

ARTIFICIAL INTELLIGENCE AND ITS ROLE IN ENHANCING E-COMMERCE TRANSACTIONS

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Abstract:

This article examines the application of artificial intelligence-a subject that is currently one of the most widely discussed topics—owing to the rapid development of its applications characterized by intelligence comparable to human cognition. These applications have influenced every facet of our lives, including economic and commercial domains.

They have significantly contributed to the evolution and enhancement of the commercial sector, be it in terms of transactions, contracts, negotiations, marketing, small business activities, and more. Therefore, this study aims to define artificial intelligence as one of the crucial terminologies of the present day by investigating its characteristics and significance. Furthermore, the study will specifically focus on exploring the roles of smart electronic agents and blockchain technology within the realm of e-commerce.

Keywords: Artificial Intelligence; Concept; E-Commerce- Smart Electronic Agent; Blockchain

1. INTRODUCTION

Today, the world is witnessing a new revolution in digitization and information technology. Most nations, especially the advanced ones, are experiencing rapid developments in this field. Artificial intelligence is regarded as one of the most significant applications spawned by the information revolution. It now constitutes a tangible reality with which we must adapt, particularly in light of the emergence of robots and software that mimic human intelligent behavior.

The emergence of artificial intelligence dates back to the 1950, when Alan Turing published a scientific paper titled "Computing Machinery and Intelligence." In this work, he designed a machine to decipher the "Enigma messages." Turing proposed a test in which a human examiner engages in a voice or written conversation within a closed environment with both a human and a machine whose identities are concealed. If the examiner is unable to distinguish the machine from the human, the machine can be considered intelligent ¹

In 1956, the term "artificial intelligence" ²was used for the first time at a conference held at Dartmouth College in the United States, during which advanced computer programs and devices were presented. Subsequently, the US Department of Defense began funding research in the field of artificial intelligence in the mid-1960³

At the beginning of the twentieth century, research in artificial intelligence attracted significant attention due to the success of expert commercial systems that emulated the skills of human experts⁴. However, progress soon stagnated for several years due to slow technological advancement; these systems required extensive storage capacities which, at that time, could not be adequately met by available electronics. Nevertheless, with the rapid advancement in computer technology and the availability of large storage spaces, new forms of algorithmic techniques emerged—one of which is deep machine learning, whose capabilities now surpass those of human beings.⁵

The applications of artificial intelligence have expanded across numerous fields today, benefiting many workplaces worldwide. Its influence pervades various scientific

¹ Samia, S .Q., Bay M., Hayziya K, Artificial Intelligence Between Reality and Aspirations ,A Technical and Field Study" in International Conference "Artificial Intelligence: A New Challenge for Law? , Novembre 27–28. ,Proceedings of the University of Algiers 1, Issue 07,(2018), p. 18.

² DOI : https://www.wipo.int/tech_trends/ar/artificial_intelligence/story.html [Last access: 04 January, 2025]

³ Mufrih, J. M. A. The Impact of the Introduction of Artificial Intelligence on the Future Employment of Employees in the Saudi Government Sector: An Applied Study on the Ministry of Justice in the Asir Region, Journal of Economic Administrative and Legal Sciences. vol. 05. no. 01, (2021, 30 January) , p. 84.

⁴ Samia, S .Q., Bay M., Hayziya K, Op. cit. p. 19

⁵ Ibid, p. 19.

sectors including health, education, telecommunications, gaming, entertainment, consumer products, marketing, planning, and increased situational awareness, as well as the commercial sector in general.

Artificial intelligence also affects the legal field through the use of intelligent electronic lawyers. It is employed in the judiciary to resolve various disputes and plays a significant role

in the academic domain, where many students use it to access accurate information in a very short time.

