Artificial Intelligence: The New Inevitability of Contemporary Society

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Abstract

Artificial intelligence is one of the most fundamental areas of science and engineering. Its urban development began after the Second World War, and the name itself dates back to 1956. Today, artificial intelligence as a universal field is relevant to all intellectual tasks that tries not only to understand, but also to build intelligent entities. Given that today is characterized by facing increasingly serious environmental problems (challenges) such as climate change, loss of biodiversity, depletion of natural resources, air and water pollution, the need for innovative approaches that will help solve these problems is becoming increasingly urgent. Therefore, in this paper, we will present some of the possible ways of solving the mentioned problems. Given that the application of artificial intelligence is increasing every day and that it enters every pore of modern society, we will also make a brief review of artificial intelligence in the legal system of the European Union.

Keywords: artificial intelligence, legal regulation, fourth industrial revolution, climate change, European Union

Artificial Intelligence: The New Inevitability of Contemporary Society

As the fourth industrial revolution accelerates, innovation is becoming faster, more efficient and more accessible than ever before. The digital revolution has impacted all segments of society and transformed the way human beings function, even on a daily basis (Bjelajac & Filipović, 2021a). Also, technology is becoming connected in different spheres, especially regarding the merging of digital, physical and biological space. New technologies enable social change by influencing the economy, social values, and opportunities for future generations (Herweijer & Waughray, 2018). Concurrently with the emergence of scientific and technological advancements, a plethora of security challenges, risks, and threats manifest themselves (see more: Bjelajac, 2017; Bjelajac & Filipović, 2021b). Among other reasons, these risks and threats are generated by omnipresent human alienation (see more: Bjelajac, 2014).

Artificial intelligence is at the forefront of significant changes in the spectrum of technological innovations. In principle, it consists of two logical segments: one for maintaining and controlling the autonomous functions of artificial intelligence itself, and the other, a cognitive segment that manages the ability to process data and knowledge gathered through experience and learning (Bjelajac & Filipović, 2021c). One of the fundamental characteristics of intelligence in general, and consequently, artificial intelligence, is the ability to perceive relevant connections in specific situations (Bajac & Bjelajac, 2022). Artificial intelligence (AI) is leading to the transformation of the traditional environment of industrial production, services and everyday life. New discoveries driven by AI often do not work independently, but only in combination with other technologies of the fourth industrial revolution (World Economic Forum, 2017). Entrepreneurs, companies, investors, etc. They want to exploit and extend the impact of AI on the current characteristics of technologies to create a strategic advantage.

In their work, Hunter and Hewson (2020) presented the most catastrophic threats facing humanity today, namely:

- Chemical pollution of the earth system, including the atmosphere and oceans and seas;

- Ecosystem collapse and loss of biodiversity;
- Reduction of natural resources, where the loss of water is particularly significant;
- Global warming and climate change caused by human activity;
- Human population growth;
- National and global failures in the function of understanding and preventive action on these risks;
- Nuclear weapons and other weapons of mass destruction;
- Pandemics of new and incurable diseases;
- Growing food insecurity and lower quality of nutrition;
- The emergence of powerful and uncontrolled new technologies.

Caring for the environment and sustainable development is one of the most important topics today. Facing the increasingly serious environmental challenges mentioned above, the need for innovative approaches to help solve these problems is becoming increasingly urgent.

AI has the potential to transform climate change strategy. In the process of clean energy production and distribution, machine learning is used to balance energy production and demand in real time, realizing the potential of „smart grids", reducing unpredictability and increasing efficiency, ergodicity of the energy balance, use and storage of energy produced by renewable sources (Word Economic Forum, 2015).

This paper will describe the concept of green AI (Green AI) as an integrated approach that combines algorithmic models of AI technology with the aim of achieving sustainability and preserving the environment, which is one of today's pressing problems. However, taking into account the fact that AI is widely used in all areas of human activity, the initiative launched by the European Commission is aimed at more intensive regulation of AI in the European Union. The road to creating a legal framework for AI in the European Union was neither quick nor easy. Both the European Parliament and the European Commission worked on that path for more than 4 years (Prlja et al., 2021).

Artificial Intelligence and its Impact on the Fourth Industrial Revolution

The fourth industrial revolution is characterized by a fusion of technologies that erases the boundaries between the physical, digital and biological spheres. Ever since Klaus Schwab and the World Economic Forum announced the arrival of the fourth industrial revolution in 2015, it has been the subject of much debate.

