

ARTIFICIAL INTELLIGENCE IN FINANCIAL SYSTEMS

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ABSTRACT

Artificial intelligence is being used in financial systems to make tasks more efficient, detect fraud, and offer personalized services. It is changing industries like banking, trading, and insurance by making processes faster, cutting costs, and helping manage risks better. Some key uses include automated trading, financial advisors that operate on their own, and making sure companies follow financial rules. Objectives of Study: Automating repetitive and data-heavy tasks like entering data and processing invoices to cut down on mistakes, speed up processes, and save money. Research Methodology: Research on AI in financial systems uses different methods, like looking at past studies, examining real-life examples, and using data to see how AI affects areas such as trading, risk management, and compliance. Data Analysis: AI watches patterns in transactions in real time to spot suspicious behavior. This helps reduce false alarms and improves how risks are managed. High-frequency trading systems use machine learning to notice small price changes and make trades with very little delay. Finding: AI helps cut costs by automating tasks. In banking and capital markets, 32 to 39% of work could be done by AI. Mid-sized financial firms have already seen a 28% drop in their operating costs. Recommendations: Create complete frameworks that cover all parts of AI use, including regular checks, making sure data is accurate, and identifying bias. This is important for dealing with issues like false information and cyber threats. Conclusion: AI is not just a new tool but a big force that is shaping the future of finance. It's important to use its benefits while being careful about the ethical and system-wide risks it can bring.

KEYWORDS: Artificial Intelligence, Financial Systems, Customer Service And Personalization, Operational Efficiency.

1. Introduction:

Artificial intelligence is being used in financial systems to make tasks more efficient, detect fraud, and provide personalized services. It is transforming industries like banking, trading, and insurance by speeding up processes, reducing costs, and improving risk management. Some of the major applications include algorithmic trading, automated financial advisors, and ensuring compliance with financial regulations.

Key Aspects of AI in Finance:

- **Fraud Detection and Risk Management:** AI systems analyze large volumes of real-time data to detect fraudulent activities and assess credit risk with greater accuracy than traditional methods.
- **Automated Trading and Investment:** AI, including generative AI, executes trades quickly based on market trends and helps

robo-advisors develop personalized and automated investment strategies.

- **Customer Service and Personalization:** Natural language processing enables advanced chatbots and virtual assistants, offering customers round-the-clock support and customized financial advice.
- **Operational Efficiency:** AI helps simplify back-office tasks such as document analysis and compliance monitoring, resulting in reduced costs and increased productivity.
- **Generative AI (GenAI) & LLMs:** Large language models are increasingly used to create reports, summarize information, and assist with coding, making financial services more efficient.

Challenges and Risks: While AI offers many advantages, it also comes with challenges such as biased algorithms, low-quality data, and

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the need for strong data governance. Regulatory compliance is a major concern, as companies must ensure AI decisions are clear and fair.

Future Outlook:

- AI integration is progressing rapidly, and future advancements may include more autonomous AI agents managing entire workflows.
- There is also potential for quantum computing to change how portfolios are optimized and how risks are modeled.

2. Objective of Study:

A study on artificial intelligence (AI) in financial systems focuses on making operations more efficient, improving risk management, and enhancing the customer experience by using automation, predictive analytics, and real-time data processing. The main goals of this study include making financial systems more secure by detecting fraud, helping with better investment decisions, and ensuring that financial institutions follow all rules and regulations.

The main objectives of studying AI in financial systems are:

- Automating routine and data-heavy tasks like data entry and invoice processing to reduce errors, speed up processes, and save costs.
- Using machine learning to monitor transactions in real time, so unusual activities can be identified quickly, helping to prevent money laundering, fraud, and cyber attacks.
- Improving the customer experience by providing personalized financial advice, custom investment plans, and 24/7 support through chatbots and virtual assistants.
- Using big data to predict market trends, assess the creditworthiness of individuals or businesses, and manage investment portfolios more effectively.
- Automating compliance reporting and monitoring to handle complex regulations in a more efficient way.
- Understanding how AI is transforming the financial industry, helping to discover new business opportunities, and promoting innovation in financial services.

