engineered to require less water and fertilizer, which can reduce the amount of runoff and soil erosion caused by traditional farming practices. Furthermore, biotechnology can also be used to develop crops with enhanced nutritional value, which can help combat malnutrition and improve public health. For example, biofortified crops can be created to contain higher levels of essential vitamins and minerals, such as iron, zinc, and vitamin A. Ethical and social aspects of the application of biotechnology. [2, p.2] The application of biotechnology should also be considered from an ethical and social point of view. It is necessary to ensure safety in the application of biotechnology and take into account moral and ethical aspects. [1, p.11] Risks and limitations of the use of biotechnology. The use of biotechnology may have some risks and limitations. For example, genetic modification can lead to unforeseen consequences, such as negative effects on the environment and human health. In addition, the use of biotechnology can create ethical issues, such as using human embryos for research or creating genetically modified animals for entertainment. Legal aspects of the application of biotechnology. The application of biotechnology should also be considered from a legal point of view. For example, it is necessary to determine the legal status of genetically modified organisms and products obtained with the help of biotechnology. [2, p.6] Also, it is necessary to determine the responsibility for the possible consequences of the use of biotechnology. Socio-economic aspects of the application of biotechnology. The application of biotechnology can have a great impact on the socio-economic development of the country. For example, the creation of new technologies can lead to an increase in the competitiveness and efficiency of enterprises, but at the same time it can lead to a decrease in the number of jobs. [3, p.21] Also, the use of biotechnology can have a great impact on people's health and lives, which can affect their social position and economic status. [4, p.7]

The application of biotechnological methods can help to solve many problems related to the protection of the environment and biodiversity. However, it is important to ensure the safety and ethical application of these methods. Biotechnology is an important tool in the fight against environmental and social challenges facing humanity in the 21st century.

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TRANSPORTATION AND ECONOMIC OPPORTUNITIES

Transportation developments that have taken place since the beginning of the industrial revolution have been linked to growing economic opportunities. At each development stage of the global economy, a particular transport technology has been developed or adapted with an array of impacts. Economic cycles are associated with a variety of innovations, including transportation, influencing economic opportunities for production, distribution, and consumption. Historically, six major waves of economic development where a specific transport technology created new economic, market, and social opportunities can be suggested:

Seaports. The historical importance of seaports in trade has been enduring. This importance was reinforced by the early stages of European expansion from the 16th to the 18th centuries, commonly known as the age of exploration. Seaports supported the early development of international trade through colonial empires but were constrained by limited inland access. Later in the industrial revolution, many ports became important industrial platforms. With globalization and containerization, seaports increased their importance in supporting international trade and global supply chains. The cargo handled by seaports is reflective of the economic complexity of their hinterlands. Simple economies are usually associated with bulk cargoes, while complex economies generate more containerized flows. Technological and commercial developments have incited a greater reliance on the oceans as an economic and circulation space.

Rivers and canals. River trade has prevailed throughout history, and even canals were built where no significant altitude change existed since lock technology was rudimentary. The first stage of the industrial revolution in the late 18th and early 19th centuries was linked with the development of canal systems with locks in Western Europe and North America, mainly to transport heavy goods. This permitted the development of rudimentary and constrained inland distribution systems, many of which are still used today.

Railways. The second stage of the industrial revolution in the 19th century was linked with the development and implementation of rail systems enabling more flexible and high-capacity inland transportation systems. This opened substantial economic and social opportunities through the extraction of resources, the settlement of regions, and the growing mobility of freight and passengers.

Roads. The 20th century saw the rapid development of comprehensive road transportation systems, such as national highway systems and automobile manufacturing, as a major economic sector. Individual transportation became widely available to mid-income social classes, particularly after the Second World War. This was associated with significant economic opportunities to service industrial and commercial markets with reliable door-to-door deliveries. The automobile also permitted new forms of social opportunities, particularly with suburbanization.

Airways and information technologies. The second half of the 20th century saw the development of global air and telecommunication networks in conjunction with economic globalization. New organizational and managerial forms became possible, especially in the rapidly developing realm of logistics and supply chain management. Although maritime transportation is the physical linchpin of globalization, air transportation and IT support the accelerated mobility of passengers, specialized cargoes, and their associated information flows.

No single transport mode has been solely responsible for economic growth. Instead, modes have been linked with the economic functions they support and the geography in which growth was taking place. The first trade routes established a rudimentary system of distribution and transactions that would eventually be expanded by long-distance maritime shipping networks and the setting of the first multinational corporations managing these flows. Major flows of international migration that occurred since the 18th century were linked with the expansion of international and continental transport systems that radically shaped emerging economies such as North America and Australia. Transport played a catalytic role in these migrations, transforming the economic and social geography of many nations.

Transportation has been a tool of territorial control, particularly during the colonial era, where resource-based transport systems supported the extraction of commodities in the developing world and forwarded them to the industrializing nations of the time. The goal to capture resource and market opportunities was a strong impetus in the setting and structure of transport networks. More recently, port development, particularly container ports, has been of strategic interest as a tool of integration into the global economy, as the case of China illustrates. There is a direct relationship, or coordination, between foreign trade and container port volumes, so container port development is commonly seen as a tool to capture the

opportunities brought by globalization. The growth of container shipping has systematically been 3 to 4 times the GDP growth rate, underlining a significant multiplier effect between economic growth and container trade. However, this multiplying effect has substantially receded since 2009, underlining the maturity of the diffusion of containerization and its dissociation from economic growth.

Due to demographic pressures and urbanization, developing economies are characterized by a mismatch between the limited supply and growing demand for transport infrastructure. While some regions benefit from the development of transport systems, others are often marginalized by a set of conditions in which inadequate transportation plays a role. Transport by itself is not a sufficient condition for development. However, the lack of transport infrastructures can be a constraining factor in development. The lack of transportation infrastructures and regulatory impediments are jointly impacting economic development by conferring higher transport costs, but also delays rendering supply chain management unreliable. A poor transport service level can negatively affect the competitiveness of regions and their economic activities and thus have a negative impact on the regional added value, economic opportunities, and employment. Tools and measures are being developed to assess and compare the performance of national transportation systems. For instance, the World Bank published in 2007 its first-ever report, which ranked nations according to their logistics performance based the Performance Index. on Logistics

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THE ORGANIZATION OF PRODUCTION

The organization of production is a crucial aspect of any manufacturing process. It refers to the systematic planning and implementation of various activities related to the production of goods and services. This includes resource allocation, scheduling, quality control, and inventory management.

Manufacturers earn revenue and profit from the design and development of high-quality products. Producing low-cost, quality products is key to long-term success.

One of its key principles is lean manufacturing. This approach focuses on reducing waste and increasing efficiency in the production process. [1, c. 12]

Toyota Motor Corporation is a prime example of a company that successfully implements lean manufacturing. Toyota's production system emphasizes the importance of continuous improvement, just-in-time production, and visual management. [2, c. 35]

Another important concept in the organization of production is automation. The use of machines and technology has made a revolution in the manufacturing industry, as it allows faster production times, higher accuracy, and lower costs.

One example of a company that uses automation is Tesla. Tesla's electric car production line uses a high level of automation, which enables the company to produce cars at a much faster rate than traditional car manufacturers. [3, c. 20]

Quality control is also one of the most important components of the organization of production. It refers to the measures taken to ensure that products meet the required quality standards.

One example of a company that makes a significant effort on providing a quality control is Apple. Apple's production process includes rigorous testing and inspection at every stage, from the sourcing of raw materials to the final assembly of the product. [4, c. 10]

This is the way "closed-loop" manufacturing system works. It reduces waste and conserve resources by using recycled materials in products and recycling them at the end of their lifecycle.

Inventory management is one more important aspect of the organization of production. This refers to the planning and control of the stock level of raw materials, work-in-progress, and finished goods.

One example of a company that excels in inventory management is Amazon. Amazon uses a sophisticated inventory management system that allows the company to keep track of millions of products in real-time, ensuring that the right products are in stock at the right time. [5, c. 15]

"Anticipatory shipping" is Amazon's patent that allows sending products before the users have even purchased them.

As we see, the organization of production is a complex process that requires careful planning and implementation. Companies that excel in the organization of production are able to produce goods and services efficiently, with high quality and at low cost. Using the processes mentioned, companies can gain a competitive advantage in the global marketplace.

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CAUSES OF WHALE STRANDING

Whales are giant living creatures an, as usual living beings they are born and die. Old age and diseases are obvious things here. However, what about those cases when whales are found on the shore? The first thing to consider is asphyxiation, that is, simply suffocating, but after thinking a little more, one can remember that whales, like us humans, are mammals, therefore they breathe air, so let us study more about this issue and find out the possible causes.

One of the causes of whale death is dehydration; the animal does not have access to water on the shore.

Own weight, as we know whales have an incredibly large body weight, which becomes another cause of death because their own bones cannot withstand such weight and whales die from internal injuries.

There are also cases when the tide closes their airways.

Now that we know the reasons for the death of whales, we will consider how they get ashore and what the cause is.

Stranding can be divided into several types. The most obvious division into individual and mass. Dead whale carcasses are likely to surface at some point, then currents or wind can carry them to the coast. As thousands of whales die each year, many of them are washed ashore already dead. Most of the carcasses never reach the coast; they decompose in the ocean itself. Isolated cases of live animals being washed ashore are the result of illness or injury, which inevitably ends in death if a person does not intervene in the situation. Mass stranding is rare and attracts a lot of attention.

A key factor in many cases is the strong social cohesion of whales.

There are many theories, some of them are contradictory; explaining the reasons for beaching, but there is no clear answer.

Main theories are as follows:

Natural factors

Whales have washed ashore throughout human history and this has been due to natural causes such as bad weather, weakness due to old age or infection, difficult births, hunting too close to shore, or due to navigational failures.

• The problem of ocean pollution

This reason is obvious. Human activity usually harms other living beings. Whales are no exception. This theory has many confirmations. Many times, kilograms of synthetic waste were found in the stomachs of animals that washed ashore and died. Animals cannot get rid of it on their own. Synthetic waste causes indigestion in whales. To save themselves from suffering, animals commit suicide.

This version is quite convincing for single or even cases involving the death of whales. However, it does not explain mass suicides.

Noise

Another version says that the deafening roar of submarines destroys whales and dolphins. Losing their hearing, whales lose their orientation and are washed ashore. After hearing the sounds of the sonar, the animal gets scared and tries to float to the surface as quickly as possible. This causes the whales to lose their orientation in space. In addition, rapid resurfacing threatens the fact that they have to endure a large change in pressure, due to which gas bubbles can form in the animal's blood. Echo sounders, radars, sonar, missiles, submarines can frighten whales. There are examples of whales stranding during military exercises using sonars.

• Diseases

Scientists assume that the cause of stranding may be parasites that settle in the bodies of animals and damage important organs. It is possible that the reason lies in the mental illness of the leader - the leader "went crazy", and the whole pack rushed after him.

Summing up, we cannot say that people are entirely to blame for the mortality of whales, but they also played a significant role in this. Therefore, it is necessary to take more care of the environment, because not only whales suffer from pollution, but also hundreds of species of fish and animals. ДАВТЯН Анастасія Степанівна, студентка 4 курсу гуманітарно-педагогічного факультету, Національний університет біоресурсів і природокористування України (м. Київ, Україна) Науковий керівник – доц. Зуєнко Н. О.

Das Problem der Ökologie in der Welt und der Ukraine während der russischen Invasion

Das Umweltproblem ist in der Welt und in der Ukraine seit vielen Jahren relevant, aber ein Faktor wie der Krieg verursacht noch mehr Umweltschocks auf unserer Erde. In der Ukraine begannen die ökologischen Schocks mit der Invasion Russlands im Jahr 2014, aber das schwerwiegendste Problem war gerade die umfassende Invasion des Territoriums der Ukraine vom 24. Februar 2022. Bis Mai 2022 verzeichnete das Ministerium für Umweltschutz und natürliche Ressourcen der Ukraine 231 Umweltverbrechen, die höchstwahrscheinlich von Russland begangen wurden.

Nicht nur die Ukraine selbst leidet unter dem Krieg, die Folgen sind in ganz Europa zu spüren. Politisch droht der Krieg die Biodiversitätsagenda des europäischen Grünen Deals zu gefährden. Die Zoologische Gesellschaft Frankfurt verlor mehr als ein Drittel ihres europäischen Programms durch den Krieg in der Ukraine, wo sie zwei Jahrzehnte lang Naturschutzarbeit geleistet hatte. Die Schäden im Zusammenhang mit der Zerstörung der natürlichen Umwelt durch Russland werden auf Milliarden Euro geschätzt. Krieg trägt auch zur Freisetzung von Treibhausgasen bei, insbesondere von Methan aus einer beschädigten Gasleitung.

Die Kakhovskaya HPP in der Region Cherson war lange Zeit ein Erpressungshebel des russischen Militärs. Seit Beginn der Invasion haben russische Streitkräfte auch ukrainische Häfen sowie Schiffe unter verschiedenen Flaggen im Schwarzen Meer angegriffen, was zu einem lokalen Auslaufen und einem Brand von Treibstoff im Meer geführt hat, was auch die Todesursache von ist viele Meerestiere.Biosphärenreservate fielen in die Besatzungs- und Militärzone: Askania-Nova, Chornomorskyi; Naturschutzgebiete: Ukrainische Mykhailivska-Urland, Luhansk, Yelanetsky-Steppe; Steppe, nationale Naturparks: Dzharylgatsky, Oleshkivsky Sands, Kamianska Sich, Priazovsky, Heilige Berge, Asow-Syvasky, Meotida, Dvurichansky, Desnyansko-Starogutsky, Mezynsky, Hetmansky, Zalissya; sowie Zoos: Mykolavivskyi, Berdyanskyi, Charkiwskyi, Mariupolskyi, Feldman Ecopark, Beremytskyi, Kyivskyi, 12 Monate, Mezhyhirrya, Minski.

Als Fazit lässt sich festhalten, dass die Umweltfolgen des Krieges für die Ukraine von Tag zu Tag größer werden. Weltorganisationen entwickeln zusammen mit der Ukraine bereits Pläne zur Wiederherstellung der Ökologie, jeder versteht, dass dieses Problem nicht nur die Ukraine betrifft.

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CONCEPT OF BIOFERTILIZER AND ITS BENEFITS

Soil fertility is another important characteristic for human survival. A quality of suitable for agriculture soil is constantly deteriorating, which can lead to the complete their disappearance. One reason is destruction of the soil ecosystem caused by the introduction synthetic fertilizer, pesticides, herbicides. Some of them does not disappear anywhere and continues to be accumulated. A biofertilizer is a low-cost, eco-friendly opportunity to increase soil fertility.

Biofertilizers are microorganisms that support the growth of plants by enhancing the nutrient supply to the host plant when given to seeds, plants, or the soil. They colonize the rhizosphere or the inside of the plants. This entails the use of plant growth-promoting microorganisms that participate in a variety of biotic activities in the soil ecosystem in order to make it dynamic and sustainable for crop development. Biofertilizers are widely used to accelerate microbial activities that increase the availability of nutrients that plants can easily absorb. They increase soil fertility by fixing atmospheric N_2 and solubilizing insoluble phosphates in the soil, resulting in plant growth-promoting chemicals. These biofertilizers make use of the naturally available biological system of nutrient mobilization, which greatly enhances soil fertility and, as a result, crop productivity. It has been reported that the biofertilizer market is estimated to grow at a compound annual growth rate (CAGR) of 14.0% from 2015 to 2020 and is expected to reach USD 1.88 billion by 2025. Because of strict regulations on the use of chemical fertilizers, biofertilizers are the most widely used in Europe and Latin America [1, p.1].

Biofertilizers are cost-effective and ecofriendly in nature, and their continuous usage enhances soil fertility. They also increase crop yield by up to about 10-40% by increasing protein contents, essential amino acids, and vitamins, and by nitrogen fixation.

Directions of action of biofertilizer:

1) Nitrogen Fixation. This process is carried out by nitrogen-fixing bacteria, which could be either free-living (like Azotobacter), or live inside the plant roots (Rhizobium, which lives inside nodules on roots of leguminous plants; also called plant growth-promoting rhizobacteria, or PGPR).

2) Phosphorus, Sulfur, and Potassium Mobilization. Apart from these major elements, soil microbes also enhance the uptake of micronutrients like iron, zinc, copper, manganese, boron, molybdenum, chlorine, cobalt, and silicon.

Root-associated fungi (arbuscular mycorrhiza, or mycorrhizal fungi) play a major role in the solubilization and mobilization of many compounds to make them available to plants. They are often called root fertilizers.

3) Plant Growth Promoters. Commercial biofertilizers are a combination of different helpful strains of bacteria and fungi that perform various activities to support crop production. Because these are live organisms, it is not necessary to add large amounts of biofertilizers to the soil. Once the microorganisms have colonized the soil and have managed to regain the intricate natural balance, only little quantities of biofertilizer application is necessary to account for minor losses due to natural processes. Thus, using biofertilizers is not only eco-friendly but cost-effective as well [2, p. 1].

The positive effect of biofertilizer application depends on many factors. Similarly, the evaluation of the biofertilizer application is also complex. The mechanisms involved in plant promotion may be both host-plant-specific and strain-specific. Plant-growth-promoting microorganisms, when released into the soil, are subjected to competitive conditions that may severely reduce their beneficial effects. That is, the beneficial effects due to the application of a specific biofertilizer may differ significantly under different agro-environmental conditions, questioning the efficacy of microbial-based products.

To overcome such awareness, it is important to consider which factors affect the efficacy of biofertilizers on crop productivity. The factors mostly affecting the efficacy of biofertilizers are related to the plant (agronomic), the soil and the economy of the products.

Microorganism(s) with multifunctional properties and biofertilizers containing more than one microorganism are currently gaining special attention. Although currently most biofertilizer products consist of a single function microorganism such as nitrogen-fixing bacteria, emphasis is given to the production of bacterial isolates that could be developed as multifunctional biofertilizer microorganisms. The multi-strain consortia confer additional characteristics to the biofertilizer they include in respect to improvement of crop plants growth and performance, as well as in enhancement and maintenance of soil fertility. There is evidence that a multifunctional consortium of different strains of Rhizobium, phosphate-solubilizing bacteria and fungi, arbuscular mycorrhizal fungi, and free-living nitrogen-fixing Azotobacter strains improves the nodulating ability, nitrogen content and herbage yield (up to two-fold) of subabul seedlings (Leucaena leucocephala) in comparison with the application of each component of the consortium alone [3, p. 4].