Given that there is no generally accepted definition of the fourth industrial revolution, Min Hwa Lee and the authors used ***brainstorming*** methods in their work and conducted research with the aim of answering four research questions (Lee et al., 2018):

- What is the definition of the Fourth Industrial Revolution?
- How can we respond to the Fourth Industrial Revolution in terms of institutions?
- How can we respond to the Fourth Industrial Revolution in terms of technologies?
- How can we respond to the Fourth Industrial Revolution in terms of company innovation and start-up strategy?

Although this research did not provide definitive answers to the four research questions, it produced a kind of advanced template for answering them. One of them is certainly the definition of the aforementioned authors that the fourth industrial revolution is a **co-evolution between human desire and technological innovation**, (Figure 1) (Lee et al., 2018).

There are four distinct periods of the Industrial Revolution throughout history namely:

- The first revolution: physiological needs and mechanical technology;
- The second revolution: security needs and electrical technologies;
- The third revolution: social needs and information technologies;
- The fourth revolution: the need to appreciate and intelligence technology.

AI began to develop several decades ago with periods of growth and stagnation, and in the first years of this decade, a rapid

development and expansion of application began thanks to breakthroughs in the field of deep neural networks, the increasing amount of available data suitable for machine learning, as well as the increasing the availability of microprocessors suitable for extensive numerical calculations. Many of the effects of AI are already visible, so this technology is expected to shape the development of all segments of the economy and society (Russell & Norwig 2010).

Green AI can have a significant impact on the fourth industrial revolution, which we also call the fourth scientific and technological revolution, in terms of:

- Optimization of the use of resources;
- Improvement of sustainable technologies;
- Reductions in negative impact on the environment.

Green Artificial Intelligence in Climate Change Mitigation

Scientists have identified nine processes and systems that regulate the stability and resilience of the Earth system, and say four of the nine are:

- climate changes;
- loss of biosphere integrity;
- change of the land system;
- changed cycles in the chemistry of the globe;
- the most pressing critical planetary boundaries, (Figure 2) (Steffen et al., 2015).

Regarding climate change, we can say that due to the human factor, we have reached the limit line of the deterioration of the globe (Word Economic Forum, 2018).

As planet Earth continues to warm, the impacts of climate change are becoming more pronounced. In the year 2000, there were 342 weather disasters, while in 2022 there were as many as 421 natural disasters, which means that in the last 20 years, the number of natural disasters has increased by 21%, (Figure 3) (Steffen et al. ., 2015; Alves, 2023). Twenty percent of species currently face extinction, and that number could rise to 50% by 2100. Even if all countries keep their pledges to stop global warming by 2100, average

global temperatures are likely to be 3°C higher than in pre-industrial times (Steffen et al., 2015).

According to the World Meteorological Organization report on greenhouse gases, atmospheric carbon dioxide concentrations increased at a record speed in 2021 to the highest level in relation to a period of 800,000 years (Alves, 2023). Global average CO_2 concentrations reached 415.7 ppm in 2021, up from 414.72 ppm in 2020.

The rate of increase in atmospheric CO_2 over the past 70 years is almost 100 times greater than at the end of the last ice age. As far as direct and indirect observations can tell, such sudden changes in atmospheric CO_2 levels have never been seen before (World Meteorological Organization, 2017). Rapidly increasing levels of CO_2 and other greenhouse gases in the atmosphere have the potential to initiate unprecedented changes in climate systems, leading to severe ecological and economic disruption. These observations help monitor changing levels of greenhouse gases and serve as an early warning system for changes in the key atmospheric drivers of climate change.

Figure 4 shows the sharp increase in the concentration of greenhouse effects in the period from 1985 to 2020 (World Meteorological Organization, 2020).

Guided by such statistics, we can present the objectives of AI in preventing the large impact of greenhouse gas emissions on climate change through the following processes of predicting climate change and modeling it. This can be done by analyzing the following parameters of climate change such as: temperature, rainfall, humidity and greenhouse gas emissions. These analyses are carried out for the purpose of predicting future changes and modeling their effects on global, regional and local level. With this process, you can identify the most vulnerable areas affected by climate change. It can also help in making decisions in order to develop appropriate strategies for adaptation and mitigating all effects that contribute to major climate change (Xin et al., 2022).

AI can optimize the processes of using global resources such as: energy, water, agricultural land and forest land. To reduce the impact of the greenhouse effect , AI can use weather data as well as data on conditions pollution, which can optimize irrigation and servicing

processes agricultural lands.This is all done in order to reduce energy consumption,sources, as well as reducing greenhouse gas emissions, where they can analyse data on energy production and consumption in order to identify areas in the use of renewable energy sources (Oliver, 2020).

