

NEW INTELLIGENT TECHNOLOGIES- THE PROBLEMS AND OPPORTUNITIES

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ABSTRACTS

In this paper attention is focused on threats to people and security, which may be caused by the intelligent technologies of the recent years, such as neural networks, deep learning, and artificial intelligence. In nowadays, the mobile companies, social networks, various computer applications, smart devices constantly collect data for people without they know it, and then are used to develop intelligent software systems to predict future behaviour. One of the ways to protect citizens is to change the approach to the use of technology. At present, people do not understand the dark side of the platforms until they are involved in activities leading to personal and financial losses.

KEYWORDS: neural networks, artificial intelligence, smart communications, risks, critical issues

The aim of this report is to demonstrate the importance of the new technology development, from one hand, and to show some threats for the citizens and media, from another hand. The problems of developing intelligent and smart technologies have two dimensions technical and non-technical. Technological problems affect the construction of the network, the introduction of communication protocols and the definition of mechanisms involved in intelligent objects. A special Internet Protocol (IP) for Smart Object Alliance (IPSO Alliance) has already been created. Another problem is the standardization of smart sites or it is one of the most important factors in the development of technology. Intelligent systems are characterized by a huge number of devices, applications of many manufacturing companies with different specializations. With the help of standardization, on the part of manufacturers and system equipment, a new Internet system should be built. The more one technology is standardized, the greater of its successful application in practice and its acceptance by the business. In the past few years, there has been a boom in publications in the media, on websites and in specialized journals about the role and importance of artificial intelligence for economics and innovation. Projections of the development of such technologies are more than optimistic, although real achievements are not so noticeable. It can be said that there are more problems than significant success.

Technology development ahead of the pace of building competencies in the web environment. Undoubtedly, there is a huge impact of new intelligent platforms on the life of people and the development of new media platforms. The balance of the media ecosystem in the modern world of information and network environment plays an important role in preventing the creation of sub-systems or conceptual orientations leading to mass control over the habits and behavior of citizens. Below we show the principal scheme of one hypothetical semantic chain(Fig. 1)

Semantic chain and connections between basic terms related to problem situation development:

- Problems: global, complexed and types of puzzles (decision and management)
- Threats: H-entropy, incomplete information, uncertainty
- Risks: analysis, evaluation and prognosis
- Conflicts: resolution and management
- Crisis: prevention, reactions, response, management.