Bio-fertilizers will help to reduce the burden on soil. Main advantages of their use: 1) stimulate plant growth; 2) restore natural soil fertility; 3) protect against harmful components. Biofertilizers with multifunctional properties are currently gaining special attention. The fertile soils of Ukraine are the most important resource potential. An urgent task is to change the fertilizer application system with a reorientation to increase the share of biofertilizers.

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IS IT POSSIBLE TO RECREATE DINOSAURS FROM THEIR DNA?

Just a few years from now, herds of woolly 'mammoths' could be roaming the Siberian tundra. Are dinosaurs next for de-extinction?

What Alida Bailleul saw through the microscope made no sense. She was examining thin sections of fossilised skull from a young hadrosaur, a duck-billed, plant-eating beast that roamed what is now Montana 75m years ago, when she spotted features that made her draw a breath.

Bailleul was inspecting the fossils, from a collection at the Museum of the Rockies in Bozeman, Montana, to understand how dinosaur skulls developed.

Embedded in calcified cartilage at the back of the skull were what appeared to be fossilised cells. Some contained tiny structures that resembled nuclei. In one was what looked like a clump of chromosomes, the threads that bear an organism's DNA.

Bailleul showed the specimens to Mary Schweitzer, a professor and specialist in molecular palaeontology at North Carolina State University, who was visiting the museum. Schweitzer herself had become famous – and faced waves of criticism – for claiming to have found soft tissue in dinosaur fossils, from blood vessels to fragments of proteins.

Schweitzer was intrigued by Bailleul's discovery and the two joined forces to study the fossils further. In early 2020, as the world was dealing with the arrival of Covid, they published a bombshell paper on their findings. Their report laid out not only evidence for dinosaur cells and nuclei in the hadrosaur fossils, but results from chemical tests that pointed to DNA, or something like it, coiled up inside.

The idea of recovering biological material from dinosaur fossils is controversial and profound. Schweitzer doesn't claim to have found dinosaur DNA – the evidence is too weak to be sure – but she says scientists should not dismiss the possibility that it could persist in prehistoric remains.

"I don't think we should ever rule out getting dinosaur DNA from dinosaur fossils," she says. "We're not there yet, and maybe we won't find it, but I guarantee we won't if we don't continue to look."

Scraps of prehistoric tissue, proteins or DNA could transform the field of molecular palaeontology and unlock many of the mysteries of dinosaurs' lives. But the prospect of having the intact genetic code from a tyrannosaur or velociraptor raises questions. Armed with sufficient dino DNA, could we bring back the lumbering beasts?

Rapid advances in biotechnology have paved the way for elegant approaches to de-extinction, where a species once considered lost for ever gets a second shot at life on Earth. For now, the focus is on creatures that humans once shared the planet with – and which we helped to drive out of existence.

Most de-extinction projects are viable because researchers have either living cells or the entire genome from the lost species, and a close living relative that can be both genetic template and surrogate mother for the "resurrected" animal. In the case of dinosaurs, these may be insurmountable hurdles.

The work by Schweitzer, Bailleul and others challenges the textbook explanation of fossilisation as the wholesale replacement of tissue with rock: life turned literally to stone. They see a more complex process at work, with the fossilisation process occasionally preserving the molecules of life, for perhaps tens of millions of years.

But even if soft tissue can survive in fossils, that may not be true for dinosaur DNA. Genetic material starts to break down soon after death, so anything preserved could be highly fragmented. The oldest DNA yet recovered is from the tooth of a million-year-old mammoth preserved in the eastern Siberian permafrost. Older DNA may well be found, but will scientists be able to read the code and understand how it shaped the prehistoric creatures?

Other hurdles abound, Schweitzer says. Armed with the entire genome of Tyrannosaurus rex, researchers would have no idea how the genes were ordered on how many chromosomes. Solve that puzzle, somehow, and you still have to find a close living relative that can be gene-edited to carry the dinosaur genes. While birds are distant relatives of dinosaurs, an ostrich might struggle to carry a T rex to term. "You end up just going down the list," says Schweitzer. "If we can solve this, then there's this, and if we can solve this, then there's this. I don't think technology can overcome it, at least not in the foreseeable future."

By tinkering with bird genomes, researchers have recreated dinosaur-like teeth, tails and even hands

But what if life can find a way? An approach championed by Schweitzer's former supervisor, Jack Horner, is to take a living relative of the dinosaur – the chicken – and rewrite its genome to make birds with dinosaur-like features. By tinkering with bird genomes, researchers have recreated dinosaur-like teeth, tails and even hands, similar to those on the velociraptor. Keep going, says Horner, and you end up with a "chickenosaurus".

Technology cannot solve everything, though. A sustainable population, with healthy genetic variation, might call for 500 or so animals. "Where are we going to put them? And which modern species are you going to drive to extinction so that dinosaurs have a place again on this planet?" says Schweitzer. "We might be able to put one in a zoo for people to spend zillions of dollars to come and look at, but is that fair to the animal?"

Instead of trying to recreate the beasts, Schweitzer simply wants to understand them better. Organic molecules locked up in fossils could shed light on the endless mysteries that surround the dinosaurs. Did they produce enzymes to get more nutrition from plants? How did they cope with carbon dioxide levels more than twice as high as today? And how did they maintain their often enormous body sizes?

"I don't think it's unreasonable to suggest that as technology and our understanding of degradation catches up, we may get informative DNA," she says. "Think of the questions we can answer if we do – that's what I find exciting.

> "I don't hold my breath that we'll ever see a dinosaur walking around. I'm not going to rule it out - a scientist should never say never - but I think it's human hubris to bring back a dinosaur just so we can say.

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GENETICALLY MODIFIED FOODS: SAFETY, RISKS AND PUBLIC

Genetic modification alters organisms through recombinant DNA technology, resulting in GM or transgenic organisms. Transgenic crops like herbicide and insecticide resistant soybeans, corn, cotton, and canola are commercially grown, along with virus-resistant sweet potatoes, nutrient-enhanced rice, and weather-tolerant plants. GM technologies offer promises for global challenges but also pose risks related to safety, labeling, ethics, food security, and environmental conservation. This review will address concerns about the risks and benefits of GM foods and recombinant technology, including impacts on the environment, consumer health concerns, and associated safety, environmental, and ecological risks.

Measuring the presence of genetically modified organisms (GMOs) in food products. The routine testing of GMOs in food and feed involves molecular techniques like DNA microarrays or qPCR, which screen for specific genetic elements or event-specific markers. Controls are used to avoid false positive or false negative results. PCR detection systems, such as the 35S-PCR technique, permit detection of GMO contents in foods and raw materials. Quantitative detection systems like QC-PCR and real-time PCR offer advantages in DNA survival during processing, but may be affected by food processing techniques and require normalization using plant-specific QC-PCR system.

Advantages and disadvantages of genetically modified (GM) foods. The use of genetically modified (GM) foods, which involve inserting genes from other species into the DNA of plants or animals, has both advantages and disadvantages. GM foods have the potential to alleviate diseases, increase productivity, and provide food in areas with unfavorable climatic conditions. They may also be more nutrientrich, have a longer shelf life, and taste better. However, there are concerns about the unknown long-term health effects, potential harm to the environment and other organisms, lack of transparency in labeling, cultural and religious objections, and potential dependence of developing countries on industrial countries for food production [1, p.1].

Studies on the potential for allergenicity. The allergenicity of genetically modified (GM) foods can be established through in vitro tests using sera from individuals sensitized to the original crop, as demonstrated in studies on GM soybeans and potatoes expressing allergenic proteins. However, indirect approaches based on factors such as protein size and stability are less reliable. Concerns about allergenicity in GM foods include the transfer of known allergens from one crop to another, and the creation of neo-allergens through de novo sensitization. Risk assessment can be improved by conducting IgE-binding studies

and considering physico-chemical characteristics of proteins and known allergen databases. Evidence for the allergic potential of GM food production methods is lacking compared to established methodologies in the food industry [2, p.1].

Public concerns-global scenario. The controversy surrounding genetically modified organisms (GMOs) and their industrial applications in food production and marketing has been a major public concern since the late 1980s. Despite the harmonization of regulations by the European Commission in the 1990s, concerns from the community about GMOs, including their authorization, labelling, and use in human consumption, have persisted. The implementation of the first European directive initially seemed to settle conflicts, but the arrival of GM soybeans in Europe in 1996 triggered a second controversy. This, along with other events related to GM commodities, animal and human cloning, led to increased public attention and the formation of non-governmental organizations. Research has focused on assessing public attitudes towards GM foods as a technology, including ethical concerns about tampering with nature and unpredictable unintended effects [3].

Genetic modification (GM) technologies offer promises for addressing global challenges in agriculture, such as improving crop productivity, increasing nutrient content, and developing weather-tolerant plants. However, GM foods and recombinant technology also pose risks related to safety, labeling, ethics, food security, and environmental conservation. Concerns about the presence of genetically modified organisms (GMOs) in food products can be addressed through molecular techniques like DNA microarrays or qPCR, although challenges remain in standardizing and normalizing these methods. The advantages of GM foods include potential benefits in disease alleviation, productivity improvement, and food availability in adverse climatic conditions. The potential allergenicity of GM foods requires further research and risk assessment to ensure safety. Public concerns about GMOs have persisted, leading to increased attention and formation of non-governmental organizations. Understanding and addressing these concerns are crucial for responsible and sustainable use of GM technologies in agriculture.

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THE IMPORTANCE OF TRANSPORT IN AGRICULTURE

Transportation plays a huge role in agriculture. Its main role is to deliver agricultural products from farms to store shelves around the world. The economy and well-being of a country depend on it.

Transportation costs make up a significant part of the total cost of agricultural production. These costs in the cost of agricultural products range from 15 to 40%, and labor costs – from 30 to 70%, depending on the natural production conditions and the type of cultivated crop. At the same time, 20-25% of agricultural workers are engaged in transportation work.

The main mode of transportation in agriculture is road transport, which accounts for up to 80% of all shipments. Tractor transport in agriculture accounts for no more than 20-27% of the transportation volume[1].

Transportation of any agricultural goods, both conventional and mechanized, requires transport. In many parts of the world, farmers and producers live far from where their products are sold. This means that a large amount of inventory needs to be delivered to collection points, stored, or simply sold for sale. Road transport makes it possible to connect the open countryside where farming takes place to industrial areas where processing takes place, and , finally, to consumers and business people in cities.

Transportation allows farmers to invest more, increase production and reach international markets. Without transportation, business cannot grow because something has to be transported, shipped or delivered to eventually get to the consumer. In addition, large volumes can be wasted because the lack of efficient transportation leads to a deterioration in quality. In fact, the reputation of a farmer and his business largely depends on transportation[2].

Both product quality and transportation quality are crucial for customer satisfaction. It is important to note that agricultural products are different from industrial products. Most agricultural products are consumer goods, as well as bulky and perishable. Packaging and transportation must prevent damage to the products during transportation. Harvesting, threshing, shucking, packing, processing, and storage are all stages of the harvesting process. They have different qualities, which makes the quality of transportation as important as the availability of transportation.

Some products may be cheaper to produce, but they need to be transported from the neighborhood or from another country to make the product cost in stores. Low transportation costs help farmers make a profit and make it more affordable for consumers. It doesn't matter if the harvest is bountiful, the farmer may worry that the products cannot be shipped abroad or delivered to customers elsewhere. The goods must be delivered to the customer at the right time and at a reasonable price[3].

Thus, transportation plays an important role in the development of agriculture. Unlike other branches of material production, transport does not create new consumption products, but participates in the creation of the value of the transported product, adding to it the costs of its transportation.

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THE ROLE OF BIOTECHNOLOGY IN MEDICINE

Medical biotechnology is a branch of medicine that uses living cells and cell materials to research and then produce pharmaceutical and diagnosing products. These products help treat and prevent diseases. From the Ebola vaccine to mapping human DNA to agricultural impacts, medical biotechnology is making huge advancements and helping millions of people.

Some of the most recent uses of biological tech are work in genetic testing, drug treatments, and artificial tissue growth. With the much advancement in medical biotechnology, there are new concerns that arise. From funding to ethics, there are many things to determine and regulate when it comes to this fast-paced industry. Learn about the many technical biology advancements and the concerns surrounding them [1].

It is easy to see how biotechnology can be used for medicinal purposes. Knowledge of the genetic makeup of our species, the genetic basis of heritable diseases, and the invention of technology to manipulate and fix mutant genes provides methods to treat the disease.

Pharmacogenomics is the study of how the genetic inheritance of an individual affects his/her body's response to drugs. It is a coined word derived from the

words "pharmacology" and "genomics". It is, therefore, the study of the relationship between pharmaceuticals and genetics. The vision of pharmacogenomics is to be able to design and produce drugs that are adapted to each person's genetic makeup. Pharmacogenomics results in the following benefits:

1. Development of tailor-made medicines. Using pharmacogenomics, pharmaceutical companies can create drugs based on the proteins, enzymes, and RNA molecules that are associated with specific genes and diseases. These tailor-made drugs promise not only to maximize therapeutic effects, but also to decrease damage to nearby healthy cells.

2. More accurate methods of determining appropriate drug dosages. Knowing a patient's genetics will enable doctors to determine how well the patient's body can process and metabolize a medicine. This will maximize the value of the medicine and decrease the likelihood of overdose.

3. Improvements in the drug discovery and approval process. The discovery of potential therapies will be made easier using genome targets. Genes have been associated with numerous diseases and disorders. With modern biotechnology, these genes can be used as targets for the development of effective new therapies, which could significantly shorten the drug discovery process.

4. Better vaccines. Safer vaccines can be designed and produced by organisms transformed by means of genetic engineering. These vaccines will elicit the immune response without the attendant risks of infection. They will be inexpensive, stable, easy to store, and capable of being engineered to carry several strains of pathogen at once.

Modern biotechnology can be used to manufacture existing drugs more easily and cheaply. The first genetically-engineered products were medicines designed to combat human diseases. In 1978, Genentech joined a gene for insulin with a plasmid vector and put the resulting gene into a bacterium called Escherichia coli. Insulin, widely used for the treatment of diabetes, was previously extracted from sheep and pigs. It was very expensive and often elicited unwanted allergic responses. The resulting genetically-engineered bacterium enabled the production of vast quantities of human insulin at low cost. Since then, modern biotechnology has made it possible to produce more easily and cheaply the human growth hormone, clotting factors for hemophiliacs, fertility drugs, erythropoietin, and other drugs. Genomic knowledge of the genes involved in diseases, disease pathways, and drug-response sites are expected to lead to the discovery of thousands more new targets [2].

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Errungenschaften der Energiewirtschaft und Zukunftsaussichten in der Ukraine

Das 21 Jahrhundert schreitet schnell voran, aber rund 80 % der weltweit für Heizung, Strom und Verkehr verbrauchten Energie stammen immer noch aus nicht erneuerbaren fossilen Ressourcen. Sie kennen sie sehr gut – sie sind Kohle, Öl und Gas. Dieselben Trios sind die Hauptverantwortlichen für den Treibhauseffekt, da Kohlendioxid entsteht, wenn sie verbrannt werden.

Es gibt Länder auf der Welt, die erneuerbare Energiequellen maximal nutzen, einfach weil sie am günstigsten sind. Island liegt zum Beispiel auf heißen unterirdischen Geysiren. Auf den größten von ihnen werden Dampfkraftwerke errichtet, und überschüssiges heißes Wasser wird in Rohre unter den Straßen gepumpt und so im Winter erwärmt. Fast 80 % der Energiebilanz Norwegens besteht aus Wasserkraft. Es gibt viele Gebirgsflüsse im Land. Und die Technologien der Wassernutzung sind der Menschheit seit mehreren tausend Jahren bekannt.

Die langfristige Prognose des menschlichen Energieverbrauchs ist eine unglaublich schwierige Aufgabe. Hier gilt es, eine Balance zu finden zwischen aktuellen Trends in der Ressourcennutzung, Perspektiven der wirtschaftlichen Entwicklung, verfügbaren und erwarteten Technologien – und einem Anteil Science-Fiction.

Laut Prognosen von Experten werden Wind- und Sonnenenergie im Jahr 2050 zusammen 56 % des "grünen" Stroms weltweit liefern. Gleichzeitig werden Atomkraft, Wasserkraft und andere kohlenstoffarme Technologien weitere 20 % des Stroms liefern. Daher wird der Gesamtanteil kohlenstoffarmer Technologien an der globalen Stromerzeugung bis 2050 76 % erreichen. Doch schon 2031 werden Sonne und Wind zusammen weltweit mehr Strom erzeugen als Kohlekraftwerke. Die aktive Verbilligung von Solar- und Windenergie sowie Energiespeichern wird in den nächsten 30 Jahren zu einer Verzehnfachung der erneuerbaren Energiequellen in der globalen Energiebilanz führen. Der Anteil der fossilen Brennstoffe an der globalen Energiebilanz wird im gleichen Zeitraum auf 24 % sinken, verglichen mit heute 61 %.

Die "grüne" Energiewende vollzieht sich in Europa schneller, wo bis 2050 der Anteil von Wind- und Solarenergie an der gesamten Stromerzeugung 74 % betragen wird und ein Energiemarkt wie beispielsweise Deutschland diese Gesamtzahl und Reichweite übertreffen wird 80 % der Wind- und Sonnenenergie in der nationalen Energiebilanz.

Grüne Energie kann nicht von ökologischer Kultur getrennt werden. Auch Solar- und Windkraftanlagen in Haushalten – in der Ukraine gibt es bereits Zehntausende – sind ein Indikator dafür, dass sich das Bewusstsein der Ukrainer verändert und in den allgemeinen Trend zu "sauberer" Energie einfließt.

Im Allgemeinen ändern sich Technologien buchstäblich jeden Monat, einige Neuheiten erscheinen, die diese Entwicklungen verbessern. Je mehr Unternehmen in der Ukraine mit kreativer, innovativer Energie bereit sind, in die Produktion und damit im Land zu investieren, desto schneller wird die Zukunft kommen.