By promoting sustainable mobility, AI can analyze data on traffic, transport routes, vehicle emissions and many other mobility factors in order to identify reductions in transport emissions. In this process, AI proposes to us the optimization of routes for public transport or the use of vehicles by the maximum number of passengers (car sharing), in order to successfully reduce the number of vehicles on the roads, and thus reduce harmful greenhouse gas emissions (Oosthuizen, 2022). Combining the action of AI with other technologies can be crucial in solving this global challenge.

Artificial Intelligence in the Legal System of the European Union

In February 2017, the European Parliament adopted the Resolution on Civil Law Rules for Robotics, which opened up many issues related to the use of AI in products that appear on the market, especially their safety issues (European Parliament, 2017).

On April 25, 2018, the European Commission adopted the strategic document AI for Europe. In this first strategic document, attention is directed towards strengthening the technological and industrial capacities of the European Union and the introduction of AI into the entire economy, towards the preparation of social and economic changes due to the development of AI, towards the creation of an appropriate ethical and legal framework for the use of technologies based on AI and towards joint action and mutual exchange of experiences of European Union countries in relation to the development and use of AI (European Commission, 2018a).

This strategy states that AI has become an indispensable part of our daily life. Its use ranges from virtual assistants for organizing the working day, to autonomous vehicles and mobile phones that suggest activities and help organize each day. In a document analyzing this topic, AI is defined as „a system that exhibits intelligent behavior

by analyzing its environment and taking actions – with a certain degree of autonomy – to achieve specific goals." These systems can be exclusively software, so they operate in a virtual environment (e.g. a system for image, speech and face recognition), but they can also be embedded in hardware devices such as robots, drones, autonomous vehicles and others (Prlja et al., 2021). With the expansion of AI, the possibilities for numerous abuses increase, which suggests the importance of establishing effective standards for combating high-tech crime (see more: Bjelajac, Matijašević, Dimitrijević, 2012).

The strategy of the European Union in area AI is based on:

- Strengthening the technological and industrial capacities of the European Union and introducing AI into the entire economy;
- Prepare for social and economic changes;•
- Creating an appropriate ethical and legal framework;
- Joining forces and exchanging experiences.

Over time, the legal framework for AI has progressed and a number of resolutions have been adopted, such as the Resolution on the Ethical Aspects of AI, Robotics and Related Technologies (European Parliament, 2020a), the Resolution on the Civil Liability Regime for AI (European Parliament, 2020b) and the Resolution on Intellectual Property Rights in regarding the development of AI (European Parliament, 2020c).

By signing the Declaration on cooperation in the field of AI in 2018, the European Union highlighted the importance of AI in a political sense and placed it at the top of the agenda. This means that significant investment will be made in research and innovation to develop the next generation of AI systems, modernize education to adapt to changes in the labor market, address legal issues related to liability and biased decision-making, and other issues.

The most important members of the European Union worked on developing the AI strategy. In March 2018, France was the first to present its national strategy for AI, followed by Germany and Finland, followed by many other members of the European Union. By combining the best practices, harmonized actions of different strategies were created and the actions for Strategy AI in the European Union followed.

In December 2018, the European Commission adopted the Coordinated Plan for AI (European Commission, 2018a). The

coordinated plan was adopted on the basis of the Strategy for AI, which was accepted by the European Commission in April 2018, and on the basis of the Declaration on cooperation in the field of AI, which was signed by the EU member states. These initiatives represent a key step towards the creation of a European framework for AI and encourage the establishment of European strategic autonomy in this area.

In 2019, the Republic of Serbia adopted the AI Development Strategy for the period 2020-2025. (Government of the Republic of Serbia, 2019) which is aligned with the European initiative on AI, and in 2021 founded the Institute for the Development of AI and became a member of the Global Partnership for AI. The European Union and Serbia have a strong partnership in research and innovation, as evidenced by the grants awarded to the Institute for AI of Serbia. The project „It takes two to tango", funded by the Horizon Europe 2022 program, aims to develop a synergistic approach to human-machine decision-making (European Parliament, 2020c).

Noting that AI brings numerous advantages, but also potential risks, the European Commission adopted the White Paper on AI in February 2020, which builds on the previously adopted Strategy for AI from April 2018 and represents a European approach to achieving excellence and trust in this area (European Commission, 2020).

