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The Integration of AI in Contract Law: Formation, Enforcement, and Legal Challenges from an International Perspective

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ABSTRACT

The rapid development of technology is reshaping the whole world and the way it functions, including the realm of contract law – a field that has usually relied on human judgement, negotiation and enforcement. Therefore, this paper includes comprehensive analysis on how AI is being integrated in all stages of contracting – from drafting and negotiating to enforcement, while also examining the challenges it introduces and the strategies implemented to address them. Utilizing a qualitative research approach encompassing literature, case studies, real-world examples, and legislative frameworks, it examines how AI is integrated into contracts, how this integration helps the contracting process, is delves into the main challenges it imposes, and the responses from courts and the governments. This paper further compares different types of AI, emphasizing the importance of distinguishing between them when considering AI liability, the intent of the parties to contract, the unpredictability of AI and enforcement of those contracts. Additionally, to provide a global perspective, the study analyzes how three powerful legislations – European Union, United States and Japan are addressing these changes. The findings reveal that while AI is facilitating the contracting process, the rise of autonomous systems is imposing significant challenges to existing legal frameworks. Scholars are divided on key issues, such as the existence of genuine consent in AI – concluded contracts, whether AI should be granted legal personhood and held accountable for its actions, and whether such contracts are enforceable under current laws. Meanwhile, courts are working to adapt current laws to meet those new changes, and governments are actively working towards drafting new legislation to enhance protection.

ABSTRAKT

Die rasante Entwicklung der Technologie verändert die ganze Welt und ihre Funktionsweise, einschließlich des Bereichs des Vertragsrechts – einem Bereich, der normalerweise auf menschliches Urteilsvermögen, Verhandlungen und Durchsetzung angewiesen ist. Daher enthält dieses Dokument eine umfassende Analyse der Integration von KI in alle Phasen des Vertragsabschlusses – von der Ausarbeitung und Verhandlung bis zur Durchsetzung – und untersucht gleichzeitig die damit verbundenen Herausforderungen und die Strategien, die zu ihrer Bewältigung umgesetzt werden. Mithilfe eines qualitativen Forschungsansatzes, der Literatur, Fallstudien, Beispiele aus der Praxis und gesetzliche Rahmenbedingungen umfasst, untersucht es, wie KI in Verträge integriert wird, wie diese Integration den Vertragsprozess unterstützt, geht auf die wichtigsten damit verbundenen Herausforderungen ein und befasst sich mit den Reaktionen von Gerichten und Regierungen. Dieses Dokument vergleicht außerdem verschiedene Arten von KI und betont, wie wichtig es ist, zwischen ihnen zu unterscheiden, wenn es um die Haftung von KI, die Absicht der Vertragsparteien, die Unvorhersehbarkeit von KI und die Durchsetzung dieser Verträge geht. Um eine globale Perspektive zu bieten, analysiert die Studie außerdem, wie drei einflussreiche Gesetzgebungen – die Europäische Union, die Vereinigten Staaten und Japan – mit diesen Veränderungen umgehen. Die Ergebnisse zeigen, dass KI zwar den Vertragsprozess erleichtert, der Aufstieg autonomer Systeme jedoch die bestehenden Rechtsrahmen vor erhebliche Herausforderungen stellt. Die Wissenschaftler sind sich in wichtigen Fragen uneinig, wie etwa in Bezug auf die Existenz echter Zustimmung in von KI abgeschlossenen Verträgen, ob KI Rechtspersönlichkeit zuerkannt und für ihre Handlungen zur Verantwortung gezogen werden sollte und ob solche Verträge nach geltendem Recht durchsetzbar sind. In der Zwischenzeit arbeiten Gerichte daran, die geltenden Gesetze an diese neuen Veränderungen anzupassen, und Regierungen arbeiten aktiv an der Ausarbeitung neuer Gesetze zur Verbesserung des Schutzes.

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INTRODUCTION

Technology is rapidly developing, which means that Artificial Intelligence is no longer an unknown concept but rather a part of our everyday lives. It is influencing the way we work, communicate and even make decisions. Among the areas that it has affected is contract law, where AI is not only facilitating the whole contracting process but also transforming it from the contract formation phase to its performance and enforcement. Therefore, this thesis explores how AI is integrated into contract law and how it is redefining contractual principles and practices.

The impact of AI in contract law is multi-layered. On one hand, it offers efficiency and precision in contract drafting, negotiating, and managing. On the other hand, it is presenting new legal challenges and gaps concerning liability, enforceability and ethical considerations. The automation of contracting has raised questions about the intent of the parties to contract, when it is considered that the consent is given, the rights of the parties and the evolving standards of fairness and justice in the digital age.

Moreover, the intersection of AI and contract law presents new challenges regarding data privacy and security, especially in the context of smart contracts and AI decision-making. The more autonomous AI is becoming, the more it is challenging the current legal framework, with its unforeseen consequences and increased disputes, demanding a review of existing legal frameworks to accommodate these emerging technologies.

This thesis offers a comprehensive analysis of the integration of AI into contract law. Chapter I provides foundational insights into AI, explaining its operation and setting the stage for a deeper understanding in Chapter II. In Chapter II, the focus shifts to AI's role as an assisting tool in contracting, with a further exploration of Smart Contracts, including their definitions and various types. Chapter III delves into the legal challenges posed by AI, presenting different scholarly perspectives on how these issues should be addressed. Chapter IV brings these challenges to life through real-world cases, highlighting the difficulties courts face and examining their approaches to resolving these emerging disputes. The final chapter provides an overview of the existing legal

frameworks governing AI, with a focus on recent developments in the European Union, the USA, and Japan, offering a forward-looking perspective on the evolving regulatory landscape.

CHAPTER I: INTRODUCTION TO ARTIFICIAL INTELLIGENCE

1.1. What is Artificial Intelligence?

The research field of AI is considered to be founded by McCarthy, Minsky, Newell and Simon, who participated in the Dartmouth meeting in 1995, in which the term "Artificial Intelligence" was first introduced, but also, they founded three prominent research centers and their ideas have significantly influenced the trajectory of mainstream AI for many years.[1]

Given the complexity of Artificial Intelligence, it is widely acknowledged that there is not a universal definition.[2] However, Newell and Simon defined in 1976 the term "general intelligent action" as the same level of intelligence observed in human action: the ability to act appropriately in any given situation, adapt to environmental demands and achieve the system's goals within certain speed and complexity.[3]

Whereas McCarthy in 1988, explained that: "AI is concerned with methods of achieving goals in situations in which the information available has a certain complex character. The methods that have to be used are related to the problem, whether the problem solver is human, a Martian, or a computer program."[4]

Speaking from a technical science perspective, there is a difference between "weak" and "strong" AI. In this respect, weak AI is the technology that is restricted to only one function, and task. On the other hand, strong AI is a program that uses both hardware and software to reach or even surpass the level of human abilities or is able to apply these abilities to different types of tasks.[5]

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[1] Pei Wang, "*On Defining Artificial Intelligence*" (2019) https://www.researchgate.net/publication/335279198_On_Defining_Artificial_Intelligence#fullTextFileContent
[2] *Ibid.*
[3] *Ibid.*
[4] John McCarthy, "Mathematical Logic in Artificial Intelligence" (1988). http://www.jstor.org/stable/20025149
[5] A.A. Shchitova, "*Definition of Artificial Intelligence for Legal Regulation*" (2020). https://www.atlantis-press.com/proceedings/iscde-20/125947856

The issue of defining artificial intelligence is complex, many authors have proposed various solutions, such as dividing and defining AI systems in two groups in accordance with their purpose. For example, the fixed-purpose AI-systems, which would be trained only for one specific purpose, whereas AI systems with a general purpose can perform other tasks except the ones that they are trained for.[6] This proposal would be in line with the technical perspective discussed above.

However, other authors think that a better way to handle the situation, is to replace the term "artificial intelligence," with other terms, for instance with "intelligent software," and define it as "*a set of programs, procedures, rules and relevant documentation of information processing systems that are capable of independent data processing and analysis and decision-making based on the conclusions obtained, aimed at achieving the goal*"[7]

Despite the discrepancies on authors and researchers' opinions, the need to define artificial intelligence has risen and governments have acted focusing on the properties, or purposes of AI. For instance, Japanese legislation defines artificial intelligence technology, as intended for implementing intellectual functions (learning, reasoning, judgment) by using artificial means.[8] Russian Federation in 2019 defined AI as a set of technological solutions that enable the simulation of human cognitive functions, including self-learning and problem-solving without predefined algorithms. These technologies produce results that are at least comparable to those achieved by human intellectual activity when carrying out specific tasks. The complexity of those technological solutions encompasses information and communication infrastructure, software (including those that use machines that use self-learning methods), processes and services for data processing and solution discovery. [9]

In addition, European Union's High-Level Expert Group on its proposal defined Artificial Intelligence as follows:

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[6] Carlos I. Gutierrez, Anthony Aguirre, Risto Uuk, Claire C. Boine, Matija Franklin, "*A Proposal for a Definition of General Purpose Artificial Intelligence Systems*" (2023) file:///Users/lirikakamberi/Downloads/s44206-023-00068-w.pdf

[7] A.A. Shchitova, "*Definition of Artificial Intelligence for Legal Regulation*" (2020) https://www.atlantis-press.com/proceedings/iscde-20/125947856

[8] *Ibid.*

[9] *Ibid.*

"*Artificial intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals.*"[10]

Further, they established that AI – Systems can be solely based on software and applied to the virtual world, these are the cases of search engines, speech and face recognition systems, or voice assistants and image analysis systems. They can also be embodied in hardware devices, for instance advanced robots, drones or autonomous cars.[11]

This proposal was followed by the Regulation 2024/1689 on Laying Down Harmonized Rules on Artificial Intelligence, which provides that:

"'AI system' means a machine-based system that is designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment, and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments;"[12]

United States have also made efforts in regulating the use of AI. In this respect, in 2023, President Biden issued a landmark Executive Order to manage the potential risks of AI. In this document, AI was defined as:

"*a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments. Artificial intelligence systems use machine- and human-based inputs to perceive real and virtual environments; abstract*

[10] European Commission, "*A Definition of AI: Main Capabilities and Disciplines*," (High-Level Expert Group on Artificial Intelligence, 18 December 2018).
https://ec.europa.eu/futurium/en/system/files/ged/ai_hleg_definition_of_ai_18_december_1.pdf
[11] *Ibid.*
[12] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 11 July 2024 on laying down harmonized rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act), art 3, par 1.
https://eur-lex.europa.eu/eli/reg/2024/1689/oj.

such perceptions into models through analysis in an automated manner; and use model inference to formulate options for information or action."[13]

1.2. Main Domains of Artificial Intelligence

Domains of Artificial Intelligence refer to specific fields of study and their application within AI. AI encompasses various technologies and methodologies aimed at mimicking human cognitive functions. Each domain of AI has unique applications and contributes distinctly to both technological advancements and social benefits.[14]

