THE ROLE OF AI IN COUNTERING CLIMATE CHANGE: LEGAL, AND ETHICAL CHALLENGES IN EUROPEAN UNION AND UKRAINE

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ABSTRACT

The two most significant trends of our century are climate change and the digital revolution. We must find solutions to integrate climatic and technology transformations while maintaining our social and democratic principles. The research will closely examine and focus on the increased use of artificial intelligence (AI) to solve climate change, citing the energy industry as an example of its potential promise and hazards. The purpose of this article is to investigate the role of artificial intelligence (AI) in addressing contemporary concerns such as climate change, environmental protection, and natural resource management. The benefits and risks of employing AI to build political and legal criteria for assuring the safe and successful deployment of technical systems, as well as ensuring long-term control over their operation and development patterns, are discussed. The topic's importance is supported by the fact that the regulatory framework in this field is still in its early stages, and the scope of AI's influence on all sectors of social life may be hard to predict precisely. A specific focus is placed on the legal regulation of these concerns in the contexts of the European Union and Ukraine. The current study is one of the few that covers three issues: climate change, the expanding impact of artificial intelligence, and the prospect of legal control of using AI to solve pressing environmental problems without jeopardizing fundamental human rights and freedoms.

METHODOLOGY

This paper analyses papers on many areas of AI application for mitigating climate change and the construction of behavioural models that maximise the interaction between humanity and environment, therefore reducing the negative influence of AI. Examples of successful application of artificial intelligence to address serious climate change challenges are offered. This is followed by a review of the problems of AI application in the context of environmental protection, with a focus on those aspects that have a direct impact on the climate, as well as the political and ethical concerns associated with the problem of climate change. This research relies on broad scientific methods of analysis, such as the systems approach, synergetics, and modelling. Finally, the subject of legal regulation of AI usage in the European Union and Ukraine, as well as the legislative growth possibilities in this field, is thoroughly discussed. Particular scientific methods of specific sociological research and comparative legal research were utilised to gather, evaluate, and process legal information and to maximise legislative control of AI's application for solving current environmental challenges.

INTRODUCTION

Climate change is one of the world's most pressing issues today. Bill Gates, the founder of Microsoft, considered climate change to be the greatest threat to mankind after the COVID-19 pandemic, which has the potential to produce even greater mortality rates.[1] In October 2018, the United Nations Intergovernmental Panel on Climate Change (IPCC) issued a Special Report on global warming, identifying its catastrophic consequences, such as rising sea levels and oceans, melting glaciers and flooding coastal areas and islands, and unusual events such as hurricanes, floods, more frequent and intense droughts and storms, desertification of land, and a decrease in crop yields due to water supply depletion. To prevent the grave consequences of a 2°C global temperature rise, the IPCC recommends a 45% reduction in greenhouse gas emissions by 2030 and a 100% reduction by 2050, which can only be accomplished by enormous transformations in all aspects of social life. The United States of America's case should be highlighted. Its carbon footprint is dominated by transportation (29%), energy (28%), industry (22%), commercial and residential building (12%), and agriculture (9%).[2] As a result,

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[1] Gates, B. (2020). 'COVID-19 is awful. Climate change could be worse' The blog of Bill Gates, August 04, 2020. Available online: https://www.gatesnotes.com/Energy/Climate-and-COVID-19 [Accessed on 22 June 2021].
[2] United States Environmental Protection Agency (2020). Sources of Greenhouse Gas Emissions. Available online: https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions [Accessed 21 June 2021].

a collaborative effort of academics and policymakers presented various strategies for mitigating harmful impacts and adapting to them.[3] Many international talks on potential solutions to the climate change problem have occurred, and framework international laws have been created. The United Nations Framework Convention on Climate Change (UNFCCC) established the groundwork for international collaboration to reduce the magnitude of climate change in 1992. The Kyoto Protocol on the Reduction of Greenhouse Gas Emissions was adopted in 1997.[4] The Paris Agreement was agreed upon in 2015 (the first universal instrument to transition to a low-carbon global economy), which established a worldwide action plan beginning in 2020 to reduce warming to far below 2°C.[5] The World Meteorological Organization produced a study on the status of the climate from 2015 to 2019 in 2019. It was evident that countries are failing to achieve their international obligations to cut greenhouse gas emissions, and climate change is occurring faster than experts projected.[6] The present quest for a remedy to climate change in the information society is unattainable without the development of cognitive bases and systemic AI technologies, encompassing ecology, environmental policy, and law.[7] According to the EU High-Level Expert Panel on Artificial Intelligence, artificial intelligence is a software (and potentially also hardware) systems designed by humans that, given a complex goal, act in the virtual or physical dimension by experiencing their environment through data capture, interpreting the gathered either structured or unstructured data, rationale on the understanding, or processing data, and deciding the best action. AI systems can utilise symbolic rules or learn a mathematical model to adjust their behaviour, and they can also adapt their behaviour by studying the environment that is influenced by their prior activities." Furthermore, "AI refers to systems that exhibit intelligent behaviour by assessing their surroundings and acting autonomously to achieve certain goals." AI-based systems can be solely software-based, trying to act in the virtual environment (e.g., voice assistants, image analysis software, search engines,

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[3]Mulvaney, K. (2019). Climate change report card: These countries are reaching targets. National Geographic, September 19, 2019. Available online: https://www.nationalgeographic.com/environment/article/climate-change-report-card-co2-emissions [Accessed on 21 June 2021].