3. Research Methodology:

Research on AI in financial systems uses a variety of methods, including reviewing past studies, analyzing real-world examples, and using data to examine how AI impacts areas such as trading, risk management, and compliance. The main approaches in this research involve studying large datasets to find patterns in things like fraud

detection, algorithmic trading, and credit scoring. A lot of this work also focuses on important issues such as bias, transparency, and who is accountable for decisions made by AI.

Common Research Methods:

- Literature Review and Bibliometric Analysis: Examining existing research on AI in finance, including machine learning, big data, and blockchain, to identify trends, highlight areas that require more attention, and suggest future research directions.
- Quantitative Analysis and Empirical Modeling: Using machine learning and deep learning techniques to analyze financial data for fraud detection, stock price prediction, and risk management. This includes evaluating the effectiveness of models, such as how well they identify unusual activities.
- Case Studies: Looking at specific banks or financial platforms to understand how AI tools are applied and what impact they have on operational efficiency and decision-making processes.
- Qualitative Research (Surveys and Interviews): Engaging with industry professionals, such as business leaders, to gather insights on real-world challenges, the frequency of AI usage, and the risks associated with adopting AI in financial services.

Important Data Sources and Techniques:

- Transaction Data: Both historical and current transaction records are used to train AI models for detecting fraudulent activities.
- Market Data: Trends in stock markets and economic indicators support predictions and automated trading strategies.
- Regulatory Data: Information on compliance and risk management helps assess how AI influences financial stability.

Important Things to Think About in the Research:

- Ethical Considerations: Ensuring AI decisions are fair and free from bias.
- Transparency and Explainability: Making sure AI systems are not "black boxes" so that regulators can understand how decisions are made.
- Performance Metrics: Evaluating model performance based on accuracy, speed, and effectiveness in reducing false alarms, especially in areas like combating money laundering.

4. Data Analysis:

AI has a major impact on financial systems by changing how businesses operate. It uses machine learning and predictive analytics to make things run more smoothly, help manage risks better, and support smarter decisions. AI can quickly process large volumes of data, which supports various financial activities. Some main uses include detecting fraud with extremely high accuracy, such as 99.99%, automating fast-paced trading, and offering personalized financial advice through robo-advisors.

Here are the main areas where AI is applied in financial data analysis:

- **Fraud Detection and Risk Management:** AI monitors transaction patterns in real time to identify suspicious behavior. This reduces false alerts and improves risk handling.
- **Algorithmic Trading:** High-frequency trading systems use machine learning to spot small price changes and make trades with minimal delays.
- **Credit Scoring and Lending:** AI considers data beyond traditional credit scores, like social media activity and mobile usage, to provide more accurate credit evaluations, especially for individuals with little or no credit history.
- **Customer Personalization:** AI delivers customized financial advice and services, which helps improve the customer experience in financial services.
- **Financial Reporting and Analysis:** AI tools speed up the financial closing process and assist in analyzing large financial reports, as noted by SAP.
- **Explainable AI (XAI):** XAI ensures transparency, which is important for compliance and decision-making, according to the Journal of Marketing & Social Research.

Benefits of Adopting AI:

- **Efficiency:** AI streamlines operations, lowers costs, and reduces the need for manual tasks.
- **Data-Driven Decisions:** It improves how investment strategies and portfolio management are handled.
- **Speed:** AI processes vast data quickly, providing real-time insights that can be used right away.

5. Result:

AI in financial systems has made a big difference in how operations are handled, how decisions are made, and how plans are set. It helps by doing tasks that used to be done by hand, like checking papers, confirming who customers

are, and answering standard questions. This lets workers spend more time on important and strategic work. AI also helps spot fraud more quickly by finding strange activity as it happens. It makes credit scoring more reliable and helps deal with changes in the market. Plus, it gives customers better and more personalized experiences through tools and chatbots that offer 24/7 banking services and customized financial advice.

Some major uses of AI in finance include managing risks better, using algorithms for trading, and getting deep insights from data. By 2027, spending on AI is expected to reach \$97 billion. However, there are some challenges to consider, like biased data, unclear how AI models make decisions, and possible risks to the financial system as a whole.