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THE PROSPECTS FOR THE DEVELOPMENT OF HUMANITARIAN SCIENCES

Humanitarian sciences are essential for addressing many of the world's most pressing issues, such as poverty, inequality, environmental sustainability, and social justice. By studying the social, cultural, and historical context of these issues, researchers in humanitarian sciences can provide critical insights and perspectives that inform policy decisions and contribute to building a more equitable society. Nevertheless, for a general understanding of the phenomenon of humanities, it is also important to discuss the prospects for the development of humanitarian sciences as an important element of human activity.

The prospects for the development of humanitarian sciences are quite varied because of diversity of aspects and factors that determine research for various humanities. However, we will describe only a few of them. Here are some crucial potential areas of growth:

1. Advancements in technology: As technology continues to evolve, there is a growing need for experts in the humanities to understand how these innovations affect society. Humanitarian sciences can play a critical role in addressing ethical, social, and cultural issues related to emerging technologies such as artificial intelligence, automation, and biotechnology.

2. Globalization and multiculturalism: As the world becomes more interconnected, the need for cross-cultural understanding and communication skills is becoming increasingly important. Humanitarian sciences can help individuals and organizations navigate cultural differences and create more inclusive and equitable environments.

3. Environmental sustainability: The growing recognition of the impact of human activity on the environment has created a need for experts in the humanities to explore sustainable solutions to complex environmental issues. Humanitarian sciences can help develop ethical frameworks for managing natural resources and addressing climate change.

4. Social justice: The ongoing struggle for social justice has created a growing demand for experts in the humanities to address issues related to race, gender, and other forms of inequality. Humanitarian sciences can play a critical role in advancing social justice by providing insight into the complex historical, cultural, and political factors that contribute to systemic injustice.

In summary, humanitarian sciences are important for understanding human behavior, encouraging critical thinking, promoting cultural understanding, advancing social justice, and contributing to innovation. These fields are essential for building a better world and addressing some of the most pressing challenges facing humanity. The prospects for the development of humanitarian sciences are promising as they continue to play a vital role in shaping society and addressing some of the most pressing issues facing worldwide community.

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GENETIC MODIFICATION AND BIOTECHNOLOGY

Today I want to tell you about biotechnology and its connection with genetic modification. To my mind, this breach can be useful and popular in the future, because we would be able to grow whatever we need for our purposes. Genetic modification allows people make products with any characteristics, grow new species of animals and plants, treat hard diseases and etc.

PCR is a technique used in a lab to replicate small samples of DNA in a small period of time. Each reaction cycle doubles the amount of DNA. Gel electrophoresis is a technique used to separate proteins or fragments of DNA. The phosphate group in DNA's backbone causes it to be negatively charged. Genetic modification is the process of changing an organism's genome by transferring genes from one species to another. The process of gene transfer can be summarized in four key steps:

- 1. Gene isolation;
- 2. Digestion;
- 3. Insertion;
- 4. Expression.

John Gurden developed the method called somatic cell nuclear transfer. – [1, p1]. Information is encoded in the structure of the molecule. DNA – a complex molecule that guides the growth, development, function and reproduction of everything alive. In the 1960 scientists bombarded plants with radiation to cause random mutations in the genetic code. In the 70's scientists inserted DNA snippets into bacteria, plants and animals. The earliest genetically modified animal was born at 1974. The first food modified in the lab went on sale in 1994. In the 1990 's, were also a brief foray into human engineering. In 2015 scientists used CRISPR to cut the HIV virus out of living cells. In 201 and 2016, Chinese scientists experimented on human embryos and were partially successful on their second attempt [2, p1].

Addend has sent 60,000 CRISPR-related molecular tools — about 17% of its total shipments — to researchers in 83 countries, and the company's CRISPR-related pages were viewed more than one million times in 2015. What CRISPR offers, and biologist's desire, is specificity: the ability to target and study particular DNA sequences in the vast expanse of a genome. There are two chief ingredients in the CRISPR–Cas9 system: a Cas9 enzyme that snips through DNA like a pair of molecular scissors, and a small RNA molecule that directs the scissors to a specific sequence of DNA to make the cut. The epigenome is the constellation of chemical compounds tacked onto DNA and the DNA-packaging proteins called histones. In the past few years, millions of dollars have been

poured into cataloguing these epigenetic marks in different human cells, and their patterns have been correlated with everything from brain activity to tumors growth [3, p1].

To summarize, we have the newest method for arranging our lives. Genetic engineering has wide field of use, but despite all opportunities and advantages it is also a great risk. As well as option to treat deadly diseases, discovering more terrifying sicknesses could happen. Also, this branch raises lots of ethical issues. So it would be a nice question: what is the price of our ambitions?

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APPLICATION OF DRONES FOR FORESTRY

Drone technology is always advancing and is increasingly being utilised in public services, one area where drones are slowly being adopted into the workflow is in forestry management. They are ultra-portable and lightweight and provide many benefits such as the ability to cover large areas quickly and capture highresolution images and videos that can be used for forestry management. Drones can be used for a variety of tasks in forestry management, including mapping and surveying, monitoring forest health, helping against forest fires and for surveillance purposes to prevent illegal logging and other criminal activities. They can also be used to observe and track wildlife, and to assist in search and rescue operations. The use of drones in forestry management is in its infancy, but the results are promising, and the applications will only grow as the technology gets more advanced and accessible. In this article, we shall explore the use and benefits of drones in forestry and the type of drones that are best suited for these applications.

There are a variety of benefits that can be realized by using drone technology for forestry management. Some of the main ones include:

Faster Data Acquisition & Reduced Costs

Drones are small, lightweight and ultra-portable, this gives them a distinct advantage over traditional methods of gathering aerial data.

They can be easily deployed and acquire data much faster than something like a manned aircraft or satellites without compromising on data accuracy.

Drones can help reduce the time and costs associated with conducting forestry surveys and managing forest resources. They can also help identify areas that need attention, and they can provide real-time information about the health of trees and any other vegetation.

Identifying any health-related issues early on will provide forestry professionals more time to plan a course of action and remedy the situation.

Whether it's finding pest-related disease, identifying soil contamination, tracking a wildfire or surveillance of any illegal activity, many drones come with multispectral or thermal imaging cameras that will allow easier identification of these issues without the related costs of hiring a manned aircraft.

Enhanced Safety

Forests can be difficult to navigate on foot, the terrain is uneven and can be dangerous and in the event of something like a forest fire or some other disaster, it's even more dangerous to investigate and collect data on the ground.

Drones provide a much safer way to collect aerial data, fly surveillance missions and carry out search and rescue operations in forests and wooded areas.

As drones are easy to fly and ultra-portable, they can be deployed very quickly and missions can be carried out on a more regular basis without putting personnel at risk.

Greater flexibility

Drones offer greater flexibility when it comes to scheduling activities, as well as the ability to move around freely within a given area. This makes them easier to use than traditional vehicles for managing forest resources on a day-to-day basis.

Reduced Use Of Fossil Fuels

Another benefit of using drones is their zero use of fossil fuels, this not only helps with fighting climate change but also reduces the need for small, manned aircraft which are very expensive to operate and use a lot of fossil fuel.

The most popular types of drones used for forestry management are multicopter drones, although fixed-wing drones are the better option for surveying and mapping large forest areas.

Both multi-copter and fixed-wing drones have their pros and cons, multi-copter drones are far more flexible and easier to operate, there are also a lot more multi-copter drones to choose from and they are usually cheaper than fixed-wing drones.

One of the main advantages of multi-copter drones is their flexibility, they take off and land vertically which eliminates the need for a large area to start drone missions and they can also hover with little drift which provides lots of advantages such as inspecting a particular area or tree or to deliver some vital supplies for people who are lost or stuck.

Another advantage of multi-copter drones is that they are easy to operate and even beginners who have no experience with flying drones can get a handle on them very quickly. This will reduce the need for extensive training for forestry professionals which will help with saving costs and speed up the process of introducing drones into the workflow

Drones provide a new, safer and more efficient way to collect data about forests. Their ultra-portable and easy-to-deploy design provide a huge advantage over ground-based data collection methods.

Faster data acquisition leads to identifying issues early that will allow forestry professionals to put a plan of action in place and remedy the issue as fast as possible.

However, drones are not being used just to monitor the health of forest trees, they are also being used for inventory count, identifying invasive species, monitoring illegal active.

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CREATION OF PEST GENOME DATABASES FOR THE DEVELOPMENT OF NEW SOLUTIONS IN PLANT PROTECTION

Despite the development of modern agriculture, insect pests continue to be one of the most significant threats farmers have to face. After all, they exist in a wide range of species, have significant biological features, high fecundity and reproduction rate, so finding an effective tool to combat them is very difficult. [1]

An intriguing solution to this problem was suggested by scientists from Rothamsted Research: they created a new database of 19 genomes of some of the most threatened pests of crops to develop safer solutions for nature and humans to control pests. After all, for effective pest control, it is necessary to understand the very mode of action and the selectivity of insects.

After all, for effective pest control, it is necessary to consider the mode of action and selectivity of insecticides, the life cycles of insects, their biology and behavior, and this can be useful thanks to high-quality genomic data that will greatly facilitate the work.

The database contains genomes of the following pests: striped nutcracker (Agriotes lineatus), melon aphid (Aphis gossypii), tobacco whitefly (Bemisia tabaci), rapeseed tsvetoed (Brassicogethes aeneus), seed hidden proboscis (Ceutorhynchus obstrictus), striped rice moth (Chilo suppressalis), soybean scoop (Chrysodeixis includeens), cucumber beetle (Diabrotica balteata), sugar cane moth (Diatraea saccharalis), green fetid bug or nezara green (Nezara viridula), brown cicada (Nilaparvata lugens), cabbage leaf beetle (Phaedon cochleariae), striped flea (Phyllotreta striolata), cabbage flea (Psylliodes chrysocephala), tomato scoop (Spodoptera exigua), Asian cotton scoop (Spodoptera littoralis), western corn rootworm (Diabrotica virgifera), tropical brown bug (Euschistus heros) and cruciferous flea (Phyllotreta cruciferae). [2]

Such a database will help in the elaboration of pesticides that are less likely to cause resistance in target species, which is a serious problem for farmers and often causes excessive pesticide use. Understanding the mechanism of action of a particular class of drugs will help agronomists to avoid mistakes in building a protection system, make it more effective and prevent the emergence of such a phenomenon as resistance. Because by having these high-quality genomes, researchers will be able comprehend how pesticide resistance develops. [2,3]

The database will also be useful for the creation and development of nonchemical pest control methods, such as manipulating insect behavior, focusing on genes that control how insects find mates, and host plants that divert them away from crops. [2]

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INTERCULTURAL COMMUNICATION OF OUR MODERN TIME

Today's global socio-political changes have aroused considerable interest in the peculiarities of the development of modern intercultural communications around the world. Intercultural communication is a connection between representatives of different cultures of the peoples of the world, which involves both direct contacts between people and their communities and indirect forms of communication.[2, p.35]

Intercultural relations are mainly based on the exchange of values, information and experiences that create a connection between different cultures in order to deepen mutual understanding and minimise various disputes that have led or potentially could lead to unfortunate consequences.

For example, members of the European Union show a deep-rooted distrust of foreigners, which in some European areas (the Balkans) turns into hatred .[1, p.40]

In accordance with this, a good example is the North American society, which was formed due to mass immigration and can be considered a completely intercultural society. In order to start communicating in certain socio-cultural centers, it is necessary to understand the relationship between the communicative activities of various subjects and their value structures, since this understanding helps to eliminate misunderstandings between different views on a particular situation. Respect for values is expressed not only in legal and ethical standards, but also in their establishment and interpretation. The factors of globalization that have influenced our society over the last twenty years are becoming more dynamic.

Modern society is constantly interacting with communication systems that support consumption, exerting pressure on the entire population using methods that generate fear in individuals and society as a whole.

Contemporary intercultural society is strongly influenced by the so-called "consumption" of American culture, which leads to its unjustified overuse. [3, p.20] Therefore, the key task is to fairly and factually classify the conditions under which relations with foreign cultures are formed in order to preserve their unique identity.

In general, modern intercultural communication provides interaction between cultures, which is becoming increasingly important as the world becomes smaller. Smaller does not mean that the world is becoming identical, it means more and more contacts with people who are culturally different from each other.

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BIOTECHNOLOGY IN MODERN WORLD

Modern biotechnology refers to the use of living organisms, cells, and biological processes to develop new products and technologies that can be used in various industries. Some examples of modern biotechnology include:

Genetic engineering: This technique involves changing the genetic material of an organism to introduce new traits or characteristics. This can be done by inserting or deleting specific genes, modifying existing genes, or combining genes from different organisms. Genetic engineering is used in a variety of applications, including developing crops that are resistant to pests or drought, producing medicines and vaccines, and creating biofuels. Despite its many benefits, genetic engineering is also a controversial topic due to concerns about the safety and ethics of modifying the genetic makeup of organisms. However, with proper regulation and oversight, genetic engineering has the potential to continue to advance many fields and provide new solutions to some of society's biggest challenges.

Biopharmaceuticals: Biopharmaceuticals are drugs that are produced using biological systems, such as cells or microorganisms. This allows for the creation of highly specific and targeted therapies for a wide range of diseases, including cancer, autoimmune disorders, and rare genetic diseases. Biopharmaceuticals are often more expensive to produce than traditional chemical-based drugs, but they offer significant benefits in terms of efficacy and safety.

Industrial biotechnology: This field focuses on using living organisms to create materials, chemicals, and fuels that are more sustainable and environmentally friendly than traditional industrial processes. For example, bioplastics are made from renewable resources such as corn or sugarcane and are biodegradable or compostable, while biofuels are made from plant-based materials like algae. Biofuels are renewable and have the potential to reduce greenhouse gas emissions and dependence on fossil fuels. Industrial

biotechnology has the potential to transform many industries and provide sustainable solutions to some of the world's biggest challenges, such as climate change and food security. However, it is important to carefully consider the potential risks and benefits of new biotechnologies and ensure they are properly regulated to ensure safety and ethical considerations are taken into account.

Synthetic biology: This field involves designing and constructing new biological systems or modifying existing ones to create new functions or properties. For example, researchers have used synthetic biology to create bacteria that can detect and remove pollutants from the environment or to create new treatments for diseases. Synthetic biology is an interdisciplinary field that draws on principles from biology, engineering, and computer science.

Synthetic biology is about making new things and rethinking the way we engineer living things. The ultimate goal of synthetic biology is to make all the information in DNA-encoded genetic circuits available to scientists, allowing us to reprogram cells to do what we want them to do, and technologies such as quantum computing or AI will play an essential role in achieving its potential.

Quantum computing, for example, has the potential significantly to accelerate certain computationally intensive tasks such as protein folding and drug discovery. By leveraging the unique properties of quantum computing, such as quantum parallelism and entanglement, scientists can perform complex calculations more efficiently, which could lead to new insights and breakthroughs in the field of synthetic biology.

Environmental biotechnology: This field uses living organisms and biological processes to protect and restore the environment. Examples include bioremediation, which involves using microorganisms to break down pollutants in soil and water, and bioaugmentation, which involves introducing microorganisms to contaminated sites to enhance their natural biodegradation processes. Environmental biotechnology has the potential to provide sustainable solutions to some of the world's most pressing environmental challenges, such as climate change and pollution.

In fine, modern biotechnology is a rapidly advancing field that has the potential to create new products and technologies that can benefit society and the environment. As this technology continues to evolve and improve, we can expect to see even more innovative applications and benefits in the years to come.

PLANT GENETIC TRANSFORMATION

Plants use solar energy, creating organic substances in the process of photosynthesis. These organic substances are fundamental to the life of other living things. Genetic transformation of plants is the process of making changes to the genetic information of plants. This, in turn, leads to a change in their physiological and morphological properties. This process can be used to improve yields, increase resistance to pests and diseases, and create new varieties of plants with better characteristics.

Plant genetic transformation (PGT) is a process where DNA is introduced into plant cells, tissues, or organs using molecular and cellular biology methods. Through plant genetic transformation, we can discover a gene and its function, understand traits of interest and favor breeding programs by producing novel and genetically diverse plant materials. In a plant transformation protocol, step-bystep wet lab activities are performed to introduce the foreign DNA (exogenous DNA) and evaluate its insertion. Thus, PGT comprises: delivery of the DNA into a single cell and regeneration into entire fertile plants. [1, p.1]

However, researchers are not always interested in developing a whole genetically transformed plant (stable transformation), instead, they may want to quickly test the expression of a foreign gene in the plant tissue (transient transformation). Furthermore, how you transfer foreign DNA into plant cells can be divided into: protoplast-mediated, biolistic-mediated, and Agrobacterium-mediated techniques. Depending on their goal, researchers may want to develop a stable genetically transformed plant variety to massively produce new plant materials with desirable traits for agriculture, like disease resistance. With stable transformation, the foreign DNA is fully integrated into the host genome and expressed in later generations of the plant. This type of plant transformation is used for longer-term research. For instance, a stable transformation project can take months, even years, to be thoroughly developed. [2, p.4]

In other cases, researchers are more interested in understanding a gene or protein function. In this case, developing a whole genetically transformed plant is not necessary. Instead, a tissue portion (e.g. detached leaf) would be enough to evaluate the expression of a foreign gene.

Transient transformation allows temporary introduction or silencing of genes to determine their expression. Therefore, the foreign DNA is not integrated into the host cell. A transient method can also be used for gene silencing by expressing small interfering RNAs (siRNAs) and microRNAs (miRNAs) in plant tissues. In this case, a transient transformation can take days or weeks. After innoculation with the agrobacterium, the plant tissue is cultured on media which contains antibiotics to kill the agrobacterium, as well as selective factors. The selective factor is commonly an antibiotic which would normally kill the plant cells. When the gene of interest is added to agrobacterium we add a selective marker – for example an antibiotic resistance gene. This means that only cells in which the foreign DNA has been successfully integrated into their own DNA, will be able to survive in media with the antibiotic. [3, p.6]

As mentioned above, agrobacterium is added to wounded plant tissue explants. A plant explant can be taken from many different parts of a plant: shoots, leaves, stems, roots ect. The type of explant you need for plant transformation differs from plant to plant.

