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Historical Evolution of Artificial Intelligence

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ABSTRACT

The fast-paced evolution of Artificial Intelligence (AI) has had a profound impact on decision-making in various sectors, especially corporate banking and insurance. This paper discusses the evolution of AI both historically and theoretically and assesses its legal and ethical consequences in relation to these sectors. The paper will look at the evolution of AI starting with early rule-based AI in the 1950s and 1970s, moving through machine learning in the latter half of the twentieth century, and concluding with modern forms of AI including deep learning and autonomous systems, which require less human involvement.

This study will discuss how the increasing autonomy and sophistication of AI have resulted in the evolution of AI from simple technology to actual players in decision-making processes. AI provides numerous benefits for corporations, including increased efficiency, accuracy, and risk mitigation however, they pose many legal challenges due to issues of accountability, transparency, and liability. The analysis concludes that existing legal frameworks are insufficient to fully regulate the complexities of AI-driven decision-making. It emphasizes the need for evolving legal doctrines and regulatory approaches, such as stricter liability regimes or new accountability models, to ensure responsible deployment of AI technologies. Understanding the historical evolution and ethical dimensions of AI is therefore essential for developing legal frameworks capable of addressing the challenges posed by intelligent and autonomous systems in the modern financial landscape.

I. INTRODUCTION

This revolution is more pronounced in the area of corporate governance, the financial structure and regulatory framework, especially in the area of corporate banking and insurance. The original idea behind AI systems was that it would help human beings to complete monotonous or computationally challenging tasks. The workings of these systems were confined to well-established limits whereby they do not think or adapt but follow certain set rules to execute specific instructions. Nevertheless, and as the computing capabilities increase, a large amount of data is available, and complex algorithms are developed, AI has become a dynamic and flexible system that can learn through experience, discover patterns, and make decisions partially or without human intervention. This change not only is a technological one but a

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conceptual one as well.[3]

AI is not a passive tool any longer, but it is an active participant in the decision-making process. In most scenarios, AI systems currently affect, or even oust human opinion, especially in complex and data-saturated settings. Such development has resulted in the introduction of the so-called tool to tutor paradigm where AI systems are not only assistants, but also advisors or decision-makers, which influence the results. This change has far-reaching consequences in the case of Corporate Banking and Insurance Law (CB&IL). The use of AI in financial institutions is becoming so mainstream that these institutions are using it to perform key tasks like risk analysis, fraud, algorithmic trading, underwriting, and claims.

Such roles have high complexity and risk and therefore the precision and dependability of artificial intelligence systems is paramount. On the one hand, AI increases efficiency and minimizes operational costs; on the other hand, new types of risk are introduced, especially when systems are used in autonomy and generate the results that can be harmful or even criminal. The increasing independence of AI systems poses some basic questions of accountability and liability. Conventional jurisprudence, especially criminal law, is based on human agency and will. Actus reus (the physical act) and mens rea (the mental intent) concepts presuppose that there is a human perpetrator of a wrongful act which can be identified. The problem with the use of these principles is, however, when AI systems produce decisions in isolation and cause harm. AI does not have a sense of consciousness, moral awareness, and purpose, which poses a disproportion between law doctrine and technological actuality. [4]

Scope of the Study

The aim of this research is to investigate the growing application of Artificial Intelligence in corporate banking and insurance practices, as well as raise the issues arising from its usage. In particular, the paper aims to analyse the existing problems of liability and accountability in the light of new technologies applied in the sphere. Moreover, the paper aims to find out whether the traditional principles of law (especially, criminal liability) can be effective in dealing with AI-caused harm. First of all, the study will focus on the issues concerning responsibility for the results of actions or processes initiated by an AI system. Moreover, the paper will pay special attention to the problems of liability for decisions made or implemented via AI. In addition, it is important to investigate whether there are grounds for liability if a certain action has been performed by AI without the involvement of a person. The study will be confined only to

[3] Deloitte. (2023). *AI regulation and governance report*
[4] Domingos, P. (2015). The master algorithm

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investigating the ethical and legal problems related to the application of artificial intelligence in the sphere. Thus, the problem of computer science, technical or programming aspects of AI implementation will not be investigated.

