Fusion System for Blockchain Asset Securitization Risk Control Using Adaptive Deep Learning-Based Framework

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Abstract

Feature engineering methods, which entail identifying and extracting useful features from big datasets, can be used to enhance the precision of asset securitization. It might be difficult to securitize assets that produce multiple receivables, such as consumer or company debt. In order to overcome these difficulties, companies might think about adopting a fusion system that integrates feature engineering with distributed ledger technologies such as blockchain. Businesses can benefit from implementing a fusion system like the Deep learning-based Adaptive Online Intelligent Framework (DLAOIF) since it allows for better decision-making, less wasted time and money, and less chance of fraud. Financial asset tracking on a blockchain can help investors keep a closer eye on asset performance and related risks, while also decreasing their reliance on credit rating agencies. Blockchain's high data security standards and elimination of regulatory bottlenecks in the securitization process also make it a useful tool for easing the burden of due diligence.

Keywords: Blockchain technology; Fusion system; Distributed ledger technology; Asset securitization.

1. Introduction

Increased security, transparency, efficiency, and convenience might be brought to the financial sector by blockchain technology's decentralized, distributed, and validating features. Fusion systems that integrate blockchain with other cutting-edge technologies such as IT encryption, artificial intelligence, centralized cloud, big data analytics, and secure data protection can help organizations reap the full benefits of blockchain [1-3]. Financial institutions can benefit from a fusion system since it allows them to combine the best features of different technologies [4]. An electronic asset can be created, stock transfers can be simplified, investment systems can be optimized, digital copyrights can be protected, economic infrastructure can be enhanced, and payments can be made automatically all thanks to a fusion system [5]. In sum, the financial sector and its derivatives may benefit greatly from a fusion system that makes use of blockchain technology. The provision of financial services is set to be revolutionized as blockchain technology develops and matures, opening up new opportunities for enterprises [6-11].

Blockchain technology optimizes business operations, reduces overhead expenses, and increases collaboration performance [12]. The technology used in the Blockchain is used mainly for financial services, chain management, culture and entertainment, intellectual property, smart manufacturing, social welfare, and cultural education [13]. Blockchain technology is used in the area of financial services in business contexts such as manufacturer funding, exchange financing (letters of credit, letters of assurance, factoring, bills), credit management, account clearing, insurance, securities, etc.., [14].

Blockchain technology is commonly used in financial fields such as digital currency, cross-border transfer and transaction, the funding of the supply chain, securities issue and trade, consumer loans, and other sectors [15]. At the same time, blockchain technologies can be used to manage and archive the transition details of different digital financial assets effectively and safely, for example, in a centralized cloud database based on blockchain

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transaction records, such as inventories, options, bonds, notes, funds, etc.., [16]. The trading and conversion of financial assets can take place on a blockchain automatically [17].