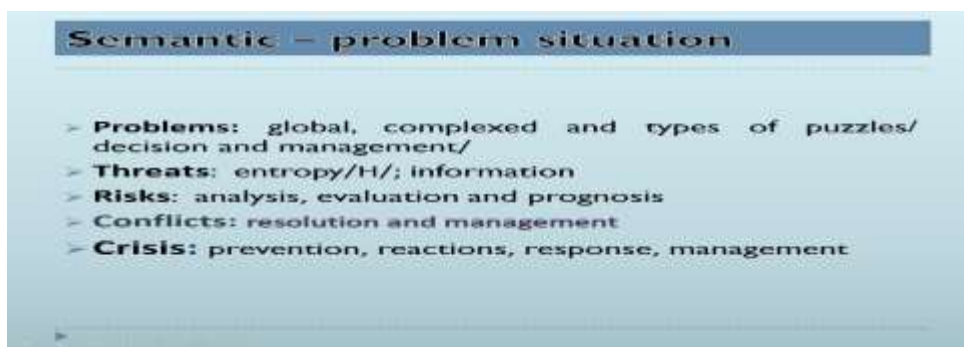


Figure 1. Semantic chain related to problem situation development

A special website (whatis.com) says that an intelligent system is a machine with embedded computers connected to the internet that can collect, analyse data and interact with other systems. The main features of such a system are the ability to learn from their own experience, to adapt to the situation in accordance with the data obtained, to manage remotely. Intellectual systems include not only “smart” devices, but also a set of other similar devices. A more sophisticated intelligent system is based on specialized software and may include chat and expert systems. In this case, embedded systems can process and analyse data or specialize in a specific type of task. An intelligent system can also be an important component of the Internet, providing automatic data transfer based on human-computer interaction. For example, technology-based intelligent data analysis, artificial intelligence, and neural networks were introduced in the 1960s, being the subject of many studies, publications, experiments, and developed projects. Interactive technologies and architectures, big data, neural networks have been actively developing in recent years as a result of improved capabilities of computer systems and accumulated knowledge in these areas of modern science. In this case, one can hardly speak of a “revolution”, but rather there is a slow gradual accumulation of experience

and knowledge transfer until the current level of network technologies is reached. It can be said that this is the Papert's Principle: "some of the most crucial steps in mental growth are based not simply on acquiring new skills, but on acquiring new administrative ways to use what one already knows".

Most of the research in the field of "artificial intelligence" is devoted to finding methods that can divide the problem into small sub-tasks, and then, if necessary, divide into even smaller parts. The most effective way to solve a problem is to know how to do it now. Under this condition, we can avoid the entire search process. Another area in the field of artificial intelligence is to find ways to integrate knowledge into machines. The problem here is how we discover the knowledge we need in order to learn how to represent this knowledge and, finally, develop a process that evaluates the effectiveness of our knowledge. In 1968, Marvin Minsky and Seymour A. Papert published the book "Perceptrons", demonstrating the capabilities and limitations of a simplified neural network. This book is also the first parallel study using a computer. Work is important for the further development of artificial intelligence. The idea that protects authors is that intelligence can arise from the activity of networks, such as neurons. Some elements of AI computers include the following basic actions: speech recognition, self-study, planning and troubleshooting. Research in the field of artificial intelligence are high-tech and specialized. The main problem in this case is how to program computers to gain knowledge; logics; identify problems; planning ability; perception; possess properties for manipulating and moving objects. Knowledge engineering is an important part of AI /Artificial Intelligence / research. Machines must be able to act and react in the same way as humans, provided they have enough information about the world. It is assumed that artificial intelligence platforms have access to objects, categories, qualities, and corresponding relationships between these important elements and can design things. Machine learning is another important part of AI. Training without external control still requires the ability to identify patterns depending on the input information at the system input. On the other hand, machine perception is associated with the ability to use data from sensors integrated into the external environment; computer vision means the ability to analyse a visual signal. Robotics is an important area related to artificial intelligence, or robots need intelligence to solve various tasks, such as manipulating objects and navigating, solving problems with location and display.

In the specialized website [techtarget\(searchcio, 2019\)](#), artificial intelligence is defined as a kind of simulation of human intelligence, implemented using machines and computer systems. The main processes in this case are training, obtaining information, arguing and correcting behaviour when conditions change. The practical application of AI can be implemented in the field of expert speech recognition and machine vision systems. The term "artificial intelligence" was commissioned in 1955 by American computer scientist John McCarthy, at a conference in Dartmouth, and has since developed as a separate discipline. In 1958, McCarthy created a special programming language called LISP. In the 1980s, during the boom in the development of artificial intelligence, the LISP language became the favourite of programmers who develop software to solve complex problems. This is the era of LISP machines manufactured by various companies, the most famous of which is Symbolics. Minsky, along with McCarthy in 1959, developed the "Artificial Intelligence Project" at the Massachusetts Institute of Technology. Today is called the "Laboratory of Computer Science of Artificial Intelligence." Minsky (Encyclopedia Britannica, 2019) defines AI as the science of creating machines that perform actions that require intelligence, if they are made by people. In 1986, he published his book,

“The Society of mind”. In the vocabulary(Minsky, 1985) developed at the end of the books he defined the basic concepts related to the direction of intelligence and artificial intelligence, which are shown below to identify semantic dependencies.

Artificial intelligence - area of research solutions as machines to do things in a way that corresponds to intelligence.