Furthermore, artificial intelligence has a profound impact on our daily activities, including transportation, agriculture, engineering, architecture, and energy. The relationship between humans and machines is not new; it has traditionally been a relationship between a human and an inanimate object. However, machines today are endowed with artificial intelligence, making it necessary to examine their applications- this study will specifically focus on their use in the commercial sphere. The central question posed here is: How is artificial intelligence utilized in the commercial field?

The research methodology employed in this study consists of a descriptive-inferential approach combined with an analytical method, as these are deemed most appropriate and compatible with the *nature* of the study. To systematically explore the topic, the research has been divided into two sections: the first presents the conceptual framework of artificial intelligence, while the second examines its impact on e-commerce transactions.

2. The Conceptual Framework of Artificial Intelligence

The term “artificial intelligence” (AI) comprises two components: “intelligence” and “artificial.” The Latin term for intelligence, *intelligentia*, denotes the capacity for understanding. However, from a scientific perspective, where disciplines diverge and overlap, arriving at a unified definition of intelligence is challenging. For instance, the concept of intelligence as understood by philosophers differs from that of mathematicians and psychologists, in addition to the frequent reduction of intelligence to the functions of the human brain¹. Based on these complexities, many scholars have strived to develop a definition of artificial intelligence that encompasses its most salient characteristics.

2.1 The Concept of Artificial Intelligence

Artificial intelligence is defined as a branch of computer science aimed at creating intelligent machines. It has evolved into an integral part of the technology industry, with research in AI characterized by high specialization and technical sophistication. This

¹ Ibid, p. 11.

field addresses core problems such as endowing computers with attributes including knowledge, logical reasoning, problem-solving capabilities, perception, learning, planning, and the ability to manipulate or move objects¹.

AI is also described as a science whose primary goal is to enable computers and other machines to acquire human-like intelligence and the ability to perform tasks that, until recently, were exclusively within the human domain—such as thinking, learning, creativity, and communication. Today's computers can solve highly complex mathematical operations millions of times faster than human beings.² Moreover, AI represents a scientific advancement that now permits machines to execute tasks traditionally considered within the realm of human intelligence—for example, tasks involving educational processes, logical reasoning, self-correction, and even self-programming³.

The following sections outline the fundamental characteristics and significance of artificial intelligence.

2.2 Characteristics and Importance of Artificial Intelligence

Artificial intelligence is distinguished by a unique set of characteristics that contribute to its substantial significance. These attributes include:

2.2.1. Characteristics of Artificial Intelligence

- **Autonomy in Decision-Making:** AI systems are capable of making decisions independently, without relying on explicit user commands. This autonomy is based on the vast amount of information they process.
- **Handling Vast Quantities of Data:** AI has the capacity to manage and analyze huge volumes of data efficiently.
- **Proactivity and Interaction:** Besides processing data, AI systems can initiate actions, offer suggestions, and actively interact by responding to user requests.⁴
- **Versatile Application:** AI can be implemented across various devices, whether in computers, robots, or other electronic systems.

¹ Mufrih, J. M. A. , Op. cit, p. 84.

² Boumediene. M, Artificial Intelligence: A New Challenge for Law, Paths in Legal Research and Studies, vol. 10, (2019) , p. 200.

³ Abdelhadi .Z, Artificial Intelligence and Expert Systems in Libraries, Academic Library, (2000),p. 20.

⁴ Ben Othman .F, Artificial Intelligence – A Legal Approach, Dafatir Al-Siyasawa Al-Qanun, Notebooks of Politics and Law, vol. 12, no. 02,(2020), p. 159.

- Adaptive Problem-Solving: AI employs trial-and-error methods to explore diverse solutions and can quickly adapt to new, complex, or challenging situations.¹
- Advanced Auditory and Linguistic Processing: AI-enabled devices can recognize voices and speech. They are also capable of deeply analyzing inputs to deliver outputs that align with users' needs.
- Capacity for Creativity and Visual Perception: AI systems are not only capable of recognizing and interpreting visual information but also have the potential to evolve and innovate.²
- Flexibility and Adaptability: AI exhibits a remarkable ability to adjust and adapt to a variety of phenomena.
- Error Detection: AI software can identify mistakes whether they originate from human operators or from other software programs.