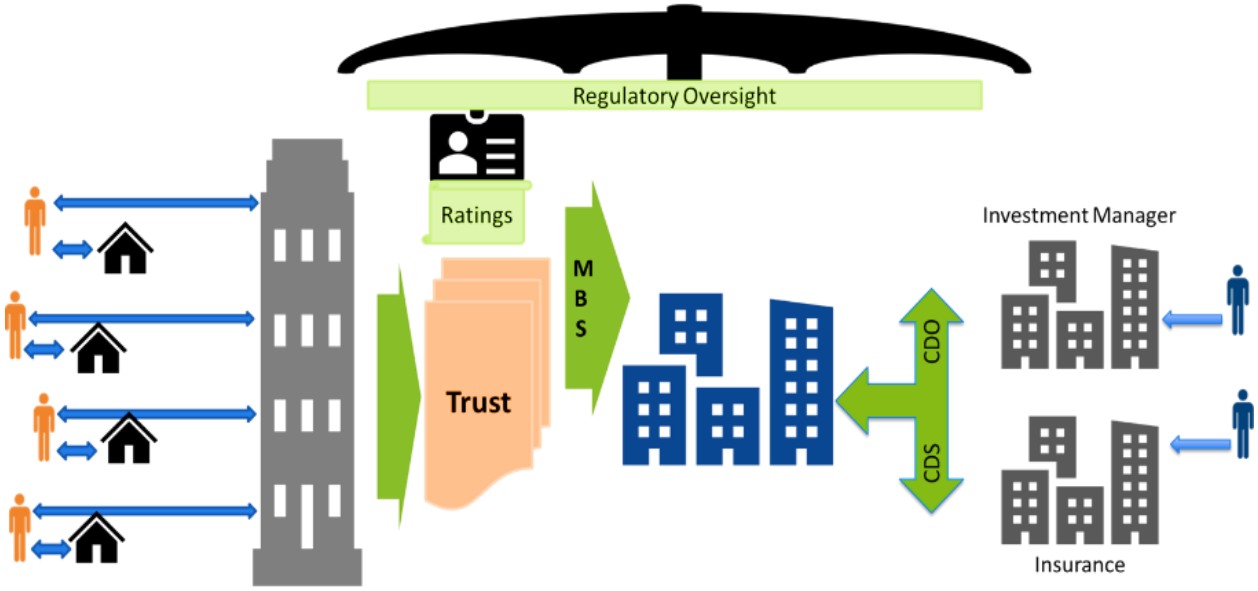

Figure 1: Example of Blockchain asset securitization

As shown in Figure.1. Blockchain technology can provide ID and business verification services [18] to the financial supply chain, and it checks the identification of any involved entity within the network and blockchain technology to examine the authenticity [19] and validity of any bill in the entire financial services to provide proof that the creditor [20]. The implementation of technology via Blockchain will digitize loan notes, promises, factors, and business bills and carry out interbank correspondence in the form of an alliance chain that allows the connection between domestic and foreign banking in the way of peer-to-peer [21]. Simultaneously, banks and regulators use blockchain platforms to provide foreign exchange organizations with identity with authentication services and to check that bills are genuine and valid [22].

The mainstream finance system is well-resolved with the problems of fraud risk, credit risk, business risk, and central entity risk, with an efficient combination of blockchain technologies and distributed technology for the protection of information, artificial intelligence, secure cloud storage, and significant data processing [23 -26]. Designing a blockchain-based digital payment model, business asset securitization control, and the standard blockchain development implementation has been developed using financial-related software business ideas in the future [27]. This paper has proposed the possible benefits of Blockchain during the securitization process using the Deep learning-based Adaptive Online Intelligent Framework (DLAOIF). The benefits can be significant, from reduced costs, time, and fraud risks to increased safety, trust, and accuracy.

2. Literature Survey

Wu et al. [28] introduced the Blockchain's core design and technological features. Blockchain technologies are designed and investigated in the China Foreign Exchange Trading Network. The Inter-Bank Application (IBA) focused on blockchain technology, which is combined with the credit exchange system X-Swap. In the financial sector, the blockchain platform was used for a wide variety of experiments and development.

Zhu et al. [29] implemented a next-generation technology and Internet Powered Blockchain (IPB) with wide-ranging interconnection, informed decision-making, real-time connectivity, and transparent sharing. The application of blockchain technologies on the web includes the photovoltaic power microgrid, blockchain energy-based Internet businesses, blockchain resource sharing, and securitization of energy assets. Technological systems were being developed for energy exchange on Internet-based blockchain technologies. Transactions on the Internet and payment settlement mechanisms were being designed. The network shares energy producers and customers peer-to-peer to improve device performance and health.

Meralli et al. [30] suggested a new framework that would require all market players in the securitization process (e.g., funding, rating agencies, regulatory agencies, and protection issuers) to interact with a single shared network while retaining the security of loan-level data such that industry metrics and performance data are available in a great time. This network is powered by Ledger, the first system to enable participants in a collective leader to carry out publicly controlled examines on masked data, and a zero-knowledge distributed ledger technology application (ZKDLGA).

Blockchain application technology can transfer securities assets to the network system for examination using a P2P framework of securities protection. The whole stock trading phase being held in the Blockchain will

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dramatically lower the risk; the usage of blockchain technologies can effectively prevent financial assets from being manipulated during the transaction. The database structure of Blockchain Dependent Stock Trading (BDST) [31] was introduced, aiming at the issue that blockchain infrastructure would prohibit data from being impaired during the trade. Securities transactions based on blockchains were carried out through device design. Java technology was introduced to develop the system. Blockchain was used as the basis for design ideas and transferred to the Blockchain.