As the explant is cultured, different plant hormones are added to the tissue media to induce plant regeneration. This induces the formation of a Callus which is a mass of unorganised plant cells. After formation of a callus, the calli are moved media containing hormones to induce shoot growth, and then to shoot-root inducing media. Once shoots and roots have grown sufficiently the seedling can be moved into soil. After the plant has successfully grown on soil, the plant will be analysed to confirm successful integration of desired DNA, and that it is functioning correctly. [4, p.1]

Plant genetic transformation is the process of introducing DNA utilizing molecular and cellular biology techniques into plant cells, tissues, or organs. The bacterial pathogen Agrobacterium tumefaciens is a vital component in plant genetic transformation, because it may transfer important genes into a host plant. Summarizing, we can say that the genetic transformation of plants is very important for mankind. It is a tool for improving agriculture and creating new varieties of plants with better properties. It can help increase yields, reduce the use of chemical pesticides and other plant protection products, and make plants more resistant to stresses such as drought.

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INFLUENCE OF THE ORGANIZATIONAL CULTURE

The importance of organisational culture is growing in the context of the transition from industrial to post-industrial and information society. Organisational culture is a complex and multidimensional phenomenon that plays a key role in the economic activity of enterprises. There is a considerable amount of scientific research works devoted to the study of organisational culture of an enterprise, which examines the theoretical aspects of development and management processes.

Due to the constant development of the modern economy, companies must adapt and evolve to remain competitive, rethinking the functioning of various structures in the company and changing approaches to competing for customers. Organisational culture in the motor transport industry is becoming an important element for achieving success and creating a competitive advantage, contributing to a favourable working environment and achieving common goals.

The organisational culture of a motor transport enterprise has an impact on the following aspects of its operations:

- Efficiency of transport services: employees feel that their work is valuable and important to the company, and they begin to make more efforts to achieve high quality standards.

- Staff retention: creating a positive working atmosphere and good working conditions helps to retain qualified employees. This, in turn, helps to reduce the cost of replacing staff and ensure stable and continuous operation of the enterprise.

- Business development: organisational culture promotes business development, the creation of new initiatives and increased innovation. At the same time, employees feel supported and recognised for their work, and become more inclined to participate in various projects and initiatives.

- Reputation and customer relationships: A good organisational culture has a positive impact on reputation and customer relationships. If an enterprise has a good organisational culture, employees will be more attentive to the needs of customers and try to satisfy them. This can lead to increased demand for the company's services, positive feedback and recommendations.

- Employee relations: A strong organisational culture can have a positive impact on employee relations and the work environment. If employees feel that their work is important and valuable, they are more likely to cooperate and interact, which helps to create a team that works in the same direction.

Ukrainian scholars as O. V. Kovaleva, Such O. Y. Kolesnichenko, L. L. Leshchenko, O. O. Liubovchyk, A. G. Martynenko, L. I. Pryimachenko, I. V. Kharchenko and many others have studied the components of the organisational culture of an enterprise. However, there is no consensus among them on the definition of key elements of organisational culture. Thus, some scholars, such as O.V. Kovaleva [1, p. 392] and L. I. Pryimachenko [2, p. 61-62], include values, norms, rituals, symbols and communication processes as components of organisational culture. Researcher S. M. Hnatenko [3, p. 42-49] additionally singles out habits in these components. A. G. Martynenko [4, p. 51-58] also includes standards and social relations in the organisational culture. Another researcher, O.Y. Kolesnichenko [5, p. 63-70], believes that the components of organisational culture include values and norms, rituals and habits, stereotypes and means of communication. According to her research, organisational culture determines the efficiency of the enterprise and ensures the development of employees.

Based on what is common to many researchers, the main components can be defined as follows. Organisational culture includes the system of norms, habits and values that the staff adheres to at the enterprise; rituals and symbols; social structures embodied in the company; behavioural forms and communication processes that exist between employees and employers.

Thus, the paper analyses how Ukrainian researchers define the components of the organisational culture of an enterprise. On this basis, its main components are identified, namely, norms, habits and values, rituals and symbols, social structures, behavioural forms and communication processes, and its influence on the enterprise's performance is characterised.

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THE INNOVATION TECHNOLOGY IN AUTOMOBILE INDUSTRY

Since the introduction of automobiles to the mainstream markets of the world, technological innovations have always been a part of the industry. The automobile industry is witness to several incredible technological advances over the last century. Right from the arrival of engines that used fossil fuels to power transportation, the impact of technology in shaping the automobiles over the course has been enormous. Just like every other industry, the automobile industry is also rapidly advancing in contemporary times.

Most features of the modern automobile are almost unrecognisable from the original products other than they have four wheels and steering. The integration of technological advances makes cars safer, user-friendly and has introduced several features that improve their value and usefulness for automobile owners. Modern automobiles can offer much more than driving you from one point to another, just like modern cell phones are capable of performing more than just a call.

If you are thinking about investing in natural resources based on their demand by the global automotive industry, the world's largest user of commodity metals, you must always be aware that the industry does not easily share innovative technical information within itself, because individual manufacturers are keenly aware that technology can give competitive advantage through the substitution of a cheaper metal for a more expensive one or the reduction or elimination of a metal's usage by a manufacturer for either cost or environmental reasons.

Simple announcements that, for example, Ford will, or will not utilize, aluminum body panels can immediately affect global commodity prices way out of proportion to the actual demand for the commodity involved, because speculators prognosticate from such announcements an across the board change in an industrial process. Companies like Ford, therefore, fry to protect their long-term costs by discrete risk management, where there is a futures market, whenever possible, before they ever make such announcements [1].

This article is not about a metals usage in any particular types of vehicles. It is about the newest metal to be used in the 'process' of manufacturing automobiles and trucks for the main purpose of making the process more environmentally friendly then has been done previously, zirconium. This metal has not been used before on a car. A new use means, obviously, increased demand and a reasonable indication that there could be additional usage and demand if the use is successful and expands to other industries producing painted steel products. Zirconium is best known to the general public for the use in jewellery of its oxide compound, zirconia, which, as cubic zirconia, is used as a substitute for the appearance of diamond. This use requires only a very small amount of zirconium oxide and has very little influence on demand.

Zirconium was first identified in 1824 and does have many large scale industrial uses of long standing application mainly due to the corrosion resistance under extreme conditions and high temperature durability of its compounds and alloys. It also has a large mundane use that puts it in every home in America. A zirconium salt along with an aluminium salt is the basis of the active ingredient in nearly all underarm antiperspirants. This fact alone tells you that zirconium salts are of very low toxicity. Keep that in mind. Zirconium is produced and processed in the Republic of South Africa, Mozambique, the U.S., India and the Ukraine. It is nearly always produced as a by-product of titanium minerals. In recent years its supply and demand have just kept in balance, but with new uses this balance could be upset [2].

The corrosion protection by zirconium of other metals has been exhaustively studied. This article has already mentioned how it protects uranium. It also protects iron in the form of steel from corrosion, but this can be done with coatings of zirconium chemicals using only a small amount of zirconium per unit area of steel protected.

One of the key problems causing the decline of the American automotive industry is its lack of keeping up with innovation in the global car industry. This is due to the ostrich like reaction of American automotive engineering and research and development staff to the world around them. This was historically caused by the arrogance of the "not invented here" attitude.

In Japan, Toyota had already discussed these issues with its steel suppliers and scrap processors. Apparently a small amount of zirconium can have a large effect on the properties of steel, but the steel maker can take this into account as long as they know about it beforehand. The project is going ahead. Toyota, for reasons of competitive advantage, for itself and for its suppliers will not comment on the overall effect of the addition of measurable amounts of zirconium to its outgoing steel scrap stream.

All of the Japanese suppliers of Toyota who operate in the United States, not just Trutec, are already preparing for the change from zinc phosphate to zirconium salts pretreatment of the body-in-white at Toyota's North American plants. Toyota and Nihon Parkerizing have studied the overall effect of this change on their worldwide operations and have instructed their steel suppliers, their scrap processors, their paint suppliers and their environmental management suppliers to be ready to make the necessary changes in their operations.

In the meantime the Toyota Company in Japan in concert with the Japanese government have made preparations to add zirconium to the list of strategic metals to be stockpiled. The Korean carmakers have done the same also with their suppliers and their government [1].

So this article shows you great advantages of using zirconium in the world automobile industry and especially in some popular car companies.

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GENERAL BASICS OF THE THEORY AND TENDENCIES IN ANALYSIS OF THE SPEECH ACT OF REFUSAL IN UKRAINIAN LINGUISTICS OF THE LAST TWO DECADES

The basics of the theory of speech acts are the ideas set forth by the English logician J. L. Austin in the "Word as Action" course of lectures. American logician D. Searle became his follower. He set out his own vision in the "Speech Acts" monograph [1].

In the future, this topic was continued to be developed by the numerous analytical philosophers, logicians, pragmatists and linguists.

For its creators, this theory was, first of all, a step towards deepening ideas about the content and meaning of linguistic expressions. It has no clear boundaries, covers a range of issues concerning the subject and the object of communication in their interaction. That is, it is of essential importance for the study of speech pragmatics [5].

The object of research in the theory is the act of speech. When analyzing speech acts, researchers use statistical and dynamic approaches. The subject of speech acts is an abstract individual, as the bearer of a number of psychological and social characteristics.

The theory of speech acts is characterized by an approach to the act of speech as a way for a person to achieve a certain goal and the study of those linguistic means that are used at the same time.

J. L. Austin introduced the concept of a three-level system of the speech act. First, the speech act is locative in relation to the linguistic means used in the process. It is related to the needs of communication, is aimed at communication and is actually an act of speech. Secondly, it is illocutionary about the goal and a number of conditions for its implementation. Manifesting the goal under certain conditions, the speaker contributes to the implementation of one of the speech functions - prompting, questioning, evaluation, etc. Thirdly, the speech act acts as perlocutionary in relation to its own results. Although the perlocutionary act does not have a deep relationship with the content of the utterance, perlocution is that aspect of the speech act that rhetoric has long dealt with, it is the effect of speech on people's thoughts and feelings, and thereby indirectly influences activities, thoughts and behavior [3].

At the current stage, one can notice a certain outburst of interest among scientists in the problems of communication and the discursive behavior of its participants (I. Galaktionova, N. Arutyunova, R. Grootendorst, O. Romanov, A. Utsumi).

According to the functional approach to the description of linguistic phenomena, the attention of researchers is focused on the study of non-cooperative forms of communication (N. Danilova, K. Syedov), which also include discourses of refusal and implementation of linguistic interpretation of subjects of communicative interaction (V. Ilchenko, O. Kytytsia).

The relevance of the research topic is determined by the general focus of linguistics on the study of the functioning of language and speech, their social character, communicative behavior of speakers in dialogues. Dialogues with expressions of refusal belong to non-cooperative dialogues. Therefore, the analysis of the structure, semantics and pragmatics of the speech act of refusal in the Ukrainian, English and German languages is relevant.

The work of N. Maksyuk [2014] and N. Odarchuk [2003] in the Englishlanguage artistic discourse - were devoted to the study of expressions with the meaning of refusal in the Ukrainian artistic dialogic discourse. The utterances were the object of a study of discourses of non-destructive interaction on the material of the German language (I.M. Osovska [2003]). The strategic aspect of the communicative act of refusal on the material of English and French languages - in the study of M. A. Pashchenko [2012].

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GENETICALLY MODIFIED ORGANISMS AND THEIR IMPACT ON THE ENVIRONMENT AND HEALTH

Genetically modified organisms (GMOs) are organisms whose genetic material has been altered using genetic engineering techniques. The use of GMOs has been a topic of much debate, particularly with regard to their impact on the environment and human health. Here are some potential impacts of GMOs on the environment and health:

Environmental impacts:

1) Increased pesticide use: Many GMO crops are engineered to resist pests, which can lead to increased use of pesticides. This can result in the development of pesticide-resistant pests, as well as the potential for pesticides to enter the surrounding ecosystem.

2) Harm to non-target species: GMO crops may harm non-target species such as beneficial insects and pollinators, which can have a cascading effect on the ecosystem.

3) Gene transfer: Genes from GMO crops can potentially be transferred to wild relatives, creating new weed or pest problems.

4) Loss of biodiversity: The widespread adoption of GMO crops can lead to the loss of biodiversity, as fewer non-GMO crops are grown [3, p. 1].

Health impacts:

1) Allergic reactions: The introduction of new proteins into GMO crops can potentially cause allergic reactions in some people.

2) Antibiotic resistance: Some GMO crops have been engineered to be resistant to antibiotics, which can contribute to the development of antibiotic-resistant bacteria.

3) Unknown long-term health effects: Because GMOs are a relatively new technology, there is still much that is unknown about their long-term health effects [1, p. 5].

It is important to note that not all GMOs have the same impact on the environment and human health. Some GMOs may be developed with the goal of reducing pesticide use or increasing crop yields, while others may have unintended consequences. As such, it is important to carefully evaluate the potential risks and benefits of each individual GMO before they are approved for use.

Regulatory agencies around the world have established guidelines and regulations for the development, testing, and release of GMOs. These regulations

aim to ensure that GMOs are safe for the environment and human health, and that the potential risks and benefits are carefully evaluated before approval.

Additionally, there are ongoing debates and discussions about the use of GMOs in agriculture and food production. Supporters of GMOs argue that they can increase crop yields, reduce pesticide use, and help to address global food shortages. Opponents argue that the potential risks to the environment and human health outweigh the potential benefits, and that alternative methods such as organic farming should be used instead [2, p.1].

There are also ongoing efforts to develop new genetic engineering techniques, such as CRISPR, which could allow for more precise and targeted modifications to be made to plant and animal genomes. These techniques could potentially have fewer unintended consequences than older genetic engineering methods, and may be less controversial.

Overall, the use of GMOs remains a complex and controversial issue. It is important for scientists, policymakers, and the public to continue to evaluate the potential risks and benefits of GMOs, and to ensure that they are used in a responsible and sustainable manner.

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SAFETY OF ENZYME PREPARATIONS, FOOD ADDITIVES AND FLAVORS OBTAINED BY BIOTECHNOLOGY

At present time, enzyme preparations, food additives, flavorings are broadly used in the food industry. Enzyme preparations commonly used in baking, wine industry, brewing, in the production of alcohol, cheese, organic acids, tea, meat and fish products, amino acids, vitamins used as processing aids and food additives. Increased production of enzyme preparations is associated, primarily, with the possibility of using transgenic microorganisms, which can greatly improve their consumer characteristics. The food additives and flavorings (natural colours, flavor enhancers, vitamins, organic acids and amino acids, modified starches) could be obtained with the help of transgenic plants (GMO) and microorganisms (GMM) too. The basic requirements and guidelines of food safety obtained with help of GMOs (including GMMs) in legislative documents of the Eurasian Economic Union determined. These requirements mostly harmonized with the international demands. Furthermore, in Ukraine currently approved procedure for monitoring of food and enzymes obtained from/or with help of GMM and microorganisms having GMM's analogues. However, in the light of new scientific data on the possible negative impact on the human food produced with help of GMM, safety requirements to transgenic enzyme preparations, food additives and flavorings currently in need of improvement. These requirements should be updated with regard to: 1. In case of registration of food produced with help of GMM, into specification should been included data about safety assessment of the production strain, in particular, its pathogenic and toxigenic potential, availability of plasmids of antibiotic resistance, deciphering the molecular structure of inserted DNA from donor-strain, in compliance with criteria have established for food additives, flavorings and enzyme preparations quality and safety; Updating the list of enzyme and their producer strains acceptable for use in the food industry.

In 2012, methodological recommendations were approved that establish the procedure for assessing risks to public health when exposed to microbial factors, including genetically modified strains of microorganisms (GMM) contained in food products [3].

However, due to the high dynamics of the development of this branch of the food industry, with the emergence of new scientific data on the possible negative impact on the human body of food products obtained using GMMs, the safety requirements for enzyme preparations, food additives and flavors, manufactured using HMM, currently need to be improved.

It is known that the insertion of a foreign donor gene into the DNA of a recipient cell is associated with certain difficulties in ensuring targeted insertion of a gene or a group of genes and its expression; incorrect folding of the replicated protein and, consequently, a change in the structure of metabolites produced by these microorganisms; the presence of a genetic risk of obtaining mutants containing proteins that are toxic or allergenic to humans or other dangerous compounds; variability of plasmid copy number in bacterial cells; acquisition of GMM properties of pathogenicity, virulence, toxigenicity and antibiotic resistance; the negative effect of HMMs on the formation of intestinal microbiocenosis and the immune status of the organism.

Therefore, the real risk associated with the manifestation of a foreign gene in a recipient cell hypothetically always exists.

However, even in the case of the use of GMMs approved for use in the food industry, food products obtained using biotechnological methods may contain, due to insufficient purification, DNA fragments of these microorganisms and their toxins, other contaminants and impurities that may have a negative effect on -

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Meaning of Culture in Translation

Translation is not a matter of whole words only; it is a matter of making intelligible a whole culture – *Anthony Burgess*

Language and culture are closely related to each other. The term "culture" refers to three main categories of human activity: the "personal", whereby we as individuals think and function as such; the "collective", whereby we function in a social context; and the "expressive", whereby society expresses itself (Karamanian, 2002).

Language is part of people's culture and the most important instrument of communication between members of society. Language is the only social system without which other social systems cannot function. It, therefore, underpins three pillars on which the culture is built.

Translation, which involves translating ideas expressed in one language by one social group into the appropriate expression of another group involves processes of cultural decoding, recoding, and encoding.

There are many institutions and practices that exist in one culture and not in other. Deep-rooted taboos in one culture may be completely neutral in another. By the way, the interdependence of language and culture improves translation because it is a way of enriching meaning. The importance of moving from one culture to another while translating from one language to another is a must for all text translations. This requirement motivates and even delights translators who need to know how to manipulate the beautiful interrelationships between translation and culture. They scrutinize the cultural spheres of each culture to enrich the references and context of their translations, improving the quality and relevance of their translations (Translation and culture, a constructive interdependence, 2017).