2.2.2. Importance of Artificial Intelligence

Discussing the significance of AI is far from trivial, as it necessitates exploring its impact across multiple fields, including economic, medical, industrial, and environmental domains. AI encompasses a wide range of applications that benefit nearly every branch of science. Some key aspects of its importance include:

- Medical Field: AI technologies assist in the formulation and synthesis of modern pharmaceuticals. They also aid physicians in identifying and diagnosing diseases, and they are widely used in medical analyses and laboratories.
- Administrative Decision-Making: In the administrative arena, AI facilitates decision-making, especially in scenarios with numerous alternatives by guiding the selection of the most suitable option. In legal contexts, for example, AI contributes to judicial decisions by mitigating biases and emotions, thereby supporting an independent judicial process.
- Enhanced Productivity :By automating routine tasks, AI allows knowledge workers to concentrate on more critical responsibilities, thereby improving overall productivity³ Criminal Justice: AI plays a positive role in crime prevention and resolution; it helps in identifying criminals by analyzing their

¹ Ammar. Y. M. Z , The Role of Artificial Intelligence Systems in Crime Prediction, Journal of Security and Law, vol. 29, no. 01, (2021), p. 141.

² Ibid, , p. 141.

³ Al-Babl. A. Y. M. Z, Mohammed. Z. Y, The Role of Artificial Intelligence Systems in Crime Prediction, Journal of Security and Law, vol. 29, no. 01,(2021) , p. 142.

facial features, as demonstrated in recent cases where AI techniques were pivotal in identifying suspects.

- Mitigation of Psychological Burdens :AI reduces mental stress in workplaces by enabling machines to perform tasks that are physically or cognitively demanding.
- Improvement of Daily Life: AI significantly simplifies everyday life, exemplified by the development of self-driving vehicles—autonomous cars that operate without human intervention. Numerous companies, such as Google, have expedited the production of such vehicles.

In conclusion, the significance of artificial intelligence permeates numerous facets of society. However, in this study, we will confine our discussion to its role within the commercial domain.

3. The Impact of Artificial Intelligence on E-commerce Transactions

In recent years, the rapid expansion of the Internet and e-commerce has contributed to a pronounced growth in promotional activities, thereby generating enormous wealth. Undoubtedly, both the Internet and e-commerce have already transformed traditional models of business and education, generating profound shifts in how goods and services are marketed, traded, and consumed.¹

E-commerce encompasses a wide spectrum of commercial exchanges conducted via the Internet, spanning all forms of business activities in which products are displayed online and subsequently ordered through offline channels.²

In essence, it involves all electronic exchanges related to business activities by fostering relationships between organizations, administrations, and the interactions between institutions and consumers. Moreover, e-commerce facilitates not only the exchange of information but also the transactional processes involving consumer goods, financial and legal services, and communication means such as telephony and the Internet. This digital evolution offers consumers the convenience of shopping at any time and from any location without the need to visit physical stores, which in turn contributes to increased profitability³.

Recent observations indicate that this type of commerce is notably influenced by artificial intelligence technologies. The synergy between e-commerce and AI has generated a plethora of innovative transactions that positively impact commercial dealings. Two prominent applications emerging from their intertwined relationship are

¹ Nour M , E-Commerce and E-Marketing, , 2014, p. 09.

² Osama. A. B, Consumer Protection in Electronic Contracting – A Comparative Study: New University Publishing House, (2005), p. 85.

³ Bakhthi.I, E-Commerce: Concepts and Application Strategies in Enterprises, Algeria,University Publications Office

the smart electronic agent and blockchain technology, each playing a pivotal role in redefining how commercial transactions are executed and managed.