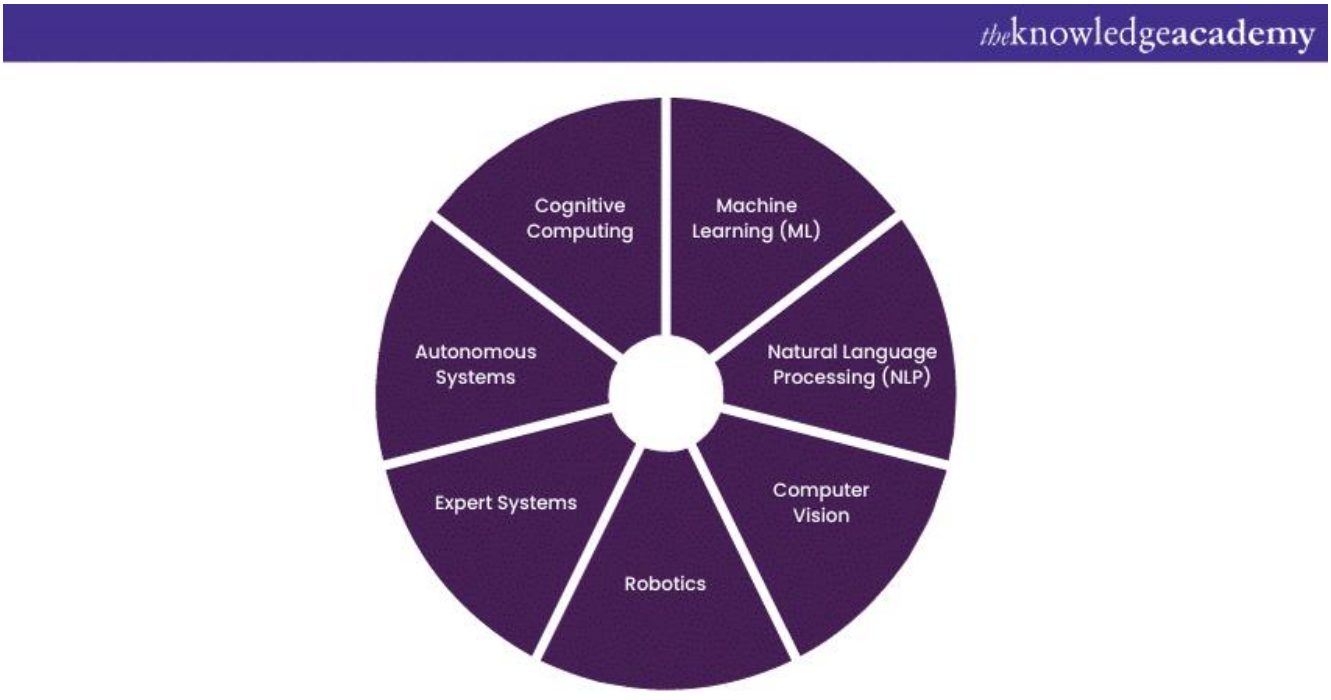

Figure 1. Diagram of domains of artificial intelligence

[15]

[13] White House, "*Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence*" (30 October 2023) https://www.whitehouse.gov/briefing-room/presidential-actions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence/

[14] International Association of Business Analytics Certification, "*Exploring the Branches of AI*" (18 March 2024) https://iabac.org/blog/exploring-the-branches-of-ai

[15] Figure 1. The Knowledge Academy, "*Domains of Artificial Intelligence*" (2023) https://www.theknowledgeacademy.com/blog/domains-of-artificial-intelligence

1.2.1. What is Machine Learning (ML)?

A broad definition on Machine Learning is that it establishes a computational method that utilizes data in order to advance its performance or make precise predictions. The data utilized in machine learning consist of past information available to the learner, either in the form of a digitally labeled training set or obtained through the interaction with the environment. Machine learning is typically used for classification of documents, or text, where the algorithm is given a document or a text and it identifies if it contains inappropriate or explicit content, or if it includes spam.[16] This is of high importance when it comes to contracting.[17]

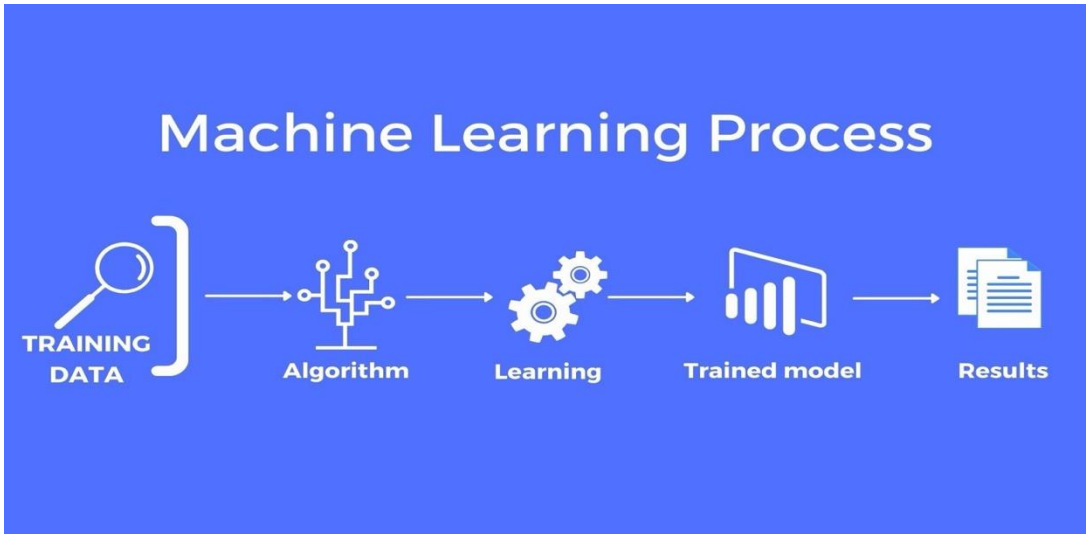

Figure 2. Machine learning process

Beyond these implementations, machine learning is also used in speech processing for tasks such as recognition of speech, speaker verification and acoustic modeling, it is used in computer vision for face detection and object identification. In addition, machine learning also addresses a variety of other issues ranging from fraud detection in credit cards or insurance claims to recreational uses, like learning to play chess.[18]

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[16] Mehryar Mohri, Afshin Rostamizadeh and Ameet Talwalkar, "*Foundations of Machine Learning, second edition*" (2018) https://books.google.at/books?hl=en&lr=&id=dWB9DwAAQBAJ&oi=fnd&pg=PR5&dq=what+is+machine+learning&ots=AzpQWQq-r1&sig=n9eJFmK4pyD5ne9JL4yCuo4zu1A&redir_esc=y#v=onepage&q=what%20is%20machine%20learning&f=false

[17] Figure 2. Mapendo, "*Training Data: The Milestone of Machine Learning"* (Mapendo, 2023) https://mapendo.co/blog/training-data-the-milestone-of-machine-learning

[18] *Ibid.*

1.2.2. What is Natural Language Processing (NLP)?

Natural Language processing encompasses a set of computational techniques that are designed to analyze and represent natural language text across different levels of linguistic analysis. The primary objective is to achieve human-like language processing capabilities for a wide array of tasks and applications.[19] The natural language text can be either written or spoken as long as it is used by humans to communicate. This language is processed by algorithms at different levels, including phonetics, morphology, syntax, semantics, and pragmatics. While humans naturally use all of these levels, NPL systems use one or more of these levels, but not necessarily all of them.[20][21]

Figure 3. Illustration of Natural Language Processing (NPL)

Natural Language Processing is used for Information Extraction, which is used for recognizing, targeting, and extracting certain key information from a large collection of text. It is also used for Information Retrieval, where a list of potentially useful documents is provided to the user upon request. In contrast, Question-Answering systems provide direct answers to questions of the user, rather than lists of documents. Its application also includes the summarization of larger texts into

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Figure 2. Mapendo, "*Training Data: The Milestone of Machine Learning"* (Mapendo, 2023) https://mapendo.co/blog/training-data-the-milestone-of-machine-learning

[19] Elizabeth D. Liddy, "*Natural Language Processing*" (2001) https://surface.syr.edu/cgi/viewcontent.cgi?article=1043&context=istpub

[20] *Ibid.*

[21] Figure 3. Revolve AI, "*Natural Language Processing Techniques*" (2023) https://revolveai.com/natural-language-processing-techniques/

shorter ones while keeping its crucial elements, machine translation which is the oldest use of NPL, and last but not least Dialogue Systems, which is considered the future application of NPL that uses the phonetic level and lexical level, through which it aims to communicate with humans using natural language.[22]

1.2.3. What is Computer Vision?

Computer Vision is a domain of Artificial Intelligence that aims to enable computers to recognize and interpret objects and people in imagines and videos. Similarly to other fields it strives to automate tasks that mimic human abilities, especially it aims to replicate human visual perception and cognitive processes involved in making sense of visual information. Computer vision applications function by using input from sensing devices, combined with advanced technologies like artificial intelligence, deep learning and machine learning to be able to mimic the functionality of the human visual system. The algorithms of these applications are trained on extensive datasets of visual information stored in the cloud. By identifying patterns within this data, the algorithms can interpret the content of other images.[23][24]

Figure 4. Illustration of Computer Vision

[22] *Ibid.*
[23] Microsoft Azure, "*What is Computer Vision*?" https://azure.microsoft.com/en-us/resources/cloud-computing-dictionary/what-is-computer-vision/#object-classification
[24] Figure 4. Rishabh Software, "Computer Vision: A Comprehensive Guide" (2023) https://www.rishabhsoft.com/blog/computer-vision

Computer Vision is used for content organization because it is able to identify people and objects, therefore it is often used in photo storage, or social media applications. Optical character recognition, which is a specialized application of computer vision can be useful in discovering information in large amounts of text. Furthermore, advanced applications of this field include self-driving cars, or assisting in targeting and diagnosing medical issues in health care.[25]

1.2.3. What is Robotics?

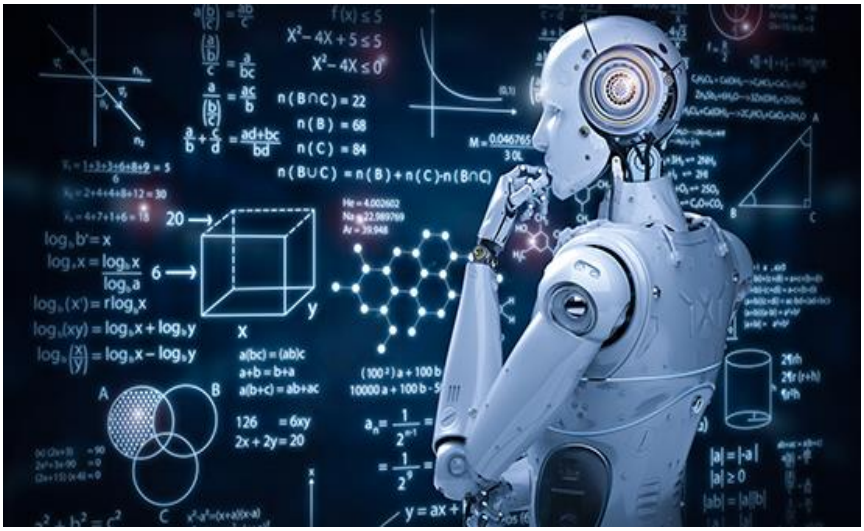

Figure 5. Illustration of a robot

The Robot Institute of America defines robots as a versatile, programmable device capable of handling materials, tools, or specialized equipment, and executing a range of tasks through adjustable programmed movements.[26] Whereas, robotics is described as an interdisciplinary field that merges the advantages of electrical engineering, electronic engineering, mechanical engineering, computer science, biology and other sciences. It encompasses the expertise in designing, implementing and utilizing robots in various human activities.[27][28]