Translators face alien cultures that demand that we never get our message across in alien ways. This culture expresses its idiosyncrasies in a culturebound way. Translation requires know-how and a culture of translation, i.e. cultural experience in the field. It's a purely technical job. Encyclopedic knowledge and curiosity about both the source and target languages are required.

Cultural translation is to translate while respecting and expressing cultural differences. This type of translation deals with topics such as dialects, food, and architecture. In fact, translation research is not only based on language issues but also on the cultural backgrounds of people.

Cultural words, proverbs and, of course, idioms whose origins and usage are closely related to their respective cultures. That's why we challenge ourselves to create cross-cultural translations. Its success depends on understanding the culture in which we work (Karamanian, 2002).

Translation is perhaps more than just a passage and a key to multicultural dialogue. Dialogue is the best guarantee of peace. Translators are peacemakers, bridges between cultures, peoples, and languages. They build bridges that protect and develop cultural diversity, emphasizing the importance of differentiation and "heterogeneity". Without translation, we would be stuck in a cramped world tainted by ignorance, misunderstanding, and even fear of "others".

In conclusion, process of transcoding is not only a linguistic transmission but a cultural implementation. As a result of the previous statement, translators must be bilingual and bicultural, if not multicultural. By exploring the relation between culture and translation, we should know the translation approaches of semantic equivalence and pragmatic equivalence when translating these words. Also we know that between different languages and different cultures, there exists in translation semantic correspondence and semantic zero. So we should try to make up semantic zero caused by culture when translating (Gou, 2012).

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ECOLOGY

Many sciences have both theoretical and practical values. But there is a science whose theoretical results make no sense without its practical usage. The best example of such sciences is ecology. This article is aimed at drawing public attention to the true destiny of ecology science.

Pessimism about the human condition in the 1980s stemmed from more than the problems of the present. It was derived as well from a fear about the future of the earth's human beings of the earth itself. "Ecology" is a very popular word today. But what does it mean? Ecology is a science that studies the relationships between all forms of life on our planet and the environment. This word came from the Greek word "oikos" which means "home". This idea of "home" includes our whole planet, all other living beings and even the atmosphere around our planet. The word ecology is often used to refer to human beings and their environment but it is much broader than that [2].

Ecologists think of humans as related to a vast chain of life that extends through mammals, amphibians, invertebrates and the simplest microorganisms, both plants and animals. In popular usage ecology may be synonymous with pollution problems. Again this is an oversimplification. The causes and prevention of pollution make up important elements in the study of ecology but they are not its whole subject. Equally important is the use of our environment in ways that will safeguard the heritage of fertile soil, pure air, fresh water and forests for those who come after us [3].

Does all the nature – population: humans, animals, birds, fish and insects live happy and healthy lives in our common "home" nowadays? Unfortunately not. Since ancient times nature has served man giving him everything he needs: air to

breathe, food to eat, water to drink, wood for buildings and fuel for heating his home. For thousands of years people lived in harmony with the environment and it seemed to them that the nature resouces had no end or limit. The 20th century is known to be the century of scientific and technological progress. The achievements of mankind in mechanization and automation of industrial processes, in chemical industry and conquering outer space, in the creation of atomic power stations and ships are amazing. With the industrial revolution our negative influence on Nature began to increase. This progress gave birth to a very serious problem: the poisoning of our planet, its land, its air and water. Large cities with thousands of steaming, polluting planets and factories can be found nowadays all over the world. The by-products of their activity affect all living beings. Much is spoken now about acid rain, global warming and ozone depletion caused by tons of harmful substances emitted by industrial enterprises [4].

Every year the atmosphere is polluted by about 1000 tons of industrial dust and other harmful substances. Big cities suffer from smog. Transportation is one of the main offenders in poisoning the environment. Cars with their engines have become the main source of pollution in industrial countries. Vast forests are cut down in Africa, South America and Asia for the needs of industries in Europe and the USA. The loss of the forests upsets the world's oxygen balance. As a result, some species of animals, birds, fish and plants have disappeared and continue disappearing. Many of them are on the brink of extinction, many have been written down into the "Red Book of Nature" [5].

People continue to kill animals to wear fur coats. Some of these animals, such as the fox are in danger of extinction. Every hour some kinds of animals and plants die. Rivers and lakes dry up. The pollution of the air and the world's oceans and the thinning of the ozone layer are other problems arising from man's careless attitude towards ecology. The protection of the environment is a universal concern. Active measures should be taken to create an international system of ecological security. Some progress has been made in this direction. 159 countries, all members of the United Nations Organization have set up environmental protection agencies. A lot of conferences have been held by these agencies to discuss ecological problems some of which are of extreme urgency [1].

There are some areas where the environment is in a very poor state. The ground is contaminated with radiation there. As a result of the pollution more than 50 per cent of the world's purest water has been ruined. The whole ecological system of the lake has changed greatly. In 1986 a nuclear power station at Chernobyl, which is near Kiev, exploded, producing highly dangerous radioactive fallout not only in the vicinity of the accident but because of prevailing winds across the continent of Europe. Affected countries protested, while citizens increased the pressure on their governments to curtail the manufacture of such lethal industrial and military by-products. After the disaster in Chernobyl the inhabitants of the nearby towns and villages had to be evacuated. Some of them died and some have become invalids. Ecological catastrophes do a lot of harm to Nature but they are much more dangerous for Man. The question is whether mankind is going to live or die. The EARTH is our HOME. The world around us is wonderful. Our aim is to make it more beautiful and to preserve it for ourselves and for future generations.

That is why the main goal of modern ecologist is not only to conclude new ecological laws but also, which is more important to encourage governments and industrialists to take practical measures to improve the ecological situation on the planet.

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NUCLEAR POWERED CAR

Many governments around the world seem to be on a very real mission to send internal combustion engines (ICE) to an early grave. This is for a variety of reasons, but since most of the infrastructure that underlies our civilization is, quite literally, powered by fossil fuels, such a transition must be done relatively gradually and well planned.

Could nuclear reactors ever be made to fit inside a car?

Believe it or not, theoretically, it is quite possible. What's more, it has even been considered in the past, sort of.

Meet the 1958 Ford "Nucleon."

Conceived at the height of nuclear fever in the 1950s, the "Nucleon" was a sort of thought experiment - a concept for cars that could theoretically be made to run for more than 5,000 miles (over 8,000km) without needing to refuel.

Sadly, the technology needed to make such a car a reality was far beyond the engineers of the day. To this end, it never left the drawing board.

The "Nucleon" would have been, if ever built, 16.7 feet (5.09m) inches long and 6.45 feet (1.97m) wide, making it about as long as the Ford Maverick compact pickup, but ever so slightly wider. The roof of the car would have stood about

3.45 feet (1.05m) inches from the ground, making it just a tad taller than a Ford GT40.

Its wheels were also pretty close together to, presumably, support the presumably heavy weight of an onboard nuclear reactor.

As for the power source, Ford envisaged something called a "power capsule" that would sit in the "trunk" of the "Nucleon." According to their design of the time, this reactor would be easily serviced and refueled, and would generate power to move the car via "electronic torque converters."

While this seems extremely wild as a concept today, back at the time with nuclear power coming online for the first time, it would likely have felt like just a matter of time before things like cars would also be powered the same way.

However, even the "Nucleon" was something of a latecomer to the idea. Engineers, as it turns out, have been proposing nuclear-powered vehicles since around 1903. In 1941, for example, Dr. R. M. Langer, a Caltech physicist, explored the idea of a uranium-235 powered vehicle in the January Edition of Popular Mechanics.

But, just like today, shrinking a nuclear reactor to the size needed for an automobile was deemed to be very technically challenging. Perhaps prohibitively so.

Why don't we have any nuke-powered cars?

One of the main reasons is the amount of shielding needed to prevent the vehicle's occupants and the general public from receiving fatal levels of radiation. This is a very serious technical challenge and one we will explore a little later on.

Shielding aside, nuclear technology has improved greatly since the 1950s, so could we build a nuclear-powered car today?

As it happens, a more up-to-date proposal for a nuclear car was made back in 2009. Called the Cadillac World Thorium Fueled Concept Car it could, according to its designers, theoretically run for over 100 years with little to no maintenance.

The concept car was debuted at the 2009 Chicago Auto Show, but only as a display piece - there was no working nuclear reactor was under the hood. Thorium would be a good choice as it is less radioactive and more plentiful than other nuclear fuels like uranium. In fact, some modern designs for micro-nuclear reactors are based on using thorium as a fuel. These reactors, while small, are still not compact enough to fit inside the chassis of a personal car, however.

Another potential approach, however, is being explored by Charles Stevens, a researcher at the Massachusetts R&D firm Laser Power Systems. His proposal was to develop a thorium-powered laser that can be used to generate enough energy to power a vehicle while producing zero emissions.

Stevens apparently managed to produce a prototype system using a proprietary high-intensity "MaxFelaser" laser that is fueled by thorium.

According to information available on the system, it works by using the laser beam to evaporate water into pressurized steam, which spins a turbine and generates electricity. This electricity can then be used to power motors for propulsion - just like in EV cars. Steven's system could produce a total of 250 kilowatts (equivalent to 335 horsepower), would weigh about 500 pounds (227kg), and be small enough to fit under the hood of a car. Impressive, but the lack of thorium-laser-powered cars on the road seems to indicate that it never really took off.

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THE IMPACT OF TRANSPORTATION ON THE ENVIRONMENT

Besides their significant socioeconomic benefits, transportation systems have environmental externalities. Through the emissions from combustion of fossilderived fuels, transportation systems contribute to degraded air quality, as well as a changing climate.

Transportation also leads to noise pollution, water pollution, and affects ecosystems through multiple direct and indirect interactions. With the continuous growth in transportation, increasingly shifting to high-speed transportation modes, these externalities are expected to grow.

At the same time, transportation systems will also be impacted by environmental change. The aviation sector may contend with increased atmospheric turbulence and heat-related degradation of aircraft performance.

The marine sector may have access to new shipping routes as sea ice melts.

Roads may be subjected to more freeze-thaw cycles in some areas, and both road and rail systems could experience direct heat damage in others. More frequent weather extremes may disrupt infrastructure, causing ripple effects throughout transportation networks.

In addition, new climate policies around the world may necessitate significant changes to transportation systems in order to reduce their greenhouse gas emissions. These and other impacts of climate and environmental change on transportation infrastructure, emphasise the necessity of incorporating an understanding of our non-stationary climate into future transportation planning and investment decisions.

The transport sector, including all modes, accounts for about 22% of global CO2 emissions, with this share being around 25% for advanced economies such as the United States. Further to these emissions, there are environmental impacts unique to transportation such as the procurement, refining, and distribution of fossil fuels and noise emitted by transport operations with conveyances and terminals.

Total emissions are generally a function of the emission factor of each transport mode than their level of activity, which implies a variety of environmental impacts. These impacts fall within three categories:

Direct impacts. The immediate consequence of transport activities on the environment where the cause and effect relationship are generally clear and well understood. For instance, noise and carbon monoxide emissions are known to have direct harmful effects.

Indirect impacts. The secondary (or tertiary) effects of transport activities on environmental systems. They are often of a higher consequence than direct impacts, but the involved relationships are often misunderstood and more challenging to establish. For instance, particulates, which are mostly the outcome of incomplete combustion in an internal combustion engine, are indirectly linked with respiratory and cardiovascular problems since they contribute, among other factors, to such conditions.

Cumulative impacts. The additive, multiplicative or synergetic consequences of transport activities. They consider the varied effects of direct and indirect impacts on an ecosystem, which are often unpredictable. Climate change, with complex causes and consequences, is the cumulative impact of several natural and anthropogenic factors, in which transportation plays a role.

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DEVELOPMENT OF AGRONOMY AND SPECIALIZED TRANSPORT WITHIN IT

Agronomy, the science and technology of producing and using plants for food, fuel, fiber, and land reclamation, will continue to evolve in the future as we face new challenges such as climate change, population growth, and resource depletion. Here are some potential developments in the field of agronomy:

Precision agriculture: With the help of advanced technologies such as sensors, drones, and machine learning algorithms, precision agriculture will become more widespread in the future. Precision agriculture allows farmers to tailor crop management practices to specific areas of a field, optimizing resource use and increasing yields.

Vertical farming: As urbanization continues to increase, and available land for agriculture becomes scarce, vertical farming may become more common. In vertical farming, crops are grown in stacked layers in a controlled environment, allowing for year-round production with minimal water use.

Plant breeding: As new challenges arise, such as the need for crops that are more resilient to extreme weather conditions, plant breeders will focus on developing new crop varieties that can thrive in different environments. This will likely involve the use of genetic engineering and other cutting-edge technologies.

Sustainable agriculture: As we become more aware of the environmental impact of agriculture, sustainable practices will become more important. This includes reducing the use of synthetic fertilizers and pesticides, improving soil health, and reducing greenhouse gas emissions from agriculture.

Digital tools for farmers: As the world becomes more connected, digital tools such as mobile apps and online platforms will become more important for farmers. These tools can provide farmers with real-time weather data, market prices, and other important information to help them make informed decisions about their crops.

Overall, the development of agronomy in the future will likely involve a combination of new technologies, sustainable practices, and a focus on developing crops that can thrive in changing conditions.

Concerning specialized transport for carrying agronomy products, we can say that in the future, there will likely be a wide range of machines used to transport agronomic products. Here are some potential examples:

Autonomous vehicles: With advances in robotics and artificial intelligence, autonomous vehicles could become a common sight on farms and in transportation of agronomic products. These vehicles could be used to transport crops, equipment, and other materials around the farm or to nearby processing facilities.

Drones: Drones could also be used for transporting small, lightweight agronomic products such as seeds, soil samples, and small equipment. Drones are already being used in agriculture for mapping and monitoring purposes, so it's likely that their use will expand to transportation as well.

Electric vehicles: As concerns over climate change and air pollution grow, electric vehicles will become more common in transportation of agronomic products. Electric vehicles have zero emissions and can be powered by renewable energy sources, making them a more sustainable choice.

Hyperloop: Hyperloop technology is being developed as a fast, efficient way to transport goods and people over long distances. If successful, hyperloop could revolutionize transportation of agronomic products, allowing them to be quickly transported between farms and processing facilities over large distances.

Hydrogen-powered vehicles: Hydrogen fuel cell technology is another sustainable option for transportation of agronomic products. Hydrogen-powered vehicles have zero emissions and can be fueled up quickly, making them a potentially viable alternative to traditional fossil-fueled vehicles.

In summary, the development of machines for transporting agricultural products in the future may involve the use of cutting-edge technologies and materials that will reduce transportation costs, the development of machines for transporting agricultural products in the future will be aimed at increasing efficiency, and ensuring safety during transportation.

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SOME ASPECTS OF ECOLOGY, GEOLOGY, BIOENGINEERING AND BIOTECHNOLOGIES PROBLEMS FOR CURRENT SOCIETY

Science and technology have made significant advancements in recent years, leading to numerous breakthroughs in various fields. However, several pressing issues still require immediate attention. It is essential to draw people's attention to global problems and encourage them to find new solutions.

In the field of *ecology*, one of the most significant problems is climate change, which has far-reaching consequences for the planet. It is crucial to develop and use sustainable practices in order to reduce greenhouse gas emissions and promote renewable energy sources.

Geology plays a very important role in the processes of identifying natural resources and predicting natural disasters. Scientific research in this field have led to the discovery of new minerals and improved methods for identifying earthquake risk zones worldwide.

Bioengineering and biotechnology are rapidly expanding fields that have enormous potential for improving human health and solving agricultural and environmental problems. In medicine, significant breakthroughs have been made in gene therapy and tissue engineering, while in agriculture genetically modified crops are improving crop yields and reducing the use of pesticides, artificial fertilizers and chemical amendments.

Sharing experiences and knowledge among the scientific community, including students, researchers and young scientists, is essential step in the developing of new ideas and solutions to current problems. Learning foreign languages is also critical in sharing knowledge and collaborating across borders.

In conclusion, the scientific community must focus on addressing pressing issues such as climate change, natural resource management, and diseases prevention. Collaborative efforts and innovative ideas are needed to find solutions and create a better future for generations to come. ПОЛОЗОВ Михайло, студент 2 курсу факультету інформаційних технологій, Харківський національний університет радіоелектроніки (м. Харків, Україна) Науковий керівник – доц. Парфьонова О.В.

NEGATIVE IMPACT OF AUTOMOBILE TRANSPORT ON THE ENVIRONMENT

Automobile transport is one of the main sources of environment pollution. Its input in environmental pollution, namely the atmosphere, makes up 60-90%. 20 mln. people reside in areas of increased air pollution of Ukraine, and governmental expenses on environmental protection amount to percentage fractions of the budget. Regardless of sharp decline in production, the environment condition in Ukraine constantly deteriorates.

Among the main sources of environmental pollution and energy consumers is automobile transport and automobile transport infrastructure. The amount of harmful compounds, entering the atmosphere with exhaust gases, depends on the general technical state of automobiles and namely on the engine, which is the largest source of pollution. Exhaust fumes of internal combustion engines contain hundreds of harmful components, however the most essential of them include carbon oxide (CO), hydrocarbons (CH), nitrogen oxides, solid parts, lead (Pb) and sulphur compounds (SO2), aldehydes and carcinogenic substances. Great significance is being attached to atmosphere pollution by carbon dioxide (CO2), which is in high quantities contained in exhaust fumes of automobiles. In some cities CO concentration within short periods may reach 200 mg/m³ and more, where standard values of maximum one-time permissible concentration constitute 40 mg/m³ (USA) and 10 mg/m³ (Ukraine). This gas plays the main part in forming the global greenhouse effect – the phenomena, elimination whereof currently constitutes the global problem.

Using ethylated gasoline containing lead causes air pollution with quite toxic compounds. Approximately 70% of lead, added to gasoline with ethyl fluid, enters the atmosphere with exhaust fumes, 30% whereof settles on earth at once, and 40% stays in the atmosphere. One medium truck releases 2.5-3 kg of lead per year. Lead concentration in the air depends on lead content in gasoline. Due to global environment pollution with lead, it became a ubiquitous component of any plant, animal food and foodstuffs. On the whole, plant products contain more lead than animal products. The reason of summer leaf fall is high lead content in the air. Trees concentrate lead, thereby purifying the air. Over one vegetative period one tree neutralizes lead compounds, contained in 130 1 of gasoline. The least sensitive to lead is maple, and the most sensitive are hazel and fur tree. The tree side, facing the highway, is 30-60% "more metal-containing". Fir and pine

acerose leaves possess the properties of a good lead filter. The ground vegetation engages 70-80 thousand tons of lead in biologic turnover each day.