3.1 The Smart Electronic Agent

The smart electronic agent plays an effective role in the development of business operations. What is meant by it and how has it affected business transactions?

3.1.1 Definition of the Smart Electronic Agent

A smart electronic agent is defined as a specialized computer program that performs various tasks on behalf of the user¹. In academic terms, it is considered an autonomous

software entity designed to execute diverse operations to achieve the user's objectives². Its defining feature is the autonomy it exhibits while carrying out these operations, meaning it functions independently without requiring continuous direct intervention from the human user³. Michael Wooldridge, Nicholas R. Jennings, and other scholars have characterized such an agent as having several core attributes, including⁴

- **Autonomy:** The ability to interact with other intelligent agents or human users without external prompting.
- **Reactivity:** This refers to the agent's capability to perceive its environment—including other intelligent agents, networks such as the Internet, and varying stimuli—and respond to environmental changes in a timely manner.

Notably, several legal frameworks have addressed the concept of the smart electronic agent. For instance, the Uniform Electronic Transactions Act (UETA) in the United States, enacted in 1999, is one of the earliest legal instruments establishing a regulatory framework for transactions conducted without direct human intervention. In Article 2, Section 6 of this act, the smart electronic agent is explicitly defined as "a computer program, an electronic device, or any other means used independently-or in whole or in part, in response-to execute electronic records without review or intervention by any person."⁵

¹ IRENE .K , ELEANNA. K, DICKSON K.W.C , Proceedings of the 38 th Annual HawaiiI international conference on System Scionces, in Legal Issues in Agents for Electronic Contracting, (2005), p. 02.

² Ahmed. Q. F , The Use of Intelligent Agents in E-Commerce – A Comparative Legal Study Regarding Its Nature and Legal Effectiveness, Al-Mufakir Journal , no. 16, p. 16.

³ Sherif. M. G, The Role of Electronic Agent in E-Commerce - A Study in Light of the Provisions of the United Nations Convention on the Use of Electronic Communications in International Contracts.: New University Publishing House. , (2012) p.20.

⁴ MICHAEL.W , NICHOLASR. J, Intelligent Agents Mtheory and Practice , Knowledge Engineering Review, vol. 10, (1995), p. 04.

⁵ UNIFORM ELECTRONIC TRANSACTIONS ACT (1999).

It is important to note that the term “agent” in American jurisprudence carries a distinct meaning that differs from the classical interpretation of agency under civil law¹.

3.1.2. The Role of the Smart Electronic Agent in Enhancing Business Transactions

Marketing tool for producers to promote their products by directly targeting potential customers the smart electronic agent plays a crucial role in mitigating the shortcomings of traditional electronic marketing methods. Its primary advantage lies in its swift ability to locate and retrieve pertinent information from specialized websites, evaluate, and categorize it in accordance with the user’s personalized criteria. By doing so, it substantially assists the consumer in making informed decisions before proceeding with a purchase. rather than relying on random selection of search results or manually filtering out irrelevant data,

The smart electronic agent leverages advanced algorithms and data analytics to offer the product or service that s interests based on quality, price, and sales conditions. Additionally, this technology has become an effective. By gathering detailed consumer data-such as purchasing history, social status, occupation, and individual preferences-smart agents create dynamic consumer profiles (or profiles) that evolve with each transaction. These comprehensive profiles enable retailers to tailor their offerings and promotional strategies to better suit the needs and preferences of each buyer².

The smart electronic agent has increasingly become a human-centered tool that empowers producers to promote their products more meaningfully. By directly engaging with consumers through the collection of personal data, understanding their behavioral patterns, and recognizing their preferences and aspirations regarding goods and services, it allows for a more personalized and empathetic marketing approach that respects individual needs.³

The smart electronic agent also serves as a thoughtful representative of the buyer, taking on a meaningful role in understanding and searching for their real needs. Virtual stores often invite visitors to share personal details-not just as data points, but as reflections of their identity, lifestyle, and aspirations. These details, such as preferred products, social background, and profession, are used to gently build a personalized profile that evolves with every interaction. By observing and analyzing the buyer’s ongoing choices and preferences, the system helps retailers offer products and services

DOI : <http://euro.ecom.cmu.edu> [Last access: 12 January, 2025]

¹ Francisco. A, Novais. P, Neves . J, Issues on Intelligent Electronic Agents and Legal Relations, (2004, January).

