The benefits of using IPA in relation to RPA for the cryptocurrency sector, in making decisions on their sale and purchase in the stock market

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Abstract
Since 2009 when the first cryptocurrency Bitcoin began to be inserted into the market of electronic currencies, today in 2023 there are more than 19,850 electronic cryptocurrencies [1]. According to information from the coinecko website, the cryptocurrency market has expanded dramatically from a market capitalization of $1 million in 2013 to $3 trillion in November 2021 [2]. Referring to the latest statistical data, 3 are the cryptocurrencies that rule the e-commerce market in November 2023, Bitcoin,Ethereum AND Tether USDt [3]. Robotic Process Automation (RPA) is a growing trend in the restructuring of business processes, combined with digital transformation. This technology can be applied in different areas of business processes and by organizations from any activity sector [4].With continuous advances in automated processes through RPA, mechanisms involving Artificial Intelligence (AI) were incorporated to influence real-life decision-making [5]. Artificial Intelligence (AI) allows improving the accuracy and execution of RPA processes in extracting information and recognizing, classifying, predicting and optimizing processes [6].Nowadays, artificial intelligence is affecting the way people process computer data, televisions have started to create avatars that they use for news reporting. In this paper we will study the impact that the use of automatic sale and purchase of electronic cryptocurrencies can have using IPA and RPA and the possibility of this process being realized through this process.

Keywords: Artificial Intelligence (AI), Robotic Process Automation, cryptocurrency.

1. Introduction
Robotic Process Automation (RPA) is a technology used to automate digital, as well as manual tasks and sub-processes, within various business processes [7].

RPA aims to automate business processes with the goal of improving efficiency by reducing costs (Cewe et al., 2017) and decreasing the time spent by individuals dealing with Information Systems [8]. Robotic Process Automation (RPA) involves the use of artificial intelligence (AI) and machine learning software to handle high-volume and repetitive tasks that were previously performed only by humans [9].

With the development of Industry 4.0, the automation of application processes using AI is applied, leading to enhanced performance. The use of AI by devices to complete complex tasks, cost reduction, and improvement in the quality of goods and services are key principles of Industry 4.0. AI technologies are being employed in manufacturing, and it appears that physical components are becoming intelligent through software robots, making them more secure and protected from cyber threats [10].

The use of Artificial Intelligence in processes that analyze large datasets is expected to become a necessity in the coming decade [11]. AI tools are utilized in digital cryptocurrencies for buying and selling processes, increasing performance, and positively influencing investors' assistance. Recent developments have seen AI extensively studied and applied for analyzing complex data and understanding how humans interact with them by training robots [12].

AI technologies are also being utilized by cryptocurrency platforms to enhance decision-making performance. A trained bot for cryptocurrencies is a program designed to execute transactions automatically in an online cryptocurrency market [13].These systems can learn through algorithms executed by past experiences and are capable of solving various problems.

One of the ways AI is based on learning is through Machine Learning (ML). AI and ML also contribute to detecting and preventing cyber attacks [14].

RPA can carry out processes autonomously through bots without human control, combining fundamental processes redesigned with RPA [15].

2. Literature Review

AI and RPA can help banks turn challenges into opportunities. Various challenges have been faced, and the application of AI and RPA combinations is key to overcoming inefficiencies.

In a survey conducted in March 2018, 2,373 top managers from large organizations in 19 countries found around $1.45 trillion in total estimated losses due to financial crime activities.

Recent statistical studies have also highlighted that in 2018 alone, there were 1,206,836 crimes related to finances in the United States [16].

Berruti, F., Nixon, G., Taglioni, G., & Whiteman, R. (2017). "Intelligent Process Automation: The Engine at the Heart of the Future Operating Model." This article discusses the role of intelligent process automation in the future operational model [17].

Kholiya, P. S., Kapoor, A., Rana, M., & Bhushan, M. (2021). "Intelligent Process Automation: Enabling Digital Transformation." This article reviews the role of intelligent process automation in the future of digital transformation [18].

Sabry, F., Labda, W., Erbad, A., & Malluhi, Q. (2020). "Cryptocurrencies and Artificial Intelligence: Challenges and Opportunities." This article explores the challenges and opportunities arising from the connection between cryptocurrencies and artificial intelligence [19].