Harmful substances released in the atmosphere cause a wide range of diseases: bronchitis, pneumonias, bronchial asthma, cardiac failure, insults, cancer, etc. Consequently it decreases life expectancy in Ukraine and abroad. Children particularly suffer from bronchitis, bronchial asthma, cough; newborns experience abnormalities of gene structures and incurable diseases, thus, child mortality increases by 10% each year.

To reduce road slipperiness in winter, they are strewn with salt, causing incredible dirt and puddles. Such dirt and moisture is carried over to trolleybuses and buses, subway and passages, houses and apartments; shoes get damaged from it, solination of soil and rivers kills all the living organisms, destroys trees, grasses and ecology in general. In Russian 1 km of automobile roads takes up 2-7 ha. Thereat not only agricultural, forest and other lands are occupied, but also territory breakdown to separate isolated areas takes place, which destroys wild animal habitat.

In the course of work negative automobile effect on the environment and human health was made evident. The number of pollutants, released to the atmosphere by automobile transport, was demonstrated. Humanity will not refuse from automobiles; however deciding ecological problems, connected with their operation, may help decrease negative effect of automobile fumes on the environment. First of all, fuel must be totally different, second of all, operating life of an automobile must be defined, and third of all, problem of automobile scrappage must be solved. The driver itself may solve part of the problems, namely, by not washing its car in a river, taking good care of its car, and regularly testing noise level of its car.

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PLANT GROWTH STIMULATORS IN THE VEGETATIVE PROPAGATION OF WOOD SPECIES

Nowadays it's a significant increase of the experiencing vegetative propagation by separating parts from the tree basis in domestic decorative nurseries applying the scientifically based use of growth substances to stimulate root formation by cuttings of propagating tree species. A condition for the widespread introduction of rare and valuable ornamental plants is the development and improvement of effective propagation methods taking into account their biological properties, features of mass cultivation and landscaping needs. The issue of providing the domestic market with the required amount of planting material tested and adapted to local natural and climatic conditions remains relevant. In particular, the use of plant growth stimulants during vegetative reproduction of tree species was studied and described by V. Balabushka, O. Kolisnychenko, Yu. Kosenko, S. Kuznetsov ([1], [2], [3]) as well as N. Smilianets, M. Tarasenko or N. Shumyk [4], [5].

As the experience of foreign and leading domestic nurseries shows, the use of synthetic and natural growth regulators with phytohormonal activity not only stimulates the rooting of cuttings but also contributes to increasing the yield of native plants and increasing the quality of the obtained starting planting material, while reducing its technological cost. According to today's requirements, coniferous woody plants, the number of cultivars and forms of which in our country are at least 1000 taxonomic units, deserve special attention in terms of reproduction [4;142–143].

Among them the species (Thuja occidentalis L.) stands out, which is winter-, frost-, drought- and gas-resistant and undemanding to soils culture, which has many cultivars according to the shape and color of the crown [1, 2]. Having high decorative qualities and wide possibilities of their application, the mentioned group is of considerable interest for gardening as a valuable source for replenishing the assortment of decorative crops, the list of which in domestic production is insufficient, compared to the leading countries of the world [3;190–194]. The types, forms, number of varieties of introduced wood species, which are widely used in the green construction of Western Polissia, are only the

property of specialized introduction centers and are rarely used in horticulture due to the lack of data on biological features and effective methods of reproduction in cultural conditions. The collection of the Rivne Arboretum contains a large number of rare and valuable plants, many of which cannot reproduce by seed in natural and climatic conditions. This is one of the obstacles to their distribution. Therefore, the problem of accelerated vegetative propagation of valuable introduced woody plants, which has not been completely studied, is relevant.

Vegetative propagation of plants has been known since ancient times. Ancient people observed in nature the rooting of branches sprinkled with earth, the splicing of densely pressed shoots and applied the knowledge gained in their economy. Artificial vegetative reproduction of plants is usually associated with surgical intervention and division of the whole organism into parts. Stem grafting is the most effective method of vegetative propagation of plants in terms of speed and quality of growing mass planting material. This method is based on the use of the natural ability of plants to form adventitious roots on stem cuttings being determined genetically, but can vary widely depending on specific environmental conditions [5].

The effectiveness of stem grafting depends on many factors. The success of this process is influenced by the mother plants exampling their age, successful growth as well as their development or phytopathological conditions. But, of course, the main influence is the physiological state of the cuttings used, the conditions of procurement and preparation for planting, the method, the conditions created at the rooting site, the quality and features of care for the cuttings during rooting.

In our research, we considered the experience of rooting gymnosperms of the Rivne Dendrological Park. The soil cover in the area of research is black soil typical of forest loams. The mechanical composition of the soil is coarse-dusty-medium loamy. The amount of coarse dust particles in the arable layer is 50-53%, silt 18-32%, sand elements up to 18%. Grafting was carried out in early spring with lignified cuttings. Planting of cuttings was carried out on a level area being protected from the wind in open ground.

According to the 2022 data concerning the Rivne Dendrological Park, the maximum percentage of rooted western thuja plants was in the version of cuttings treated with Kornevin. In an experiment with berry yew, the best result was obtained with the use of Heteroauxin. In an experiment with alder, the best result was obtained with the use of Kornevin. Table 1 shows the influence of root formation stimulators on the percentage of rooting of cuttings:

According to the presented table it was established that all selected plant growth stimulators significantly increase the rate of rooting and the quality of the obtained planting material, but the most effective is the use of rhizome and heteroauxin. For the vegetative reproduction of tree species and their cultivars, modern growth substances should be applied in a differentiated manner, taking into account their effectiveness and species-specific characteristics of plants as well as noting the fact that the use of rooting stimulants did not significantly increase the percentage of rooting.

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THE ACHIEVEMENTS OF LAND MANAGEMENT

Nowadays it's important to recognize the specific features of the chosen specialty starting from the first year of student's life.

Our aim is to attract attention to the land manager's major and to represent the main achievements of this specialty after analyzing the adequate Internet sources ([1], [2]. [3]) as well as describing own practical experience impressions while studying at the Faculty of Land Management within the National University of Life and Environmental Sciences of Ukraine in 2023.

During the first stage of professional English adaptation it's important to adapt the first -year students to the perception of professional purpose English due to the their observation of some interesting facts concerning their specialty exampling the statements that the oldest cartographic landmark on the territory of Ukraine is the prehistoric "Mezhyrich map" as a layout on a fragment of a mammoth tusk or saying that the first written documents on the use of geodesy on our territory refer to the times of Kyivan Rus as instructions on the procedure for land use in 996. Besides, future surveyours are expected to become interested in such fact that in 1639 the first Ukrainian geographical map "Tadula Geographica Ukrainska" was drawn up by the French engineer-cartographer Guillaume de Beauplan according to Polish king's order or Taras Shevchenko was among the participants of the topographical expedition on the shores of the Aral Sea. The similar effect to our mind will be noticed while noting the fact that the famous game "Monopoly" was previously called "The Landlord Game", American Lizzie Magee invented this game in 1904 to demonstrate the existing system of land grabbing with all its usual results and consequences or the fact that professional holiday "Land Manager's Day" is celebrated every year on the second Saturday of March since 2000.

During the second stage of professional English adaptation it's worth to develop future surveyors' horizon by adoption of more difficult facts like saying that modern land legislation includes the Constitution of Ukraine, the Land Code, Cadastral database and other regulatory acts or that modern geodetic devices (tacheometers, theodolites, 3D scanners) are elaborated on the basis of laser technologies. Besides, it's worth to tell freshmen that GNSS is a satellite navigation system being created to specify objects location coordinates as well as their direction or speed of movement or to tell them that kind of "revolution" in topographical and geodetic activities in recent decades was caused by three technologies: satellite radio navigation systems (GNSS), laser 3D scanning (lidar surveying) and operational mapping using unmanned aerial vehicles (UAVs). Moreover, future land managers need to know that nowadays 200 organizations dealing with collecting GNSS data from database stations all over the world are united into IGS (International GNSS Service) to be the part of International Geodetic Association.

While determining the main achievements of land management branch we can not avoid the fact that GIS is changing the world: the era of evolving GIS as a service begins, spatial analysis will become essential for any business in which location is a condition of success and GIS will provide access to a huge amount of data about the environment and human behavior. Moreover it's worth to know that GIS use of a huge network of devices and sensors or to know that receiving data from mobile devices will replace working with GIS through web services and traditional workstations as well as to know the main geodetic software complexes (AutoCAD, CREDO, "Digitals", "Geoproekt", "Invent-Grad", GIS "Map-Karta") while constructing modern maps with a help of geoinformation modelingas a high-tech process of creating a terrain model.

While representing the main achievements of land management branch we can not also do without mentioning the fact that the future of cartography will be determined by the following trends: real-time cartography, everyday life, media adequacy; personalization and good design. Besides, it's worth to know that according to the Article 36 of the Law of Ukraine the state provided access to the basic data of the state land cadastre to find information about the cadastral number of every land plot, its boundaries, area as well as form of ownership or purpose. Prospective technologies of cadastral and registration activity should deal with public land use model (STDM), point cadastre, use of a "digital pen"as well as application of crowdsourced cadastre ,"Cadastre 2.0"or the use of high-resolution satellite images (HRSI) for rapid establishment of boundaries and mapping of rural areas or use of low-altitude air defense systems (LARSI).

In the end of our report we'd like to come to conclusion that it's important to convince young generation the development of geodesy and cartography in Ukraine has not only economic value but also makes an important contribution to strengthening the country's defense capability and preserving its territorial integrity. It's undoubtedly that studying at the Faculty of Land Management within the National University of Life and Environmental Sciences of Ukraine proposes practical and scientific investigations in the field of geodesy, pedology, land law, land cadastre, geology cartography, GIS to be always in employers' need.

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Напрям роботи Енергетика, електроніка та телекомунікації

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CERAMIC CHIP ANTENNA INTRODUCTION

Nowadays the modern investigation in automation sphere demand to pay attention on the covering casing materials as well as on the suited size shape while selecting automatic installations details to find the most reliable and convenient ones.

Our aim is to analyze miniature RF Ceramic Chip Antennas as the convenient element of installations to provide great reliability and versatility.

From the very beginning we'd like to admitt the issue of finding reliable parts for
creating microwave emitting devices as relevant because of such fact that many leading companies like BIP Roottek, TDK, Abracon LLC and Johanson Technology dealt with this issue as with the technology being used for mobile communication devices such as mobile phones and mobile personal computers which are involved into many agricultural and induxstrial enterprises appliances [1].

At the second stage of our report it's worth to say that one of the achievements in the field of automation is lower sintering temperature for LTCC (lowtemperature co-fired ceramic) materials whuch are made mostly through the addition of a glassy phase to the ceramic, which lowers its melting temperature. An analogue of LTCC is HTCC(high-temperature co-fired ceramic) with has higher-resistance conductive layers. and the the producer to be specified [2].

In general, Johanson Technology's miniature RF ceramic chip antennas are made using low temperature co-fired ceramic (LTCC) technology which has the ability to embed low- and high-dielectric constants inside their antenna. This enables them to have great detuning resilience and extreme temperature stability (~2 ppm) behavior. Their ceramic chip antennas offer SMD manufacturability in standard- or small-form-factor designs of applications providing great reliability and versatility while maintaining industry-demanding performance. These antennas are easy to tune to any unique PCB environment([3]) being visualized in scheme as Image 1:

At the third stage of our report it's worth to take into account the key features of the mentioned ceramic chip antenna to prefict application of the smallest form factor ceramic chip antenna in the industry taking into account its extreme temperature Stability (~2ppm), 2X-3X higher dielectric constant than any FR4, PCB or standard plastics as well as 125C rating capable. Besides, it's worth to say that for qualified customers, prior to prototype, full 3D Electromagnetic simulation service is available. According to AEC-Q200 Automotive Qualification Standard in need [4].

At the fourth stage of our report we'd like to represent the abovenamed element in the relevant scheme being regarded as Image 1 to remind students the basic technical terms *like routing layers, built-in components layers, band pass filter, capacitor, inductor,* etc:

In general as for us, this detail has a general value like other similar details. Without the mentioned ceramic chip antenna some device may work incorrectly. But sometimes deleting some detail in automatic device will not have changes and this gives a possibility to save money. But at the same time LTCC is important to ensure great reliability and versatility.

Besides, it's worth to analyze foreign sources technical texts to involve some foreign terms like *microwave emitting devices, lower sintering temperature, higher-resistance conductive layers, great detuning resilience and extreme temperature stability, reliability, versality, capacitor, inductor* and other ones into everyday foreign speech usage of the future engineers' own speech as well as to visualize mostly all described phenomena in schemes and images or to start *similar scientific investigations concerning automation from the first course of the* bachelor's degree program. Moreover, the prospect of further research is also in use of thisceramic chip antenna in the wider sector of devices.

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SDI200G SERIES GaN ADAPTERS

Nowadays it's important to obtain some modern reliable components for automation systems in general and concerning such components of automatic installations as adapters.

Our aim is to attract audience attention to the introduction of the main advantages and special features of some compact desktop adapters features on the basis of adequate Internet sources observation [1], [2], [3], [4], [5], [6].

The first advantage of CUI Inc SDI200G Series GaN AC-DC desktop adapters deals the the statements that they utilize the latest Gallium Nitride (GaN) technology, which offers superior performance and efficiency compared to traditional silicon-based solutions as well as obtaining wide input voltage range of 90-264V AC, making it more

suitable for use in a variety of regions and applications.

The second advantage of CUI Inc SDI200G Series GaN AC-DC desktop adapters concerns the fact that they are with a power density of up to 18.5 watts per cubic inch, offering a compact and efficient solution for space-constrained applications designing with safety in mind, featuring over-current, over-voltage or short-circuit protection;

The third advantage of the mentioned adapters are compliant with various energy efficiency standards including DOE Level VI and UL/cUL as the an

environmentally friendly choice obtaining a low standby power consumption of less than 0.1 watts to reduce energy costs and environmental impact;

The fourth advantage of CUI Inc SDI200G Series GaN AC-DC desktop adapters deals with providence of the excellent customer support and technical assistance, ensuring a seamless integration into any application as well as the ability to work in

temperatures up to 70°C, making them suitable for use in harsh environments.

Besides, we can not avoid mentioning such fact that CUI's SDI200G-U and SDI200G-UD series of desktop adapters offer innovative GaN technology and up to 200 W of continuous power. These efficient AC/DC power supplies comply with UL/EN/IEC 62368-1 and 60950-1 requirements. The adapters meet the current average efficiency and no-load power specifications mandated by the US Department of Energy (DoE) under the Level VI standard and the European Union's (EU) CoC Tier 2 directive for universal input voltage ranges with up to a 250% increase in power density, no-load power consumption as low as 210 mW, and universal input voltage ranges of 90 V_{AC} to 264 V_{AC}. The SDI200G-U series offers a three-prong (C14) inlet and the SDI200G-UD features a twoprong (C8) inlet. The SDI200G-U and SDI200G-UD are designed for a wide range of portable industrial and consumer products where efficient power is needed in a lighter, smaller adapter package obtaining such technical characteristics as continuous power, no-load power consumption, overcurrent, overtemperature, overvoltage and short circuit protections as well as power factor correction or safety approvals.

Finally, we'd like to come to conclusion that due to its high efficiency, compact design and robust safety features, the SDI200G series is a reliable and cost-effective

power solution for a variety of applications. It is ideal for a wide range of applications including industrial automation, telecommunications and consumer electronics. Besides, while studying some technical topics on the professional purpose technical English lessons it's worth to fix technical material texts contents with some visual patterns exampling some adequate video [6] or some relevant video blocks [1], [2].

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MAIN COMPUTER VIRUS ATTACKS WHILE STUDENTS' REMOTE STUDYING

In the conditions of distance learning teachers and students often face a large number of non-standard, unforeseen situations, the solution of which requires constant warning, making changes, regulation, which stimulates the teacher to manifest an innovative style of pedagogical thinking ([1], [2], [3]) taking into account some computer virus programs being investigated by S. Supronova ([4]) and other researchers.

Our aim is to observe FireEye Industry Intelligence Report to define some range of the most dangerous and actual attacks cyber attacks on the Ukrainian grid ([5]) exampling DDOS attack BlackEnergy, Snake or Operation Armageddon virus attacks while remote students' studying.

At first we'd like to mention DDOS attack as an attack on a computer system with the intent to make computer resources inaccessible to users for whom the computer system was intended. One of the most common methods of attack is to saturate the attacked computer or network equipment with a huge amount numbers of external requests (often meaningless or incorrectly worded) so the attacked equipment cannot respond to users, or responds so slowly that it becomes virtually unavailable. In general, the service is denied:forcing the attacked equipment to stop the software equipment or to expend available resources, as a result of which the equipment cannot continue to operate or occupation of communication channels between users and the attacked equipment, as a result of which the quality of communication ceases to meet the requirements. It's worth to note that DOS attacks are divided into local and remote attacks. Local exploits include a variety of exploits: fork bombs and programs that open hundreds of thousands files or run a cyclic algorithm that use memory and CPU resources. In their turn remote DOS attacks include remote control of errors in software to keep it in non-operational state and a flood meaning a large number of meaningless packets to the victim. The purpose of a flood can be a communication channel or machine resource. In the one hand, packet flow takes up the entire bandwidth and

does not allow the attacker computer to process legal requests. In the second hand, the machine's resources are recorded through repeated and very frequent access to all services that perform a complex, resource-intensive process. This can be, for example, a long request to one of the active components of the web server. The server attackers use all of the computer's resources to process requests and users have to wait. The classic flood is useless because with today's server channel width, computing power levels and widespread use of various anti-DOS techniques in the software (for example, delays in repeated execution of the same actions by one client), the attacker turns into an pesky fly that can cause no damage. But if these «flies» gather hundreds of thousands, they will easily put the server on the blades. A distributed denial-of-service (DDOS) attack, usually performed by multiple hosts, can cut off even the most robust server from the outside world, and the only effective protection is to organize a distributed server system. The danger of most DDOS attacks is in their absolute honesty and "normality". After all, if the error in the software may always be corrected, the total consumption of resources is almost on common place. They are faced by many administrators when the resources of the machine (channel width) becomes insufficient, or the web-site is exposed to a slash effect. And, if you cut traffic and resources for everyone in a row, you can escape from DDOS, at the same time, losing most of the customers. There is virtually no way out of this situation, but the consequences of DDOS attacks and their effectiveness can be significantly reduced by properly configuring the router, firewall and constant analysis of anomalies in network traffic. There are several methods of control, one of which is the use of a filter network. The network takes the traffic on itself, filters it and only the tested and high-quality traffic from real users reaches the target server.