Machine Agent - Any part or process of thinking that is sufficient for understanding mental activity. Sensor is an agent that affects other agents.

Interaction - the effects that one part of the system has on the other. It should be noted that in the history of science, almost all phenomena are explained in terms of the interaction between parts during.

Another area in the field of artificial intelligence is to find ways to integrate knowledge into machines. The problem here is how we discover the knowledge we need in order to learn how to represent this knowledge and, finally, develop a process that evaluates the effectiveness of our knowledge. The learning(Minsky,1985)) has two sides. Some of our mind learns to memorize success when some methods work successfully. Other parts of our mind learn mainly when we make mistakes, recalling circumstances in which individual methods do not work properly. Therefore, learning to succeed focuses on how we think, while learning to fail leads to productive thinking, but there is a less direct approach to things. Naturally, people learn more than their success than failure. On the other hand, learning “positive” learning leads to minor improvements. We can assume that there is no way to avoid some discomfort when we make significant changes in our thinking. In the online version of the encyclopaedia, artificial intelligence is defining as the ability of digital computers or computer-controlled robots to perform tasks typical of humans. This term is often used to describe projects related to the development of systems with intellectual characteristics typical of people, such as discovery, logical approach, generalization and study from previous experience. Despite advances in computer science, no program has yet been created that would correspond to human intelligence and flexibility, especially for tasks requiring a broader view of things and daily updating of knowledge. On the other hand, some programs can successfully solve expert and specific tasks; in this sense, artificial intelligence has limited application in such areas as medical diagnostics, computers for information retrieval, speech and text recognition. The neural network, according to the online encyclopedia, works in a manner similar to the features characteristic of natural networks of the brain. The purpose of an intelligent system is to represent relevant cognitive functions using problem-solving techniques and machine learning technology. Specialized site on the new technology "Fluid" analyses the achievements of IBM in the field of artificial intelligence to solve problems. Company teams use AI in three main areas:

- creating solutions for production problems;
- more effectively use people's skills;
- improved business timelines.

Examples of AI technologies:

- Automate system processes / robots can be trained to perform repetitive or routine tasks, usually performed by humans;
- Machine and reinforcement learning;
- Machine vision - the science of computer vision, used in medicine to analyse various types of photographs, as well as to identify signatures;
- Management of processes related to the recognition of human languages (NLP). It is used in the recognition of spam messages, text translation, speech recognition, and analysis of feelings;
- Robotics - engineering sciences, focused on the design and manufacture of robotic systems.

The modern history (A Brief History, 2019) of artificial intelligence began in 1956, when John McCarthy popularized this term. In the same year, Allen Newell, J. C. Shaw, and Herbert A. Simon of the Carnegie Institute of Technology held a public demonstration of the first AI program called Logical Theorist (LT). A year later, or in 1957, these three authors wrote a program to solve common problems, called GPS, demonstrated in 1959. It is also the first useful program in the field of artificial intelligence. The goal is to become a universal tool for identifying problems. The software is quite simple, but it can be improved in the future. In the period from 1952 to 1962, Arthur Samuel from IBM was preparing the first game program for chess players to improve their skills. In the early 1960s, Margaret Masterman and her colleagues from Cambridge developed a semantic web design that is used to translate texts. In 1962, the first industrial company to produce robots appeared. Thomas Evan in 1963 developed the ANALOGY program as part of his dissertation, defended at MIT, demonstrating that computers can solve analogue problems like those presented in IQ tests. During this period, Edward Feigenbaum and Julian Feldman published a collection of "Computer and Thought", a collection of articles on artificial intelligence. Alan Robinson in 1965 invented a special method that allows the machine program to work effectively with formal logic. Ross Killian in his dissertation shows the effectiveness of the semantic network. This year, the first artificial intelligence seminar was held in Edinburgh.

