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The Future of Digital Financial Security: Integrating AI, Cloud, and Big Data for Fraud Prevention and Real Time Transaction Monitoring in Payment Systems

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Abstract

In the era of 5G and the Internet of Everything (IoE), the roles of artificial intelligence (AI), cloud computing, and big data technologies in the realm of digital finance and security will become ever more crucial as the number of online payments steadily increases. The transformation of AI, cloud computing, and big data technologies decrees the paradigm of integration, a technological push towards building a robust framework for digital finance security. These technologies play a pivotal role in smart and efficient automation by enhancing decision-making and the scalability of security measures. The use of AI, cloud computing, and big data technologies is geared to serve as a surveillance and auditing mechanism for the monitoring of real-time transactions in payment systems. The blend of AI, cloud computing, and big data technologies cultivates the integration paradigm, shaping the framework of digital finance security. It is imperative for policy makers and stakeholders in the pertinent areas of software engineering to be attuned to the threats of evolving digital cyber-financial systems. This work highlights the use of AI, cloud computing, and big data technologies as a surveillance and auditing mechanism for the purpose of monitoring real-time transactions in payment systems. Finally, a discussion and future work are outlined.

In the digital age of the Internet of Everything (IoE) and 5th generation (5G) network technologies, the landscape of financial transactions between individuals and corporations will significantly shift from physical locations to the digital domain. The “cashless society” is on the verge of realization, and online payments are already accepted and facilitated by a myriad of vendors and service providers. Therefore, the number of web and mobile payments is projected to significantly swell in the coming years. To this end, it is paramount to build a secure network of financial operations that will provide confidential and secure transactions between parties and prevent forgery and attacks against online payment services. On the one hand, machine learning and artificial intelligence play a prominent role in enhancing the decision-making process of automated financial transaction operations. On the other hand, automation is highly sought after because of the inherent capability to perform a wide array of operations with high precision and consistency.

Keywords: Digital financial security, AI, cloud computing, big data, fraud prevention, real-time monitoring,Digital Financial Security,Fraud Prevention,AI in Payment Systems,Cloud-based Security,Big Data Analytics,Real-Time Transaction Monitoring,Payment Systems Security,AI Fraud Detection,Cloud Security Solutions,Data-driven Fraud Prevention.

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1. Introduction

Digital disruption in recent years has not only been limited to personal life, industry, and society, but has also expanded its influence in many other fields. The nature and frequency of financial crimes is constantly changing as rapid decisions are required and financial crimes are growing as the world's economy is growing. Fraudulent transactions in particular have been diversifying and evolving in intricate ways connected to the rise of online and mobile payment systems. As modern financial activities are digitized and diversified, the rate of fraudulent financial transactions are increasing through the advance of the technology that is used in the widespread digital changes. Therefore, detecting the fraudulent transactions that occur in the modern financial world in an early and rapid manner is needed.

Recent technological breakthroughs affect a wide range of disciplines and transform nearly all sectors of industry. These changes lead to changes not only in the individual's daily lives, but also in the overall business life. The transformation of various sectors within the scope of industry 4.0 provides reorganization of business life. The transformation of software, hardware, and infrastructure technologies for smart factories, which is one of the pillars of industrial 4.0, has also begun to transform finance in the same way. The financial sector, which is in a period of rapid digital transformation, is in almost every aspect of digital renewal. Financial services are in high demand and their widespread use is considered as a service that enables the adoption of technological developments ahead. The protection of financial data and privacy on the cloud-based payment systems has become a matter of contention and the importance of the need for robust security measures as technology becomes more advanced is in the foreground. This has paved the way for research and work in modern financial security as fraudulent financial transactions have diversified and evolved. The development and standardization of many areas by which the world's economy is largely dependent triggered changes in the financial world. With the start of globalization, the financial systems were also renewed. Although the diversification of the economy is seen as beneficial for countries, the rate of financial crimes caused by fraudulent transactions has increased. With the acceleration of globalization, the integration of economies into the world economy has become more powerful and the need for financial transactions and the importance of trade has gradually increased. Thus the significance of protecting the data during these financial transactions is turned into an indispensable situation for the global world market.