II. HISTORICAL EVOLUTION OF ARTIFICIAL INTELLIGENCE

A. Early Foundations (1950s–1970s): Rule-Based Systems

Artificial Intelligence can be considered a product of the mid-20th century, the time when computer science and theoretical mathematics started to develop significantly. Alan Turing, whose contributions to the topics of computation and machine intelligence became a founding figure of the further development of AI, was one of the most influential representatives of this initial period. The conceptual framework of the future study in the field was offered by Turing conception of machines that can simulate human intelligence, best illustrated by the so-called Turing Test.

At this time, AI systems were mainly rule based and they acted on explicitly programmed instructions. This relied on logic and symbolic processing in order to carry out particular functions. Early expert systems were to simulate human decision-making in small areas (medical diagnosis or engineering problems solving). These systems worked by using a set of rules that were pre programmed to input data and hence produce outputs because of logical reasoning. The abilities of these early AI systems were not extensive though. [5]

Legally, the consequences of AI based on rules were relatively simple. Since these systems were highly controlled by humans, any damage done by such systems could be directly linked to the people or organisations that designed and implemented such systems. That is, AI was seen as an instrument, and the human participants were put into the liability category by the conventional law provisions.

B. Expansion Phase (1980s–2000s): Machine Learning and Data-Driven Models

In the late 20th century, the development of AI took a new turn upon the appearance of machine learning as a paradigm, which replaced the emphasis on rule-based programming with the focus on the data-driven learning. The machine-learning algorithms could process huge amounts of data, discern patterns, and do predictions without being explicitly coded to perform the particular task unlike previous systems.

This has been enabled by major improvements in processor strength, expansion of digital information and development of advanced statistical methods. Machine learning allowed the AI

[5] Duff, R. A. (2007). Answering for crime: Responsibility and liability in the criminal law

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systems to enhance their performance as time goes by by exposure to new data, thus bringing about some form of flexibility and independence. Machine learning has been highly utilized in real life in fields like banking and insurance. [6]

These systems did not always give expected results even to its creators. Such unpredictability cast some doubts on the issue of foreseeability and negligence, especially when AI-based decisions led to injuries. To illustrate, in case a fraud-detection algorithm mistakenly marked legal operations, it was not always easy to distinguish between a technical malfunction of the software, the lack of quality data, or the defects of the algorithm itself. In this way, as machine learning broadened the AI capabilities, it also added new dimensions of the attribution of responsibility and accountability.[7]

C. Contemporary Phase (2010s–Present): Autonomous and Deep Learning Systems

The latest stage in the development of AI is the emergence of deep learning and autonomous systems, which is a big jump in the technological capabilities. Deep learning relies on artificial neural networks that can replicate the design and functionality of the human brain facilitating AI systems to process large volumes of unstructured information and carry out intricate tasks with high degrees of precision.

The current AI programs can execute diverse tasks, such as natural language processing, image and speech recognition, predictive analytics, and autonomous decision-making. Such systems are stronger and more autonomous but at the same time, they are frequently run with minimal human intervention. In terms of corporate banking, AI-based algorithmic trading systems are able to carry out financial transactions with high velocity and react to the market environment in real-time. In the same way, AI finds application in the insurance industry in automated underwriting, claims and risk evaluation. These applications indicate the rising trend of utilizing AI in making important decisions.

Nonetheless, these systems have a lot of legal challenges in terms of their autonomy. In a case of autonomous actions of AI systems there is no easy way to know who does what. A conventional liability model that presupposes human control and will is not applicable any more to the complexity of autonomous AI. Furthermore, due to the complexity of deep-learning systems, lack of transparency is frequently observed, and the process of decision making cannot be easily grasped. This non-explainability also complicates the topic of the liability attribution

[6] European Commission. (2020). White paper on artificial intelligence
[7] European Parliament. (2021). Ethics guidelines for trustworthy artificial intelligence.

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and creates some doubts regarding the responsibility and justice.[8]

III. CONCEPTUAL FRAMEWORKS OF ARTIFICIAL INTELLIGENCE

A. Narrow AI vs. General AI

General AI on the other hand describes systems that have the ability to perform a wide range of operations that are human-like in nature. These systems have been theorized to be able to reason, learn and adapt in a variety of areas. Although there is no fully developed General AI yet, the current developments in the research of AI show a gradual transition towards more generalized features. Legally, the distinction between narrow and general AI is a crucial issue to draw. The predictability and regulatory tractability of the narrow AI systems is due to the limited scope of operation. [9]

However, the complexity of liability attribution increases with the increased generality and autonomy of the AI systems. The tendency to ambiguity in matters and independent decision-making presents new problems to the legal regimes that are based on human agency.