DOI :<https://repositorium.sdum.uminho.pt/handle/1822/3169>[Last access: 14 January, 2025]

² Ahmed. Q. F , Op. cit, p. 25.

³ Ibid, p. 26.

that genuinely resonate with the consumer's expectations, making the experience more human-centered, efficient, and emotionally attuned.¹

Moreover, the smart electronic agent's functions parallel those of a human agent in many respects, as it exhibits similar behavioral traits and characteristics. Some scholars even argue that its impartiality and objectivity in online interactions allow it to execute tasks with the same level of good faith as a human agent. Ultimately, the adoption of smart electronic

agents offers significant practical benefits, including considerable savings in time and effort for all parties involved in commercial transactions.²

3.2 Blockchain Technology

The term "blockchain" is derived from the structure and method by which transactions are recorded and maintained. Essentially, blockchain technology involves recording every transaction on a digital ledger, where transactions are grouped into "blocks" and cryptographically linked to form an unalterable chain. This decentralized technology enables the secure transfer of value between two parties without relying on a centralized system. The exchanged value can take various forms-monetary amounts, property titles such as real estate or vehicles, intellectual property rights, and more. Traditionally, such exchanges have been mediated by central authorities that validate, record, and authorize each transaction. In contrast, blockchain technology relies on sophisticated cryptographic methods, consensus algorithms, and decentralized networks to verify and secure transactions³.

Blockchain technology plays an important role in facilitating business operations. What is it and how does it impact business transactions?

3.2.1. Definition of Blockchain Technology

The origins of blockchain can be traced back to 1991 when Stuart Haber and Scott Stornetta conceptualized the idea of a chain of data blocks secured by cryptography. Later, in 1998 ,⁴ computer scientist Nick Szabo attempted to create a decentralized digital currency called "bit gold" based on similar principles. However, the true breakthrough came in 2008 when developers operating under the pseudonym Satoshi Nakamoto published a white paper outlining the blockchain model, which was subsequently implemented as the public ledger for Bitcoin transactions the following year.⁵

¹ Nariman. M. B, Contracts Concluded via Intelligent Electronic Systems, Doctoral Dissertation, University of Algiers,(2017), p. 74.

² Ahmed. Q. F , Op. cit, p. 26.

³ Nouri .J. R , Shatouh .R, Blockchain Technology Applications, Journal of Legal and Social Sciences, vol. 07, no. 02, (2022) , p. 914.

⁴ DOI : <https://www.arabictrader.com/ar> [Last access: 19 January, 2025]

⁵ DOI : <https://www.arabictrader.com/ar> [Last access: 19 January, 2025]

From a technical standpoint, blockchain is commonly defined as a digital ledger that stores validated transactions across a network of nodes. Each participating node maintains a complete or partial copy of this ledger, thereby ensuring a high level of security and transparency. Some experts describe blockchain as a distributed and shared database that records and verifies transactions through a consensus-driven, peer-to-peer network.¹

3.2.2 The Role of Blockchain Technology in Facilitating Business Transactions

Blockchain technology plays a critical role in streamlining commercial transactions and facilitating direct exchanges of value between parties without the need for intermediaries such as banks. This direct transaction capability not only accelerates the process and reduces transaction fees but also significantly enhances security by eliminating potential points of failure inherent in centralized systems.² One of the notable advantages of blockchain systems is their capacity to support modern electronic transactions by keeping pace with digital technology trends. This contributes substantially to the field of entrepreneurship and the evolution of new business models³. Unlike centralized databases-which require a single entity to oversee data management-the decentralized nature of a blockchain allows every node on the network to store a complete version of the public ledger.