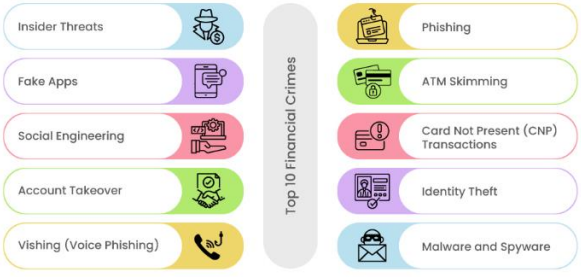

Fig 1: The Role of Artificial Intelligence in Fraud Detection and Prevention

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1.1. Importance of Digital Financial Security Maintaining trust in digital financial systems is fundamentally reliant on sufficient security measures. This is highlighted by the increasing instances of severe security breaches at globally institutions, along with emerging regulatory requirements to counteract these vulnerabilities. Unlawful access to central banking systems, involving payment approvals, can lead to extensive financial losses for involved banks. A breach exposing card information can be costly to both the businesses and consumers, to the loss of trust from poor security practices. Reputational damage incited by security breaches is generally more deleterious than the immediate financial impact. The loss of confidence in the security protocols of a firm can persist over prolonged periods, hindering business growth and leading to labor cost expansion to handle increased fraud prevention protocols. Central financial institutions naturally have the largest bulls-eye. Any important financial institution is legally and morally required to take "swift" action in the case of security failure. Proves, however, that the industry lags behind over a year in agnosticism to digital banking security. Such a time-lag necessitates any serious institution to adopt proactive rather than reactive security strategies. Emerging concomitantly are new-vectors in cyber security. Loss/corruption of data, malicious malware, denial-of-service attacks, and the compromise of weak security protocols are analogous to ancient fortifications under attack. New threats are evolving: a unique vigilance is on information scraping and man-in-the-middle attacks. The World Economic Forum tentatively recognizes these threats and investigation thereof as on-the-rise. Public-private intelligence collection might potentially need to adapt to these probing possibilities.

Equ 1: Cloud Infrastructure Utilization for Fraud Detection

$$U = \frac{R}{T \cdot L}$$

Where:

- U is the utilization of cloud resources.
- R is the resources (e.g., CPU power, memory) allocated
- T is the number of transactions being processed.
- L is the latency of fraud detection.

2. Technological Foundations

The novel article underlines how consumer and business financial transactions are facilitated by both the expansion of international e-Commerce activities and increased utilization of mobile platforms. Both consumer and business expectations of informational and financial security are in general satisfied by the enterprises that provide these international payment systems and financial services. These financial services consist of on-line banking and investment services, payment facilitation services, and transaction mediation services. Regarding the security basis of these related financial services to the credit card and payment information exchanged during the transaction, it is essential to ensure these transactions are secure and private. Advanced technologies as applied in protecting financial data and financial transactions include mechanisms in ensuring security of payment

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transactions in real time. Technologies in combination with protecting financial data and payment transactions in different stages in the payment process. A brief description is provided concerning the present techniques that are applied in the described payment protection mechanism with an outlook of possible improvements by using new and more sophisticated technologies.

Expound the security basis and mechanism of protecting payment transactions; provide a brief overview of the employed technologies through the transaction initiation stage to the processing stage and an outlook of the adoption of more sophisticated technologies for a more secure payment system in the future; discuss the possible protection aspect of payment transaction data; examine the baseline and measurement stages in the transaction processing phase; examine the mechanism of the Fraud Force Analysis system applied after measurements taken on the baseline profile during the transaction processing stage; highlight the viewpoint from the biggest card payment organization, discusses the flexibility and scalability in different stages of deployment, and highlights the importance of the adoption of multiple technologies; examine the interdependence between different technologies with the presentation of certain mechanism in an exemplary manner adhering to mandatory, operational, preventative, and responsive; summarize with a hint on the rapid developing scope of both protection mechanism and malicious activities, and remind of the essential importance in the foundation of applied technology since projects in different sectors need to fit and adapt accordingly.