[25] *Ibid.*
[26] Appu Kuttan K. K., "*Robotics*" (2007) https://books.google.at/books?hl=en&lr=&id=5N7NY_YVufkC&oi=fnd&pg=PP8&dq=robotics&ots=6G38VMvYpt&sig=YoYfzJ0ZS-WTE1tcqk-8-oEXbmU&redir_esc=y#v=onepage&q=robotics&f=false
[27] Saeed B. Niku, "*Introduction to Robotics, Analysis, Control, Application, Third Edition*" (2020) https://books.google.at/books?hl=en&lr=&id=rLfADwAAQBAJ&oi=fnd&pg=PR15&dq=definition+of+robotics&ots=_wXstr0iDp&sig=wkwE3NKqgOYolUH61MR9G0rgVxY&redir_esc=y#v=onepage&q=definition%20of%20robotics&f=false
[28] Figure 5. FutureSkills Prime, "What is the Inherent Connection Between Robotics and Artificial Intelligence?" (2023) https://futureskillsprime.in/knowledge-center/tech-simplified/what-is-the-inherent-connection-between-robotics-and-artificial-intelligence

Robots are most effectively used for tasks that are repetitive, task that demand precision exceeding human capabilities, or involve dangerous conditions. It is frequently employed in machine loading, to supply or remove the processed parts from other machines, to pick and place parts in different locations, and for other tasks such as welding, painting.[29]

1.2.4 What are Expert Systems?

Expert Systems are advanced computer programs that solve complex problems by simulating human reasoning. Unlike traditional computer programs that follow predefined procedural steps, expert systems use knowledge from human experts to make decisions and solve problems in a more dynamic and flexible manner. They are also known as knowledge-based systems or inference-based programs. [30]

Expert systems are used because they meet specific business needs, primarily in decision-making. These systems enable expert-level decision-making to be programmed and distributed electronically, ensuring consistent decision-making across an organization by applying uniform principles in every situation. They allow organizations to expand scarce knowledge resources without the need to increase personnel. Additionally, they serve as excellent training tools because they demonstrate expert thought processes to users while solving problems. The aim of their use is to help the elimination of routine work and assist in decision-making.[31]

1.2.5 What are Autonomous Systems?

The term "autonomy" in AI systems refers to the ability of AI technology to function independently, make decisions, and carry out tasks without the constant need for human supervision. This degree of automation represents a significant leap in AI development, enabling

[29] *Ibid.*
[30] Arthur W. DeTore, "*An Introduction to Expert Systems*" (1989) https://www.aaimedicine.org/journal-of-insurance-medicine/jim/1989/021-04-0233.pdf
[31] *Ibid.*

algorithms to learn, adapt, and perform actions with little to no human input.[32] In addition, they are expected to "plan and carry out complex tasks as intended with minimal human input, operate in unpredictable and unstructured physical or informational settings, and handle unforeseen external or internal events."[33]

Examples of implementing autonomous systems include self-driving cars and specialized robots in various fields such as healthcare, manufacturing or agriculture. Drones that are employed for tasks like surveillance, mapping or delivery, while smart homes use autonomous systems to optimize temperature and lightening. In healthcare these systems assist in surgeries, facilitate in monitoring the patients and provide personalized care. In agriculture they perform tasks such as planting, harvesting and crop monitoring. Additionally, autonomous systems play a crucial role in environmental monitoring by assessing conditions like air quality, water quality and weather. [34]

1.2.6 What is Cognitive Computing?

Cognitive Computing Systems are self-sufficient technologies grounded on the principles of machine cognition. These systems perceive the mind as a processer that handles multiple pieces of information at once, using different models to represent data and algorithms to transform and reason with this information. These systems handle ambiguity and conflicting or missing data effectively. When making decisions or answering questions, these systems assess uncertainty, generate multiple hypotheses with supporting evidence, and rank these hypotheses based on the evidence. Therefore, they provide several ranked decisions and answers and can explain the reasoning behind those decisions and answers. They are stateful, understand different nuances of

[32] Dive, "*What Is Autonomous Artificial Intelligence (AI)?*" (October 9, 2023) https://www.letsdive.io/blog/what-is-autonomous-artificial-intelligence-ai
[33] Dalton Powell, "*Autonomous Systems as Legal Agents: Directly by the Recognition of Personhood or Indirectly by the Alchemy of Algorithmic Entities*" (2020) https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1357&context=dltr
[34] Ashwani K., "*What are Autonomous Systems and use cases of Autonomous Systems?*" (2023) https://www.devopsschool.com/blog/what-are-autonomous-systems-and-use-cases-of-autonomous-systems/#:~:text=

human communication, are self-aware, and continuously learn, adapt and evolve. Their capabilities are diverse.[35]

Cognitive computing is essential for self-driving cars, as it enables advanced control systems to identify and differentiate objects on the road. It facilitates cross-media retrieval, allowing users to search for documents across various media using any form of query. In cognitive robots, it helps extract meaning from unstructured data which can be found in text, images, videos and social media. In cognitive businesses, it supports learning systems designed to interact naturally with people. In healthcare, IBM Watson Health has used it for personalized cancer treatments, and systems like Sim Student, utilize it for learning problem-solving like solving linear equations. [36]

CHAPTER II: HOW CAN AI BE UTILIZED IN CONTRACT FORMATION

2.1. What is a contract?

A contract is an agreement between two or more parties that aims to establish business relations or legal obligations. It outlines the activities that need to be performed by different parties, in order to satisfy a set of terms and conditions. In a contract parties have certain obligations.[37] A contract usually is concluded in three stages. The first stage includes preparation, which provides specifications for fulfillment of the contract. The second is negotiation, which facilitates reaching a common consensus on payments, deliverables, and milestones. And last, but not least the third is stage is fulfillment, which involves the actual execution of the contract, meaning carrying out the contractual obligations outlined in the agreement.[38]

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[35] Venkat N. Gudivada, Sharath Pankanti, Guna Seetharaman, Yu Zhang, "*Cognitive Computing Systems: Their Potential and the Future*" (2019)
https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8713837

[36] Venkat N. Gudivada, Vijay V. Raghavan, Venu Govindaraju, C.R. Rao, "*Cognitive Computing: Theory and Applications, Handbook of Statistics 35*" (2016)
https://books.google.at/books?hl=en&lr=&id=PBKhCgAAQBAJ&oi=fnd&pg=PP1&dq=definition+of+cognitive+computing&ots=UUBEg3rBxJ&sig=vb-txHmRW9vaer6TsxUpTWejQBA&redir_esc=y#v=onepage&q=definition%20of%20cognitive%20computing&f=false

[37] P. Radha Krishna, Kamalakar Karpalem, A.R. Dani, "*From Contracts to E-Contracts: Modeling and Enactment*" (2005)
https://link.springer.com/article/10.1007/s10799-005-3901-z

[38] *Ibid*, page 365, paragraph 1.

2.2. Integration of AI in Contracts

Automated systems are utilized throughout all stages of the contract life cycle. Specifically, it is used in the negotiation and formation phases, where computer programs can determine the terms of an offer and accept offers with minimal human involvement. These contracts are referred to as "machine-made contracts," to highlight the significant impact of computer programs in their creation. Despite the absence of direct human participation at the moment of formation, these contracts are still recognized as valid under contract law. The human user's intention to contract is implied by their choice to automated means for finalizing transactions.[39]

Additionally, in a world of complex contracts and regulatory compliance, the speed and accuracy of contract review, analysis, and management significantly affects an organization's operational efficiency, risk mitigation, and competitiveness. Legal professionals invest extensive time scrutinizing detailed language, cross-referencing provisions, and ensuring compliance with constantly evolving legal frameworks. This labor-intensive approach is time-consuming, boring, and prone to human error, potentially leading to legal penalties or missed opportunities. [40]

In this respect, AI can be integrated into contract management in various ways to enhance precision and efficiency. Advances implementations include "machine-made contracts," which are entirely generated by AI, or it can be used as an assisting tool. Within this context, there are two primary types of AI contracts:

1. AI-Assisted Contracts, where AI aids in the creation, review, and management processes to ensure accuracy and compliance;

[39] Christina Frattone, "*Algorithmic mistakes in machine-made contracts: the legal consequences of errors in automated contract formation*" (2024) https://doi-org.uaccess.univie.ac.at/10.1093/ulr/unae004

[40] Dr. M. Fathima, Dr. D. Paul Dhinakaran, Dr. T. Thirumalaikumari, Dr. S. Rukmani Devi, Dr. Bindu M.R. and Dr. Shanthi P, "*Effectual Contract Management and Analysis with AI-Powered Technology: Reducing Errors and Saving Time in Legal Document*" (2024) https://ieeexplore.ieee.org/abstract/document/10568733

2. Machine-made contracts, including smart contracts, which are self-executing agreements with terms encoded directly into the software, automatically enforced by blockchain technology and requiring no human intervention post-deployment.

2.3. AI assistance in Contracts

As previously discussed, technologies such as Machine Learning or Natural Language Processing are trained by huge amounts of data, which are risk-free and are manually examined on whether they contain any errors. When these data are coded then the algorithm is able to identify them in other contracts to ensure accuracy. There are three potential ways that the use of AI can help to improve contracting world. Namely altering the tools companies use to contract, it impacts the content of contracts and affects the processes by which companies contracts.[41]

Beginning with the first example, AI contracting software can identify contract types by analyzing drafting patterns within the document. Since the algorithms of AI contracting software are trained on a set of data, it is able to recognize patterns and extract key variables, which can be clauses, dates, or parties. This allows firms to manage contracts more effectively because AI already knows what is in each of them. In addition, AI is able to make simple predictions, which can have implications for due diligence – for example - it can quickly sort through a large volume of contracts and identify individual contracts pursuant to companies-specified criteria.[42]

In addition, AI software can accurately read contracts in any format, it is able to provide analytics in accordance with the data extracted from the contracts, and it can extract contract data much faster than humans can.[43]

AI also helps firms to keep their terms and conditions uniform in all of their contracts. In this regard, if a company wants to define a term, it must make sure that all of the divisions are in accordance with the definition proposed. In addition, this particular term, as defined, needs to be

[41] Beverly Rich, "*How AI is Changing Contracts*" (12 February 2018) https://hbr.org/2018/02/how-ai-is-changing-contracts
[42] *Ibid*
[43] *Ibid*

incorporated in all of the contracts of the company quickly and accurately. This is where AI contracting software helps, because it can easily not only incorporate the term into all of the company's contract templates, but it can also detect other terms that mean the same thing from other business partners.[44] For example, if a company wants to define the term "confidentiality" in a non-disclosure agreement, or the term "employee" in an employment agreement, AI will be able to keep it consistent through the all of the contracts that the company enters.