According to the Gartner Institute (Gartner, 2016), by 2020 the share of autonomous software agents without human control used in economic transactions will be 5 percent. It may be noted that such structures are present now, but they are controlled by people. New autonomous software blocks will be used in corporations, in the legal system and in business. Gradually, he will move to a programmed, algorithmic economy, which will also require new models of financial services. In the future, there will be new opportunities for banking, currency exchange, insurance and market changes. Currently, mobile companies, social networks and various computer applications are constantly collecting data for people, unaware of this, and are further used to develop intelligent software systems to predict future behaviour. As Rob McNamee (Robert, 2019) points out in combinations of similar systems with manipulative and Internet platforms, there can be unpleasant things for people. One of the ways to protect citizens is to change the approach to the use of technology. Currently, people do not understand the dark side of the platforms until they are involved in actions that lead to personal and financial losses. We, as consumers, have more opportunities to control the Internet and influence lifestyle. Today, platforms are limited to several technologies, such as Amazon Alexa, Google Home, Apple Siri, but very soon the data will attract us, such as television systems, cars, refrigerators,

toys, drones, and so on. As a result, the collected personal data can be used in intelligent systems and algorithms that can manipulate the attention and behaviour of the consumer in order to make a profit for the owners of web platforms. Now we have control over the extent of the Internet impact of items, because they are very poorly distributed as technologies. Experts advise people to think about the negative aspects of technology right now, before it is too late. Our voice is our experience is paramount. Otherwise, anti-utopian technologies will control our life in the near future. Excessive reliance on Internet platforms as something good and positive causes people to ignore warning signals of danger.

In the report from 2019, in the “Technology Review”(Giles, 2019) is analysed five threats related to the development of new intelligent machines, which will be discussed in more detail below.

- machines using AI can generate fake video and audio recordings. People can hardly tell how they correspond to what is happening. It is possible, with the help of false video from top managers of real companies, to provoke financial crises, especially when it is assumed that the video of top executives has economic problems. There are also “start-up projects” that offer software to detect fake video files, but their effectiveness and practical applicability are questionable.
- loss of protection against AI threats: security companies are trying to use artificial intelligence models to improve protection, but complex hacker attacks try to spoil such approaches. On the one hand, AI can facilitate the process of recognizing true noise signals, but on the other hand, such technologies in the hands of opponents can complicate attacks against business security. Another type of risk is that hackers can attack a data network used to one trained neural network to integrate malicious code, which shows that there is no danger from external threats and attacks on data and organization’s sites.
- hacking smart contracts. Intellectual contracts and related programs are stored in the form of blockchain structure, which, of course, can automatically change the form of some digital assets depending on conditions. Such contracts and contracts are widely used in business for both the transfer of funds and the transfer of intellectual property rights and property. Currently, hackers can use financial flows and commit millions of dollars of robbery. The main problem of block technologies is that the design is designed and focused on full transparency. With this approach, the protection of data associated with smart contracts is a serious problem, and some start-up projects are oriented in this direction, offering software to protect such systems.
- crack the code using the advantages of quantum computers. In the near future, quantum computing systems will have enormous computational capabilities in terms of fast data and information processing. This will unimaginably violate the traditional network and computer codes. Quantum machines are in the process of being developed and improved, currently with limited capabilities, and a similar threat will arise in a few years. But on the other hand, automotive software can be used for decades, and then easily manipulated. This is true, and with the protection of confidential data relating to financial contracts that are valid for a long period of time, they do not change, and then this threat becomes more than real. Recent reports and recommendations of professional expert groups on quantum electronic systems recommend switching to new models for programming and coding information in order to be resistant to quantum computer risks.

- attacks from the computer cloud. A large business that stores data from other small companies on its servers or in computer centers is always a super task for professional hackers. By destroying the security systems and walls of such mega-companies, it is easy to access their customers' data. Companies with cloud computing resources, such as Amazon, Google and Microsoft, are investing huge cybersecurity resources in their computer centres. On the other hand, the more attractive target for hackers are small companies that offer cloud services to their customers. Some of the threats and risks outlined above will become a mass practice soon, only occasional cases of such attacks are present. The recommendations of the expert centres are to prepare enterprises in advance for such risks in the future in order to more effectively protect them from new technological threats.