B. The "Black Box" Problem

One of the most critical challenges associated with modern AI systems is the "black box" problem, which refers to the lack of transparency in the decision-making processes of complex AI models. Many deep learning systems operate in ways that are not easily interpretable, even by their developers.

This lack of explainability poses serious challenges for legal accountability. In order to establish liability, it is necessary to understand how a decision was made and whether it was influenced by negligence, bias, or other factors. However, when the internal workings of an AI system are opaque, tracing the causal chain becomes extremely difficult.

Furthermore, the black box problem complicates the application of legal standards such as foreseeability and due diligence. Without a clear understanding of how AI systems operate, it becomes challenging to assess whether reasonable steps were taken to prevent harm.[10]

IV. ETHICAL DIMENSIONS OF ARTIFICIAL INTELLIGENCE

The fast development and growing autonomy of Artificial Intelligence (AI) systems have spawned a wide range of ethical issues going beyond technical effectiveness and innovation.

[8] European Union. (2016). General Data Protection Regulation (GDPR).
[9] European Union. (2024). Artificial Intelligence Act.
[10] Financial Conduct Authority. (2021). Algorithmic trading compliance report. FCA.

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With AI becoming extensively embedded into decision-making, especially in high-stakes industries such as corporate banking and insurance, questions of fairness, accountability, transparency, and human control have risen to the forefront of the debate, in both legal and ethical terms. These moral aspects are not purely speculative; directly they have implications on an individual, institution, and society, in general.

Algorithms bias is a major ethical issue related to AI. The essence of AI systems lies in the fact that they are dependent on the data that they are trained on. In case the training data has biases, regardless of these biases being historical, sociocultural, or structural, the AI system would tend to recreate them and potentially exacerbate them in their outputs. In the banking sector, algorithm bias could be in the form of discrimination in lending, i.e. when a group of people is unfairly denied the right to be lent to, or offered worse conditions than they might otherwise be because of the trend embedded in the historical data. Similarly, in the insurance sector, biased algorithms may lead to the denial of claims or to the imposition of high premiums on certain demographic populations. The ethical issue of algorithmic bias is especially disturbing due to the fact that it can be active unnoticed. [11]

Unlike human decision-makers, whose biases can be recognized either consciously or unconsciously, AI systems can provide biased results without showing the signs of discrimination. This veil hinders the process of detecting and rectifying any undue practice, and thus, disempowers the standard of equality and justice. In addition, the magnitude of the AI functioning implies that biased judgments can cover large groups of people at once, increasing the scale of the problem of discrimination in the society. The issue of bias is closely connected to the issue of transparency, or the problem of explainability as it is often called. The modern AI systems (and in particular those based on deep learning) are often black boxes, the internal workings that lead to a particular decision are not easily understandable. Such lack of transparency raises serious ethical and legal concerns. When a person is refused a loan or an insurance payment because of an AI-powered decision, they have a decent right to understand the logic behind the given decision. [12]

Nevertheless, when it comes to AI systems, accountability is often spread across many actors, such as developers, data providers, corporations, and end-user, which creates a diffusion of accountability that creates uncertainty about whom is to bear the liability in the event of harm

[11] Floridi, L., et al. (2018). AI4People—An ethical framework for a good AI society.
[12] Financial Action Task Force. (2021). Artificial intelligence in anti-money laundering and counter-terrorist financing.