The ability of AI to identify and extract key data points assists companies to organize and implement contracts. For example, a company that deals with numerous vendor contracts must keep track of differences in termination, penalty and damage provisions, not only in their own contracts, but also in those sent from vendors. Managing variations in vendor contracts demands proactive organization. However, AI contracting software can record and standardize these provisions through the company's contracts and vendor agreements, ensuring that cases of noncompliance are identified, and unfavorable provisions are dealt with quickly.[45]

Lastly, as already stated, AI contracting software is able to quickly assess risks in contracts by recognizing terms and clauses that are suboptimal and may lead to disputes in the future. Moreover, it can reduce the risk of human error in contract drafting and review.[46]

A real-world application of AI as an assisting tool is the JavaScript-powered AI legal tool, which is designed to simplify the editing of legal document templates on a website. It analyzes thoroughly the user's inputs, allowing for the smooth customization of templates to meet specific needs and preferences. Through advanced linguistic analysis, this tool helps users refine language, structure clauses, and ensure legal accuracy. By leveraging AI, it improves efficiency and precision in the document editing process, enabling users to create legally sound documents with ease. Additionally, the tool also features user-friendly interfaces, making it accessible and easy to use for individuals with varying levels of legal expertise.[47]

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[44] *Ibid*
[45] *Ibid*
[46] *Ibid*
[47] P. Vimala Imogen, J. Sreenidhi, V. Nivedha, "*AI-Powered Legal Documentation Assistant*" (2012)

2.4. Examples of AI Application in Different Contracting Stages

The traditional commerce involves various of informal transactions, which usually have been carried on by humans. Those interactions cover several steps from identifying needs to assessing customer satisfaction. In this regard, humans are occupied with gathering data to identify the needs of consumers and finding what products or services will satisfy those needs, and recommending the best merchant based on user's preference. They negotiate the terms and conditions of the agreement directly and exchange consent for those terms. Next, they decide on a payment method and evaluate the consumer satisfaction of those steps. However, electronic commerce will enable these steps to be carried out by intelligent contracting agents that will assist by making the whole process quicker, more efficient, and less likely for human errors.[48]

One example of using contracting agents is the Kasbah application from MIT Media Lab's, which is described as a multi-agent system for classified ads. The way it functions is that a user of this application creates an agent, to which it gives some instructions and sends it to a centralized agent marketplace. In this marketplace, Kasbah engages in finding potential buyers or sellers, which are also agents negotiating on behalf of their owners. The goal of both parties' agents is to reach an acceptable deal in accordance with the user's desired price and date of completion. The latest update of this application allows the users to rate how the other party managed their half of the deal through a mechanism called Better Business Bureau. Then, these data are used by agents to determine if they should negotiate with agents that fall below the user's specified threshold. As a result, this app is used not only for the brokering phase, but for the negotiation phase as well. Users are notified when the deal is closed, and additionally, the agent is removed from the marketplace so it won't be able to negotiate with other agents.[49]

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https://www.researchgate.net/profile/Vimala-Imogen/publication/381099261_AI-Powered_Legal_Documentation_Assistant/links/668e380cb15ba559074d9b00/AI-Powered-Legal-Documentation-Assistant.pdf

[48] Ian R. Kerr, "*Ensuring the Success of Contract Formation in Agent-Mediated Electronic Commerce*" (2001) https://link.springer.com/content/pdf/10.1023/A:1011587932113.pdf

[49] Ibid.

Additionally, MIT Media Lab has another application has another application called T@T, which automates other aspects of contracting. This application provides agents with the ability to negotiate the specific terms and conditions of the contract, like the delivery time, return policies, gift services, warranties, and other merchant value-added services. Enabling agents to negotiate on behalf of their owners could improve many legal challenges that are associated with the standard form agreements, which are take-it-or leave-it offers and do not allow the users to tailor the terms and conditions in accordance with their needs. Therefore they give the bargaining power to the merchants. [50]

Another example of a successful application of AI in contracts is Kira Systems, which was awarded the International M&A Technology Product Award in 2015. This application analyzes contracts in the due diligence process, from which it is able to identify contract provisions and essential data, even from non-standard forms, such as tables and forms. This application uses similar provisions that it has previously processed to identify relevant sections of the contract it is working on. Because it uses algorithms that analyze previously processed contract provisions, it is able to build a broader understanding of what users are looking for, even if the terminology used in the contracts is inconsistent or unfamiliar. Additionally, Kira's knowledge is not limited because it uses machine learning, therefore, users can consistently teach it to recognize new types of provisions.[51]

Lex Predict and Bloomberg's Corporate Transactions use algorithms to process contracts that are available publicly in large online databases like the Securities and Exchange Commission's and EDGAR; then, it is able to suggest drafting language based on these stored contracts. Through the analysis of the stored contracts, the algorithm is able to identify which provisions are "standard" and what language appears most frequently in those provisions. After, the algorithm is able to sort internally through contracts and identify to which degree a contract is in accordance with or departs from the standard language, and additionally, later, it is able to create contracts in accordance with the standard language.[52]

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[50] *Ibid.*
[51] Kathryn D. Betts & Kyle R. Jaep, "*The Dawn of Fully Automated Contract Drafting: Machine Learning Breathes New Life into a Decades-Old Promise*" (2017) https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1306&context=dltr
[52] *Ibid.*

2.5. Smart contracts

A smart contract is an agreement where the execution of the contract's terms is automated through computer code. This is achieved by translating the terms of the contract into code so that it can be executed by a computer. This means that the computer automatically fulfills the terms specified in the contract when certain conditions are met. In these contracts, the program controlling the smart contract has the ability to interact with physical or digital objects. For instance, a car might have software installed that prevents it from starting if the owner fails to make a debt payment.[53][54]

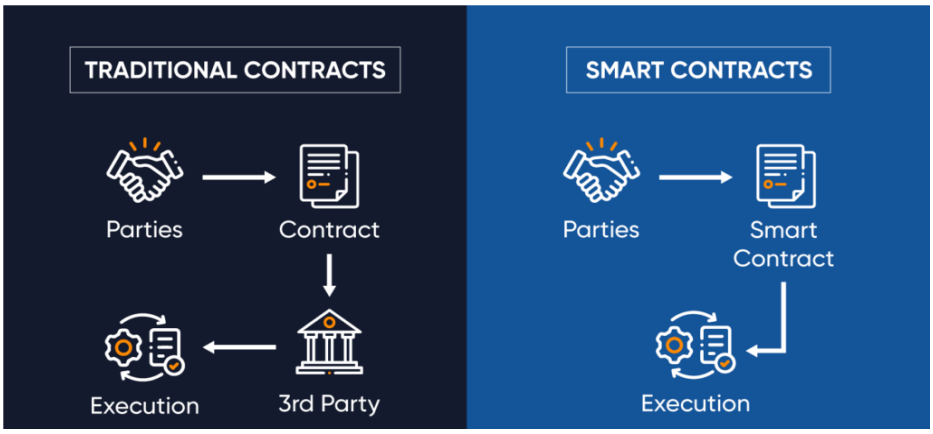

Figure 6. Difference between Traditional Contracts and Smart Contracts

An advantage of the smart contracts is that unlike traditional contracts which rely on legal systems and courts to enforce terms, smart contract can enforce themselves, through the code that makes sure that the contracts terms are executed exactly as written without the need for external enforcement. The self-execution capability of these types of contracts provides reassurance to the parties involved that the agreed-upon actions will be carried out, removing the need for trust between the parties.[55]

The most famous example of Smart Contracts is the public blockchain platform called "Etherum." Founded in 2013 by Vitalik Buterin, the Etherium blockchain enables anyone with access to the

[53] Max Raskin, "*The Law and Legality of Smart Contracts*" (2017) https://georgetownlawtechreview.org/wp-content/uploads/2017/05/Raskin-1-GEO.-L.-TECH.-REV.-305-.pdf
[54] Figure 6. Mindbowser, "*Introduction to Ethereum"* (2023) https://www.mindbowser.com/introduction-to-ethereum/
[55] *Ibid.*

decentralized network to trade any virtual asset, which may be digital or is digitally represented using cryptocurrency known as Ether.[56]

2.6. Types of Smart Contracts

Smart Contracts can appear in the following forms: (a) as a self-execution tool for contracts that are already concluded; (b) as a specific part of a contract (Ricardian Contracts), or as a (c) stand-alone Smart Contract.[57]

The most common type of Smart Contracts is the first one, or their use as a self-execution tool. In these types of contracts, parties have already concluded the contract in the off-chain world and have agreed upon the terms and conditions of the contract. After the contract is concluded they choose that the execution is carried out by a blockchain platform, therefore they encode the content of the contract into the blockchain platform, where the natural language is translated into a computer programming language, so the algorithm is able to read it and execute it. The content translated into a computer language constitutes what is called "contractware," which, from a legal standpoint, does not constitute a contract; it is rather a tool for facilitating the self-executing process. So, contractware does not impose any obligations upon the parties.[58]

The second type is a hybrid contract form, which means that some contractual provisions have been negotiated in the off-chain world, and some are negotiated in the on-chain world. Even though the two parts of the contract are concluded in different forms, it still establishes one contract only. The main characteristic of these contracts is that they can be read by a computer and a human at the same time. One example of these types of contracts is the Ricardian Contracts, which, from a technical standpoint, is a digital document that, after special software is applied to it, translates the document from computer language into natural language, and any amendment to the contract in natural language is reflected onto the computer language. In this respect, hybrid smart contracts

[56] Vasiliki Papapdouli, Vagelis Papakonstantinou, "*A Preliminary Study on Artificial Intelligence Oracles and Smart Contracts: A Legal Approach to the Interaction of Two Novel Technological Breakthroughs*" (2023) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4622322
[57] *Ibid.*
[58] *Ibid.*

are not only used as a self-execution tool but they are also used during the contract formation phase. [59]

The third type of these contracts is the rarest one. It is often used because the parties have difficulties or it is impossible to meet in the off-chain world. Hence, the whole contract is concluded in the on-chain world through the blockchain platform. Usually, there are no negotiations between the parties and no legal document that manifests the consent or declaration of intent of the parties. Therefore, the blockchain platform in these types of contracts serves not only as a self-executing tool and a tool for contract formation but also as a place of communication between the parties, who use the smart code to form their declarations of intention and automatically perform their obligations through these codes. Given the fact that elements of a contract, such as intent and meeting of minds, exist, they constitute "a contract" in the traditional sense of the word. This point of view is also supported by the principle of freedom of contracting and the principle of the informality of contract as well.[60]

CHAPTER III: LEGAL CHALLENGES RELATED TO THE APPLICATION OF AI IN CONTRACTS

As elaborated above, algorithms can be used to facilitate the contracting process and assist in their drafting, making the whole experience less time-consuming and minimizing human errors. However, the appearance of smart contracts and contracting agents has shown us that there is much more potential for AI, especially with the application of autonomous systems, which have the ability to take decisions without human supervision.