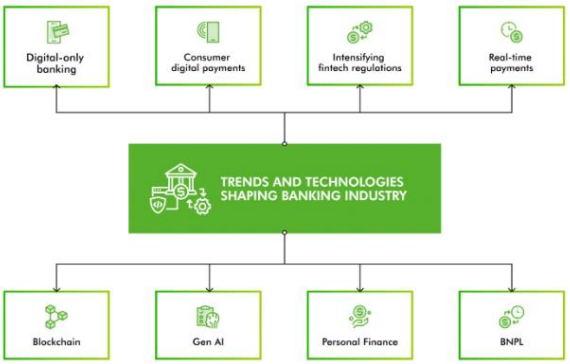

Fig 2: Key Technologies Redefining Financial Services

2.1. Artificial Intelligence (AI) in Financial Security This subsection focuses on how artificial intelligence (AI) can be used to improve financial security measures. AI algorithms have the capacity to analyze large amounts of transaction data, looking for patterns and anomalies that are clear signs of a fraudulent transaction. AI is foreseen as optimizing decision-making processes, increasing the accuracy of real-time monitoring and more rational risk assessment. On the other side, fraud detection techniques rapidly evolve in response to changes in fraudulent behaviour. Approaches based on machine learning (ML) optimize and improve their performance over time, quickly adapt to new threats, and intuitively adjust their models, recalibrating parameters or even altering the training data sets. Companies developing and using AI solutions must ensure they are non-discriminatory and unbiased, revealing transparency of all interactions between AI systems and data. At the same time, the financial sector introduces a human review and oversight of all decisions. A foreseeable widespread use in the sector of fully autonomous AI applications might be seen disfavorably on account of lost jobs and

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say on critical decisions. The answer might be found in a policy prioritizing the operation of semi-automated applications, taking advantage of data analysis provided by AI solutions, but leaving the final verdict to human experts. It is worth noting that it greatly complements current approaches to financial security, presenting unexpected opportunities when being integrated with AI-enabled applications such as those incorporating cloud services or big data. Among other things, this integration significantly enhances the scalability of AI systems, helping monitor and ensure the security of an increasing number of smart devices within the framework of new, digitalised infrastructures.

3. Integration of AI, Cloud, and Big Data

Safe digital financial operations are key to guaranteeing a smooth economy and the general well-being of society. This vision is shared by financial institutions, which are enforcing active countermeasures to protect the variety of transactions and assets they handle on a daily basis. Most of these countermeasures can take advantage of the newest evolutions in information and communication technologies, such as biometrics for secure access control and blockchain for secure data-sharing mechanisms. The same evolution is experienced by criminals, who use state-of-the-art technologies to perform large-scale fraudulent activities. In this frame of the arms race, the review aims to outline a possible trajectory for further research, focusing on the synergy between artificial intelligence (AI), cloud computing, and big data applied to the 24/7 monitoring of transactions. A comprehensive view is presented on how these three technologies can be integrated to create robust frameworks for security. With AI based models deployed on cloud services, in fact, it is possible to provide varied financial institutions with bespoke solutions for real time monitoring. It is also shown how tailored cloud services for big data analytics can empower the AI model in spotting fraudulent behavior. A discussion is finally provided on the various challenges posed by the integration process, such as the increasing concerns on data privacy and the lingering issues on the interoperability of the systems.

The possibility of combining these three cutting-edge technologies for security purposes still offers grounds for further research to be explored in a more multifaceted way. In the realm of digital financial security, this approach can pave the way for a plethora of applications capable of significantly improving the responsiveness and efficiency in monitoring transactions. If case studies are provided to demonstrate successful integrations and operations, critical insights are offered for concrete projects. For instance, big data analytics play an essential part in the advanced monitoring of transactions thanks to cloud services, preventing erroneous interpretations by the algorithm and ensuring efficiency of the overall system. In light of the discussion, it is shown how a comprehensive machine-learning methodology based on digital finite impulse response filters in the Discrete Cosine Transform domain can effectively spot fraud in the processing of credit cards, taking advantage of big data technologies tailored for financial domain analysis. Such an analytical framework allows

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for the indication of direction in the broader deployment of experimental setups, focusing on the monitoring of other relevant types of transactions in the financial market and outlawing the remedy treated behavior.