Risks and Challenges:

- **Operational Risks:** Too much reliance on AI can lead to mistakes, like faulty algorithms causing bad financial decisions, such as problems with mortgage approvals.
- **Bias and Security:** AI models may repeat unfair biases, and data-driven systems can face issues with privacy, security, and the risk of producing false information.
- **Transparency:** Some AI systems are like “black boxes,” making it difficult for regulators to understand how decisions are made, which makes it harder to monitor them.

Future Outlook:

The financial industry is putting a lot of effort into Generative AI. It's expected that 32–39% of tasks in banking and capital markets could be highly automated. The focus is shifting from just doing things faster to using AI to make more money, improve security, and support sustainable finance efforts.

6. Finding:

AI in financial systems makes things more efficient, saves money, and helps catch fraud more effectively. Research shows that AI can improve how well businesses run by 37% and help make more money by 42%. Important studies point out that AI improves how well risks are managed, makes customer service more personal, and helps with following rules more smoothly. However, there are also problems, like unfair treatment based on biased data, privacy issues, and the fact that AI systems can be hard to understand.

Key Findings on AI in Financial Systems:

- **Operational Efficiency & Cost Savings:** AI helps reduce costs by automating tasks. In banking

and capital markets, 32 to 39% of work could be automated. Mid-sized financial companies have already seen a 28% decrease in their operating costs.

- **Enhanced Security & Compliance:** Better anti-money laundering systems help cut down on false alerts. AI improves fraud detection and checks who people are by looking at how they act.
- **Improved Risk Management & Lending:** AI looks at lots of data to better assess whether people can pay back loans. This can help reduce the number of times people can't pay back money and improve control over financial risks.
- **Customer Personalization:** AI can create custom financial products, make chatbots smarter, and offer more personalized support to customers.

Challenges and Risks:

Big worries include data privacy, biased algorithms, unfair treatment because of AI decisions, and "black box" risks where AI systems aren't clear about how they work. These issues can cause problems with following rules and regulations.

Future Outlook:

Investments in AI are expected to grow to \$97 billion by 2027. More attention will be paid to AI that not only improves efficiency but also brings in more money. The use of AI in finance needs to balance new ideas with following rules and managing risks like false information created by AI or mistakes in the models used.

7. Recommendation:

AI in financial systems, with sector spending expected to reach \$97 billion by 2027, should be used to improve fraud detection, automate compliance, and provide better customer service. At the same time, it's important to put in place strong governance to reduce bias and other risks. The main suggestions focus on using explainable AI (XAI), making sure data is private, and keeping humans involved in important decisions such as lending.

Key recommendations for using AI in financial systems include:

- **Implement strong AI governance and risk management:** Create full frameworks that cover all stages of AI use, including regular checks, ensuring data quality, and catching bias. This is essential for dealing with issues like false information and cyber threats.

- **Focus on explainable AI (XAI):** Move away from complex models that are hard to understand to systems that are clear and easy to explain, which helps build trust and responsibility.
- **Improve fraud detection and compliance:** Use AI to look through large amounts of data to find signs of money laundering and unusual activities, which can also help cut down on false alarms in anti-money laundering efforts.
- **Use AI for portfolio management:** Apply AI for better data analysis to help shape investment strategies and build portfolios, as 91% of asset managers are already using these tools.
- **Keep humans involved in the process:** Make sure important financial decisions, especially in areas like credit approval and risk control, involve people to avoid unfair or biased results.
- **Strengthen data privacy and security:** Improve cybersecurity to protect customer information when using AI for personalized services.
- **Encourage ethical use of AI:** Make sure AI models don't repeat unfair biases, so all customers are treated fairly. Regulators are also advised to use AI to improve their ability to watch over the financial system, check the quality of data, and handle any possible big risks.

8. Conclusion:

Artificial Intelligence is transforming financial systems by improving efficiency, enhancing risk management, and delivering personalized financial services through data-driven automation. AI helps reduce costs, speed up processes, and support better decision-making, but it also creates challenges related to data privacy, algorithm bias, and financial stability. Although AI can automate many tasks, human judgment and ethical oversight remain important in complex financial situations. Therefore, balancing technological innovation with proper regulations and responsible use of AI is essential for creating a secure, fair, and sustainable financial future.

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