At second we'd like to pay attention on other various malicious programs being especially noticeable during the Russian-Ukrainian war while the information confrontation exampling BlackEnergy, Snake and Operation Armageddon. It's worth to note that BlackEnergy is a family of malware being often used by cybercriminals. The first version of BlackEnergy was used to gain access to networks in order to launch DDoS attacks. The second version "BlackEnergy2" was updated with data-stealing features. The latest version "BlackEnergy 3" was updated to target supervisory control and data acquisition (SCADA) systems and added a new KillDisk feature that rendered infected computers unusable. This version was used to attack the Ukrainian power system back in December, 2015 [5]. Attackers use phishing emails with compromised attachments to infect computers. The last two versions of the malware were deployed to collect information and implanted into specific targets.

At third it's worth to say that the Snake malware was discovered in 2014 but has been active since at least 2010 or 2011. It is similar to the older Agent.btz malware. Victims were infected either by opening phishing emails or by visiting watering hole websites, i.e. web pages infected with malware. Once the malware infects a computer, it waits for the user to open a web browser and then simultaneously opens a backdoor to communicate with the attackers without the user's knowledge. This tool is designed to copy and delete files, connect to infected servers, and download and execute other malicious programs. Snake malware consists of two elements: a rootkit and a driver. The first takes control of a computer and hides its activities from the user in order to steal data and capture network traffic. The driver injects code into the web browser to hide the exchange of information with the attacker's servers and creates a hidden file to store the configuration and stolen data.

At fourth we can not do without informing that Operation Armageddon is a remote administration or access tool discovered in September 2014 by American security firm LookingGlass. Ukrainian security experts suspect Russia of creating and using this malware. Operation Armageddon infects computers via phishing emails with a compromised Microsoft Word attachment [4].

Thus, distance learning has many advantages and disadvantages, and during the coronavirus pandemic and the Russian-Ukrainian war, it became a test for higher education and determined not only the need for the formation of information technology and digital competence, but also for identifying the ability of participants in the educational process to self-organize, culture, the desire and ability to work together, to determine one's own trajectory of self-education.

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INSULATED REGULATED DC-DC CONVERTERS FOR HARSH ENVIRONMENT

Nowadays it's important to analyze special features of modern electric devices elements as the background to specify the possibilities to have the required details in need.

Our aim is to represent insulated regulated DC-DC convertors as suitable for harsh environment basing upon the main statements to be represented by their producers or sellers as well as automation spheres engineers [1], [2], [3].

We'd like divide our report into such stages as the abovenamed convertors introduction, description of current situation with their application as well as to note their nalogues and manufacturers together with the forecast of future research.

Our first step is introducing our thematic automatic element mentioning such fact as the development of isolated, regulated DC-DC converters has resolved the problem of unreliable power supply in harsh environments. Before the invention of these converters, there was a high risk of damage to electronic devices due to voltage spikes, power surges, and electromagnetic interference. The converters were developed by scientists and engineers in the field of electronics and power systems, including researchers at universities and private companies but nowadays these converters are widely used in a variety of applications, including aerospace, automotive and industrial

systems.

Our second step is mentioning current situation with their usage announcing that the search for reliable electronic components for harsh environments is an ongoing challenge in the field of electronics and power systems. It's worth to know that many scientists and engineers have been working on developing technologies that can withstand extreme temperatures, humidity, vibration and shock including researchers from various universities like MIT, Stanford, and UC Berkeley who have made significant contributions to this field of technical knowledge.

Our third step is representing insulated regulated dc-dc converters analogues and manufacturers meaning several analogues of insulated, regulated DC-DC converters as available on the market including such producers as Vicor, Texas Instruments and Analog Devices to manufacture converters being suitable for different types of applications and environments. Other manufacturers exampling Bel Power Solutions, Delta Electronics and Murata Power Solutions produce similar products too.

Our fourth step is to announce prospects for future research taking into account such fact that the development of insulated, regulated DC-DC converters has opened up new possibilities for the design of electronic devices and systems that can operate in harsh environments. These converters are now used in a variety of devices and systems, such as military equipment, satellites and oil drilling rigs.

Finally we can not miss the fact that at this moment many researchers in the sphere of automation and power engineering researchers are working on improving the performance of these converters either to increase their efficiency or to reduce their size and weight. The prospects for future research in this field are promising as the demand for reliable electronic components for harsh environments continues to grow.

Thus, undouptly one of the achievements in the field of automation is the development of isulated, regulated DC-DC converters in order to operate reliable tools within harsh environments.

Література

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PANDUIT'S ELECTRONIC DEVICES TO REDUCE RISK OF ELECTRICAL HAZARDS

Nowadays the problem of finding reliable components for the electrical industry is becoming increasingly important in general and concerning the item to reduce the risks of electric hazards. This issue has been addressed by researchers on a global scale including the representatives from the National Institute for Occupational Safety and Health (NIOSH), Institute of Electrical and Electronics Engineers (IEEE) as well as Occupational Safety and Health Administration (OSHA) [1], [2], [3].

Our aim is to pay attention on PANDUIT's electronic devices being relevant to solve the abovenamed problem to reduce the risk of electrical hazards and injuries caused by the assumption of a deenergized state of equipment taking into account that PANDUIT is a global leading manufacturer of electrical and network infrastructure solutions [4].

The result of our PANDUIT's electronic products review is focusing on such items as the VeriSafe Absence of Voltage Tester and Access Control Kits were created to address a crucial safety issue in the electrical industry because exactly these VeriSafe tester and Access Control Kits provide a comprehensive and reliable solution for verifying and controlling the absence of voltage before starting work to become reliable voltage detecting systems in many automatic installations.

Therefore, this component represents a significant advancement in the field of electrical safety and risk management.

Thus, one of the breakthroughs in automation technology is the development of the VeriSafe Absence of Voltage Tester and Access Control Kits by PANDUIT. That is the reason to consider the VeriSafe tester and Access Control Kits to be unique and innovative solutions on the market with no direct analogues base in order to propose future specialists in automation some adequate scientific investigation in this sphere to represent own Ukrainian analogues dealing with safeguard of human health as well as of the health of biological objects on really existing agricultural and industrial enterprises.

The prospect of further research in this area is to find and to specify analog foreign companies' products or even to design with own efforts some potential future developments or applications on the basis of the Department of Automation and Robotic Systems named after I. Martynenko within the National University of Life and Environmental Sciences of Ukraine as well as to involve some foreign terms like *reliable solution, unique and innovative solutions, verifying and controlling the absence of voltage, fuse, sensor, electrical hazard, voltage detecting, short circuits, damages, electric work safety rules* etc. into everyday foreign speech usage of the future specialists in automation not only on the professional purpose English lessons but also in everyday students' life discussions out of class itself.

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AUDIO CIRCULAR CONNECTOR INTRODUCTION

Nowadays it's important to review some details for circuit board elements selecting in general and concerning audio circular systems to transmit audio signals in need.

Our aim is to introduce The M55116 Audio Circular Connector Series noting its producers as well as technical characteristics and a sphere of application taking into account the review of the existing sources being dealt with the relevant scientific interest [1], [2], [3], [4], [5].

At first it's worth to say that M55116 Audio Circular Connector Series is manufactured by several companies including Amphenol Corporation, TE Connectivity Ltd, and ITT Cannon LLC. In general, these companies are known because of producing high-quality electrical connectors being used in various industries or agricultural branch itself [1], [2].

At second we'd like to mention some technical features of M55116 Audio Circular Connector Series paying attention on such fact that I n comparison to other audio connectors the M55116 Series stands out for its durability and resistanceto external factors. For instance, the series features a robust metal constructionand a moisture-sealed design that makes it resistant to moisture, dust or even vibration.

At third we'd like to announce the practical sphere of the abovenamed device application. This makes it an ideal choice for applications where harsh environmental conditions are present [3].

One of the most common applications of the M55116 Series is in military equipment exampling radios, intercom systems and tactical communication devices. The series is also used in medical devices exampling hearing aids and diagnostic equipment either for human beings or in veterinary medicine as well as in aviation or scientific instruments elabotation [1], [4].

At last we'd like to come to conclusion that M55116 Audio Circular Connector Series is a reliable andversatile connector series being used in various industries where the transmission of audio signals is required. Its durability, to external factors resistance well as as wide range of connector types and sizes make it a popular choice among engineers and designers to prove interconnection of scientific interests either for electrician or specialist in automation as well as robotic system engineer or biomedical engineer himself. Moreover, the studying of linguistic units while reviewing text about M55116 Audio Circular Connector may improve the level of scientific speech practical use stressing on usage such specialized words as resistance to external factors, intercom systems and tactical durability, communication devices, applications, harsh environmental conditions, connector supplier, high-quality electrical connectors, audio frequency, moisture, dust, audio signals, etc.

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FMAD CP FILTERS

Nowadays it's important to select electronic details paying attention on 3-phase compact filters with a neutral conductor.

Our aim is to announce basic statements about the mentioned electronic component on the bases of some Internet sources ([1], [2], [3]) in order to make it more popular and attractive while adequate electronic components selecting.

At the first stage we'd like to note that the completely newly developed -phase compact filters with a neutral conductor. are the ideal replacement for the SCHURTER FMW4-65, offering at least the same, but rather higher performance at lower weight. SCHURTER's FMAD CP is the title of the latest 1-stage filter family for 3-phase systems with neutral line. Thanks to their extremely compact dimensions and high performance, the new filters are ideally suited to the tight space conditions in today's machine and equipment construction. Moreover, because of an extended temperature range they can also be used in critical applications.

At the second stage of our report it's worth to say that new filter family is ideally suited for devices with high EMC loads at low or medium power. Typical applications include converters for photovoltaics, battery storage or charging stations for electric vehicles. These powerful, particularly compact filters are also the first choice for modern frequency inverters for motor control. The FMAD CP filter series has $6.3 \times 0.8 \text{ mm}$ plug-in connections for quick and easy wiring. Thanks to a metal flange, a good earth connection is guaranteed while being screwed to the chassic application.

At the third stage of our report we'd like to detalize some relevant technical characteristics of the mentioned device. The standard versions can be used over a temperature range of -40 °C to 100 °C. The filters are designed for currents from 3 A to 20 A at an ambient temperature of 50 °C. They have ENEC and cURus approval and are recommended for applications up to max. 520 VAC. Versions with different leakage currents are available for various applications: for industry ≤ 3 mA, standard ≤ 0.5 mA and for medical technology $\leq 5 \mu$ A. Although the new filter family is already equipped with very high-quality components, an even stronger filter effect may be required for particularly demanding applications. This is where the "High Performance" version comes into game. Thanks to compact chokes with particularly high inductance and a larger X capacitor, both

symmetrical and asymmetrical interference can be suppressed even more effectively.

Thus, the completely newly developed FMAD CP filters are the ideal replacement for the SCHURTER FMW4-65, offering at least the same but rather higher performance at lower weight. The perspectives of research lay in the further attempts to use the abovenamed device component on practice while studying at the laboratory of the NULES Department of Automation and Robotic Systems named after I. Martynenko

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MULTI-RAIL POWER SUPPLIES

Nowadays it's important to find adequate technical solutions while mounting different automatic installations.

Our aim is to represent a power supplier as the first turn important electronic component to be in need for every bioengineer, power engineer or specialist in automation focusing on reviewing adequate Internet information [1], [2], [3].

We'd like to start from general representation mentioning that power supplies are electronic devices that provide electrical power to other devices or components. They are commonly used in computer, television and another electronics in the most cases to connect a. c power from the wall outlet into d.c. power that can be used by electric device itself. There are different types of power supplies like DC power supplies. An AC-to-DC power supply operates on an AC input voltage and generates a DC output voltage,AC power supplies to be programmable, uninterruptible, bipolar power supplies etc.

It's worth to know that power Supplies are an integral part of any electronic device. It is electrical equipment to provide a stable and uninterrupted supply of electricity to various electronic devices. Power Supplies can be built-in or external, depending on the design of the device. Moreover, pay attention that power suppliers are used in a variety of applications including computer hardware, medical equipment as well as in automotive electronics, industrial automation and much more additional kinds of electronic technique. In computer systems power suppliers are responsible for powering all computer components exampling processor, video card, hard disk and others Modern power supplies all come with a bunch of safety features and long warranties so as long as your <u>PSU has enough wattage</u> for your build you can safely overclock your components (<u>CPU/GPU</u>) and do intensive tasks with no issues. [1].

Besides, we'd like to represent the fact that there are many companies in the world that produce modern power suppliers, including Corsair, Seasonic, EVGA, Thermaltake, Antec, Cooler Master, and many others. These companies have an excellent reputation in the electronics industry and produce high-quality products.

The practical use of the represented information may be dealt with opportunity to compose some dialogues being relevant to the everyday life of specialist in automation examplinf the following abstract concerning the situation when consumer's call to the technical support of a power supply manufacturer: "- *Good afternoon I have smoke coming out of the power supply, what should I do? Employee: - You need a new power supply. –No I don't, I need the old one to stop smoking. – You may not understand me, but you need a newpower supply. –Why do I need a new one? Just tell me what to do tostop the smoke coming out of the old one to keep the smoke out. - Type "no smoke" into autoexec... Five minutes later. – It's not working. – Then you need a new power supply. –No, I need the old one to keep the smoke out. - You're running Windows? - Yeah, I do. - Okay. Call Microsoft tech support... and they'll explaineverything... Ten minutes later... Same User - Good afternoon, I need a new power supply. S (surprised) – Uh ... can I ask ... what did Microsoft tellyou? – Turns out it was very simple: the "no smoke" command does not work with my power supply''.*

In the future we'd expect power supplies to become even more energy efficient and smaller in size, while maintaining their high performance. In addition, I expect developers to work on uninterruptible power supply technologies to ensure that electronic devices continue to operate in the event of a power outage.

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ALLEGRO ACS71240 INTEGRATED CURRENT SENSOR

Nowadays it's important to be involved into technical students' scientific observation starting from observing and analysis of modern electronic components in general and paying attention on integrated current sensors themselves.

Our aim is to observe technical parameters and analyze the functioning of Allegro ACS71240 integrated current sensor as a concrete perspective item among the range of modern integrated current sensors [1], [2]. [3]. Information for this abstract was mainly sourced from multiple industry publications, technical articles, and the ACS71240 datasheet[1]. It's worth to know that these sources highlight the advanced features and performance of the ACS71240 integrated current sensor, positioning it as a leading solution in the field of current sensing technology. With its exceptional accuracy, temperature compensation, programmable gain options, low power consumption, fast response times, and compact form factor, the ACS71240 is revolutionizing current sensing in numerous industries, enabling innovative solutions in areas such as energy management, industrial automation, and power electronics.

We'd like to start our report with its origin mentioning as well as its first advantage saying that theACS71240 integrated current sensor, being developed by Allegro Microsystems, is a cutting-edge device that has garnered widespread recognition for its advanced features and exceptional performance in current sensing applications. Leveraging Hall effect technology, the ACS71240 offers precise and efficient measurement of DC and AC currents up to 40A, with minimal offset error and high accuracy [1]. The sensor's temperature compensation and programmable gain options further enhance its performance, making it adaptable to various operating conditions.

The second stage of our report is noting one more special feature of Allegro ACS71240 integrated current sensor informing that standout features of the ACS71240 is its low power consumption, which is critical in applications where energy efficiency is a priority. The sensor's fast response times make it ideal for applications that require real-time current monitoring and control, such

as motor control, power management, energy monitoring, and industrial automation. The ACS71240's high performance and reliability have made it a popular choice among engineers and designers seeking cutting-edge current sensing solutions.

The third stage of our report is paying attention on the abovenamed device practical use mentioning that the compact form factor of the ACS71240 makes it easy to integrate into existing systems, offering flexibility in design and installation. The sensor can be easily incorporated into circuit boards or other electronic devices, enabling precise current measurement in tight spaces or complex systems. Additionally, the ACS71240 features a wide supply voltage range, making it compatible with various power supply configurations.

In the end of our report we'd like to come too conclusion that the ACS71240 integrated current sensor from Allegro Microsystems represents a significant advancement in current sensing technology, offering state-of-the-art features and exceptional performance for a wide range of applications. Its versatility, reliability, and ease of integration make it a popular choice among engineers and designers seeking precise and efficient current sensing solutions for their projects.

Thus, the ACS71240 integrated current sensor by Allegro Microsystems is a cutting-edge device that offers advanced features and exceptional performance in current sensing applications. With its precise measurement capabilities, low power consumption, fast response times, and compact form factor, the ACS71240 has become a popular choice among engineers and designers for a wide range of applications. Its versatility, reliability, and ease of integration make it a top choice for industries such as energy management, industrial automation, and power electronics. With its innovative technology and reliable performance, the ACS71240 is driving advancements in current sensing and enabling new possibilities in various industries.

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FIVE ADVANTAGES OF MAGALFA CONTACTLESS ANGLE SENSORS

Nowadays the problem to obtain some modern reliable components for automation systems is becoming increasingly important because of their tendency to become more complex and demanding as it was previously mentioned by such scientists in the area of electronics as H. Qi et al. (2018) or R. Kaczmarek et al. (2019) who have investigated various aspects of sensor reliability and fault detection regarding to automation systems as the advancing technology for humanity [2].

Our aim is to pay attention on MagAlpha Contactless Angle Sensors because earlier in our opinion it was a great problem with the accuracy and reliability of traditional angle sensors which were prone to wear and their measurements could be affected by some environmental factors exampling dust or temperature changes.