The neural networks imitate human behaviour and the nervous system in a very specific way, and such networks are built up of several interconnected “nodes” that process information. Like neurons, these specific computer points receive information signals from neighbouring nodes, and then imitate their own signals. Neural networks are trained to solve computer problems by analysing vast amounts of data, and now they are becoming an indispensable part of artificial intelligent systems, speech recognition platforms, automatic translators and self-guided vehicles. Neural networks, on the other hand, are also “black box” systems, when they are trained once (considering that developers have ideas about the data and the processes that they will process), their behaviour can also be unpredictable. In 2015 The Laboratory of computer science and Artificial intelligence at MIT has developed a special method for analysing processes in the so-called “black box” of a neural network trained to recognize visual scenes. Scientists present a fully automated version of the system. Today, neural networks are organized in the form of layers, and the data from the lower layers after processing are transmitted over the network. When using the method of visual data entered photos are divided into separate small parts, each of which points to a separate network node. Researchers can then trace the data processing process and determine how the network responds to a pixel in a photo.

Another publication (Wolchover, 2019) in August 2017 on the professional web site dedicated to new wired technologies discusses the problem area in the neural network known as the black box. Like the brain structure, deep neural networks have several neural layers, some of which are artificial fictions as part of computer memory. When neurons are activated, they send signals to the appropriate neurons from the upper levels, in-depth training, network connections are amplified or weakened, depending on the need to make the system more efficient when receiving input signals. The neural network can then learn from thousands of photographs or images stored in the system that help identify the object with high accuracy. Of special cases, a magical leap to generalized concepts occurs, and it transmits to the network additional power, like logical thinking typical of a person, in this case it can even be said about the creative process and other similar functions inherent in the intellect. Such structures are trained using a procedure known as “information transfer”. The method can be used to analyse the learning process and for larger neural networks. In practice, experts are faced with a huge amount of information, and the problem is how to process the data so that the extracted signals correspond to the tasks performed by the network. From the theory of Shannon it is known that information has no relation to semantics, but Naftali Tishby believes that this is not so with the neural network.

According to him, using information theory, the relevant information can be determined with great accuracy. In 2015, Nuga Slazovsky hypothesizes that deep learning is based on the principle of “transmitting information,” which in practice means compressing the data that introduces noise into the system in order to preserve and preserve valuable information for the task being performed.

Seven important principles (euronews, 2019) that can help a company using an artificial intelligence platform to solve potential problems, published on the site "euronews.com". The available problems were discussed at the World Economic Forum in Davos in 2019, related to the consequences of the “forth-Industrial revolution”.

- Accuracy-knowing what happens to business algorithms and the implications for companies;
- Transparency- to be open to change, to publicly talk about your problems and requires seven reliability, consistency, realism;
- Empathy - to be in direct contact with those affected by our services and products;
- Critical thinking - encouraging research and an honest answer;
- Strategic approach - based on scenarios, presentation of the results of the strategy implementation /being part of the community - important requirements /;
- Democratization of processes- avoiding centralization, constant control and narrative monopoly;
- Collaboration- to help decision makers and policy makers explain massive changes.

The report(weforum, 2018) prepared by World Economic Forum highlights some potential shocks that will be a serious threat to society in the coming years. We consider only some of the characteristics of risky situations.