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caused by an AI system. An example is when an algorithm written by AI enters into market manipulation or causes financial instability, it is hard to identify the person to bear the liability, be it the programmer who wrote the algorithm, the corporation who deployed it, or the regulatory agency who did not oversee it is a tricky task. This absence of clarity in accountability makes the enforcement of the law more complex and also draws ethical issues connected to the justice and upholding of the individual rights. Moreover, the growing independence of the AI systems complicates the concept of human control, which has traditionally been one of the foundations of legal and ethical systems. Human control is a means of making sure that decisions can undergo human judgment and thus, it is easy to take into account the context, morality, and fairness. The financial and insurance industries can embrace AI usage and expand to many users and stakeholders based on their trust. In case AI is seen as discriminated, untransparent, or unresponsible, community trust in the technology and the organization using it might decline. [13]

Due to the increasing influence of AI systems on making decisions that touch the lives of people, the threat of reducing human agency is present. Machines are given decisions that previously involved empathy and moral judgement to humans. This shift provokes the issues of dehumanisation of the decision-making process and the loss of personal autonomy. To summarize all the details discussed above, the ethical aspects of AI are complex and closely connected with legal aspects. The topics of bias, transparency, accountability, human control, and trust are some of the critical elements regarding the responsible use of AI in corporate banking and insurance. Resolving these ethical dilemmas is essential in order to make AI systems more efficient and, at the same time, fair, just, and compatible with societal values.[14]

V. IMPLICATIONS FOR CRIMINAL LIABILITY

The development of artificial intelligence (AI) has significant consequences of criminal responsibility, especially in corporations connected to banking and insurance. The more AI systems become independent and involved in decision-making procedures, the more traditional legal systems become overstretched in their ability to handle the challenges posed by these technologies. The first issue lies in the lack of mens rea, which is the mental component necessary to have criminal culpability with AI systems. Traditionally, criminal liability requires showing that a person acted with intent, knowledge, recklessness or negligence. AI, on the contrary, is not conscious or intentional in the human sense; it is driven by the algorithms and

[13] Gardner, J. (2007). Offences and defenses: Selected essays in the philosophy of criminal law.
[14] Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep learning.

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the input of data, and it has no ability to make moral decisions or act with subject intentions.[15]

The implementation of AI systems is traditionally viewed as resulting in the maintenance, implementation, and conception of many actors, such as data scientists, software developers, corporate organizations, and end-users. Once an AI system produces a detrimental result, the blame is usually spread among these participants, and it is hard to define a single liable party. An example is that in the event that an AI-based fraud detection system falsely alarms about transactions, which causes loss of money or reputation, it is unclear whose responsibility is the liability that should be incurred either by the developers of the algorithm, the organization that installed it, or the person who operated it on a daily basis. This decentralization leads to a liability gap, where bad practices can escape retribution because of the lack of a villain that can be easily recognized. [16]

Under vicarious liability, corporations traditionally face responsibility in the case of actions of their employees. It is not easy to apply the same to the AI systems since AI does not easily fit within the subcategories of employee or agent. These issues demonstrate the necessity to develop new legal practices that can be used to properly address the peculiarities of AI systems. The possible solutions are the formation of strict liability regimes, AI as a legal entity, or a new term like the AI guardianship in which the liability is placed on the party responsible to supervise AI systems.[17]

VI. Conclusion

The historical and theoretical development of Artificial Intelligence shows a noticeable shift in the example of simple, rule-based systems up to complex, self-reliant ones with the ability to make their own decisions. This has essentially changed the role of AI in society, especially in the high levels of stake areas like corporate banking and insurance, where such systems are being increasingly relied on to do some of the vital functions. Although the potential benefits of AI regarding efficiency, accuracy, and innovation are undisputable, the issues surrounding legal and ethical standards regarding AI are equally deep.

The shift in the attitude towards AI as a tool to a viewpoint of it as a tutor has revealed the inefficiency of traditional legal theories, in particular, the one referring to criminal liability. Mens rea and personal responsibility are the concepts that are not easily applicable in the situation of autonomous systems that do not possess human-like consciousness and intent. The

[15] Hart, H. L. A. (1968). Punishment and responsibility
[16] Harvard Law Review. (2021). Artificial intelligence and the law
[17] Husak, D. (2008). Overcriminalization: The limits of the criminal law

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paper has provided an in-depth exploration of the ethical aspects and legal implications of AI, highlighting some of the most important aspects, such as the biases of the algorithms, their obscurity, distribution of responsibility, and jurisdictional problems.

All these worries show the dire need to reform the laws and create new frameworks that can be effective in tackling the complications posed by AI. To face the challenges posed, it is important to turn to the key principles of the criminal law and consider new methods of liability and responsibility as the paper is going to show. The comprehensive knowledge of the development and the consequences of AI is therefore crucial in designing a system of laws that would be responsive enough to the needs of the digital era.

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