Discussing the lack of a common regulatory framework, the White Paper points out that this could lead to fragmentation in the European Union's internal market and undermine legal certainty. That is why it is necessary to have a solid regulatory framework for AI at the European level, which will minimize the risks related to fundamental rights, safety and responsibility.

The White Paper also supports the ethical guidelines for reliable AI adopted by the High-Level Expert Group: human control, technical resilience and security, privacy and data management, transparency, diversity, non-discrimination and fairness, preservation of the human environment and society, responsibility.

The need to adopt, in addition to the non-binding guidelines of the High-level Expert Group, a binding legal regulatory framework that will be harmonized with the legislation, principles and values of the European Union (Prlja et al., 2021) was highlighted.

Conclusion

Artificial intelligence can and should help build a more sustainable world and deal with climate change. AI is a driver of innovation in many industries, enabling the development of new technologies, solutions and approaches in the fight against climate change.

As we have presented in this paper, AI plays a key role in mitigating climate change. AI is used to predict and monitor climate change where it can analyze large amounts of data to predict changes in climate patterns and provide a better understanding of climate change and its causes. Next, AI is used to optimize energy efficiency where it can optimize energy use, providing suggestions for more efficient energy use in industry, transport and buildings, reducing greenhouse gas emissions. It can also identify the best locations for renewable energy sources, optimize their production and management, helping to increase the share of sustainable energy in the energy mix. Of course, AI is also of great importance in the optimization of the use of resources in agriculture and forestry, the optimization of the waste management process, and the management of water resources.

The role of green AI is to use AI principles to address environmental challenges and support environmental sustainability. Green AI can be applied in various ways to contribute to environmental protection and reduce the negative human impact on the planet.

Therefore, over time, AI will experience an increasing involvement in various spheres of everyday life. AI itself will also become smarter with each passing year, not only more productive, but developing intelligence that is not yet available to humans, accelerating human learning and innovation. As we think about benefits, efficiencies, business and everyday life, we must also think about how to maximize the benefits to society and our environment. Therefore, it is necessary to have a solid regulatory framework for AI at the European level, which will minimize the risks related to fundamental rights, safety and responsibility. It is for these reasons that European Union legislators reached an agreement and submitted a draft law on AI, called the Artificial Intelligence AI Act, which will be the first of many laws to regulate the field of AI.

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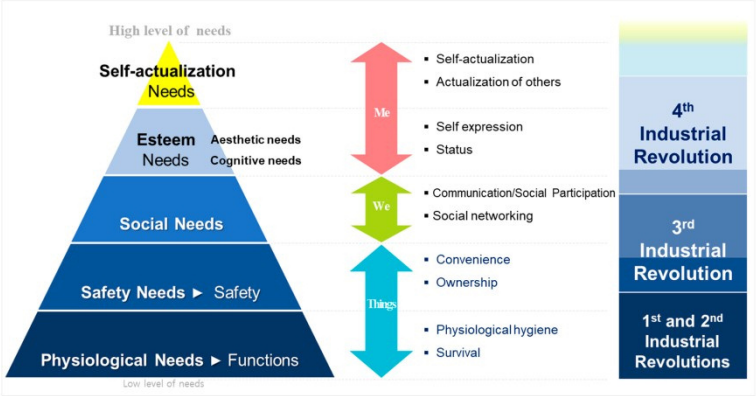
Appendix

Figure 1

The relationship between Maslow's hierarchy of needs and the evolution of the industrial revolution



(Maslow's hierarchy of needs)