Jiang et al. [32] introduced the full spectrum of licensed and approved distributed ledger computing technologies and concluded that the use of distributed ledger technology (DLT) in a business case represents, among other aspects, a delicate compromise between the needs of disintermediation [33, 34], confidentiality, and scalability. Smart interactions are pre-agreed by a DLT-based automated framework for the assessment and efficiency of rules [35]. Smart agreements combined with loT or Big Data Analytics will help digitalize the physical business world and illustrate potential uses of the financial-securitization industry.

Based on the above survey, the proposed Deep learning-based Adaptive Online Intelligent Framework (DLAOIF) performs better than the above existing methods.

3. Fusion Deep learning-based Adaptive Online Intelligent Framework (DLAOIF)

To explain the concept of Blockchain, the following concepts must be identified: a hash function, the public key, and the sender's private key are included. Two digital signature functions exist. (1) verification of the issuing signature and (2) confirmation of message authenticity. SHA 256: The hash function to enter any data string to obtain a 256-bit hash value. The same data processing works in the same way. The input data is quite uncertain, and the result is unknown. It is straightforward to measure forward. The reverse is particularly challenging to measure. It is considered difficult under current scientific and technological conditions. The double hash tree is shown in figure 2.

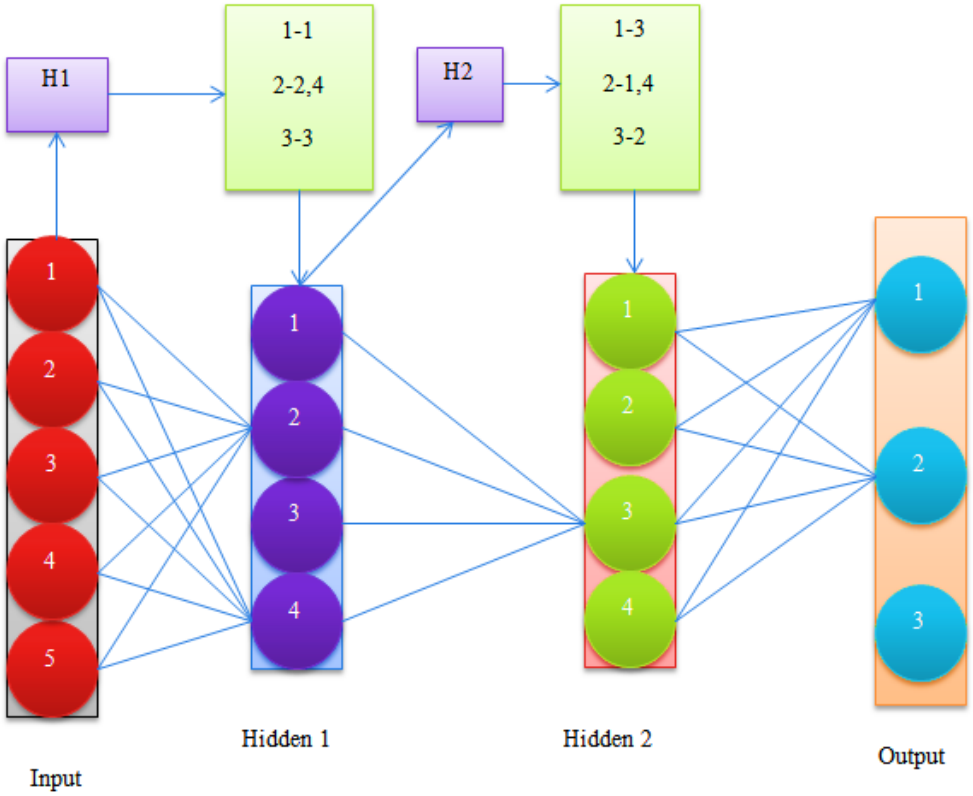

Figure 2: The Fusion deep learning-based hash function

Every machine could operate a complete Bitcoin node, and the entire Bitcoin node would include (1) a wallet that would allow users to exchange over a block network and (2) a complete Blockchain, which tracks the entire transaction history. Specific structures are used to ensure the safety of historical transactions and the authority of new operations; (3) workers develop new blocks through transactions and math issue-free mining. (4) In The routing feature, information from other nodes must be transferred to other nodes. The blockchain node network is shown in Figure 3.