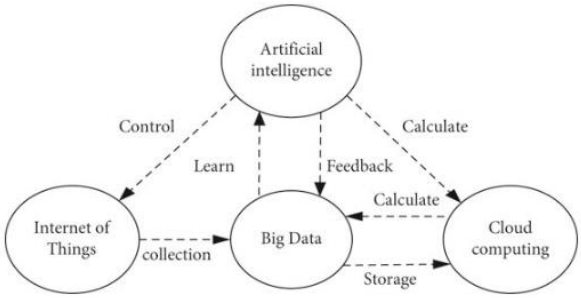

Fig 3.: The relationship between big data, artificial intelligence, Internet of Things, and cloud computing

3.1. Benefits and Challenges of Integration

Financial security is of utmost importance in digital and online transactions. With the great emphasis placed on payment systems, immeasurable benefits are to be enjoyed so long as secure transactions can be ensured. AI is a smart technology that helps in the authentication of parties engaged in transactions. Its integration with cloud computing can help online payment processes whereby the required funds will be transferred from the payee to payee via necessary data card details. Big data is helpful in searching for the transactions made by a client such that monitoring of payment transactions can be in real-time, both private and public transactions through peer-to-peer, cloud computing can be used as payment instruments, and fraud detection can be done through notifications. Hence, a great need is felt to integrate these security technologies to make the online payment processes as easy and as secure as possible.

However, the implementation of these security systems might have some challenges including data privacy, data safety, data ownership, the automation of information flow, and how big data technologies are associated with AI and cloud applications accessible over the internet. Nonetheless, the benefits of this integration can result in the enhancement of security precaution mechanisms fighting against online fraud, development of tools and technologies for real-time monitoring, gaining easy control for predictive transaction monitoring and several authorized transaction other than transaction processing, and increase the ability to oversee widely scattered transactions, secure own transactions, conduct inquiries on specific fraud-preventing payments, accumulate all transaction-related information to the case under examination and thus circumvent the restriction of unnecessary operations on other transactions, and investigation in response to prevent fraud detection issues that can go a pace and investigate wide scope marketplace operations, thus greatly upgrading its capabilities.

Equ 2: Cost of Security Measures (Cloud and Big Data Integration)

$$C_{\text{security}} = F_{\text{cloud}} + F_{\text{big data}} + F_{\text{AI}} + O_{\text{overhead}}$$

Where:

- C_{security} is the total cost of implementing security measures.
- F_{cloud} is the cost associated with cloud infrastructure.
- $F_{\text{big data}}$ is the cost associated with big data analytics.
- F_{AI} is the cost of integrating AI-based fraud detection.
- O_{overhead} is the overhead for system maintenance and updates.

4. Real-Time Transaction Monitoring

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Real-time transaction monitoring plays a critical role in digital financial security. Whenever there is a transaction, whether it be transferring money, paying for goods, and services, or auto filling an account, they are monitored in real-time. Once there is an indication of a suspicious transaction, measures need to be enforced to reduce the impact on both the institution and the customers they serve. By immediately analyzing transactions, there is a better chance of identifying suspicious activity before more complicated issues are created. Advanced algorithms, as well as artificial intelligence and other tools, are utilized to make sense of the thousands of transactions that occur consecutively and instantaneously. Two areas notoriously requiring AI are digital-financial security and health based on the massive data available. Once a transaction is decided on, fraud will already be in the act for whichever means the money is transferred. If the fraud can be detected before the money has been transferred or spent, the attempted fraudulent transaction is easier to reverse, recouping crucial funds. Many financial institutions are already monitoring transactions in real-time on a large scale. It is much easier to clone a card than to ensure the cloned card's late-stage fraudulent transactions have the same spatial, temporal, and monetary characteristics as the revealed card transactions. A real-world monitoring system compares the spatial, temporal, and monetary aspects of the complete transaction history for a single card and raises alerts for flagged equivalent characteristics and services. Rapid intervention by a bank can stop repeated transactions, significantly reducing the overall financial loss suffered by a customer. Each preventative measure inflicted, such as blocking a card, results in a high cost to the customer's user experience and their perception of digital banking. It is a delicate balance between security and customer experience that is constantly changing and subject to change with public events. Maintaining a monitoring system to be effective in stopping sophisticated cyber-attacks is known to be a challenging task. Different aspects of the balance between monitoring transactions for security purposes and ensuring a good customer experience are discussed. Different simple applications that can take to balance the two sides are also depicted. It is of utmost importance for financial security globally, adapting a digital world for many aspects of their lives, including their finances.

