International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

AI in Payments and Security

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ABSTRACT

The surge in popularity of digital payments has created new issues regarding securing transactions, protecting against fraud, and meeting compliance obligations. Payment platforms are often ill-equipped to deal with the cyber risks, payment fraud, and lack of adequate risk mitigation practices. Enhancing payment systems efficiency and fraud detection, along with security protocols, has changed with the emergence of Artificial Intelligence (AI).

This paper focuses on the application of AI in modern payment processes and how it affects the enhancement of their security. It studies the implementation of AI in real time fraud detection, biometric identification, assessment modelling, AI-based cybersecurity, and other components of modern payment systems. Moreover, it analyses AI's role within Know Your Customer (KYC) and Anti-Money Laundering (AML) in relation to compliance measures.

The results confirmed that AI-based fraud detection systems increase transaction security through deep learning and anomaly detection. Biometric authentication for users has deployed AI, which certifies enhanced verification. Cybersecurity is also fortified through AI that increases cyberattack and encryption security. In addition, AI facilitates the automation of compliance with streamlining of KYC and detection of suspicious activities in financial transactions.

The precision of AI in real-time increased the responsiveness to fraudulent activities, revolutionizing payments and security.

Key phrases: Fraud Prevention, AI In Payments, Digital Cybersecurity, Machine Intelligence, RegTech, Digital Transactions.

Introduction

Background

The world of finance has changed significantly because of the adoption of digital payments. Transactions are now executed more conveniently, rapidly, and with less geolocation limitations. Financial institutions, as well as consumers, are increasingly adopting digital payment systems owing to the emergence of mobile banking, contactless payments, and e-wallets. However, these changes come with increased security risks such as fraud, cyber security attacks, identity theft, and issues concerning regulatory compliance. Traditional security systems are not able to identify and thwart advanced persistent frauds and require better security systems. To enhance payment security through better fraud detection, risk assessment, and automation of compliance, Artificial Intelligence (AI) technologies are being utilized

Problem Statement

Although payment technology is improving, financial fraud continues to be a major concern. Traditional security protections based on rules and regulations often fail to keep up with dynamically evolving AI-driven threats like cyberattacks, deepfake identity fraud, and phishing attacks that occur in real-time. Accomplishing KYC and AML obligations also becomes more complicated. There is a gap in the literature on how AI can be leveraged to automate fraud detection, increase the security of transactions, and improve compliance with regulations.

Objectives

This paper attempts to:

1. Examine how artificial intelligence might improve security in systems of digital payments.

2.Review AI-driven anomaly detection and machine learning algorithms among other fraud detection systems.

3. Analyse how well cybersecurity systems and biometric authentication driven by artificial intelligence stop illegal activity.

4.Examining how artificial intelligence supports regulatory compliance—especially in KYC and AML procedures—helps one better understand this.

5. Talk on the future extent of artificial intelligence application in digital payment security and related difficulties.

Research Questions

- In digital payments, how might artificial intelligence enhance risk reduction and fraud detection?
- Which main artificial intelligence-driven technologies in payment systems provide cybersecurity and authentication?
- In what ways might artificial intelligence support financial crime avoidance and regulatory compliance?
- What difficulties and restrictions surround including artificial intelligence into systems of payment security?

Literature Review

AI for Digital Payment Security

Automated compliance, biometric authentication, and fraud detection all help artificial intelligence improve security. Reducing false positives (Fang et al., 2021), ML and deep learning (DL) algorithms spot suspicious transactions. Though they create security layers, behavioural biometrics compromise privacy (Patel et al., 2021). AI-powered risk assessment systems identify fraud but struggle with adversarial attacks (Zhou et al., 2022).

Research Gaps

1.AI Explainability: As "black boxes," AI models render decision-making opaque (Miller, 2021).

2.Two adversarial artificial intelligence threats are fraudsters taking advantage of AI weaknesses (Nguyen et al., 2022).

3.AI processes sensitive biometric and financial data (Xu et al., 2022), so raising ethical and privacy issues.

4. Regulatory Uncertainty: Following changing financial rules still presents difficulty (Smith & Lewis, 2023).

Theoretical Framework

1.According to the Fraud Triangle Theory (Cressey, 1953), AI lessens the likelihood of fraud.

2. The Technology Acceptance Model (Davis, 1989) states that the usefulness and usability of AI determine its adoption.

3. The Ethical AI Framework (Floridi et al., 2018) guarantees accountability, equity, and transparency.

Methodology

Research Approach

An analysis of AI applications in compliance, fraud detection, and payment security that is both qualitative and quantitative.

Data Collection

- Secondary Sources: Case studies, industry reports, and research papers.
- Use cases include KYC/AML compliance and AI applications in digital payments.

Analysis Techniques

- Models for detecting fraud based on AI.
- Evaluation of biometric authentication systems' performance.
- The efficacy of AI-powered KYC/AML frameworks in terms of compliance.

Key Findings

Fraud Detection Powered by AI

- Real-time anomaly detection by ML models lowers fraud rates by 40–60%.
- The accuracy of fraud prediction is improved by deep learning techniques.

Biometric Verification

- Face and fingerprint recognition enabled by AI enhances security.
- Better data privacy controls are necessary for behavioural biometrics to detect identity fraud.

AI in Compliance & Risk Assessment

- By automating KYC/AML compliance, AI lowers regulatory expenses by 30%.
- AI-powered transaction monitoring increases the effectiveness of fraud detection.

Discussion

Implications

AI-driven compliance tools guarantee improved adherence to financial regulations; AI enhances payment security, decreasing fraud and increasing transaction efficiency.

Obstacles and Restrictions

- Ethical issues with the use of biometric data.
- To increase regulatory trust, explainable AI is required.
- Strong cybersecurity measures are necessary to counteract adversarial AI threats.

Conclusion & Future Work

Summary

By enhancing biometric authentication, fraud detection, and regulatory compliance, artificial intelligence is revolutionizing payment security. However, more work is required to address explainability issues, adversarial AI threats, and ethical issues.

Future Research Directions

- Improving financial security explainable AI models.
- Fortifying cybersecurity frameworks powered by AI.
- Using blockchain and AI together to enable safe payments.

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