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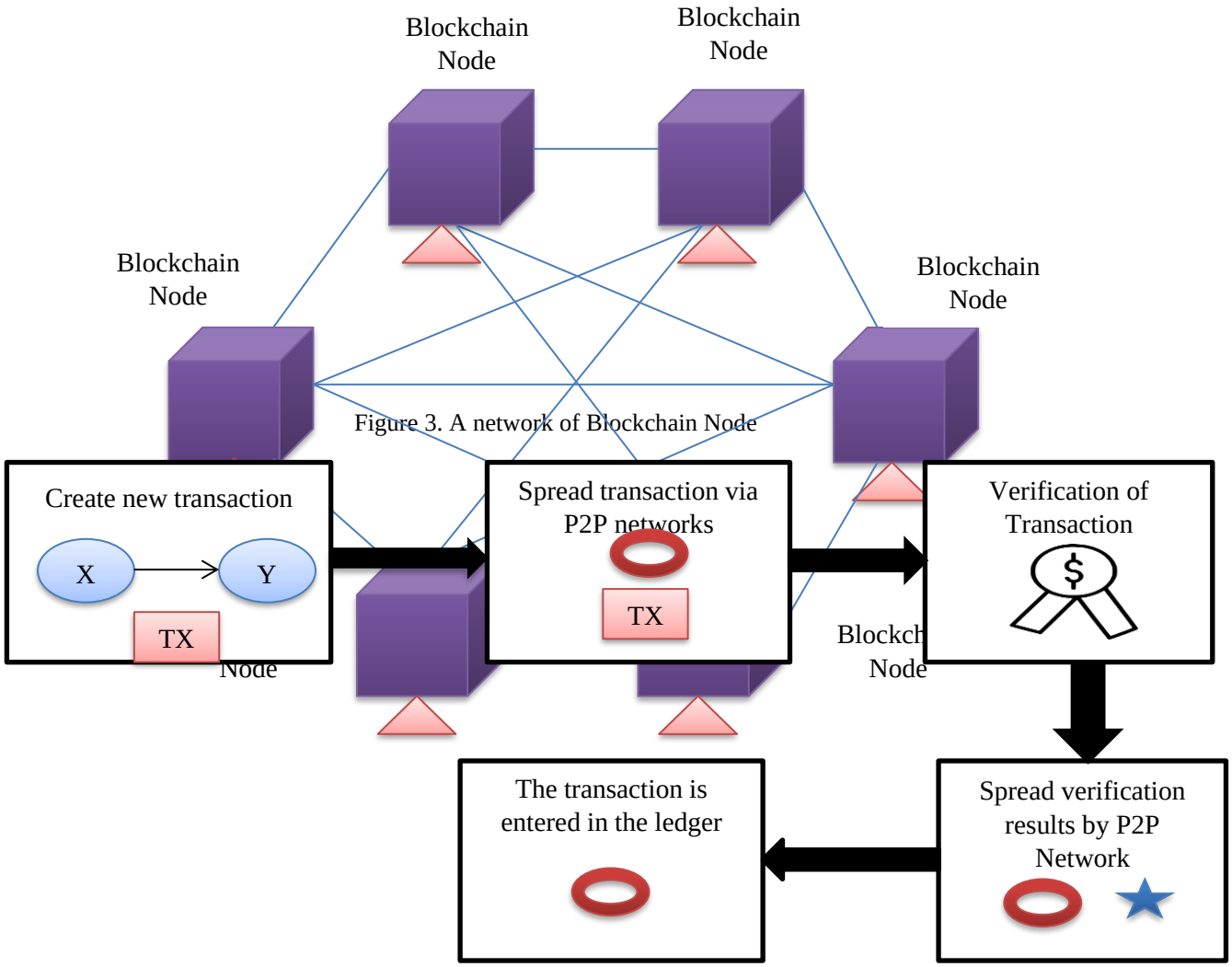

Figure 3. A network of Blockchain Node

Figure 4: Transactions in the Blockchain

As inferred from figure.4., The blockchain network transactions process can be divided into five stages

- Owner X uses his private key to register with a previous transaction data signature (bitcoin source) and signs a contract with Owner Y (public key address of the recipient).
- The connection is distributed across the network, and the Bitcoin has been sent to Y. Each node includes information from transactions received in a block (which can be used after six blocks are confirmed).
- Every node has a right to develop a new block by overcoming a math problem and earning a small coin (the introduction of new Bitcoins).
- If a node finds a solution, it moves the whole network through all timestamp transactions registered. The majority of the system checks the consistency of block accounting and takes place in the next block because there is no error after the correct block. It generates a chain (the approximate weight of five nodes) of legitimate blocks for other nodes.