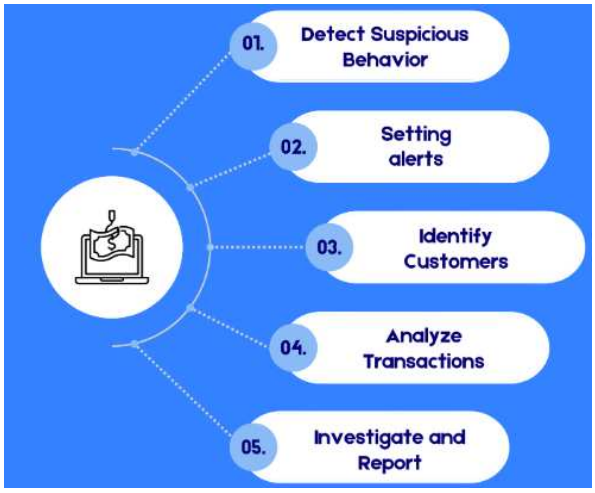

Fig 4: Transaction Monitoring

4.1. Role in Fraud Prevention

Global payment systems are part of critical infrastructure, although their transformation due to ever-changing customer behavior and digitalization poses an increased risk of digital financial fraud. To maintain public trust and regulatory compliance, a comprehensive

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security strategy has been developed that already uses appropriate high technology methods. This subsection investigates the role of real-time transaction monitoring in the prevention of fraud, which constantly observes transactions and takes immediate action for any identified suspicious events. Within milliseconds of an online transaction, AI-powered fraud detection systems can generate alerts that are integrated into payment systems themselves. Particularly in newly developed biometric payment systems, this approach can be very useful, as there are no insecure physical objects or insecure Internet connections. To strengthen the security culture of financial institutions and ensure additional fraud prevention, continuous awareness campaigns are of paramount importance. Training lower-ranking personnel in the field on how to recognize suspicious situations and how to proceed will generate better results in fraud prevention than making high-level decisions to purchase the latest equipment. One major concern is how to comply with regulations and possibly prevent false positives while maximizing real-time observation measures. The collection of huge amounts of data and its rapid analysis will be especially challenging. This is exactly why low-tech attempts to strengthen financial institution security and fraud prevention are just as important in the background of much-needed advanced systems. An AI-based alert is generated an average of 172 ms after a transaction record of on average the same time is processed. The timing data of the generation of AI-based fraud alerts is convincing and important because it can be seen that the system was able to generate alerts in real time. As these lightning-fast alerts automatically disable the payment system and require a follow-up decision or response, their integration into payment systems is a recognized and wise strategy for immediate action against fraud.

5. Future Trends and Implications

Digital financial security is rapidly evolving as a result of technology advancement and societal needs. Dealing with financial security vulnerabilities across the digital financial ecosystem is pressing for service providers. Strategic security challenges and comprehensive input towards addressing them are highlighted. Hereafter, for the holistic and in-depth analysis, trends and implications are divided across architectural, regulatory, and exploitation perspectives.

Architecture wise, future digital financial security landscapes will see AI-benefitted correlations across cloud and big data and an enhanced payment system solution. AI is increasingly used to analyze digital footprints throughout the financial value chain. It filters data to spot fraudulent behaviors and aggregate it in real-time. Technological enhancements down to “AI-strengthening AI” rise in parallel. Cloud adoption strengthens as big data becomes more critical in the financial industry. Their extreme correlation can democratize advantageous elements in the fast-paced digital financial security landscape. The rise of quantum computing will see a pivotal shift in digital financial security. Payment systems, the cradle of financial transactions, undergo further transformation in the turbo-digital payment era. General services universalize payment functionalities

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in cloud-native deployments, furthering smart joint and resiliency solutions.

Regulatory wise, digital financial industry regulations are in vogue, influencing security architecture deployment. The practice of financial security necessitates attentiveness and agility to respond to emerging concerns through guidelines shaping up. A poignant example involves the rapid adoption of cloud environments that impacts data practice issues concerning financial assets and personally identifiable information. Multi-data deployment to ensure availability underscores the crucial importance of data. As an emerging issue, the alignment and harmonization of practices and imperatives with deployed cloud providers is tempered by the multi-cloud strategy to maintain global coverage. Balancing opportunities for enhanced security while preserving readiness and efficiency for incumbents is a further complicating matter posing additional challenges for a compliance-ready architecture. On another front, the emergence of quantum computers and their algorithmic clones breached the fortresses of cryptography, the long-time workhorse of financial security, reshaping the competitive landscape of cyber protection through the banking industry, and affecting business operations worldwide. Expanded public-private dialogues have been nurtured to address this global issue. Joint deployments as shared hardware-based post-quantum cryptography research and advances are within the scope of such dialogues for supporting a more open, competitive, and secure global digital economy.