Burrus, D., & Hood, T. (2021). "Big Data, Artificial Intelligence, RPA, and Cloud Topping the List of Technology Trends for 2020." This article describes the key technological trends in the profession for 2020 [20].

Koerhuis, W., Kechadi, T., & Le-Khac, N. A. (2020). "Forensic Analysis of Cryptocurrencies with a Focus on Privacy." This article deals with forensic analysis of cryptocurrencies with a particular focus on privacy [21].

Spithoven, A. (2019). "Theory and Reality of Cryptocurrency Governance." This article discusses the connection between the theory and reality of cryptocurrency governance [22].

Böhme, R., Eckey, L., Moore, T., Narula, N., Ruffing, T., & Zohar, A. (2020). "Detecting Responsible Vulnerabilities in Cryptocurrency." This article discusses detecting security vulnerabilities in cryptocurrency and the defined responsibility in this process [23].

Petryk, M., Qiu, L., & Pathak, P. (2022). "Impact of Open Source Community on Cryptocurrency Market Price: An Empirical Investigation." This article examines how the open-source community influences cryptocurrency market prices [24].

Ozyilmaz, K. R., & Yurdakul, A. (2019). "Designing an IoT System based on Blockchain Technology with Ethereum, Swarm, and LoRa: Software Solution to Achieve High Availability with Minimal Security Risks." This article addresses the design of a blockchain-based system for the Internet of Things using Ethereum, Swarm, and LoRa [25] Digital Cryptocurrency Programs.

Monero and Verge are two well-known cryptocurrencies that focus specifically on privacy and anonymity.

Monero is a blockchain-based cryptocurrency that uses a protocol called CryptoNote to ensure a high level of privacy and anonymity. Transactions in Monero are private, and none of the transaction information is publicly visible on the blockchain.

Privacy Functionality: Monero uses a combination of different techniques, including ring signatures, unique transaction addresses, and the use of confidential transactions, to make transactions unidentifiable and unlinkable.

Community and Development: Monero has a large community and ongoing development. Regular protocol updates are an important part of maintaining security and anonymity.
Verge is a cryptocurrency that aims to provide private and anonymous transactions. To achieve this, Verge uses a protocol called Wraith Protocol and TOR (The Onion Router) to hide the origin and destination of transactions.

Privacy Functionality: Wraith Protocol allows users to choose between transparent and hidden transactions. The use of TOR helps protect users' IP addresses and hides the origin of transactions.

Community and Development: The Verge community has been involved in significant changes and developments in the platform. However, there have been some debates and controversies regarding certain aspects of management and cryptocurrency design.

Classification of Software in Relation to Cryptocurrencies

Portfolio Software: For storing cryptocurrencies, portfolio software is often used, enabling the storage of private and public keys, as well as monitoring balances.

Mining Software: Specific software is used for cryptocurrency mining, connected to the hardware used to select transactions and create blocks.

Node Software: Specialized software is used for those operating a node in the cryptocurrency network to maintain a copy of the blockchain and transmit information on the network.

3. RPA

Robotic Process Management is a software technology process that facilitates the evaluation of human-robot actions to interact with digital technology systems (Ribeiro et al., 2021).

Risk management can assist Robotic Process Automation in identifying prime areas where robots can increase accuracy (van der Aalst et al., 2018).

Robotic process automation in risk management can reduce risks by increasing compliance and decreasing errors. Risk management can expose customers' data for Robotic Process Automation (Baryannis et al., 2019) [26].

RPA technologies interact between Graphical User Interfaces (GUI) and Application Programming Interfaces (APIs) to direct functionalities on servers and code in the language (HTML) so that automatic actions can be performed on structured data.

RPA works by creating a procedure that the software should follow by executing functionalities at different moments automatically [27].

Robotic Process Automation (RPA) has begun to play a significant role in the cryptocurrency market, bringing advancements in operational efficiency and overall performance improvement in cryptocurrency-related services. Some aspects related to the use of RPA in this sector are as follows: Automatic Transaction Execution: RPA can be used to automate the process of executing transactions in cryptocurrencies. This improves the speed of the process and reduces the possibility of human errors, especially in a market where prices can change rapidly.

