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The role of Artificial Intelligence in investment decision-making: A conceptual study

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Abstract
The financial sector is emerging more and more due to artificial intelligence (AI), especially in area of investment decision-making. AI is modifying conventional investment techniques with its capacity to analyse large datasets, spot trends, and adjust instantly. The ramifications, advantages, and difficulties of incorporating AI into investment decisions are examined in this conceptual paper. It presents a thorough grasp of AI's impact on financial decision-making processes by combining results from earlier research with theoretical viewpoints.

Keywords: Artificial Intelligence, investment decision, machine learning, financial technology

Introduction
AI has been spontaneously supporting the financial sector by modifying its tools and techniques.
Intelligent algorithms that can handle massive amounts of organized and unstructured data are increasingly driving investment decision-making, which was previously depended on human expertise, intuition, and historical analysis. But now Investors can now see patterns and trends that were previously not well known which due to AI that is machine learning.
The purpose of this study is to investigate how AI functions intellectually in investment choices. It explores how AI increases precision, lessens biases, and speeds up and improves the calibre of investing decisions. Both practitioners and scholars must comprehend the theoretical foundations and empirical advancements in this field as algorithmic trading, robo-advisory services, and sentiment analysis grow more widespread.
In order to lay the foundation for AI's role in investment decision-making, the study starts with a thorough literature analysis. Next, it discusses the main ideas that underpin this integration. It ends by considering how these technologies may affect future research paths and funding strategies.

Review of literature
A. AI and Investment Strategy Optimization Krauss, Do & Huck (2017) [10]: Investigated deep neural networks for stock market forecasting and found that they performe d better than conventional models.
Dixon, Klabjan & Bang (2020) [6]: improved portfolio optimization by introducing deep reinforcement learning-based financial forecasting.
Chen *et al*. (2020) [4]: AI outperformed traditional algorithms in predicting asset price patterns.
Li, Xie & Wang (2019) [11]: shown how AI analyses massive data from multiple sources to improve investment strategies.
Zhang & Zhou (2021) [18]: emphasized how AI can be used to dynamically modify investing portfolios.
B. AI in Risk Assessment and Management Bao, Yue & Rao (2017) [1]: Deep learning has been successfully used to anticipate financial risk. Choudhry & Garg (2021) [5]: talked about applying machine learning to credit risk modeling while making investing choic es.
Niaki & Hoseinzade (2020) [13]: shown how AI may help with real-time risk reduction in erratic markets.

Zhou *et al*. (2021) [19]: Value-at-Risk models and AI were combined to improve financial forecasting accuracy.
Petropoulos *et al*. (2018) [14]: demonstrated how machine learning can lower credit risk and information asymmetry.
C. Robo-Advisors and AI-Driven Investment Platforms
Fein (2015) [7]: envisioned the rise of robo-advisors and the difficulties they face in maintaining compliance.
Jung, Dorner & Glaser (2018) [9]: assessed the degree of investor satisfaction and trust in robo-advisors.
Sironi (2016) [16]: examined FinTech innovations, such as investment services driven by AI.
Gomber *et al*. (2018) [8]: investigated how AI-powered platforms increase accessibility and personalization to democratize investment.
Bhat & Gai (2022) [3]: emphasized how AI-based financial advisory platforms are scalable and cost-effective.
D. AI and Behavioural Finance
Barberis & Thaler (2003) [2]: Lay the foundation for comprehending irrational investor behaviour.
Lo (2004) [12]: introduced the Adaptive Market Hypothesis, which combines market flexibility with AI
Poddar *et al*. (2020) [15]: identified cognitive biases in investment decisions using artificial intelligence.
Baker & Ricciardi (2015): investigated the potential of AI tools to lessen emotional bias in investing.
Statman (2019) [17]: made the case that AI can use data-driven models to address anchoring and overconfidence.

Theories supporting the study

1. Efficient Market Hypothesis (EMH)

Originator: Eugene Fama (1970)
Core Idea: Financial markets are "informationally efficient," according to the EMH, which means that asset prices always consider all relevant information.

Relevance to AI in Investment Decisions

By processing public and non-traditional data (such as news articles, tweets, and market sentiment) more quickly and correctly than humans, AI improves semi-strong and strong form efficiency.
AI models speed up price discovery and enable more logical asset pricing by minimizing human mistake and time lags.
Example: Market efficiency can be strengthened by AI-driven algorithms that instantly integrate political events or central bank statements into trading strategies.

2. Modern Portfolio Theory (MPT)

Originator: Harry Markowitz (1952)
Core Idea: An "efficient frontier" of ideal portfolios that provide the highest return for a specific degree of risk can be constructed by investors.
Relevance to AI in Investment Decisions:
AI enhances risk-adjusted returns by enabling real-time portfolio rebalancing depending on shifting market conditions.
By improving the estimation of correlations, variances, and expected returns, machine learning models can improve the input for portfolio optimization.
Example: AI is used by robo-advisors to create diversified, customized portfolios that automatically adapt to client objectives or market changes.

3. Behavioural Finance Theory

Key Contributors: Daniel Kahneman & Amos Tversky
Core Idea: Due to biases like herd mentality, anchoring, loss aversion, and overconfidence, investors are not always logical.

Relevance to AI in Investment Decisions

With consistent data-driven reasoning, AI technologies are able to identify and eliminate these biases.
By identifying emotional market reactions through sentiment research utilizing natural language processing, investors can protect themselves from illogical patterns.
Example: AI is able to identify a trend in which retail investors frequently overreact to bad news and create contrarian strategies to take advantage of this behaviour.

4. Adaptive Market Hypothesis (AMH)

Originator: Andrew W. Lo (2004) [12]
Core Idea: Combining ideas from behavioural finance and the EMH, markets change and adapt in response to the actions of market players and shifting environmental conditions.

Relevance to AI in Investment Decisions

Similar to market participants in the AMH framework, AI systems are made to evolve and learn over time.
By adapting investing strategies in response to shifting data settings and market input, reinforcement learning models serve as an excellent example of AMH.
Example: AMH is a good fit for a machine learning model that switches from momentum-driven techniques to value investing based on market cycles.

5. Prospect Theory

Originators: Daniel Kahneman & Amos Tversky (1979)
Core Idea: varied people have varied values for profits and losses, which causes them to make judgments that are not entirely reasonable, especially when there is risk involved.
Relevance to AI in Investment Decisions:
AI can suggest tactics that are in line with investors' risk tolerance by taking into account their risk profiles and past actions.
By customizing financial plans that honour a person's risk aversion, tools such as robo-advisors lessen the conflict between investor comfort and market behaviour.
Example: In order to help risk-averse investors comprehend possible losses and rewards and make better judgments, artificial intelligence (AI) can simulate various investment scenarios.

Conclusion

The expanding significance of artificial intelligence in changing the landscape of investment decision-making is demonstrated by this conceptual study. AI gives both institutional and individual investors a competitive edge through its capacity to evaluate enormous data sets, forecast market trends, and offer tailored investing recommendations. Even if there are still issues with data privacy, ethical use, and transparency, when AI is used properly, the potential advantages exceed the risks. The ethical frameworks, legal frameworks, and models of human-AI collaboration that guarantee the long-term integration of AI in financial markets must all be investigated in future studies.

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