[4] United Nations (1997). Kyoto Protocol to the United Nations Framework Convention on Climate Change. Available online: https://www.un.org/ru/documents/decl_conv/conventions/kyoto.shtml [Accessed on 21 June 2021].

[5] United Nations (2015). The Paris Agreement. Available online: https://www.un.org/ru/climatechange/paris-agreement [Accessed on 21 June 2021].

[6] WMO (World Meteorological Organization) (2019). The Global Climate in 2015–2019. Available online: https://library.wmo.int/index.php?lvl=notice_display&id=21522#.YNb_cmgzbIU [Accessed on 22 June 2021]

[7] Raban, D., Gordon, A. and Geifman, D. (2011). The Information Society. Information, Communication & Society, 14(3): 375-399. DOI: https://doi.org/10.1080/1369118X.2010.542824

speech and face recognition systems), or AI can be embedded in hardware devices (e.g., advanced robots, self-driving cars, drones, or Internet of Things applications)."

Given the civilizational relevance of AI and its rising role in solving the major challenges confronting humanity today, it is critical to legally define the status of AI in order to ensure its effective management system and control its activities. Legitimization of AI as a new level of social organisation requires society to regulate it unconditionally by continual legal and technical correction of virtual reality, which has become its derivative. It is undeniable that AI should be trustworthy because of its immense societal influence; thus, it is critical that AI usage is founded on fundamental human rights and values. It is also vital to investigate the issue of climate change and how AI technologies impact it. AI may be utilised in a variety of ways to tackle climate change. However, several environmental, ethical, and political difficulties emerge. One of the main issues discussed in this article is the need for an integrated system of legislative acts that should regulate a universal conceptual and categorical apparatus, fundamental principles and rules of project creation, testing, implementation, application, and closure, as well as the establishment of legal liability for potential negative consequences.

USING ARTIFICIAL INTELLIGENCE TO ADDRESS THE CLIMATE CHANGE ISSUE

Artificial intelligence is often regarded as the most significant game-changing element in world politics and economy. The findings of the 2017 Geneva UN Artificial Intelligence Summit highlighted that AI has the potential to improve all facets of human existence. It has also been recommended to realign AI's application choices for self-driving cars, smart phones with speech and facial recognition, and so on. This is viewed as a strategy of fundamentally improving humanity by supporting comprehensive initiatives to eliminate food and vital commodities scarcity and to protect the natural environment.[8] AI can more precisely anticipate climate and give global and individual weather reports by addressing massive difficulties such as forecasting storms, floods, and droughts, as well as simulating previous climatic conditions and their social and economic effects. According to recent study, artificial intelligence and artificial neural networks may successfully regulate challenging and local atmospheric

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[8] Muraleedharan, S. (2021). Role of Artificial Intelligence in Environmental Sustainability. EcoMENA, January 30, 2021. Available online: https://www.ecomena.org/artificial-intelligence-environmental-sustainability/ [Accessed on 21 June 2021]

processes.[9] For example, processes occurring during the formation and evolution of convective clouds and, as a result, assist in clarifying features that current models of climate metrics do not incorporate. AI brings us new avenues for comprehending the wide array of data generated from many climate component models.[10] The AI algorithms decrease and control natural catastrophe (such as extreme atmospheric occurrences) risks, which are expected to grow more frequent and severe as global climate simulations improve. Better projections are required to establish successful climate policies, allow governments to adapt to change, and find chances to mitigate harmful consequences.[11] When rapid and informed judgments are required, AI systems improve readiness for environmental concerns. The AI algorithms are employed not just for local natural occurrences, but also for larger ones, such as anticipating the coordination of measures taken in the case of a 2°C increase in world temperature. For an instance, consider the outcomes of feeding worldwide monthly temperatures to a neural network during the last 30 years. With an accuracy of 97%, the neural network forecasts heat fluctuations over the following ten years. AI might potentially be utilised to provide light on the causes of climate change. Thus, using satellite photos, large sources of CO_2 emissions in nations with no reporting responsibilities may be identified and mapped.[12] AI may also be used to demonstrate the consequences of harsh weather (Snow, 2019). Experts at the Montreal Institute for Learning Algorithms (MILA), Microsoft, and Conscient AI Labs employed a GAN (a type of AI) to simulate the likely appearance of dwellings following damage from sea level rise and increasingly violent storms in order to provide pleasantly depicted shape for the community. The idea is to publish an application that will show people what their houses and neighbourhoods could look like in the future as a result of the many effects of climate change. Furthermore, AI may be used to measure and reduce CO_2 emissions by improving current systems. Carbon Tracker, an independent financial analysis firm, measures emissions from coal-fired power plants using data gathered from satellites and concludes that such a sector is financially unsustainable. This technique can be utilised anywhere in the globe where

[9] Rasp, S., Pritchard, M. and Gentine, P. (2018). Deep learning to represent sub-grid processes in climate models. Proceedings of the National Academy of Sciences, 115(39): 9684-9689. DOI: https://doi.org/10.1073/pnas.1810286115

[10] Monteleoni, C., Schmidt, G., Saroha, S. and Asplund, E. (2011). Tracking climate models. Statistical Analysis and Data Mining. The ASA Data Science Journal, 4(4): 372-392. DOI: https://doi.org/10.1002/sam.10126