Market Monitoring and Information: RPA can monitor data from various sources, including social networks, financial news, and current cryptocurrency prices. This information can be used to understand market sentiment and make informed decisions.

Verification and Processing of Transactions: RPA can be used for the automatic verification of transactions on the blockchain and their efficient processing. This reduces the time needed for manual processing and improves security by reducing the risk of errors.

Portfolio Management: The use of RPA in cryptocurrency portfolio management can streamline monitoring, reporting, and investment diversification processes. This aspect can assist investors in dealing with market volatility.

Response to Extraordinary Events: RPA has the ability to automatically respond to extraordinary events, such as significant market changes or unexpected news. This can help minimize risks and take advantage of market opportunities.

Implementation of Rules and Automatic Restrictions: RPA can enforce certain rules and restrictions set by investors automatically. This increases discipline in the implementation of investment strategies and risk management.

Audit and Accountability: The use of RPA can help achieve audit transparency and accountability in cryptocurrency operations. Automated and recorded logs can be useful for verification and reporting purposes.

4. IPA

The use of Artificial Intelligence in Decision Making for Cryptocurrency Buying and Selling: A Review Based on References.

In a period when the cryptocurrency market has experienced rapid growth and many investors are engaged, the use of Artificial Intelligence (AI) has made a significant impact on the decision-making process for buying and selling cryptocurrencies. Analyzing this complex challenge has been documented in several studies, using a wide range of references from the fields of artificial intelligence and cryptocurrencies.

Market Analysis Improvement and Price Prediction: Studies [8] [10] and show that AI is being used for the analysis of cryptocurrency data and price prediction. Artificial intelligence algorithms can analyze complex data, including price history, market volume, and the impact of macroeconomic events on decisions made by automated algorithms.

Processes of Automatic Decision Making: References [9] [11] indicate a growing development in the use of AI-trained programs to perform automatic decision-making in the cryptocurrency market. These systems can scale and adapt to market models and changes in events, providing an advantage in terms of speed and decision accuracy.

Risk Management and Security: Studies like [9] [25] discuss the use of artificial intelligence for risk management and security in cryptocurrencies. AI algorithms can identify risk patterns, signs of unexpected changes in the market, and can intervene automatically to mitigate potential negative impacts.

Market Sentiment and Media Analysis: In addition to market data, AI has been used to analyze media and community sentiment regarding cryptocurrencies. This additional information can be used to understand how investors are influenced by recent events and make more informed decisions [10].

Adaptation to Changing Market Conditions: The use of AI in decision-making for cryptocurrencies may involve algorithms capable of dynamically changing investment strategies in changing market conditions. Reference [26] discusses how the open-source community in cryptocurrencies affects prices and how AI can be used to understand this influence.

Risk Minimization and Performance Enhancement: AI plays a crucial role in minimizing risks and enhancing performance in the cryptocurrency market. References [13] [22] show the use of artificial intelligence algorithms in detecting and addressing possible security failures, improving decision-making processes to reduce risks.

5. Conclusions

The use of artificial intelligence has brought a significant increase in efficiency and precision in decision-making for cryptocurrencies. The algorithms used for market analysis and price prediction have shown high capabilities in understanding and interpreting the complexity of this dynamic market.

AI-based systems are autonomously performing real-time decision-making, eliminating the need for human intervention. This brings speed to transaction execution and allows users to benefit from favorable market moments.

The use of AI has served as a powerful tool for risk management and security in the cryptocurrency market. Identifying risk patterns and implementing corrective measures in real-time improves the protection of investments and reduces the impact of unexpected market changes.

Artificial intelligence has brought a new dimension to market analysis through the assessment of media and community sentiment. This additional information has helped understand extraordinary events and their impact on market behavior.

AI is proving to be a suitable tool to dynamically change investment strategies in changing market conditions. Flexibility and the ability to make real-time decisions adapt to unforeseen changes and the distribution of information in the market.
The use of artificial intelligence has helped minimize risks by detecting and addressing possible security failures. This has influenced the overall performance of decision-making and created a safer environment for investors.

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