The issue lies in the fact that for a contract to be valid, it must have two defined parties, which must be in agreement, meaning that there must be consensus. The intention to create legal relations must exist, meaning that the promises in the contract must be enforceable and they must be supported by consideration.[61]

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[59] *Ibid.*
[60] *Ibid.*
[61] Tom Allen and Robin Widdison, "*Can Computers Make Contracts?*" (1996) https://jolt.law.harvard.edu/articles/pdf/v09/09HarvJLTech025.pdf

3.1. Personhood of AI

Regarding the criteria of the parties, a generally accepted concept is that natural and legal persons have the capacity to enter a contract, but legislation until now has not given computers legal capacity to AI. However, contracts involving AI have sparked discussions on whether AI should be granted legal personhood. Platforms like eBay, for instance, allow users to use 'shopbots,' or 'pricebots' to bid on items automatically. Legal challenges arise regarding the awareness of terms by the parties and whether the AI has the intent to contract. As AI agents become more autonomous and human-like, these challenges will grow.[62]

Critics argue that alternative legal doctrines could suffice without granting AI legal personhood. These include treating AI as mere tools, applying agency law, or using insurance for potential AI liability. Currently, less advanced AI is treated as tools of humans, with contracts classified as unilateral offers, or analyzed under the objective theory of contract law. However, as AI becomes more autonomous, these approaches will become inadequate.[63]

Increased AI autonomy undermines the idea that AI is merely a tool or intends a unilateral contract. This unpredictability challenges both unilateral offer and objective theory approaches. Treating AI as a legal agent would require it to have legal capacity, including the ability to give consent and exchange promises, essentially requiring legal personhood. As AI becomes more autonomous, granting it legal personhood will become necessary. [64]

An alternative approach is using insurance to cover AI liability, as proposed by Solum. However, this raises issues related to insurance law and is only a temporary solution. Insurance alone cannot address AI liability, as AI may control property and create unforeseeable risks. The insurance industry is unlikely to cover all AI – related risks, especially those involving significant financial

[62] Rafael Dean Brown, "*Property Ownership and the Legal Personhood of Artificial Intelligence*" (2021) https://www.tandfonline.com/doi/epdf/10.1080/13600834.2020.1861714?needAccess=true
[63] *Ibid.*
[64] *Ibid.*

losses, such as market manipulation. Insurance would be limited to foreseeable risks, bringing the focus back to unpredictability of AI.[65]

Another uncertainty involves the enforcement of contracts or judicial orders. In civil law countries, assets must be under the control of a legal person to satisfy a judgment. AI controlling assets would complicate enforcement, as assets not controlled by a legal person cannot be subject to judgment, exacerbating enforcement issues.[66]

3.2. Intent and Meeting of Minds

Contracts formed with the assistance of computers often face scrutiny regarding the intention behind them, as intention is inherently a human trait. Without human involvement, it's argued that intention is absent, raising questions about the contract's validity. These views, however, stem from a limited understanding of contract law. While much of the law and technology literature suggests that AI in transactions necessitates legal adaption, this perspective may overlook the robust and technology-neutral nature of contract law's core principles. Contact law has evolved through significant technological changes like the telephone, vending machines, and the internet, relying on the straightforward principles that parties must intend to be bound and exchange consideration. These principles are flexible, allowing intention to be manifested in various forms, excluding silence. Thus, despite practical challenges, contract law fundamentally requires only intention and consideration for a contract to be valid.[67]

In this respect, contract law does not focus on actual intent but rather on observable behaviors that communicate intent. If parties engage in actions that suggest transacting behavior, the law infers legal intention from these outward manifestations, such as statements or acts, not the mental states behind them. This approach, known as the "objective theory of contract," maintains that contracts are based on external actions that signify agreement, protecting commercial certainty and the

[65] *Ibid.*
[66] *Ibid.*
[67] Eliza Mik, "*AI in Negotiating and. Entering into Contracts*" (2022) https://www.cambridge.org/core/books/cambridge-handbook-of-artificial-intelligence/ai-in-negotiating-and-entering-into-contracts/F81B3D48E61B68B9F6F4B72BAA8FFF22

expectations of those involved. Commercial transactions rely on these outward appearances of agreement, and the law evaluates intention objectively from the perspective of a reasonable person receiving the statement, not the one making it. Therefore, the process behind a decision, including the use of AI, is irrelevant; what matters is the perceived intention to contract based on the statements or actions presented.[68]

Thus, in contract law, outward behavior is used as a proxy for intention. The objective theory of contract emphasizes that it is the appearance of intention that matters, not the actual mental state. This is particularly relevant in scenarios where parties transact at a distance using remote communication methods. Contract law measures perceived intention based on the contents of messages. [69]

This approach has been supported even in cases when a computer enters a contract automatically without human supervision. This is because when computers form a contract automatically, it does so based on prior human programming. The human intention is embedded in the programming, even if there is no direct human involvement at the time of contract machines and e-commerce websites, where the offeror's intention persists as long as the machine or site is operational. [70]

Thus, contracts formed by AI reflect the goals of the person who programmed the AI, and the specific communication method is the secondary content of the messages. Therefore, whether an AI develops its own rules or follows fixed instructions, the resulting contracts are considered to reflect human intention. This view has been supported by the Uniform Electronic Transaction Act, which states that the necessary intention originates from the programming and use of the machine. [71]

In practice, the person using the program may not be the one who created it, but they are deemed to understand and control its actions. The relationship between the programmer and the user is

[68] *Ibid.*
[69] *Ibid.*
[70] *Ibid.*
[71] *Ibid.*

treated as a single entity for establishing contractual intention, ensuring the validity of contracts formed by AI.[72]

This theory known as "the objective" theory of contract interpretation, does not consider the actual intentions of the parties involved. Instead, it focuses on the outward expressions of intent, making it suitable for "weak AI" systems that are programmed by humans to complete specific tasks. However, applying the objective theory to "strong AI" and autonomous systems, which are capable of making independent decisions, remains contentious.

The subjective theory, which considers the intent of the parties to establish legal relations, is closely tied to the recognition of AI personhood. If an AI enters into a contract without human supervision, its actions – though programmed – reflect the autonomous decision-making capabilities of the system. This raises questions about whether the actions truly represent the owner's intent, as the objective theory would suggest.

While the current jurisprudence predominantly embraces the objective theory, the growing influence of autonomous systems in business may necessitate a shift. In the future, as strong AI and autonomous systems become increasingly integral to companies, legal frameworks may need to evolve to incorporate elements of the subjective theory, recognizing the unique nature of AI decision-making and possibly extending the legal personhood of AI entities.

3.3. Predictability and "Explainability"

The objective theory of contract generally accommodates the use of AI in contracting, but challenges arise with sophisticated AI programs that exhibit emergent behaviors or unpredictable actions. Some AI behaviors may be original or result from programming errors, making them difficult to predict, understand, or explain. While doctrinal distinctions exist between unexplained

[72] *Ibid.*

actions, unplanned behaviors, and malfunctions, these differences may be irrelevant to the person interacting with the AI, as the outputs appear the same.[73]

Contract law does not require statements made by contracting parties to be understandable, or explainable. The decision-making process behind a statement is generally irrelevant to contract law. Contractual intention, as a decision to agree on specific terms, does not need to be comprehensible. Neither party needs to understand or explain the contents or origins of a statement, as the mental origins of most decisions are often inexplicable retrospectively. The actions of AI can always be tracked back to the human programmer's design choices, such as selecting learning rates, knowledge representation, or neutral network structures. These choices influence the AI's behavior and outputs. Programmers decide which algorithms to use, the feedback to provide, and the data to train on, which are all human decisions. Kroll argues that the inability to explain a system's operations stems not from its complexity but from design choices made by its creators. This lack of transparency is not a technical necessity but a result of specific design decisions.[74]

The complexity of certain programs can lead to commercially unfavorable contracts, such as a website offering goods far below market price or a trading algorithm buying stocks at an excessively high price. Those using automated systems might argue that such transactions were unintended and unpredictable. These problems of predictability are not limited to machine learning systems but apply to all software, including simple rule-based programs. The fundamental issue is the impossibility of ensuring a program always produces a specific output without running it. It cannot be verified that a program will always function correctly in all scenarios because it is impractical to test it for every possible input. Additionally, determining whether an unexpected output is due to emergent behavior, or a programming error can be extremely difficult, if not impossible.[75]

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[73]Eliza Mik, "*AI in Negotiating and. Entering into Contracts*" (2022) https://www.cambridge.org/core/books/cambridge-handbook-of-artificial-intelligence/ai-in-negotiating-and-entering-into-contracts/F81B3D48E61B68B9F6F4B72BAA8FFF22

[74] *Ibid.*

[75] *Ibid.*

Therefore, it is technically impossible to prevent "unintended transactions." Those who use AI in transactions cannot give up contracts based on emergent, erroneous, or unpredictable operations. From the perspective of the transaction recipient, emergent operations are indistinguishable from programming errors or malfunctions. Commercial certainty dictates that as long as the statement is commercially plausible, the AI's operator is bound by it. The exception is when a reasonable recipient knows or should know that the statement does not reflect the true intention of the maker. For example, an offer to sell a high-end printer for a fraction of its market price or an exchange of cryptocurrencies at 150 times the market rate is deemed unreasonable, and the recipient should recognize the offer's absurdity.[76]

This approach aligns with the objective theory of contract interpretation, which emphasizes the outward expression of agreement rather than the internal intentions behind a statement. Thus, the underlying reasons for the seller's statement are irrelevant, even if it results from an algorithmic malfunction. However, a subjective element comes into play when the recipient knows or should have known that the other party did not intent to contract. This is valid ground for annulment in traditional contracts.

The challenge arises when transactions are generally accepted based on their occurrence, but in specific cases, the subjective element is considered. This inconsistency can lead to greater unpredictability, especially in transactions involving AI on both sides. It is difficult to argue that the AI "knew or should have known" because the objective theory does not support such reasoning. This presents a challenge in applying traditional contract principles to AI-driven transactions. In regard to AI, this theory can be applied to "strong AI," which supposedly has the ability to mimic human thinking, so by mimicking the human mind, it can be argued that the AI "knew or should have known" that there was no intention from the other party, rather than "weak AI," which is usually programmed to perform a specific task.

[76] *Ibid.*

3.4. Privacy issues and Data Protection

AI systems process vast amount of diverse data types, including images, text, speech, video, code, business plans, and technical formulas. Handling such data requires different protection level based on whether the data is personal or non-personal. Personal data, such as names and personal life information, is subject to data protection laws like CCPA in California and GDPR in Europe. Business data, including financial and technical information, strategic know-how, and trade secrets, may be considered confidential under local laws or contractual agreements, carrying civil and criminal penalties for mishandling.[77]

Smart contracts are frequently built on non-fungible tokens (NFTs), which are unique digital assets representing ownership or proof of authenticity, typically on blockchains like Ethereum. Each NFT has a distinct value, making it non-interchangeable on a one-for-one basis with other tokens.[78]

In practical applications, NFTs can represent real estate properties, with smart contracts managing ownership transfers, rental agreements, and automated property management. The transparency and public verifiability of smart contracts on blockchain platforms mean that the details, including code and transaction data, are visible to everyone. However, this transparency raises privacy concerns if the contracts hardcode sensitive data, such as personal or financial information, are exploited by malicious actors, making it difficult to ensure data security and correctness.[79]

Various techniques have been developed to address privacy concerns in smart contracts. One approach is using private blockchains, which restrict access to authorized participants, enhancing privacy and security. Some blockchain platforms also incorporate confidential transaction mechanisms like "Confidential Transactions" and "Zero-Knowledge Proofs" to hide transaction

[77] Deloitte, "*The legal implications of Generative AI*" https://www.deloitte.com/content/dam/assets-shared/docs/services/legal/2023/dttl-legal-perspective-the-legal-implications-of-generative-ai.pdf
[78] Wenqian Zhao, Meghana Patibandla, Junhua Ding, "*An Approach for Ensuring the Privacy in Smart Contracts*" (2023) https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=10430048
[79] *Ibid.*

details while ensuring validity. Ethereum 2.0 and layer – 2 scaling solutions aim to improve privacy protections further.[80]

Another technique involves keeping sensitive data off-chain and accessing it through trusted oracles, ensuring that only necessary outcomes are recorded on the blockchain. Encryption methods, such as homomorphic encryption, allow computations on data without decryption, safeguarding privacy.[81]

However, smart contracts can have vulnerabilities and bugs that lead to privacy issues. For example, the DAO attack in 2016 and the Parity wallet loss in 2017 highlighted significant privacy and security concerns. To address these, rigorous approaches, such as static analysis, symbolic execution, fuzzing, formal analysis, machine learning, execution tracing, code synthesis, and transaction interceptions, are necessary to ensure the quality and privacy of smart contracts.[82]