[11] McGovern, A., Elmore, K., Gagne, D., Haupt, S., Karstens, C., Lagerquist, R., Smith, T. and Williams, J. (2017). Using Artificial Intelligence to Improve Real-Time Decision-Making for High-Impact Weather. Bulletin of the American Meteorological Society, 98(10): 2073-2090. DOI: https://doi.org/10.1175/BAMS-D-16-0123.1

[12] Ise, T. and Oba, Y. (2019) Forecasting Climatic Trends Using Neural Networks: An Experimental Study Using Global Historical Data. Frontiers in Robotics and AI, 6:32. DOI: https://doi.org/10.3389/frobt.2019.00032

monitoring is not performed and no authorization is required. AI is also offering new methods for measuring the impact of industries by evaluating data about local infrastructure and electrical usage. Microsoft has devised another option by developing autonomous underwater data centres managed by artificial intelligence. The ocean is utilised to cool, while the energy of the waves is used to power.[13]

ARTIFICIAL INTELLIGENCE LEGAL REGULATION IN THE EUROPEAN UNION AND UKRAINE

An integrated system of legislative actions is required for the effective, intelligible, and safe usage of AI. Such acts would establish a single conceptual and categorical apparatus, fundamental principles and rules for the creation, testing, implementation, application, and closure of such projects, legal responsibility for potential negative consequences, and a procedure for compensation for potential damage. In the 1970s and 1980s, the first research and activities devoted to various aspects and characteristics of AI and law developed. The thesis "Artificial intelligence approach to legal thinking" (Gardner, 1984) by Anne Gardner is a significant accomplishment in this topic. Aside from individual investigations, scientific collaboration in this field has evolved. The inaugural International Conference on Artificial Intelligence and Law was held in 1987. The International Association for Artificial Intelligence and Law was founded in 1991. The publication of "Artificial Intelligence and Law" began in 1992.[14] However, the legal framework in this field has only lately begun to shape in the most developed nations, where the fast growth of information technology necessitates adequate regulation. For example, in East Asian nations, the EU, and the United States of America. Notably, the European Union is implementing the most effective legal measures in this field. Many areas of law apply to AI goods and services, including privacy, data security, product liability, intellectual property, and antitrust legislation. Furthermore, several areas of law are likely to be amended in light of the novel conditions associated with AI. Because AI is a relatively new technical application, and due diligence on legal concerns has not yet become conventional, efforts to comply necessitate a non-standard approach and a desire to understand what society requires at the time. The construction of an AI legal framework, which some

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[13] Roach, J. (2020). Microsoft finds underwater datacenters are reliable, practical and use energy sustainably. September 14, 2020. Available online: https://news.microsoft.com/innovation-stories/project-natick-underwater-datacenter/ [Accessed on 21 June 2021].

[14] Rissland, E., Ashley K. and Loui R., (2003). AI and Law: A fruitful synergy. Artificial Intelligence,150 (1-2): 1-15.DOI: https://doi.org/10.1016/S0004-3702(03)00122-X.

prominent firms are genuinely requesting, is a statement of acknowledgment of the amazing powers of AI. For the time being, the recommendations are divided into principles and guidelines, but a regulatory framework should be developed. The framework is being built at a rapid pace, however in slightly different ways for different sectors and jurisdictions.[15] The framework is being built at a rapid pace, however in slightly different ways for different sectors and jurisdictions. Despite the fact that AI is employed in a variety of industries, with future industrial growth, there should be an unified legislative basis for all. Unified law should provide a system for the development and use of AI that safeguards human rights, confidentially protection, adherence to all ethical norms, and free access to information on the impact of AI on individuals and the environment. The European Parliament Resolution on Civil Law Rules on Robotics. The European Parliament issued a resolution on legislative initiative on February 16, 2017, in which it advised the European Commission on a range of legislative and non-legal measures affecting the building, operation, and use of robotics and artificial intelligence. The Resolution emphasises the importance of legal regulation in order to create predictable and clear conditions for businesses to develop their own projects and plan their own business models; and to ensure that control over the setting of legal standards is maintained so that the EU and member states are not forced to adapt and live by standards set by other countries. The statement adds that such restrictions "should not impact research, innovation, and development processes," and that future legislative actions concerning the construction and usage of robots and AI "should not limit innovation in the sector." The Resolution is divided into several major sections: social, economic, ethical, and legal issues, as well as issues concerning the development of robotics and AI; regulation of robotics development and use at this time; requirements for standardisation in the development of relevant technologies; issues concerning controlling how actors make decisions regarding the use of robotics and AI technologies; and the establishment of an institutionalised control system in the field of robotics. It is worth mentioning that the Resolution is one of the first significant steps toward legal unification of standards for the research and application of artificial intelligence. Despite the fact that the Resolution is advisory in nature, it allows you to get a sense of what will

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[15] Mitchell, A., Dokei, T., Hickman, T. and Albagli, D. (2020). Regulation of Artificial Intelligence in Europe and Japan. White & Case LLP, August 24, 2020. Available online: https://www.whitecase.com/publications/insight/regulation-artificial-intelligence-europe-and-japan [Accessed on 22 June 2021].