This structural design facilitates smoother collaboration among participants while reducing the risk of data breaches, unauthorized modifications, or deletions. In order to alter or compromise recorded data, an attacker would need to breach more than 50% of the network's nodes simultaneously, a feat that is technically and practically improbable.⁴

Beyond transactional verification, blockchain systems also serve as the underlying infrastructure for processing cryptocurrency payments. They operate on the principle of direct value transfers that avoid intermediary fees or exchange rates imposed by centralized entities. The digital currencies traded on these systems are governed by proprietary encrypted algorithms, which restrict their use for payment purposes to specific protocols. As a consequence, additional payment methods-such as debit and credit cards, digital wallets, and platforms like PayPal-must often synchronize with blockchain protocols to facilitate e-commerce transactions. This requirement has spurred ongoing debates regarding the scalability and efficiency of blockchain-based payment

¹ Nouri .J. R , Shatouh .R, Op. cit, p. 915.

² Ibid, , p. 915.

³ Mohamed .Q , Belhabib. A, The Role of the Trend Towards Blockchain Technology in Developing and Upgrading E-Commerce, Journal of Economics and Sustainable Development, vol. 06, no. 02, (2006), p. 157.

⁴ Nouri .J. R , Shatouh .R , Op. cit, p. 915.

solutions, particularly with cryptocurrencies like bitcoin. Addressing these concerns, the third generation of blockchain technologies has been working on dedicated payment protocols for wider adoption.¹

Furthermore, blockchain enhances transparency by providing all network participants with real-time access to the public ledger. Every alteration or addition to the ledger is visible to all nodes, and such changes occur only with the collective approval of all relevant parties. Moreover, once a transaction is recorded on the blockchain, it cannot be erased thereby raising the level of trust and transparency above that, found in conventional transaction systems.²

Additional benefits of blockchain technology include the reduction of costs by obviating the need for intermediary oversight, as each transaction is directly accessible and verifiable by any participant on the network. This not only speeds up the transactional process but also minimizes administrative overhead and enhances operational efficiency. The cumulative effect of these technological advancements is an integrated system that supports faster, more secure, and less expensive business transactions, thereby driving significant improvements in the overall e-commerce ecosystem.³

4- Conclusion

At present, artificial intelligence has fundamentally transformed the nature of e-commerce transactions, with the smart electronic agent and blockchain technology emerging as key drivers of this evolution. The smart electronic agent has notably contributed to interpreting consumer behavior and facilitating remote commercial operations without human intervention, whereas blockchain technology has played a positive and effective role in ensuring the transparency of business transactions. Overall, this study has led to several important conclusions, including the following:

- **Artificial Intelligence:** It helps improve the quality of services provided.
- **Smart Electronic Agent:** It accelerates contracting and payment processes by operating independently.
- **Mitigation of Traditional Marketing Deficiencies:** The smart electronic agent effectively avoids the drawbacks of traditional marketing by supplying specific and accurate information that aligns with consumer preferences.
- **Assistance for Producers:** Serving as an effective tool for producers, the smart electronic agent directs offers to targeted consumers by collecting their data and determining their purchasing tendencies.

¹ Mohamed .Q , Belhabib. A , Op. cit, p. 158.

² Nouri .J. R , Shatouh .R , Op. cit , p. 915.

³ Ibid, p. 915.

- **Blockchain Technology:**It facilitates the execution of business transactions while reducing the reliance on intermediaries and contributing to lower transaction costs.

In conclusion, the following recommendations are put forward:

- **Development of Digital Infrastructure :**It is essential to develop the digital infrastructure to keep pace with modern innovations by improving security systems and networks to ensure safe and rapid digital transactions.
- **Enhancement of Data Storage and Analysis:** Improving data storage and analysis systems through the development of advanced information technology systems is crucial for achieving greater efficiency.