When deployed on public blockchains, the transparency of smart contracts can expose sensitive data. Although blockchain transactions are pseudonymous, linking addresses to real identities through external data analysis can compromise privacy. Additionally, miners or validators can see and manipulate transactions before they are added to the blockchain. Once a contract is on the blockchain, it cannot be changed, making any mistakes or inclusion of sensitive information permanent. Interaction with off-chain services or oracles can also affect smart contract privacy.[83]

Smart contracts and blockchains are not the only risky areas of AI implementation in contracts by exposing data on blockchains, even using AI as a tool might lead to data privacy issues. AI is driven by data. These systems learn patterns from large datasets, meaning personal data used in training becomes integral to the AI's model, influencing its outputs. This raises significant data protection issues as personal data can be republished or amplified, leading to risks like invasive advertising, fraud, or identity theft. Managing personal data within AI models is complex and often impractical once the data is incorporated into the system. Thus, data protection officers must ensure

[80] *Ibid.*
[81] *Ibid.*
[82] *Ibid.*
[83] *Ibid.*

users understand what information should not be shared with AI tools. A particular concerning risk is the creation of deepfakes – hyper- realistic but false content generated by AI using personal data. These can be used for disinformation, fraud, or harassment. Additionally, if training data is biased, AI outputs can also be biased, leading to unfair consequences.[84]

Article 6, of the GDPR allows personal data processing if it's necessary for contract performance or pre-contractual steps. With respect to AI training, for personal data to be processed, it needs to be proven that it is essential to fulfill a contract with the data subject. The European Data Protection Board (EDPB) interprets this narrowly, meaning the contract's main objective must be unachievable without processing the personal data. Thus, using the contract basis for AI training is highly restrictive. It may apply if the AI system's use is the contract's core and training the AI with user data is indispensable. The pre-contractual basis is even more limited, requiring proof that the data subject's request can only be met by training the AI. Overall, this legal basis is seldom practical for AI training activities.[85]

Therefore, for companies looking to utilize AI as an assisting tool for tasks such as drafting, reviewing, data extraction or summarization must exercise caution regarding the data they input. Improper handling or exposure of sensitive information during these processes can lead to significant privacy and security risks.

3.5. Enforcement of AI integrated Contracts

When contracts do not end in breach and rancor, they are often enforced by the parties of the contract, which establishes performance and completion. However, a need for enforcement by a third party arises when there is a dispute between the parties. The most common case of enforcement is by a court decision. The issue does not lay on contracts that are enforced either by

[84] Confederation of European Data Protection Organisations, "*Generative AI: The Data Protection Implications*" (16 October 2023)
https://cedpo.eu/wp-content/uploads/generative-ai-the-data-protection-implications-16-10-2023.pdf
[85] *Ibid*.

the parties, or in blockchains as is the case of smart contracts. However, the difficulties begin when the contract needs to be enforced by the court. The issue here is if such contracts are enforceable?

The idea that electronic contracts are enforceable comes from common business practices and some legal rulings under the Uniform Electronic Transactions Act. However, as algorithmic contracts (contracts in which algorithms determine the obligations of the parties, because it was used either during, or after contract formation) extend into different business areas, they could face legal challenges.[86]

To tackle these issues, contract law might need to adopt new concepts. These could include treating algorithms as mere tools or assuming that sophisticated corporations can anticipate their behavior. An alternative approach suggests recognizing these algorithms as agents, which would better reflect their actual role and help prevent misuse.[87]

Traditional contract law, with focus on mutual assent and consideration struggles with algorithmic contracts, as they can act unpredictably, beyond their creators' intention, complicating the notion of mutual assent. Since the algorithms' actions and decisions are not fully known to either party, the required level of clear, objective intent for forming a contract might not be met. [88]

Moreover, consideration which requires a clear bargaining process, becomes problematic when algorithms are involved in negotiations rather than humans. This challenges the application of traditional contract principles to algorithmic contracts. [89]

However, an alternative approach suggests that to make AI-negotiated contracts legally enforceable, there's no need for radical changes – just a shift in how we view agreements involving AI. When someone sets up an AI program to negotiate contracts on their behalf, it acts as an open

[86] Lauren Henry Scholz, "Algorithmic Contracts" (2017) https://law.stanford.edu/wp-content/uploads/2018/03/3_SCHOLZ-FINAL_Formatted_Mar18.pdf
[87] *Ibid.*
[88] *Ibid.*
[89] *Ibid.*

offer to contract on the terms the AI decides. This is similar to other underdetermined offers where the exact terms depend on a future event, like market price on a specific date.[90]

This method reduces transaction costs and can be efficient, much like requirements or output contracts where terms are vague but functional. By using AI, the contract terms are determined in real-time, allowing for flexibility and efficiency. This approach avoids complex legal questions about the nature of AI and focuses instead on the intent behind using AI to negotiate contracts.[91]

When the buyer accepts the terms offered by the AI, a binding contract is formed, as AI fills in the details of the underdetermined offer. Courts can enforce these contracts because the terms become clear once the AI specifies them. Concerns about vagueness are addressed because the resulting contracts are precise enough for legal enforcement.[92]

Even if two AI programs negotiate with each other, a contract can still be formed. Each party, by using an AI program, makes an open offer to contract on the terms the AI agrees with another AI. When the AI programs reach an agreement, it constitutes a legally enforceable contract between the parties who set up the AI.[93]

In conclusion, there are two main theories regarding the enforcement of AI-integrated contracts. The objective theory posts that no legal changes are necessary, as the current framework can accommodate AI's novelties. When parties use AI for contracts, their intention is clear, making these contracts enforceable by law, reflecting a choice to reduce costs and increase efficiency. Conversely, the other theory argues that changes in the law are required to address AI-specific issues, such as AI personhood and its ability to express intention and consent. Legal reforms are necessary to ensure AI-integrated contracts are appropriately recognized and enforced.

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[90] Matthew Oliver, "*Contracting by Artificial Intelligence: Open Offers, Unilateral Mistakes, and Why Algorithms are not Agents*" (2021) https://anujolt.org/article/24466-contracting-by-artificial-intelligence-open-offers-unilateral-mistakes-and-why-algorithms-are-not-agents

[91] *Ibid.*

[92] *Ibid.*

[93] *Ibid.*

CHAPTER IV: CASE LAW

4.1. B2B2 Ltd v. Quoine Pte Ltd

This case is a landmark case involving automated trading on a cryptocurrency exchange. B2C2 Ltd used a trading algorithm on Quonie's platform, resulting in transactions where Bitcoin (BTC) was exchanged for Ethereum at highly unusual rates due to a malfunction in Quoine's system. Quoine reversed these trades, leading B2C2 to sue for breach of contract and trust.

Quoine Pte Ltd operated a currency exchange platform where users could trade cryptocurrencies and fiat currencies like the Singapore Dollar and US Dollar. B2C2, the plaintiff, was an electronic market maker that provided liquidity on various platforms, including Quoine's. Both companies used complex software for market making. Quoine's platform relied heavily on the "Quoter Program," which generated new orders based on market prices from other exchanges and handled 98% of trades on its platform. [94]

A technical issue with the Quoter Program led to a failure in generating new orders, reducing liquidity, and putting some customers in a margin call position. B2C2's software which sets trading prices based on market data, struggled due to the lack of accurate market prices. To compensate, B2C2's program used a "deep quote" price, resulting in trades where Ethereum was exchanged for Bitcoin at rates about 250 times higher than the market rate ("**Disputed Trades**").[95]

These trades occurred despite the buyer's account on Quoine not having the amount of Bitcoins traded. As a result, B2C2 was credited with 3092.517116 Bitcoins and debited 309.2518 Ethereum from their account. When Quoine's Chief Technology Officer discovered the issue, the trades were reversed. B2C2 then sued Quoine.[96]

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[94] Evan Ng, 'B2C2 Ltd v Quoine Pte Ltd [2019] SGHC(I) 0' (2019) https://heinonline-org.uaccess.univie.ac.at/HOL/Page?handle=hein.journals/singclr2019&id=207&collection=journals&index=
[95] *Ibid.*
[96] *Ibid.*

B2C2 argued that Quoine had no right to reverse the trades after they had been completed. In response, Quoine defended itself by citing various grounds, such as their contract's express and implied terms, claims of unjust enrichment, the idea that cryptocurrencies were held in trust through segregation, and the concept of unilateral mistake. These issues were examined in the judgment delivered by International Judge Simon Thorley QC. [97]

With regard to the Express and Implied Terms of the Agreement, Quoine argued that certain express and implied terms permitted it to cancel the disputed trades. Specifically, Quoine cited the Aberrant Value Clause and the Unilateral Variation Clauses. The Aberrant Value Clause, from the Risk Disclosure Statement, was claimed to justify the cancellation of trades due to "aberrant values" caused by system failures. Quoine also argued that the Unilateral Variation Clauses allowed unilateral changes to the Agreement without notifying users. B2C2 disputed these points, arguing that the Risk Disclosure Statement was not incorporated into the Agreement and that even if it was, the Aberrant Value Clause only covered system failures, which was not the case here, because the system did not fail, as the contract was performed.[98]

The Judge sided with B2C2, stating that Quoine failed to notify users of changes to the Agreement and the Aberrant Value Clause was not applicable. Additionally, the Judge found that implied terms allowing Quoine to reverse trades were inconsistent with the Irreversible Action Clause, which declared orders irreversible once filled. The Judge also rejected the idea that Quoine acted as an agent for users, reinforcing that the Irreversible Action applied universally.[99]

The core issue in Quinoe's defense, which the Judge found most challenging, is whether unilateral mistakes can invalidate the Trading Contracts. Quoine argued that unilateral mistakes, both at common law and in equity, justify canceling the Disputed Trades. The key question is whether Quoine, not being a party to the Trading Contracts, can use this doctrine as a defense against claims of breaching its contract with B2C2. This defense's applicability to algorithmic trading, where

[97] *Ibid.*
[98] "*B2C2 Ltd v Quoine Pte Ltd*" [2020] SGCA(I) 2 (Singapore Court of Appeals) https://www.elitigation.sg/gdviewer/SUPCT/gd/2020_SGCAI_2
[99] *Ibid.*

terms are determined by algorithms rather than direct knowledge of the contract's specifics, raises complexities.[100]

The doctrine of unilateral mistake in contract law addresses situations where one party makes a mistake about a term of the contract while the other party knows about this mistake. According to Andrew Phang's *The Law of Contract in Singapore*, a contract cannot be voided solely because one party's intent was misunderstood. The mistake must concern a term of the contract, not just the context or circumstances. For instance, in *Smith v. Hughes*, the court ruled that a contract is valid even if one party was mistaken about the quality of the goods as long as the parties agreed on the terms. Similarly, in *Statoil ASA v. Louis Dreyfus*, the court held that a mistake about a non-essential fact does not invalidate the contract if the other party was aware but did not correct the mistake. Equity can sometimes provide relief if the non-mistaken party's behavior was unconscionable, but the contract will remain binding if the mistake was about a non-essential fact.[101]

In the context of unilateral mistakes in equity, English authorities generally suggest that the doctrine does not extend beyond mistakes related to contract terms. Equity might not provide relief for unilateral mistakes related to the circumstances surrounding the contract's formation, as evidenced in several cases like *Great Peace Shipping Ltd v. Tsavliris Salvage (International) Ltd and Clarion Ltd v. Provident Institution.* As shown in *Digilandmall.com*, Singapore's stance also acknowledges equitable jurisdiction for unilateral mistakes but has not definitively addressed its extension beyond contract terms. The Court hinted at the possibility that equity might cover a broader range of fundamental mistakes, though this was not fully developed. While the scope of unilateral mistakes in equity and its application to automated contracts are areas of ongoing debate, current English and Singaporean positions suggest a restrictive approach, focusing primarily on mistakes related to contract terms and not extending broadly to other types of mistakes.[102]