underpin the regulations that will govern the relevant activity in the near future.[16] The European Commission approved the Artificial Intelligence for Europe (Communication) in 2018, which defined the EU's strategy to harnessing and tackling AI.[17] Through the Horizon 2020 programme, the EU committed € 1.1 billion in AI research and innovation from 2014 to 2017. The Communication emphasises that AI is produced and deployed in accordance with EU principles and basic rights. It also updates current safety and civil responsibility laws. In 2018, the Commission issued a follow-up statement and established a strategy based on the previous message.[18] The European Commission issued Ethics Guidelines for Trustworthy Artificial Intelligence in 2019, which establishes a framework for creating and deploying trusted AI.[19] The rules specify the demands to which AI must react in order to be regarded trustworthy. The evaluations are designed to assist in verifying compliance with the following important requirements: human agency and oversight, privacy and data governance, robustness and safety, diversity, nondiscrimination and justice, social and environmental well-being, openness, and accountability. The AI must "respect basic rights, applicable regulations, core concepts and values, and ensure an ethical purpose, as well as be technically sound and dependable, because even with good intentions, a lack of technological competence can lead to unintentional harm." Together with the General Data Protection Regulation, these Guidelines provide the EU with the opportunity to create high standards for business in the EU and perhaps beyond. The European Commission also established the Robotics and Artificial Intelligence Unit to foster the development of a competitive robotics and artificial intelligence sector in Europe. The EU member states signed a Declaration of Cooperation on Artificial Intelligence in April 2018 in order to build a European approach to AI.[20]

The European Commission[21] presented the "White Paper on Artificial Intelligence: a European

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[16] European Parliament (2017). Resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics. Available online: https://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.html [Accessed on 21 June 2021].

[17] European Commission (2018a). EU Declaration on Cooperation on Artificial Intelligence. Available online: https://ec.europa.eu/jrc/communities/en/node/1286/document/eu-declaration-cooperation-artificial-intelligence [Accessed on 22 June 2021].

[18] European Commission (2018b). Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. Artificial Intelligence for Europe. Brussels, 25 April 2018. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2018%3A237%3AFIN [Accessed on 22 June 2021].

[19] European Commission (2019a). Ethics guidelines for trustworthyAI. Available online: https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai [Accessed 22 June 2021].

[20] European Commission (2018b), *supra* note 19.

[21] European Commission (2020b). White Paper on Artificial Intelligence: a European approach to excellence and trust of 19 February 2020. Available online: https://ec.europa.eu/info/publications/white-paper-artificial-intelligence-european-approach-excellence-and-trust_en [Accessed on 21 June 2021].

Approach to Excellence and Trust" in February 2020, which establishes and identifies the standard legal framework. The book's goal is to gather information and provide recommendations for establishing a single EU field for AI legislation. Because of the high level of the AI White Paper, the following critical questions remain unanswered:

1. The precise legal infractions that the AI Whitepaper seeks to address are not disclosed;

2. It is proposed that AI applications be classified as high or low risk, but firms sometimes do not know which category is being used until it is too late.

3. There is a high danger of regulatory overlap with existing rules that apply to numerous AI technology (for example, GDPR).

The Commission's study on the safety and liability implications of AI, the Internet of Things, and robots has been published, providing further information on the gaps in current legislation identified by the Commission.[22] The Commission Report identified legal gaps, such as security risks posed by AI systems' connectivity and openness; a certain autonomy of AI decisions; the need for neural and accurate data for AI training; the complexity of products, systems, and value chains; the opacity of operating systems; gaps in product liability laws; and general fault-based liability rules that do not fit autonomously deciding AI systems.[23] Companies will face a variety of issues if the White Paper is adopted. There are, nevertheless, some favourable results. According to the White Paper, AI may benefit society, and maintaining AI coherence throughout the EU can minimise compliance with the requirements that enterprises now face owing to differences in standards from one EU member state to the next.[24] Following the identification of gaps, the EU plans to develop a complete AI legislation package that will include new requirements for individuals who design and apply AI. This package might contain three resolutions passed by the European Parliament on October 20, 2020: Framework (Basis) for ethical aspects of artificial intelligence, robotics, and related technologies; civil liability regime for artificial intelligence and intellectual property rights for the development of artificial artificial intelligence intelligence technologies, the Framework of ethical aspects of artificial

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[22] European Commission (2020a). Robotics and Artificial Intelligence (Unit A.1). Available online: https://ec.europa.eu/digital-single-market/en/content/robotics-and-artificial-intelligence-innovation-and-excellence-unit-a1 [Accessed 22 June 2021].

[23] Feindor-Schmidt, U. (2020). Regulation of Artificial Intelligence in Europe - What's in the pipeline? Lexology, December 1, 2020. Available online: https://www.lexology.com/library/detail.aspx?g=d9f74ab9-139c-49e1-9d82-70de718af80f [Accessed on 22 June 2021].

[24] Mitchell et al.,*supra* note 16.

intelligence, robotic systems, and similar technologies; civil liability regime for artificial intelligence and intellectual property rights for the field of artificial intelligence technologies.[25]