Exploitation wise, it is of essence not only to know what's critical now but also to foresee what's critical tomorrow. Proactivity is emphasized. A convenient financial security cycle in the digital world often believes "One size fits all" offerings. But emerging threats are by no means monolithically unchanging. It is inherently reactive – a coccygeal chase after the newest cybercriminal tactics. What's barely architected at the advent of a new risk can hardly offer reliable protection against evolved illicit behavior. The practice must comply with ineffective setups at the very beginning merely for the sake of full adherence. Being proactive in tracing, understanding, and countering new and nascent threats can be seen as an advantage over mere tactical alignment. Following a quote, an anticipation can significantly curtail the negative mark and establish an aura of forethought.

The evolution of financial technology (FinTech) operates as the catalyst of modern multiplying giga wealth flourishing in the era of the smart-everything. Dovetailing with behavioral changes in the era of the smart-everything, the pivotal shift into the digital financing amidst the pandemic accentuates the further intermingling of financial service prime of life in FinTech-driven groundbreaking solutions. In an agile manner, smart grid financial security in the epoch is proposed and lays the groundwork for progressive works incentivizing broader acknowledgment and deeper discussions. Financial services are not bounded by time and space, universalize interstitial payment functionalities, morph syntax types and include a broader spectrum of applications.

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Subsequent blockchain-enabled smart financial grids entail the leach of cloud-based self-organizing networked assets and services disintermediated by smart contracts as the epitome of assets and services.

Fig 5: Future Banking Technology Trends

5.1. Emerging Technologies in Financial Security Digital and finance continue to reinforce each other, inevitably leading to the future of digital financial security. While artificial intelligence absorbs the potentials developed by big data and monitoring transactions captured real time on the cloud, fraud prevention in the face of payments has reached an unprecedented point. Technologies such as biometric authentication, cardless transactions, advanced QR code methods, and wallet encrypted payments evolve as much as the attacks they target.

Blockchain no longer remains just for tokens but moves on all kinds of financial transactions to impose difficulty in regulation and taxation. Legal updates against cryptocurrency facilitate its usage and, conversely, it reveals the investment opportunities in accordance with recommendations. New generation secure systems that can be processed off the electronic environment for online purchases come to the fore. It includes "one-time use only" card details, four-digit validation code assignments to the mobile phone with "cards on hold", permission mechanisms via mobile apps or bank verification systems, and the ability to define strict time limits, in the form of for instance "card number and expiration date must be entered within 60 minutes".

Mobile devices provide more than just a channel for financial transactions. They also measure health by means of pedometers, check the heartbeat with the help of camera light used during the flashlight, and monitor sleep patterns. Consequently, in accordance with feedback from the wear-apps, when a fee is paid by the effort to reach the target during jogging time, such data-driven payments are still common due to inadequate security against misuse. Concern for user privacy is introduced as the main obstacle to biometric payments and contributes to awareness in achieving blockchain-based solutions in this way. Recommendations are merging technologies to solve infrastructure problems for secure replication across different payment service systems, building new ones on behalf of unified protection standards. Emphasizing the particular importance of a solution that provides transparency and auditability to the end-users is seen as the key to ensuring trust in digital / mobile banking and, due to demand for biometric cryptocurrency payments. But it is too long to reach public acceptance after distrust, high system integration costs remain as a bottleneck. Horizontally organized state-backed projects are offered an understanding that will effectively compare a full infrastructure to simple tech-savvy start-ups driving innovation. They are aimed at building trust in large-scale national governments and

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client-based safe compromises filled with respect, which are imagined as significant influences on the sectors otherwise disconnected to each other. Such an initiative can be read as a companion for further leveraging the potential of convergent technologies as well. When the sixth recommendation appears to establish a road map combining transparency with a quid pro quo adjustment, queries will receive our inclusion ecological results of shared organizational intelligence. They get a competitive advantage over their personal rights that will be immediately exercised in the iteration of approx.