- Algorithms can turn off the Internet: most of the fears are caused by the development of artificial intelligence systems, especially designed for dead robots and workplace automation; the analysis presents various low-level scripts-algorithms that can gradually destroy the Internet; people increasingly rely on automatic coding, but the code can only be reproduced, then we will lose tracking and control.
- War without rules: in discussions it is noted that the military actions of the 21st century will include not only weapons and missiles, but also mainly mass cyber-attacks. If critical points in a country's infrastructure are being subjected to attacks, which leads to disruption of basic services and human casualties, pressure will be put on government for revenge and revenge. The question is what happens if the target or opponent is mistakenly identified. There is currently no clear answer as to where the reaction will be blocked. Governments, more than ever, need to agree on common rules and protocols for cyber warfare, similar to those that exist for conventional wars. This will help prevent conflicts resulting from incorrect judgment.
- Internet blocking. If the cyber-attacks becoming common, they can interrupt or destroy the Internet. Countries need to build special digital walls if they want to protect themselves, but this is not the only reason. States may also take similar actions for economic protectionism. Regulation of diversity, censorship or repression. This will in the future

become an obstacle to the free flow of content and transactions, with the result that technological development will be delayed.

From a security point of view, Eric Schmidt (Schmidt, 2012) the former CEO of Google, points out three global problems related to the internet:

- hackers and cybercrime. When building the Internet, no one thought that the network would become a crime. A new type of cyber security industry is emerging;
- there is no button to delete information. Regulation, he said, is not the best way to protect the rights of citizens on the Internet. The idea is to introduce a special algorithm that classifies pages and assigns a certain rank depending on the accuracy of the information;
- censorship: law enforcement agencies, individual governments around the world control the network, filter information, create firewalls. In the future, in this direction, it is possible to achieve a state in which intelligent software can automatically delete not only our texts, but also our thoughts, voices, or all kinds of cultures.

Schmidt concludes that internet and technologies are like water, they will always make their way without obstacles.

Sir Tim Berners-Lee (Berners-Lee, 2019) in the new open letter published and devoted to 30 years of the history of the web pointed out that are three specific areas of dysfunction that can block further development of the web from network configuration:

- deliberate and malicious activity, such as government-sponsored hacks and attacks, criminal behaviour and online violence;
- a system design that creates false incentives when a user becomes a victim, when shopping revenue is measured by a “click” / content’s main goal is to attract attention and encourage the visitor to click a link to a specific page / viral distribution of misinformation;
- undesirable negative consequences associated with design, such as offensive tone and polarized discussions and the dubious quality of online discourse.

We will also focus on some aspects of the impact of new technologies (facetofacedigital, 2018) on the media:

- Accessibility: the technology allows you to transfer news and quality content using mobile applications and smartphones, the reader can reach the material much faster than with traditional means.
- Use of social networks: today most of the media use active social networks such as facebook, twitter and instagram.
- Involvement: through social networks, traditional news sites seek feedback and connect the reader with content. Comments help to improve the service of people in the future and get more information about interesting materials;

- Podcasting: the perfect way to stream audio programs, for example, using phones and computers. People listening to podcasts are easily trained to pay attention to discussions about politics, national issues and finances.
- Streaming: a new wave - puts the person at the centre of what is happening. This is achieved through funds such as YouTube Live or Facebook Live.

Key areas for improving information domain:

- mobility and ease transfer of media content;
- stability - requirements as result of non-standard environment in difficult problem situations;
- flexibility / interchangeability - creating unified and hybrid web platforms;
- simplicity - ease of technology application and software, minimal costs for employee training and quick development;
- accessibility - low costs when using technology.

CONCLUSION:

The development of new technologies such as artificial intelligence, smart machines, deep learning, the formation of cyber-physical reality, automatic processing of huge data, the introduction of analytical and cloud resources, on the one hand, leads to accelerated development of business and society, but, on the other hand, there are new threats, risks to the people, business and society that will require new types of professional skills and accelerated investments and innovations to protect the internet and network resources. Undoubtedly it is the fact of the impact of new intellectual platforms on the way people live and, on the development, and improvement of the media. In today's world, information literacy and network literacy play an important role in preventing the creation of systems or conceptual orientations leading to mass control over the habits and behaviour of citizens.

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