[100] *Ibid.*
[101] *Ibid.*
[102] *Ibid.*

In this case, the appeal centered on whether the Counterparties were mistaken about Ethereum's market value in relation to Bitcoin when they executed trades at abnormal prices on April 19, 2017. Quoine argued that the counterparties' belief that they were buying Ethereum at reasonable prices was a mistaken belief that B2C2's programmer, Mr. Boonen, knew about and exploited. However, B2C2 contented there was no mistake about the prices or any unconscionable conduct by Mr. Boonen.[103]

The Trading Contracts were formed through deterministic algorithms that functioned as intended, so any mistake was related to the Platform's operation rather than the contract terms themselves. The counterparties' mistaken belief was more about how the Platform would behave rather than the prices at which trades occurred. This type of mistake about the operational conditions rather than the terms of the contract – does not qualify for unilateral mistake relief under common law.[104]

Further, the court found that B2C2 and Mr. Boonen did not have knowledge of the Quoine's mistaken belief. Mr. Boonen's programming of the Trading Software with deep prices was not done with the intent to exploit any mistakes, but rather to protect B2C2 in case of unexpected event. Thus, B2C2 did not act unconscionably, and the claim of unilateral mistake was rejected.[105]

Additionally, Quoine argued that the Trading Contracts were void due to a common mistake, claiming that both B2C2 and Quione mistakenly believed they were trading at market rates for ETH. However, B2C2 could not have held this belief since it intentionally placed orders at prices of 9.99999 Bitcoin and 10 Bitcoins per Ethereum. Thus, the defense of common mistakes failed.[106]

Quione also claimed the right to cancel the trades, arguing that B2C2 would otherwise be unjustly enriched at Quione's expense. Unjust enrichment has three cumulative conditions to be fulfilled: a benefit for the defendant at the claimant's expense, and the enrichment is unjust. The Judge found

[103] *Ibid.*
[104] *Ibid.*
[105] *Ibid.*
[106] *Ibid.*

that the two first conditions were met; however, the enrichment was not unjust because the contracts were valid and enforceable.[107]

In conclusion, the B2C2 Ltd v. Quoine Pte Ltd case addresses several key issues discussed in Chapter II, such as the personhood of algorithms, the intent of the parties, the unpredictability of AI and the enforcement of AI-generated contracts. The court rejected the notion that algorithms acted as agents for the parties, emphasizing that the algorithms functioned according to the parties' intent as programmed. This case highlights the unpredictability of using AI in contract formation; despite Quoine's argument that there was no intent to trade at such an abnormal rate, the court sided with B2C2. This illustrates that courts adhere to the objective theory of contract formation, holding companies accountable for the actions of their AI, even when those actions deviate from intended outcomes. Importantly, this decision confirms that contracts executed by AI are enforceable under current law, demonstrating that the legal framework is capable of accommodating AI in a contractual context without the need for new regulations.

4.2. Moffat v. Air Canada

On November 11, 2022, Mr. Moffat's grandmother passed away in Ontario. That day, Mr. Moffat visited Air Canada's website to book a flight from Vancouver to Toronto using Air Canada's bereavement rates, which are offered to those traveling due to a death in the immediate family.[108]

Mr. Moffat interacted with a support chatbot on the Air Canada website. It's understood that this chatbot was an automated system rather than a live Air Canda employee. Mr. Moffat inquired about bereavement fares through the chatbot and received a response stating that reduced fares were available for travel due to a death in the immediate family. The response also mentioned that if Mr. Moffat needed to travel immediately or had already traveled, he could apply for a reduced fare within 90 days of issuing the ticket by filling out a Ticket Refund Application form.[109]

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[107] *Ibid.*
[108] "*Moffat v Air Canada*" 2024 BCCRT 149 (Civil Resolution Tribunal) https://decisions.civilresolutionbc.ca/crt/crtd/en/item/525448/index.do
[109] *Ibid.*

The chatbot's message included a hyperlink to a separate webpage titled "Bereavement Travel" with further details on Air Canada's bereavement policy. This webpage specified that bereavement consideration was not available for requests made after the traveling had been completed.[110]

Relying on the chatbot's information, Mr. Moffat booked a one-way flight from Vancouver to Toronto on November 12 for $749.98, and a return flight from Toronto to Vancouver on November 18 for $845.38. On November 11, Mr. Moffat also spoke with an Air Canada representative by phone to inquire about the bereavement discount and was told the fare would be approximately $380. There was no mention of whether bereavement rates could be applied retroactively.[111]

Mr. Moffat submitted his application for the bereavement fare on November 17, 2022, within the 90-day period mentioned by the chatbot. Despite ongoing correspondence with Air Canada through December 2022 and February 2023 to secure a partial refund, no resolution was reached.[112]

On February 5, 2023, Mr. Moffat sent an email to Air Canada, including the chatbot's screenshot and confirmation of his application and death certificate submission. On February 8, Air Canada acknowledged that the chatbot had provided misleading information but noted that the chatbot's link to the bereavement travel webpage had been correctly provided. Air Canada indicated it would update the chatbot to address the issue. Despite further exchanges, the matter remained unresolved.[113]

This claim was treated as a claim for negligent misrepresentation, which are brought when a party fails to show reasonable care when making sure that their statements are accurate and not misleading. To succeed in his claim, Mr. Moffat had to show that Air Canada owed him a duty of care. Second, he needed to prove that the information provided was false or misleading. Third, he must demonstrate that Air Canada was negligent in making this representation. Additionally, Mr.

[110] *Ibid.*
[111] *Ibid.*
[112] *Ibid.*
[113] *Ibid.*

Moffat must prove that his reliance on the information was reasonable and that it resulted in damages.[114]

Air Canada's argument that it cannot be held responsible for information provided by its chatbot, treating it as a separate entity, was not accepted, as the chatbot was part of Air Canada, and the company is accountable for all information presented on its site, whether it is from a static page or an interactive chatbot. Thus, Air Canada had a duty of care toward Mr. Moffat, as companies are expected to ensure that their representations are accurate and not misleading. Consequently, Mr. Moffat has successfully proven his claim of negligent misrepresentation.[115]

Although this case involves a relatively modest financial amount, it reinforces the legal perspective that courts regard AI as a tool rather than an independent entity. Consequently, companies are held accountable for the actions and errors of their AI systems. In this instance, the Air Canda chatbot provided incorrect information, leading to significant issues for the company. This situation illustrates the inherent unpredictability and potential inaccuracies of AI tools. As a result, companies must exercise caution when implementing AI, even as an assisting tool, to ensure that it operates reliably and does not cause harm.

4.3. Knight Capital Group

Knight Capital Group was an American financial services company providing access to capital markets, including equities, bonds, and cash equivalent, to clients such as buy and sell-side firms and corporate issuers. The company was recognized as one of the top trades in U.S. equities, with its primary focus on market making and trading across global equites, fixed income, foreign exchange, options, and futures. Knight was a leading source of liquidity in U.S. equities, dealing in NYSE and NASDAQ-listed stocks, Exchange-Trade Funds, and Over-the-Counter securities.[116]

[114] *Ibid.*
[115] *Ibid.*
[116] Christos Saltapidas and Ramin Maghsood, "*The Fall of Knight Capital Group*" (2017) https://www.math.chalmers.se/Stat/Grundutb/CTH/mve220/1718/Christos%20Saltapidas-Ramin%20Maghsood-The-fall-of-Knight-Capital-Group.pdf

Knight Capital made two critical technological errors that led to the trading incident on August 1, 2012. The company had identified a significant issue related to the operation of its routing framework.[117]

In 2005, Knight Capital moved a section of computer code in an automated equity router to an earlier point in the sequence, which caused a malfunction in the router. Although this function should not have been used, it was left in the system.[118]

In late July 2012, during preparations for the new Retail Liquidity Program, Knight Capital mistakenly activated a new code within the same router. This led to certain orders accepted by the New York Stock Exchange's program triggering the faulty function in Knight Capital's router, which then went unrecognized when orders were filled.[119]

On August 1, within minutes of the market opening, the problem surfaced, and Knight Capital's router mistakenly sent over 4 million orders into the market while attempting to fill 212 customer orders. This resulted in Knight Capital acquiring billions of dollars in unwanted positions and, according to Bloomberg, resulted to a $440 million loss for the company.[120]

Despite the Securities and Exchange Commission's findings that Knight Capital Group violated several provisions of Exchange Act Rule 15c3-5, which led to a preventable loss, this case highlights the significant risks and complexities tied to automated systems, particularly in critical sectors like financial markets.[121] The involvement of AI in contract formation or execution introduces a layer of complexity in determining liability when malfunctions occur. In this case, the Securities and Exchange Commission held the company accountable for the actions of its automated systems. Additionally, this case raises important concerns about the transparency of the

[117] *Ibid.*
[118] *Ibid.*
[119] *Ibid.*
[120] *Ibid.*
[121] Read more: "*Order Instituting Administrative and Cease-and-Desist Proceedings Pursuant to Section 8A of the Securities Act of 1933, Section 21C of the Securities Exchange Act of 1934, and Section 203(f) of the Investment Advisers Act of 1940, Making Findings, and Imposing Remedial Sanctions and a Cease-and-Desist Order*" (1 October 2013) Release No 34-70694 (United States Securities and Exchange Commission) https://www.sec.gov/files/litigation/admin/2013/34-70694.pdf

AI-driven decision-making process. The rapid execution of contracts through AI makes detecting malfunctions in time to mitigate their impact difficult, emphasizing the need for robust controls and preventative strategies to avert such outcomes.

CHAPTER V: LEGAL FRAMEWORK FOR AI

As technology is developing and AI is becoming a factor in the contracting world, countries have started to acknowledge the challenges that it is imposing, therefore they have started to draft laws and regulations addressing those issues.

5.1. European Union

The AI Act in Europe marks the first comprehensive legal framework on artificial intelligence aimed at addressing AI-related risks, positioning Europe as a global leader in this field. It sets forth clear requirements and obligations for AI developers and users, particularly concerning specific AI applications. It also seeks to ease administrative and financial burdens on businesses, with a focus on supporting small and medium-sized enterprises.[122]

The Regulation aims to improve the internal market by creating a unified legal framework for developing, deploying, and using AI systems across the European Union. It aligns with Union values to encourage using human-centered and reliable AI while ensuring robust protection for health, safety, and fundamental rights as outlined in the Charter of Fundamental Rights of the EU. The Regulation also seeks to mitigate the potential negative impacts of AI, support innovation, and prevent Member States from placing restrictions on AI systems unless specifically allowed by the Regulation.[123]

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[122] European Commission, 'Regulatory framework proposal on artificial intelligence' (Digital Strategy, 21 April 2021) https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai

[123] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act)
https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202401689

The General Data Protection Regulation (GDPR) is a comprehensive data protection law in the European Union that governs the processing of personal data, particularly in contexts involving algorithms, automated decision-making, and profiling. While the GDPR does not explicitly mention AI, its provisions are highly relevant to AI applications, especially when they involve automated processing of personal data.