3.1. Evaluation of the financial risk of the Blockchain

The Blockchain is a data block that produces all signals using a series of encryption methods to track any transaction data that takes place on the block. Hence, a transparent distributed network accounting system may be considered the Blockchain. It is the implementation of P2P Internet finance, end-to-end, and point-to-point financing. The timeline is necessary for details in this credit block. Through the user on Bitcoin, a node in its block network, and all transaction data is stored in the node providing a public ledger backup. Every node's history of transactions is correctly and accurately checked and updated.

In fact, as the amount of transactions increases, various blocks are stored in separate books, and new deal records on the current Blockchain are based on the superimposed design, which in time, can develop a network structure. The conventional centralized payment model includes using finance institutions and third parties to

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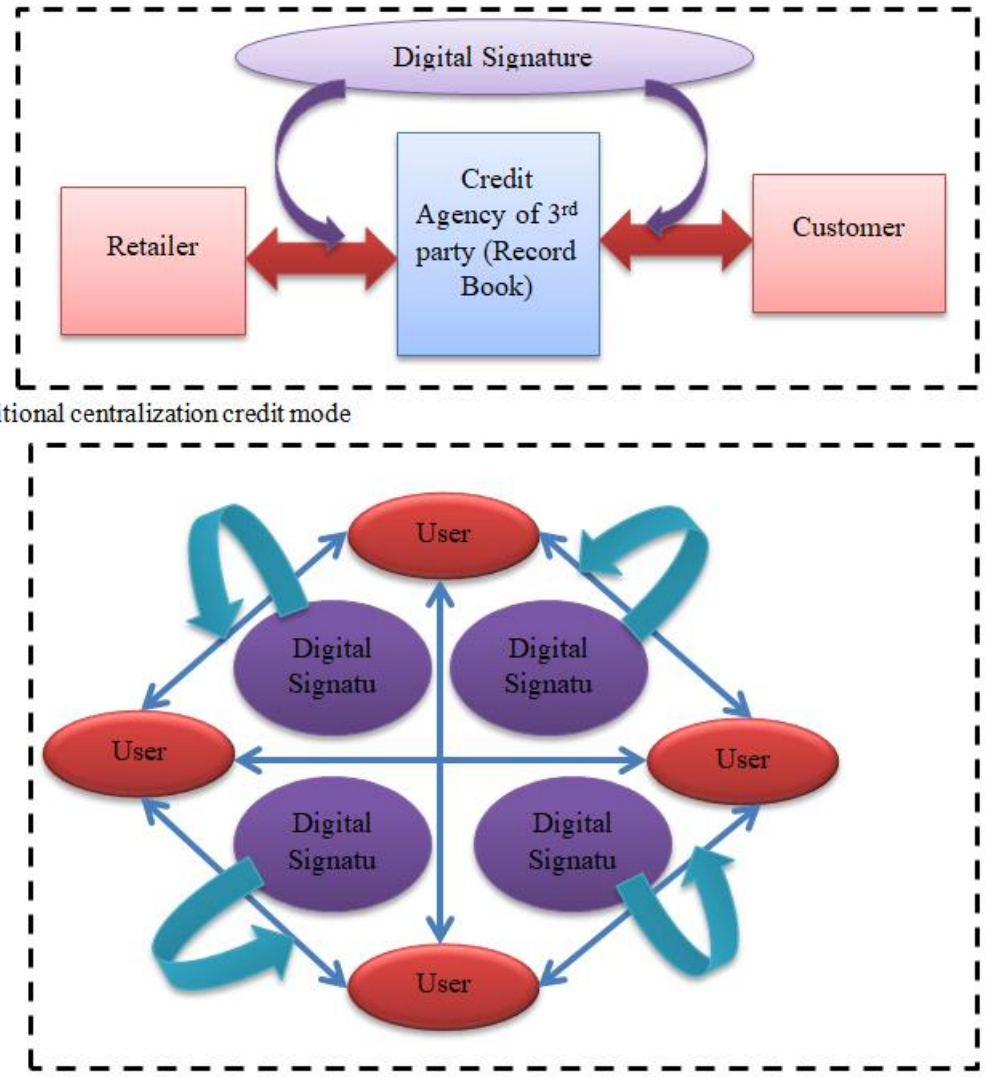
manage details on the credit card in a confidential manner compared to the blockchain network. It provides a secure database through decentralization and peer-to-peer strategy, significantly impacting the worldwide increasing financial market creativity. The distinction between traditional centralization credit mode with blockchain network mode is shown in Figure 5. (a,b)