It is also vital to underline the significant role of civil society organisations (Un agencies) in the development and use of AI technology. According to the White Paper on AI, the European AI governance framework should provide maximum engagement of all stakeholders (including civil society groups), as well as required talks with them on the structure's implementation and continued development.[26] CSOs should be aware that AI has the potential to bring new societal challenges in the future. Civil society organisations can play a key role in leading the debate about developing AI while minimising the risks of harm to society; in consultations and decision-making on the formation of the AI regulatory framework; and in ensuring CSOs' ability to solve any problems that cannot be avoided in the future by taking up the challenge now and addressing these issues. CSOs may uncover algorithmic bias concerns for businesses and organisations using new algorithms, as well as those in charge of establishing related new laws and regulations. The EU currently lacks an uniform AI regulatory mechanism. However, there are several rules governing the development and application of artificial intelligence technology. Intellectual property law, data protection legislation, consumer protection or product responsibility laws, computer misuse laws, and human rights laws are examples of such laws. Simultaneously, a number of Resolutions and an AI White Paper have already been issued, which identify the key critical concerns that require regulation and give a path for future EU legislation. Given the ambitious rate of growth in this sector, it is expected that the EU will be among the first to provide the groundwork for a legal framework that will be applied by other nations, including Ukraine.[27] The government of Ukraine adopted the Concept for the Development of Artificial Intelligence in 2020.[28] "Ukraine has a big potential in the field of artificial intelligence," says the Minister of Digital Transformation. In Eastern Europe, we have the most firms creating artificial intelligence technology. AI companies with Ukrainian roots have already purchased major organisations such as Snap, Google, and Rakuten. As a result,

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[25] European Commission (2020c). Commission Report on safety and liability implications of AI, the Internet of Things and Robotics of 19 February 2020. Available online: https://ec.europa.eu/info/publications/commission-report-safety-and-liability-implications-ai-internet-things-and-robotics-0_en [Accessed on 22 June 2021].

[26] European Commission (2020b), *supra* note 19.

[27] Parliament of Ukraine (2018). On approval of the Concept of development of the digital economy and society of Ukraine for 2018-2020 and approval of the action plan for its implementation. Available online: https://www.kmu.gov.ua/npas/pro-shvalennya-koncepciyi-rozvitku-cifrovoyi-ekonomiki-ta-suspilstva-ukrayini-na-20182020-roki-ta-zatverdzhennya-planu-zahodiv-shodo-yiyi-realizaciyi [Accessed 22 June 2021].

[28] Parliament of Ukraine (2020). The concept of artificial intelligence development in Ukraine. Available online: https://zakon.rada.gov.ua/laws/show/1556-2020-%D1%80#Text [Accessed 22 on June 2021].

we are currently trying to establish ideal conditions for AI to become one of the primary drivers of digital transformation and overall economic growth in Ukraine. After all, by creating artificial intelligence, we secure Ukraine's competitiveness in the worldwide market."[29] The Concept's goal is to define the priority areas and basic objectives of the future use of artificial intelligence products to meet the rights and legitimate interests of individuals and legal entities, to build a competitive national economy, and to improve public administration as a significant component of the development of socioeconomic, environmental, scientific and technological, defence, legal, and other activities of national importance. Despite the fact that Ukraine just passed its first specialised normative act in 2020, Ukrainian experts have already begun to address the issues of legal regulation of the use of AI in several areas of law and evaluate EU rules in this field. O. E. Radutnyi is a notable academic who investigates the criminal culpability and legal personality of AI. He mentions that the Ukrainian Criminal Code will be modified in the future with a section on the responsibility of "electronic person (identity)" for criminal actions, and so defines AI as a subject of legal relations. Reflections on the liability of AI, according to one academic, make sense only if mankind keeps control over it.[30] It should be emphasised that in Ukraine, AI technologies are being tested, including their application to improve the environment. However, in Ukraine, there is no legislative regulation on the use of AI; also, there are too few scientific works that would explore the issues of legal regulation of AI in environmental protection and might serve as the foundation for the establishment of applicable legislation. As a result, immediate action is required to ensure human rights in the adoption and exploitation of artificial intelligence technology, environmental safety regulations, and a sustainable transition to enhance the country's condition. Given Ukraine's path toward European integration, it is apparent that the EU standards in this area will serve as the starting reference point for the relevant norms of Ukrainian legislation. As a result, the use of AI must be properly regulated by law for the benefit of society as a whole. Even the statutory definition of "artificial intelligence" opens the door to new domains and enterprises. It should be underlined, however, that the major standards that require legislative consolidation are the norms for safeguarding human rights in the use of AI and the method for utilising AI for environmental goals while keeping the principles of expediency and efficiency in mind.

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[29] Fedorov, M. (2020). By developing the sphere of artificial intelligence, we ensure Ukraine's competitiveness on the international market. December 2, 2020. Available online: https://www.kmu.gov.ua/news/mihajlo-fedorov-rozvivayuchi-sferu-shtuchnogo-intelektu-mi-zabezpechuyemo-konkurentospromozhnist-ukrayini-na-mizhnarodnomu-rinku [Accessed on 21 June 2021].

[30] Radutnyi, A. (2018). Subjectivity of artificial intelligence in criminal law. Pravo Ukrayiny, 1: 123-136.