Bibliography

Books:

1. Abdelhadi .Z, Artificial Intelligence and Expert Systems in Libraries, Academic Library, (2000).
2. Bakhthi.I, E-Commerce: Concepts and Application Strategies in Enterprises. Algeria: University Publications Office .
3. Osama. A. B, Consumer Protection in Electronic Contracting – A Comparative Study: New University Publishing House , (2005).
4. Sherif. M. G, The Role of Electronic Agent in E-Commerce - A Study in Light of the Provisions of the United Nations Convention on the Use of Electronic Communications in International Contracts.: New University Publishing House, (2012).

5. Articles:

1. Ammar. Y. M. Z, The Role of Artificial Intelligence Systems in Crime Prediction, Journal of Security and Law, vol. 29, no. 01, (2021).
2. Al-Babl. A. Y. M. Z, Mohammed. Z. Y, The Role of Artificial Intelligence Systems in Crime Prediction, Journal of Security and Law, vol. 29, no. 01,(2021) .
3. Ahmed. Q. F , The Use of Intelligent Agents in E-Commerce – A Comparative Legal Study Regarding Its Nature and Legal Effectiveness, Al-Mufakir Journal , no. 16
4. Ben Othman .F, Artificial Intelligence – A Legal Approach, Dafatir Al-Siyasawa Al-Qanun, Notebooks of Politics and Law, vol. 12, no. 02,(2020).
5. Boumediene. M, Artificial Intelligence: A New Challenge for Law, Paths in Legal Research and Studies, vol. 10, (2019).
6. Francisco. A, Novais. P, Neves . J. Issues on Intelligent Electronic Agents and Legal Relations(2004, January).

DOI :<https://repositorium.sdum.uminho.pt/handle/1822/3169>[Last access: 14 January, 2025]

7. Mohamed .Q , Belhabib. A, The Role of the Trend Towards Blockchain Technology in Developing and Upgrading E-Commerce, Journal of Economics and Sustainable Development, vol. 06, no. 02, (2006).

8. Mufrih, J. M. A. The Impact of the Introduction of Artificial Intelligence on the Future Employment of Employees in the Saudi Government Sector: An Applied Study on the Ministry of Justice in the Asir Region, Journal of Economic Administrative and Legal Sciences. vol. 05. no. 01, (2021, 30 January).
9. MICHAEL.W , NICHOLASR. J, Intelligent Agents Mtheory and Practice , Knowledge Engineering Review, vol. 10, (1995).
10. Nouri .J. R , Shatouh .R, Blockchain Technology Applications, Journal of Legal and Social Sciences, vol. 07, no. 02, (2022).

Theses:

1. Nariman. M. B, Contracts Concluded via Intelligent Electronic Systems, Doctoral Dissertation, University of Algiers,(2017).

Conferences:

1. IRENE .K , ELEANNA. K, DICKSON K.W.C, Proceedings of the 38 th Annual Hawaici international conference on System Scionces, in Legal Issues in Agents for Electronic Contracting, (2005).
2. Samia, S .Q., Bay M., Hayziya K ."Artificial Intelligence Between Reality and Aspirations . A Technical and Field Study" in International Conference "Artificial Intelligence: A New Challenge for Law?. Novembe 27–28. Proceedings of the University of Algiers 1. Issue 07,(2018.)

Websites:

1. DOI : https://www.wipo.int/tech_trends/ar/artificial_intelligence/story.html [Last access: 04 January, 2025]
2. DOI : <https://www.arabictrader.com/ar> [Last access: 19 January, 2025]

Reports:

1. UNIFORM ELECTRONIC TRANSACTIONS ACT (1999).

DOI : <http://euro.ecom.cmu.edu> [Last access: 12 January, 2025]