Figure 2

Nine planetary boundaries

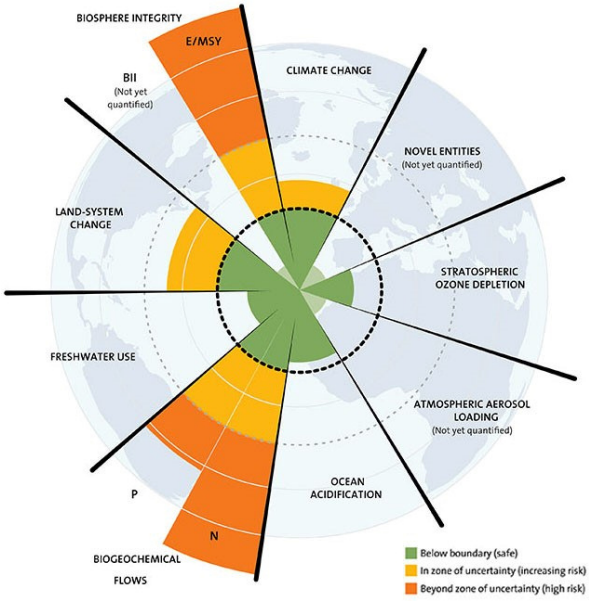


Figure 3

Total number of natural disasters worldwide from 2000 to 2022

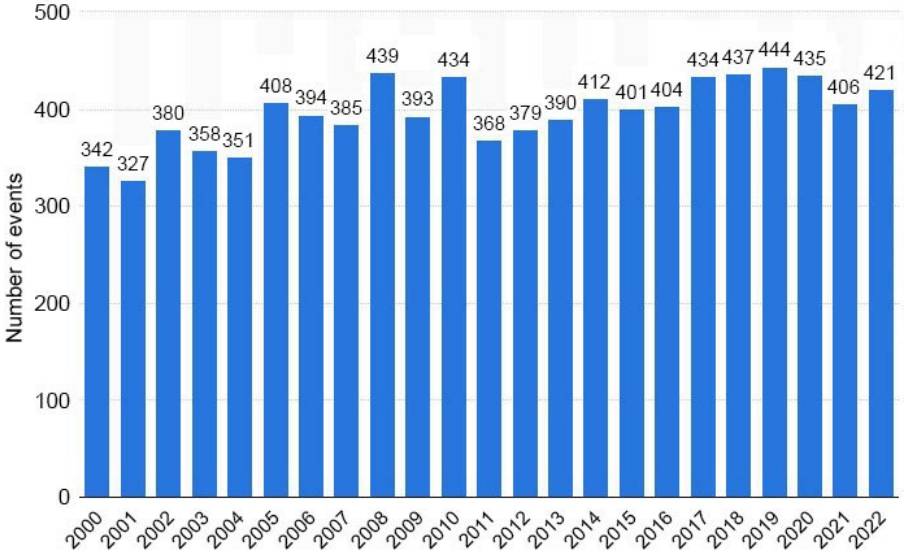
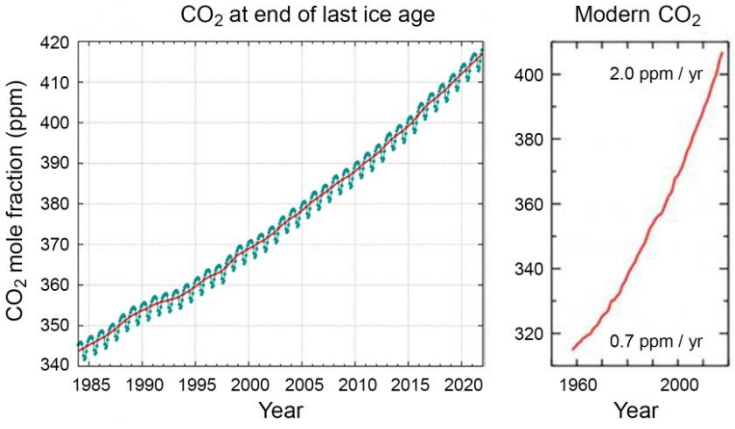


Figure 4

A sudden increase in the concentration of greenhouse effects



Veštačka inteligencija: Nova neminovnost savremenog društva

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Sažetak

Veštačka inteligencija je jedna od najosnovnijih oblasti nauke i inženjerstva. Njen urbani razvoj je počeo posle Drugog svetskog rata, a sam naziv datira od 1956. godine. Danas je veštačka inteligencija kao univerzalno polje relevantna za sve intelektualne zadatke koja pokušava ne samo da razume, već i da izgradi inteligentne entitete. S obzirom da današnjicu karakteriše suočavanje sa sve ozbiljnijim ekološkim problemima (izazovima) kao što su klimatske promene, gubitak biodiverziteta, iscrpljivanje prirodnih resursa, zagađenje vazduha i vode, potreba za inovativnim pristupima koji će pomoći u rešavanju ovih problema postaje sve hitnija. Stoga ćemo u ovom radu prikazati neke od mogućih načina rešavanja navedenih problema. S obzirom da je primena veštačke inteligencije svakim danom sve veća i da ulazi u sve pore savremenog društva, napravićemo i kratak osvrt na veštačku inteligenciju u pravnom sistemu Evropske unije.

Keywords: veštačka inteligencija, pravna regulativa, četvrta industrijska revolucija, klimatske promene, Evropska unija