ASPECTS OF USING ARTIFICIAL INTELLIGENCE IN ENVIRONMENTAL PROTECTION THAT ARE DIFFICULT

Artificial intelligence can and must contribute to a more environmentally friendly and sustainable environment, as well as battle climate change. However, this possibility creates certain ecological, political, and ethical concerns. The material and energy usage issue. Machine AI learning necessitates a significant quantity of data, as well as the energy required to analyse and store it. Some computer types require greater processing power than others. According to a University of Massachusetts research, a single NLP (natural-language-processing) model may generate the equivalent of around 300,000 kilogrammes of CO2, which is five times more than a car produces throughout its lifetime.[31] Whilst AI has the potential to reduce consumption and improve grid efficiency, it will continue to be a large user of power. According to studies, data centres presently consume more than 2% of the world's power,[32] and scientists project that this figure will rise by 8% to 21% by 2025.[33] According to a research by Belkhir and Elmeligi (2018), the predicted global footprint in 2020 is comparable to the effect of the aviation sector and bigger than that of Japan (the fifth largest pollutant in the world). In reaction to criticism, data centres were redesigned to be more efficient, and they now run, at least in part, on renewable energy sources. Google, Amazon, and Microsoft have begun to invest in renewable energy and artificial intelligence to increase energy efficiency. Researchers are decreasing their carbon footprint by introducing AI server farms powered by renewable energy, developing general-purpose artificial intelligence neural networks, and more.[34] In the quest of efficiency, the great majority of large corporations continue to rely on fossil fuels and are not subject to environmental controls. According to the "Green Peace Clicking Clean" study, all of the main streaming businesses, including Amazon Prime, HBO, and Netflix, utilise less than 22% renewable energy. And Northern Virginia, home to the most data centres on the

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[31] Strubell, E., Ganesh, A. and McCallum, A. (2019). Energy and Policy Considerations for Deep Learning in NLP. Available online: https://arxiv.org/abs/1906.02243 [Accessed on 21 June 2021].

[32] Pearce, F. (2018). Energy Hogs: Can World's Huge Data Centers Be Made More Efficient? Yale Environment 360, April 3, 2018. Available online: https://perma.cc/J2H3-EL75 [Accessed on 21 June 2021].

[33] Giles, M. (2019). Is AI the Next Big Climate-Change Threat? We Haven't a Clue. MIT Technology Review, July 29, 2019. Available online: https://www.technologyreview.com/2019/07/29/663/ai-computing-cloud-computing-microchips/ [Accessed on 21 June 2021]

[34] Gent, E. (2020). This 'Once-For-All' Neural Network Could Slash AI's Carbon Footprint. SingularityHub, May 4, 2020. Available online: https://singularityhub.com/2020/05/04/this-once-for-all-neural-network-could-slash-ais-carbon-footprint/ [Accessed on 21 June 2021].

globe, is run by a utility corporation that gets only 1% of its power from renewable sources.[35] Data and traffic gathering is already rising with the development of inefficient bitcoin mining[36] and 5G networks compelled to realise the Internet of Things.[37] Furthermore, the creation of electrical gadgets necessitates not only significant energy consumption but also intense mining of raw materials, such as the plastic used in the production of devices and their packaging. The fossil fuel industry and artificial intelligence Some huge tech companies are providing carbon-intensive AI services aimed to make oil and resource production easier and more efficient. Amazon entices new customers with initiatives like Predicting the Next Oil Field in Seconds using Machine Learning. Microsoft presented "Empowering Oil & Gas with AI",[38] and Google Cloud collaborates with fossil fuel firms. C3 IoT, an artificial intelligence player that first aided in the transition to a renewable energy society, is now assisting big oil and gas businesses in accelerating fossil fuel extraction.[39] The Guardian has investigated the role of giant technologies in supporting the fossil fuel economy, emphasising the vast resources that technology corporations are pouring into efforts that fight climate legislation and favour climate change denial.[40] As the AI becomes more environmentally responsible and safe for the climate, it is necessary to raise awareness among its users and data working professionals in order to support further technique surveys, which will make an energy ecosystem around the AI more evident. Global and intergenerational justice are also important political problems. Globally, not everyone is threatened by climate change, and the impacts of climate change generated by past generations can influence one generation. According to the COMEST report, "failure to act can be disastrous, but poorly organised, ethically charged responses to climate change can destroy entire communities, create new paradigms of inequality and uneven distribution, and make even more vulnerable those people who have already been torn apart by

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[35] Cook, G., Lee, J., Tsai, T., Kong, A., Deans, J., Johnson, B. and Jardim, E. (2017). Clicking Clean: Who is winning the race to build a green internet. Greenpeace Report. Available online: https://www.actu-environnement.com/media/pdf/news-28245-clicking-clean-2017.pdf [Accessed on 21 June 2021].

[36] Hern, A. (2018). Bitcoin's Energy Usage Is Huge – We Can't Afford to Ignore It. The Guardian, January 17, 2018. Available online: https://perma.cc/2X2H-CF9V [Accessed on 21 June 2021].

[37] Hazas, M., Morley, J., Bates, O. and Friday, A. (2016). Are there limits to growth in data traffic?: On time use, data generation and speed. Proceedings of the Second Workshop on Computing within Limits, 14: 1–5. DOI: https://doi.org/10.1145/2926676.2926690

[38] Microsoft News Center (2018). Microsoft demonstrates the power of AI and Cloud to Oil and Gas players, at ADIPEC 2018. November 12, 2018. Available online: https://news.microsoft.com/en-xm/2018/11/12/microsoft-demonstrates-the-power-of-ai-and-cloud-to-oil-and-gas-players-at-adipec-2018/ [Accessed on 21 June 2021].

[39] C3 AI (2019). Baker Hughes, a GE company and C3.ai Announce Joint Venture, June 24, 2019. Available online: https://c3.ai/baker-hughes-and-c3-ai-announce-joint-venture-to-deliver-ai-solutions [Accessed on 21 June 2021].