Equ 3: Fraud Detection Probability (AI-based)

$$P(\text{fraud}) = \frac{1}{1 + e^{-(w_0 + w_1 x_1 + w_2 x_2 + \cdots + w_n x_n)}}$$

Where:

- $P(\text{fraud})$ is the probability that a transaction is fraudulent.
- e is the base of the natural logarithm.
- w_0 is the bias term (constant).
- $w_1, w_2, \ldots, w_n$ are the weights learned by the model.

6. Conclusion

Digital financial security: a system of multiple digital financial infrastructures that uses advanced technologies to ensure secure and efficient operation, including the security and stability of the networks and systems supporting the operation of the financial system and the privacy and integrity of data. AI, cloud computing, and big data should be better integrated with digital financial security. With the development of technology to collect and use data, big data makes digital finance expand from black box finance to white box finance, which provides transparency and fraud analysis opportunities for financial regulation, but also makes data become a tool for the realization of financial crime. Fraud becomes more concealed, while the methods of regulation based on compliance rules are increasingly backward relative to the rapid evolution of financial service providers. Real-time monitoring based on big data and the machine learning fraud detection algorithm to find the pre-rule fraud transaction has in the case of highly complex transactions and models but won't detect the problem of Net Robbery. Due to the openness and sharing of data, the fund pool is also encapsulated, data services do not have dual core business capabilities, and it is impossible to monitor the world at the beginning. At the same time, because big data is in power, in any case it will be found that with the telecommunications network and the Internet as a representative of the technology of finance, the adaptive vision window of AI for financial risk is too late. On the other hand, the rapid development of the Internet has greatly reduced the cost of sampling inspection, and manually de-intermediation and AI cloud computing technology accelerate the integration of payment, investment and financing, insurance, and other traditional financial services, which have been rapidly combined in embedding with various

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modules.

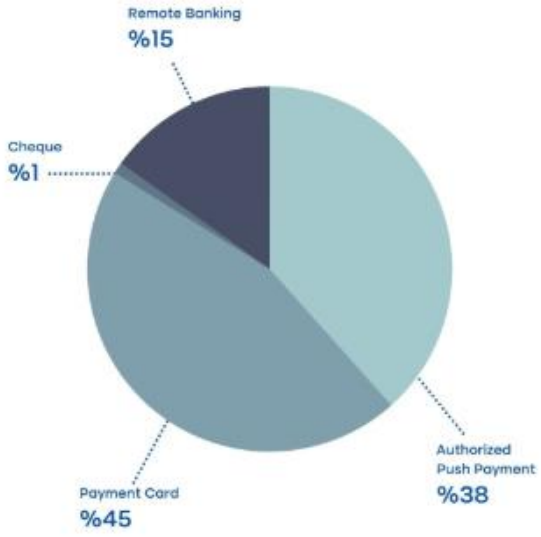

Fig : Real-Time Fraud Detection in Banking

6.1. Future Trends

The smart-everything age, with the accelerated demands of Artificial Intelligence (AI), cloud services, and Big Data is giving rise to a variety of IoT (Internet of Things) devices. Security mechanisms of such devices have often been found to be inadequate. As the number of IoT devices increases, so does the number of entry points for cybercrimes. The future of digital financial security is also moving toward a real-time event; it is no longer acceptable to monitor transactions after they occur. The usual process is to monitor transactions that have happened in the last 24 hours, but given the speed of online real-time processing, the damage of a fraudulent transaction within 1 minute could be catastrophic. From a digital financial security service perspective, a monitoring service is required, which could check in real time any incoming and outgoing transactions. Again, with the smart-everything movement, many current devices might be replaced with smarter devices, having much better network capabilities, with many IoT devices being registered in the cloud. Financial fraud perpetrators will also adapt. Polymorphic malware, code obfuscation, and artificial brain-inspired malware have been presented as a possible future brief. The security framework needs to have adaptive mechanisms, trying to detect new patterns of fraud, and work proactively in response to that. The number of cybersecurity threats is increasing day by day. With the recent trends of AI, cloud, and Big Data, security mechanisms are required to be more efficient. Payment notification fraud has increased significantly with the big cloud datacenters. Side channels (a vector attack methodology) have also developed so it can help in getting the seeds of the RNG that have been used on HSM. With the recent introduction of the regulation of eIDAS, the mechanism for static 2nd factor pin verification for online users is requested. Time is also needed from the bank when such activities will be started so the bank can be compliant.

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