Before starting our report we can not do without announcing such fact that some leading manufacturers of MagAlpha Contactless Angle Sensors include AMS, Infineon, Osram and Melexis to produce the sensors to be available in various form factors and interfaces including SPI, PWM as well as some similar features outputs[1], [3].

The result of our noting the first advantage of MagAlpha Contactless Angle Sensors is announcing the fact that they use contactless technology, eliminating wear and improving accuracy being in work process in harsh environments and providing reliable measurements even in the presence of magnetic fields and electromagnetic interference and the result of our noting the second advantage of MagAlpha Contactless Angle Sensors is announcing the fact that they were developed by Austria Microsystems (AMS) to be previously known as a leading manufacturer of high-performance ICs and sensors replacing elements.

Besides, the result of our noting the third advantage of MagAlpha Contactless Angle Sensors is focusing on the statement that they were firstly introduced in 2015 and have become widely adopted in various modern automatic applications and the result of our noting the fourth advantage of MagAlpha Contactless Angle Sensors is mentioning the sentence that they propose several advantages over their analogues, including higher accuracy, faster response times and lower power consumption as well as they are used in a wide range of devices including automotive, industrial or consumer electronics. Moreover, the result of our noting the fifth advantage of MagAlpha Contactless Angle Sensors is noting their ability to provide high-resolution measurements, up to 14 bits, while maintaining low latency and high update rates which makes them ideal for applications that require precise control and feedback like robotics and automation systems.

Thus, taking into account the abovenamed five advantages of MagAlpha Contactless Angle Sensors we consider them to become very important notable devices in the field of automation which favours development of advanced control algorithms, the integration of sensors and actuators as well as the use of machine learning and artificial intelligence to optimize performance or to reduce energy consumption.

The prospect of further research in this field includes the development of new sensing technologies, the integration of multiple sensors and modalities, and the use of distributed control and communication architectures. on the basis of the Department of Automation and Robotic Systems named after I. Martynenko within the National University of Life and Environmental Sciences of Ukraine as well as to involve some foreign terms like *improving accuracy, reliable measurements, contactless sensors, automatic applications, ability to provide high-resolution measurements, low latency and high update rate advanced control algorithms, the integration of sensors and actuators, artificial intelligence, to reduce energy consumption.* etc. into everyday foreign speech usage of the future specialists in automation not only on the professional purpose English lessons but also in everyday students' life discussions out of class itself.

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EFINIX TRION DEVELOPMENT KIT

Nowadays it's important to start scientific observation from the first courses of studying to become specialist in automation in order to observe and to specify different electronic components for visual purpose automatic installations in need.

Our aim is to analyze technical parameters and perspectives of practical use of Efinix Trion T120 BGA324 Development Kit as a modern tool being based on several adequate internet sources ([1], [2], [3], [4], [5], [6], [7], [8]) to make own conclusions.

We'd like to start our report with mentioning such fact that Efinix Trion T120 BGA324 Development Kit is an excellent tool for prototyping camera subsystems with common camera modules that require the latest MIPI CSI-2 v1.3 camera sensors. The kit's multiple high-speed MIPI connectors make it an ideal choice for applications that need to interface with these sensors to be visualized with the following image1 :

Besides, it's worth to mention that in the field of creating microwave emitting devices, finding reliable parts has been a challenge. However, companies exampling BIP Roottek, TDK, Abracon LLC, and Johanson Technology have worked to address this issue. Johanson Technology's miniature RF ceramic chip antennas, which are made using low temperature co-fired ceramic (LTCC) technology, offer great reliability and versatility. These antennas have high dielectric constants and extreme temperature stability, making them ideal for use in a variety of applications [8].

At the second stage of our report we'd like to inform that LTCC Substrate with Embedded Passive Components structure is an interesting innovation to allow embedding of low- and high-dielectric constants inside the antenna enabling the antennas to maintain industry-demanding performance while still being easy to tune to any unique PCB environment ([9]) obtaining a range of technical components like T120 FPGA in a BGA324 package with MIPI CSI-2 interface and DDR DRAM controller, LPDDR3 256 Mbits x 16 bits memory, HDMI 1080p transmitter for video output as well as Triple-speed Ethernet PHY, 4 user LEDs, 2 user pushbutton switches, 2 user DIP switches being designed to accommodate up to 7 daughter cards or two 12-pin PMOD-compatible GPIO sockets, 40-pin header to connect to Raspberry Pi computer, 60-pin GPIO and configuration

expansion headeras well as 10, 20, 25, 30, 50, and 74.25 MHz oscillators, micro-USB port or SPI and JTAG headers to facilitate configuration [1].

At the end of our report we'd like to come to conclusion that LTCC technology has general value, as it is an important detail that ensures great reliability and versatility. While removing this detail may sometimes save money, it could also result in a device working incorrectly. Therefore, LTCC technology should be considered an essential part of any device that requires reliable microwave emitting capabilities.

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THE REASONS TO APPLY FUNCTIONAL SAFETY MICROCHIPS

Nowadays it is in need to solve the problem to find and to apply multifunctional safety devices being dealt with the modern needs of specialists in automation.

Our aim is to announce to the necessity to design and to use Microchip Functional Safety Ready AVR DA MCUs as the reliable electronic devices dealing with the requirements to solve the main problem being faced automation engineers concerning the lack of a reliable and cost-efficient microchips for integrating safety features. Moreover, it's worth to pay attention on the abovenamed devices taking into account its famous producer - the developer of Microchip Functional Safety Ready AVR DA MCUs is Microchip Technology Inc. being known as the leading provider of microcontroller and semiconductors analog due to many years experience in the field of those safety-critical systems that meet the demanding requirements of the automation industry.

According to our recent publications review ([1], [2], [3]) we stated several reasons to apply functional safety microchips exampling the first fact that these MCUs always offer the advanced safety features and functional safety compliance are designed to meet the rigorous safety requirements of industrial applications to replace old-fashioned complicated and expensive safety systems requiring significant resources for implementation and maintenance.

The second reason to apply Microchip Functional Safety Ready AVR DA MCUs deals with the statement that they offer providing a microcontroller that is designed specifically for safety-critical applications and the third reason concerns the fact that the mentioned devices are compliant with the ISO 26262 standard as the sample of the highest safety standards for automotive and industrial applications.

The third reason to pay attention on Microchip Functional Safety Ready AVR DA MCUs is that it's based on a wide range of automation and control systems including safety-critical applications in automotive, industrial, and agricultural sectors offering a cost-effective and reliable solution for integrating safety features into these systems, reducing the complexity and cost of implementation.

The fourth reason to use Microchip Functional Safety Ready AVR DA MCUs is grounded on the statement that they are available in various packages and configurations to meet the specific requirements of different applications obtaining some analogs like XMC4000 and STMicroelectronics&apos or STM32G4 to replace it in need due to the offering of similar safety features and compliance with safety standards.

The fifth reason to apply Microchip Functional Safety Ready AVR DA MCUs

deals with the fact that they offer a reliable and cost-effective solution for integrating safety features into automation systems.

Thus, taking into account the abovenamed five advantages of Microchip Functional Safety Ready AVR DA MCUs we consider this innovation to be important recent development in the field of microcontrollers that address the growing demand for reliable and safe automation systems being compliant with the highest safety standards and have been developed by one of the leading providers of microcontrollers and analog semiconductors. Further research in this area may lead to even more advanced safety features and greater reliability in automation systems.

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MODERN ONLINE SCHEMATIC AND DIAGRAMMING TOOL

Nowadays it's important for every skilled power engineer as well as for freshman in this specialty to be aquainted with some computer means on order to provide himself with adequate modern technical tools to solve the problem with the engineering projects layouts drawing.

Our aim is to attract your attention to such programming drawing tools as Scheme-it, Lucidchart and Draw.io basing upon practical need to deal with such programs in real time lessons being devoted to engineer's drawing skills development on the basis of adequate Internet sources review [1], [2], [3].

From the very beginning of our report we'd like to introduce Scheme-it as an important online tool for creating flowcharts, wiring diagrams or other schematic images being launched by Digi-Key Electronics in 2012. Scheme-it has been widely used by engineers, designers, and students who were looking for a convenient way to create and document their projects. The service provided users with access to over 1,000 electronic components and the ability to share their projects with others, as well as export them to various formats such as PNG, SVG, PDF, etc. Taking into account the previous advantages of Scheme-it which was widely used by engineers-designers and students for many years we can not miss the statement that it is no longer a popular service. It has been replaced by more powerful and functional diagramming tools exampling Lucidchart and Draw.io.

Thus it became turn to represent Lucidchart as an online tool that provides users with a variety of features to create professional diagrams as well as to share them or work on them collaboratively with others. It's worth to say that abovenamed platform obtains a user-friendly interface that enables users to create various types of diagrams including flowcharts, wiring diagrams, and other schematic images.

Having represented Lucidchart we'd like to speak about Draw.io as about a free online diagramming tool that allows users to create flowcharts, wiring diagrams, database diagrams as well as other types of diagrams. It has a large number of components and features that enable users to create complex and detailed diagrams. Draw.io is free, open-source and compatible with multiple platforms including Google Drive, Dropbox or OneDrive representatives. In the end of our report it's worth to come to conclusion that scheme-it was an innovative online tool that allowed engineers, designers and students – future technicians to create and document their projects. However, due to the emergence of more powerful and functional diagramming tools like Lucidchart and Draw.io, Scheme-it is no longer as popular as it previously was. Users can now access more advanced features or create complex and detailed diagrams using these tools.

The perspectives of our scientific investigation is in step-by-step analyzing of conctrete technical layout designing with the application of the abovenamed programming drawing tools in order to solve concrete task to be in need to be solved while mathematic draing tasks fulfillment as well as the represented material may be studied further while studying professional purpose English paying attention on introduction into own students' speech such terms as *creating* flowcharts, wiring diagrams, powerful and functional diagramming tools, open-source, multiple platforms, etc.

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THE ROLE OF TWO-FACTOR AUTHENTIFICATION TO INCREASE COMPUTER USER'S SAFETY

The modern image of the world is formed in correlation with the strengthening of human creative potential and the possibilities of digital technologies, the Internet, artificial intelligence, and numerous media products within the combination of human and artificial intelligence, etc. being investigated by V. Kremen, V. Bykov and others [4; 2-3]. The emergence of computer technologies and the active digitization of society have created a public demand for authentication methods based not only on traditional cryptographic methods (encryption, hashing, digital signature), but also on the use of several factors that ensure the authenticity of an individual and intensify the problem of user security.

We'd like to start with two-factor authentication definition regarding it to be identification method that requires a user to provide two pieces of information to gain access and sign in to an account exampling a phone number, an email address or an answer to some secret question. Therefore, two-factor authentication (2FA - Two-Factor authentication) requires the user to confirm his identity twice, which increases security and protects confidential data. This 2FA method usually dramatically reduces the possibility of identity theft online, as knowing a password alone is not enough to commit electronic fraud. [2]. However, twofactor authentication approaches remain vulnerable to phishing and man-in-themiddle attacks meaning the most popular 2FA method as the user's password and SMS with verification codes being generated by OTP (One Time Password) technology and being sent to the user's smartphone. Confidence in the reliability of the 2FA method determines its use for the most responsible operations - from authorization in Google (access to mail, cloud storage, contacts and all information) to client-bank systems. M. Markina notes that the US National Institute of Standards and Technology (NIST) published a preliminary version of the future Digital Authentication Guideline criticizing SMS OTP in the summer of 2016. The main concerns of the experts of the National Institute of Standards and Technologies were that the phone number could be tied to the VoIP service. In addition, attackers can try to convince the service provider to change the phone number and obtain the access code. Although the document recommends that manufacturers use tokens and cryptographic identifiers in their applications, the authors of the amendments also note that "a smartphone or other mobile device can always be stolen, or can be temporarily in the hands of another person," the NIST document says. Scientists from the University of Amsterdam R. K. Konoth, V. van der Veen and H. Bos demonstrated an attack using the installation of a vulnerable application through Google Play. They managed to successfully bypass the Google Bouncer check and activate the application for intercepting one-time passwords [5; 87-88]. So, the disadvantage of two-factor authentication is that an attacker can pick up the user's password and intercept the SMS message with the generated codeDespite the shortcomings of 2FA, we agree with the opinion of V. Balatska, O. Polotai, and A. Puzyry that two-factor authentication should be provided primarily for accounts with administrator rights and those who have access to confidential information. This is a powerful step to prevent data theft and possible financial losses [1; 290].. This method increases protection against direct hacker attacks, such as brute force password mining and login and password theft using infected software.Special services are used to implement authentication.

Secondly we'd like to mention Google Authenticator as a mobile application being used for two-factor authentication in Google accounts and third-party services. Implemented for multiple mobile platforms, does not have the ability to initialize on multiple devices. The secret keymay be integrated into the application as a QR code or entered manually. Settings in the application are presented only by means of time synchronization with Google servers. The authenticator generates a 6- or 8-digit one-time password, using open standards HOTP and TOTP algorithms. These passwords are used as a second authentication factor and are applied after the correct login and password are entered. The password is valid for 30 seconds, which prevents it from being used multiple times. Microsoft Authenticator is a mobile app that helps you sign in to accounts using two-factor authentication. Works with any account that uses two-factor authenticator chooses a six-digit password that is displayed under each added account. The password is valid for 30 seconds, which prevents the code from being used multiple times. Initialization of the account takes place by scanning the QR code or entering the code manually. It is not possible to initialize one account in several applications on different devices at the same time [6; 55-56].

Finally we'd like to pay your attention on Fingerprint authentication systems, which are based on large databases of fingerprints and provide secure access to computers, front doors, cars, ATMs, etc., as well as facial and voice authentication systems, have become the most widespread, since most modern electronic devices have video and audio equipment. However, technologies for recognizing facial features require further improvement, because they depend on fluctuations in lighting, which affects the recognizability of a person. Voice authentication systems rely on such features as the pitch, modulation and frequency of the sound, which are unique characteristics for each person and are more amenable to verification.

We'd come to conclusion that such giant companies as Google and Microsoft provide confidence in the correctness and stability of the selected authentication factors.in addition, there are different types of two-factor authentication: password, hardware, eToken, etc. Biometric authentication is considered the most advanced system because it relies on the physical properties of an individual or a group of people. Biometric authentication is generally an improved version of password authentication, only instead of a password or PIN code, the user "enters" his physical parameters. It is quite easy to use, but complex in construction and costs for it. Biometric authentication uses: fingerprints; geometric shape of the hand; shape and size of the person; features of the voice; iris and retina pattern, etc. [3]. . Special services (Google Authenticator, Microsoft Authenticator) are used to implement authentication. There are different types of two-factor authentication: password, hardware, eToken, etc. The most advanced system is biometric authentication, which can be used to authenticate users on local devices or in a corporate network. An important factor in ensuring the security of information is the timely involvement of the latest security tools and means.

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TRANSPORT IN A LIFE OF A UKRAINIAN SOCIETY

The role of transportation in the national life of Ukrainians cannot be overstated.

There are several reasons for this, including Ukraine's large size, its diverse terrain, the importance of economic and social connectivity, and historical factors.

One key aspect of transportation in Ukraine is the country's road network. Ukraine has the second-largest road network in Europe. The main highway system covers almost the entire country and is an essential part of the national transportation infrastructure. The modern network consists 99% of roads for public use with 12% assigned as of state importance and 87% - local importance. The whole network of all automobile roads (roadways) consists of some 172,400 km (107,100 mi) of which 164,100 km (102,000 mi) - have hard surface or 95.19%.

Ukraine's railroad network is also significant. With over 22,000 kilometers of railroads, Ukraine has the second-largest railroad network in Europe. The main railway routes connect Ukraine's major cities, providing a vital means of transport for passengers and cargo.

Water transport is another important aspect of transportation in Ukraine. The country has thousands of kilometers of navigable rivers and a significant coastline along the Black Sea. Water transport is one of the oldest forms of transportation in Ukraine and continues to play a critical role in the country's economic and social development.

The State Service of Maritime and River Transport of Ukraine (Ukrainian: Державна служба морського та річкового транспорту України) (shortened to Maritime Administration) is an agency of the Ukrainian government under the Ministry of Infrastructure whose activities are aimed at implementing state policy in the field of sea and river transport of merchant shipping, navigation on inland waterways, navigation and hydrographic support of navigation, as well as in the field of safety in sea and river transport.

The country's air transport network includes dozens of airports, and air transport is a vital link between Ukraine and other countries. There are different ways of measuring air transport's impact on an economy. We look at three: the jobs and spending generated by airlines and their supply chain, the flows of trade, tourism and investment resulting from users of all airlines serving the country, and the city pair connections that make these flows possible. All provide a different but illuminating perspective on the importance of air transport. Airlines, airport operators, airport on-site enterprises (restaurants and retail), aircraft manufacturers, and air navigation service providers employ 24,000 people in Ukraine. Foreign tourists arriving by air to Ukraine, who spend their money in the local economy,

are estimated to support an additional 38,000 jobs

The role of transportation in the national life of Ukraine during wartime has changed significantly due to the impact of the ongoing conflict with Russia. The country's transportation infrastructure has been heavily affected by the conflict, with some roads, bridges, and other forms of transport being damaged or demolished.

On the other hand, transportation has also become especially important during wartime as a means of supplying military personnel, equipment, and aid to the front lines. Trains, trucks, and other forms of transportation have been used to carry soldiers, weapons, and food to areas where they are needed the most.

The ongoing conflict has also resulted in the displacement of millions of Ukrainians, and the transportation of refugees to safer areas has become a critical issue. The Ukrainian government and humanitarian organizations have been working to provide transport for refugees, using buses, trains, and other forms of transport to help people escape the fighting.

In terms of economic impact, the conflict has had significant effects on Ukraine's transportation infrastructure. Many roads and bridges have been damaged or destroyed, making it more difficult for people to travel and for goods to be transported. This has had a negative impact on Ukraine's economy as a whole, with transportation costs rising and economic growth slowing.

Despite these challenges, transportation remains an essential part of Ukraine's national life, both during wartime and in peace. The country's transportation infrastructure is vital for economic growth, social connectivity, and military operations, and will continue to play a critical role in the country's future.