Under the GDPR, profiling refers to any form of automated processing of personal data designed to evaluate certain personal aspects of individuals. Algorithms that engage in such processing are required to do so in a manner that is lawful, fair, and transparent. The regulation grants individuals the right not to be subject to decisions that are based only on automated processing, including profiling if such decisions produce legal effects or significantly impact them. Exceptions to this rule exist if the decision is essential to enter a contract or for its performance.[124]

Furthermore, the GDPR ensures that individuals have the right to access their personal data and understand the underlying logic behind automated decision-making processes. Organizations that utilize algorithms for large-scale profiling or automated decision-making must conduct a Data Protection Impact Assessment (DPIA). They are also required to implement appropriate technical and organizational measures to assure that data processing aligns with the GDPR's strict requirements. This framework aims to protect individual's rights and freedoms while fostering transparency and accountability in the use of AI and algorithms.[125]

Additionally, although not explicitly centered on AI, the Digital Services Act includes provisions that significantly impact the use of AI systems within digital platforms. Article 27 requires very large online platforms to assess and mitigate systemic risks, which could involve AI-powered tools used for content moderation, recommended systems, and targeted advertising. These platforms are obligated to perform risk assessments and implement measures to address the potential harms

[124] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)
https://eur-lex.europa.eu/eli/reg/2016/679/oj
[125] *Ibid.*

posed by such AI technologies. [126] Moreover, Article 34 mandates transparency in how content is recommended to users, requiring platforms to disclose the key parameters of their AI algorithms that personalize content feeds or advertisements.[127] Article 35 introduces auditing obligations for very large online platforms, necessitating independent reviews that could involve the examination of AI systems used in automated processes like content moderation.[128]

The Digital Markets Act also influences the use of AI within Europe, particularly through its focus on transparency and fairness in digital markets. Article 6 specifically targets the transparency of ranking algorithms, requiring gatekeepers to disclose how AI systems determine the visibility and order of services and products. This provision ensures that AI algorithms used by gatekeepers for ranking purposes are transparent and do not unfairly disadvantage competitors.[129] Furthermore, Article 13 addresses the need for interoperability in messaging services provided by gatekeepers, which might involve the integration of AI-driven systems. This requirement aims to ensure that AI systems can operate seamlessly across different platforms, promoting competition and innovation in the digital marketplace.[130]

Lastly, the European Union is in its way of adapting the AI Liability Directive, which aims to enhance the internal market by setting uniform standards for specific aspects of non-contractual civil liability concerning damages caused by AI systems. It follows a legislative resolution from the European Parliament, which called on the Commission to develop a civil liability framework for AI and adapt private law to the demands of the digital economy. The proposal addresses non-contractual civil law claims for damages caused by AI systems, specifically under fault-based liability regimes. These are regimes that require compensation for damage caused intentionally or through negligence. The proposed Directive seeks to ease the burden of proof in a precise and

[126] Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market for Digital Services and amending Directive 2000/31/EC (Digital Services Act), Article 27. https://eur-lex.europa.eu/eli/reg/2022/2065/oj
[127] *Ibid*, Article 34.
[128] *Ibid*, Article 35.
[129] Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 (Digital Markets Act), Article 6. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32022R1925
[130] Ibid, Article 13.

balanced manner by introducing measures such as disclosure requirements and rebuttable presumptions.[131]

5.2. The United States of America

Unlike the European Union, the United States adopts a sectoral and primarily market-driven approach to AI governance, which has a comprehensive legislative framework for regulating AI technologies. In the U.S., AI applications are regulated by legal frameworks specific to each domain, such as the Health Insurance Portability and Accountability Act (HIPAA) for healthcare and Federal Aviation Administration (FAA) standards for unmanned aerial vehicles.[132]

In the efforts to regulate AI at a federal level, President Biden issued the "Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence" on October 30, 2023. This order represents a major step in regulating the responsible advancement and deployment of AI technologies across the United States. This order emphasizes the importance of managing the risks associated with AI while promoting its benefits and ensuring its development aligns with safety, security, and trustworthiness values.[133]

The Executive Order aligns with the Department of Homeland Security's ongoing efforts to manage AI safely and effectively. In this regard, in the United States, the Department of Homeland Security will oversee AI applications in critical infrastructure and cyberspace, advocate for global AI safety standards, mitigate the risk of AI being utilized to create mass destruction weapons, address AI-related intellectual property theft, and support the recruitment and retention of skilled AI professionals.[134]

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[131] European Parliament, "*Proposal for a Directive of the European Parliament and of the Council on Liability for Artificial Intelligence and the Digital Services Act*" (2022). https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2022/0303(COD)&l=en

[132] Muhammad Abu Nayem Miazi, "Interplay of legal frameworks and artificial intelligence (AI): A global perspective" (2023) https://journals.umt.edu.pk/index.php/lpr/article/view/4967/2161

[133] Laurie Harris, Chris Jaikaran, "*Highlights of the 2023 Executive Order on Artificial Intelligence for Congress*" 3 April 2024) https://crsreports.congress.gov/product/pdf/R/R47843

[134] Department of Homeland Security, "*Fact Sheet: Biden-Harris Administration Executive Order Directs DHS to Lead Responsible AI Use*" (30 October 2023)

In 27 February 2019, the House of Representatives introduced House Resolution 153 on Supporting the Development of Guidelines for Ethical Development of Artificial Intelligence. This Resolution aims to balance the promotion of AI's potential to enhance well-being, stimulate economic growth, and improve care and services with the need for its safe, responsible, and democratic development. It outlines ten key objectives to achieve this balance, including transparency and explainability, protection of information privacy and personal data, accountability and oversight for automated decision-making, access and fairness in technological services and benefits, and ensuring safety and control of AI systems both now and in the future. Although the Resolution has not yet been adopted, it underscores principles that other governments and international organizations also emphasize in the pursuit of ethical and trustworthy AI development.[135]

5.3. Japan

Japan currently does not have specific laws regulating AI. Instead, the country is adopting an indirect approach that prioritizes innovation while aiming to minimize foreseeable risks. To support this policy, the Japanese government issued new AI Guidelines for Business Version 1.0 on April 19, 2024, which replaced three earlier guidelines. Although these Guidelines are not legally binding, they are intended to encourage voluntary compliance by AI developers, providers, and business users with widely accepted AI principles and a risk-based approach.[136] The Guidelines offer unified guiding principles for AI governance in Japan, promoting the safe and secure use of AI. They are designed to help businesses using AI, fully understand the associated risks, considering international trends and stakeholder concerns, and to implement necessary measures throughout the AI lifecycle voluntarily. The Guidelines aim to foster a framework that

https://www.dhs.gov/news/2023/10/30/fact-sheet-biden-harris-administration-executive-order-directs-dhs-lead-responsible

[135] Muhammad Abu Nayem Miazi, "*Interplay of legal frameworks and artificial intelligence (AI): A global perspective*" (2023) https://journals.umt.edu.pk/index.php/lpr/article/view/4967/2161

[136] White & Case, "*AI Watch: Global Regulatory Tracker – Japan*," (1 July 2024) https://www.whitecase.com/insight-our-thinking/ai-watch-global-regulatory-tracker-japan#:~:text=Japan%20currently%20has%20no%20law,innovation%20while%20minimizing%20foreseeable%20harms.

balances innovation promotion and risk reduction through cooperation among stakeholders by adhering to shared guiding principles, key considerations for AI business actors, and AI governance practices.[137]

Japan has also released the Hiroshima International Guiding Principles for Organizations Developing Advanced AI Systems, also known as "Hiroshima Principles." These principles seek to establish and advocate for global standards to ensure that AI systems are developed safely, securely, and with trustworthiness.[138] Building on these principles, the Hiroshima Process International Code of Conduct for Organizations Developing Advanced AI Systems aims to foster the development of safe, secure, and trustworthy AI worldwide. It will offer voluntary guidance for organizations working on cutting-edge AI technologies, including advanced foundation models and generative AI systems, collectively referred to as "advanced AI systems."[139]

Additionally, a working group has proposed a new regulatory framework called the "Basic Act on the Advancement of Responsible AI", which seeks to implement a formal legal approach for regulating certain generative AI foundation models, referred to as the "Proposed AI Bill." This bill would empower the government to identify which AI systems and developers are subject to regulation, impose requirements on the vetting, operation, and output of these systems, and mandate regular reporting on them. The law is expected to offer a general framework, with industry groups and developers responsible for setting specific compliance standards. Additionally, the government would have the authority to oversee AI developers and enforce compliance through fines and penalties for breaches of reporting requirements or other obligations. If enacted, this bill would represent a shift from Japan's current "soft law" approach to a more formal "hard law" approach to AI regulation.[140]

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[137] Ministry of Internal Affairs and Communications (Japan), "*AI Governance in Japan: Guidelines and Policies*" (2024).
https://www.soumu.go.jp/main_content/000943087.pdf

[138] White & Case, "*AI Watch: Global Regulatory Tracker – Japan*" (1 July 2024). https://www.whitecase.com/insight-our-thinking/ai-watch-global-regulatory-tracker-japan#:~:text=Japan%20currently%20has%20no%20law,innovation%20while%20minimizing%20foreseeable%20harms.

[139] Ministry of Internal Affairs and Communications (Japan), "*AI Governance in Japan: Guidelines and Policies*" (2024)
https://www.soumu.go.jp/main_content/000943087.pdf

[140] White & Case "*AI Watch: Global Regulatory Tracker – Japan*," (1 July 2024)

CONCLUSION

Artificial Intelligence is transforming the legal world, especially in the realm of contract law. Its use as an assisting tool is enhancing the way companies draft contracts by increasing accuracy and efficiency, maintaining consistency in terms throughout the whole contract, and additionally allowing real-time adjustment of the terms of the contracts pursuant to the party's needs. It also supports negotiations by suggesting standard clauses, analyzing data, flagging potential risks and aiding in due diligence.

The introduction of smart contracts has shown only a fragment of AI's potential use in contracts, by ensuring that the terms of the contracts are enforced without the need of a third party, such as courts. Autonomous systems have shown us that they can handle the entire contracting process - drafting, negotiating, and enforcing, in seconds without the knowledge or supervision of humans. This rapid evolution brings about new legal challenges and has led to a division among scholars.

One perspective argues that the existing legal framework is sufficient to accommodate these technological advancements. Advocates believe that as long as parties agree to use AI in their contracts, these agreements should be enforceable, with companies bearing responsibility for their AI's actions. They view this as a natural extension of how the law has historically adapted to technological progress.

Conversely, others argue that AI, especially when it operates autonomously, might require legal personhood because its decisions may not always align with the true intentions of the parties involved. The proponents of this view suggest that new laws and regulations are needed to address these novel challenges effectively.

An important aspect of this debate is the distinction between "weak AI" and "strong AI." Weak AI is designed for specific tasks, while the strong AI can make independent decisions. This ability of

https://www.whitecase.com/insight-our-thinking/ai-watch-global-regulatory-tracker-japan#:~:text=Japan%20currently%20has%20no%20law,innovation%20while%20minimizing%20foreseeable%20harms.

strong AI to replicate human thought processes can complicate the interpretation of parties' intentions, posing additional legal difficulties.

Currently, courts tend to follow the objective approach, holding companies accountable for their AI's actions. Meanwhile, governments are leaning towards a subjective approach, drafting new regulations to address these emerging issues. As AI continues to be integrated into everyday life, from self-driving vehicles to automated services, these challenges are only the beginning.

In summary, as AI evolves and becomes embedded in various sectors, including contract law, the legal system is actively working to keep pace. The aim is not to resist these changes, but to incorporate them into the legal framework, ensuring that justice is upheld, while adapting to a rapidly changing world.

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