[40] Kirchgaessner, S. (2019). Revealed: Google made large contributions to climate change deniers. The Guardian, October 11, 2019. Available online https://amp.theguardian.com/environment/2019/oct/11/google-contributions-climate-change-deniers?__twitter_impression=true [Accessed on 21 June 2021].

other man-made political and ideological struggles."[41] Crawford and Joler[42] investigated one Amazon Echo and emphasised the natural and human resources required to create, produce, maintain, and eventually get rid of this modest facility in an article and a large-scale map titled "Anatomy of an AI System." The findings were not altogether encouraging. Not only should the potential efficiency be considered, but so should the concomitant impacts. There is a risk that efforts to improve efficiency in the field of computers would increase dependence on it rather than improve it.[43] Although relative efficiency is crucial, exact figures are necessary for realistic energy metering. AI use restriction to accelerate fossil fuel exploitation. "From 2010 to 2050, one-third of oil reserves, half of gas reserves, and more than 80% of current coal reserves must remain unused in order to meet the 2°C target."[44] As a result, a legislative framework is required to limit the use of AI in the exploitation of fossil fuels. If AI is used to mitigate climate change, it should be checked to ensure that the beneficial benefit of AI surpasses the negative impact. In this regard, two aspects should be examined in order to address a number of concerns against AI use. The "data exchange" strategy aims to cover data interchange in climate computer algorithms. For example, in the power sector, countries may lead to less duplication of climate-related jobs by employing AI as a repository of open data on electricity.[45] Centralizing these stages will allow for more efficient data access while avoiding exorbitant expenses and reducing the influence on the AI learning environment.

Despite rising awareness of the climate change problem, adequate viable solutions to cut carbon emissions have yet to be discovered. As a result, AI is predicted to enable the creation of some climate plans that do not rely on a corrosive carbon budget. However, it is important to recognise that the usage of AI has a detrimental influence on the environment. AI technology is still incredibly energy and material intensive, and the firms responsible for this disclose little information regarding the environmental impact of their activities. It is also important to mention issues such as the risk of data confidentiality, the distribution of responsibilities, the

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[41] COMEST (2010). The ethical implications of global climate change. Available online: http://www.gci.org.uk/Documents/UNESCO_COMEST_.pdf [Accessed on 21 June 2021].

[42] Crawford, K. and Joler, V. (2018). Anatomy of an AI System: The Amazon Echo as an anatomical map of human labor, data and planetary resources. Available online: https://anatomyof.ai [Accessed on 21 June 2021].

[43] Coulombel, N., Boutueil, V., Liu, L., Viguié, V. and Yin, B. (2019). Substantial rebound effects in urban ridesharing: Simulating travel decisions in Paris, France. Transportation Research Part D: Transport and Environment, 71: 110-126. DOI: https://doi.org/10.1016/j.trd.2018.12.006

[44] McGlade, C. and Ekins, P. (2015). The geographical distribution of fossil fuels unused when limiting global warming to 2°C. Nature, 517: 187-190. DOI: https://doi.org/10.1038/nature14016.

[45] St. John, J., (2018). Texas Takes a Big Step in Improving Access to Smart Meter Data. Greentechmedia, February 6, 2018. Available online: https://perma.cc/G4ZJ-L4LT [Accessed on 21 June 2021].

ability to explain, the fairness, and so on. Furthermore, political issues concerning human liberties, global justice and fairness between generations, the influence of AI on people's conduct (up to the possibility of utilising direct coercion), and the "anthropogenic" problem are of significant concern. Companies and dictators are not the only ones to blame. All economics will remain the same until customers buy new devices and use oil-powered transportation. As a result, climate-friendly AI must be developed, making all technological processes more efficient while satisfying environmental and climate preservation requirements. This will undoubtedly affect daily life, resulting in the transformation of the economy and society. Special emphasis should be placed on raising climate awareness among AI users and technicians, as well as making the AI energy and material ecosystem visible. Researchers suggest a technology-oriented climate policy approach and a climate-sensitive technology policy to solve a variety of issues in this field. Recognizing AI's limits should not exclude its usage in situations where it is required to tackle complicated climate challenges. Some technology businesses are investing in machine learning algorithms in order to develop new AI solutions to address climate change. The capacity of machine learning algorithms to show and comprehend the size and value of subterranean oil and gas reserves may be improved, making it simpler to exploit these resources at a reduced cost. AI is also employed in the development of novel fuels.[46] The same rationale applies not only to old hydrocarbons, but also to emerging non-hydrocarbon energy sources. The use of AI products is critical for accomplishing the Sustainable Development Goals and supporting democratic processes and social rights. Furthermore, AI technologies are the most essential way of attaining the European Green Deal's aims. It is important to stress that consumers and developers should first ensure that the AI findings are clear and verifiable, as well as unbiased and trustworthy. Furthermore, being a new technology, AI should be able to resist testing and early unprofitability.

REDUCING EMISSIONS FROM ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI), which includes machine learning and deep learning, can play a huge role in climate change adaptation and mitigation. According to a recent research, machine learning can intervene in at least thirteen critical sectors for combating climate change. Building better electricity systems, monitoring agricultural emissions and deforestation, developing new low-carbon materials, predicting extreme weather events, improving

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[46] Kates-Harbeck, J., Svyatkovskiy, A. and Tang, W. (2019). Predicting disruptive instabilities in controlled fusion plasmas through deep learning. Nature, 568: 526-531. DOI: https://doi.org/10.1038/s41586-019-1116-4

transportation, reducing wasted energy from buildings, arranging geo-engineering for a more effective earth, and providing people with tools to reduce their carbon footprint are all examples of these sectors.[47] AI's greenhouse gas emissions might be decreased by these following methods:

1. **Energy efficiency improvement** - AI firms may make AI training and usage more energy-efficient by employing more efficient hardware or lowering the energy required for cooling in data centres, for example.[48] Another strategy may be to minimise the quantity of data utilised in training AI models, i.e., to avoid utilising more data than is really necessary.[49] AI models might also be scaled down. Bigger does not always mean better. Creating larger and larger models to produce smaller and smaller gains (diminishing returns) may be dubious in terms of climate change.[50]

2. **Free of fossil fuels** - One essential solution is to ensure that the infrastructure (data centres, communication networks) consumes as little or no fossil fuels as possible.[51] When employing cloud computing, for example, data centres might be relocated to nations or areas with a more fossil-free energy mix.[52]

3. **No artificial intelligence services to the fossil fuel business** - At the moment, various collaborations exist between major technology companies, such as Google, Amazon, and Microsoft, and major oil corporations.[53] Rejecting such contracts might be one strategy for decreasing AI emissions.[54]

4. **Artificial intelligence is used sparingly** - A drastic solution may be to restrict the use of AI in some societal spheres. This would be consistent with Millward-Hopkins and

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[47] Hao, Karen. 2019. "The Future Of Ai Research Is In Africa." Mit Technology Review (Blog). June 21, 2019.

[48] Lacoste, A., Luccioni, A., Schmidt, V. and Dandres, T. (2019), "*Quantifying the carbon emissions of machine learning*", available at: https://arxiv.org/pdf/1910.09700.pdf (accessed 27 October 2021).

[49] Toews, R. (2020), "Deep learning's carbon emissions problem", Forbes, 17 June, available at: www.forbes.com/sites/robtoews/2020/06/17/deep-learnings-climate-change-problem/?sh=450c5dc66b43 (accessed 27 October 2021).

[50] *Id.*

[51] Tech Workers Coalition (2019), "Tech climate strike", available at: https://techworkerscoalition.org/climate-strike/ (accessed 27 October 2021).

[52] Lacoste, *supra* note 48.

[53] Crawford, K. (2021), Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence, Yale University Press, New Haven and London.

[54] Tech Workers Coalition *supra* note 51.

colleagues' goal of "good life with little energy".[55] Many uses of AI for combating climate change or improving health care, for example, may be appropriate, but not all uses for luxury or amusement.

CONCLUSION

To summarise, what I referred to as "AI for climate" is a fantastic idea that ought to be recognised. We should apply artificial intelligence to address environmental and climatic issues. However, I have argued in this article that this project can only be successful if it addresses some critical ethical and political issues: issues raised by AI in general, but also a number of specific issues that are highly relevant in the case of AI for climate and have a global as well as planetary dimension: diplomatic troubles regarding freedom and justice. The Artificial Intelligence is an innovative technology that is supposed to better society, business and states. It can assist develop answers to continuing global concerns such as climate change and environmental degradation while also defending democracy and combating criminality. A human-centered approach to AI should emphasise how AI is conceived, implemented, treated, and managed, as long as basic human rights are honoured. When a person has a distinctive and inalienable moral character, the Treaties of the European Union and the Charter of Fundamental Rights of the European Union establish respect for human dignity. At the same time, environmental concerns and a balanced approach to ensuring humanity's prosperity in the coming decades and millennia are taken into account.[56] AI can be used to combat climate change in a variety of ways, including collecting and analysing data on temperature and carbon emissions, natural and ecological disasters, demonstrating how extreme weather affects the human environment, improving forecasts and energy management, processing endangered species data, transforming the transportation landscape to reduce carbon emissions, tracking deforestation and industrial carbon emissions, and tracking the ocean ecosystem. However, the application of AI creates a number of issues about the harmful impact on nature, which must be carefully considered. AI systems consume a lot of power and resources, hasten the mining of fossil fuels, and overuse ecologically beneficial minerals, while firms give little information

[55] Millward-Hopkins, J., Steinberger, J.K., Rao, N.B. and Oswald, Y. (2020), "*Providing decent living with minimum energy: a global scenario*", Global Environmental Change, Vol. 65, doi: 10.1016/j.gloenvcha.2020.102168.

[56] Madiega, T. (2019). EU guidelines on ethics in artificial intelligence: Context and implementation. European Parliamentary Research Service, pp. 1-13. Available online: https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/640163/EPRS_BRI(2019)640163_EN.pdf [Accessed on 22 June 2021].

about their environmental imprint. It is also important to emphasise problems such as a danger to private information and other data protection. The EU does not have a unified AI regulatory framework; nonetheless, a number of resolutions and the AI White Paper have previously been enacted, which identify the principal critical areas that require regulation and give a path for future EU law formulation. According to the rate of growth in this field, the EU will be one of the first to provide the groundwork for a legislative framework, which will then be applied by other nations, including Ukraine. Ukraine, for its part, has taken the first legislative measures in this regard. However, there is no regulation governing the usage of AI. Furthermore, little legal scientific study has been conducted that would explore the concerns of legal regulation of AI in environmental protection and might serve as the foundation for the development of applicable laws. As a result, it is a significant move that may take a long time to ensure a human rights-based approach to AI research, deployment, and usage in Ukraine in order to fulfil environmental safety criteria and achieve long-term sustainability. Given Ukraine's path toward European integration, it is apparent that EU standards will serve as a basis for this field and as a starting point for the equivalent norms of Ukrainian legislation in the future. This will enable Ukraine to progress in its efforts to reduce its carbon footprint and battle climate change.