(a) Traditional centralization credit mode

(a) Blockchain network mode

Figure 5. The distinction of traditional centralization credit mode with blockchain network mode

In conjunction with the accompanying credit risk theory, this paper extracts independent variables based on the details of the credit duration, credit risk plan, credit-to-asset ratio, credit-to-asset ratio, and financial suitability ratio. The bank's consumer price index and scale are used to remove unknown variables without established credit risk management variables. Regression analysis and test hypotheses are used throughout the evaluation of the relationship between credit risk and the efficiency of commercial banks. This paper analyzes the data in the panel using a random effect regression model. The panel data relates to data consisting of many cross-sections taken from various periods and obtained from user results on these interfaces in the same period.

Regression analysis is usually a numerical method of measuring variables. It primarily examines the effect of independent variables on dependent variables. This paper evaluates the panel data using a random effect regression concept. The information consists of numerous cross-sections taken several times and obtained simultaneously from user results on these interfaces. Regression analysis is typically a qualitative approach when dealing with variables. It specifically discusses the effect of independent variables on contingent variables. During the traditional securitization method, creditors have passively accepted the asset details from assets and credit rating agencies, which may risk investors' interest using asymmetrical information. Thus, it proposes two types of securitization between properties and investors.

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3.1.1. Design of Portfolio

Paying of two-asset portfolio P may be described as the theory of portfolio

$$s_p = z_X s_X + z_Y s_Y \quad (1)$$

Where $z_X + z_Y$, z_X, z_Y is the amount ratio of X and Y. X and Y is the ratio of s_X and s_Y. As an example, the optimal portfolio design is intended to optimize utility.

$$z_X = \frac{E(s_X) - E(s_Y) + 0.01X\sigma_Y^2}{0.01X(\sigma_X^2 + \sigma_Y^2)} \quad (2)$$

$$z_Y = 1 - z_X \quad (3)$$

X indicates a coefficient of risk tolerance. Variance σ calculates the probability of maturity return on assets. σ_X and σ_Y indicate asset A's and asset B's default risk. Additionally, optimal investment design is structured to minimize risk.

$$z_X = \frac{\sigma_Y^2}{\sigma_X^2 + \sigma_Y^2} \quad (4)$$

$$z_X = \frac{\sigma_X^2}{\sigma_X^2 + \sigma_Y^2} \quad (5)$$

Let Q be the portfolio size, H be the portfolio value, d be the portfolio interest for each period, k become the path to maturity, and n be the time over which interest is exceeded. It may estimate potential payout using the cash flow analysis method:

$$Q = \frac{d}{(1+k)} + \frac{d}{(1+k)^2} + \cdots + \frac{d}{(1+k)^n} + \frac{d}{(1+k)^{n+1}} \quad (6)$$

The actual cost of capital is $d(1-\sigma)$ since there is a default asset risk.

3.1.2. Asset Analysis of Blockchain Securitization

The asset retains security Y and earns the creditor's interest. Investors collect interest sp while creditors provide a potential cash flow su. Let (G_{11}, H_{11}) determine the return on investment and assets:

$$G_{11} = p_Y s_Y + z_X s_X(u_X - s_X) + z_Y s_Y(u_Y - s_Y) \quad (7)$$

$$H_{11} = z_X s_X p_X + z_Y s_Y p_Y \quad (8)$$

Security Y retains assets. Each investment with an increased interest rate i is used by investors as $(z_X p_X + z_Y p_Y)$ cash. The payoff of Asset and Investor (G_{12}, H_{12}) is:

$$G_{12} = p_Y s_Y \quad (9)$$

$$H_{12} = i(z_X p_X + z_Y p_Y) \quad (10)$$

Security Y retains assets. Here, Each investment with an increased interest rate i is used by investors as $(z_X p_X + z_Y p_Y)$ cash. The payoff of Asset and Investor (G_{21}, H_{21}) is:

$$G_{21} = z_X s_X(u_X - s_X) + z_Y s_Y(u_Y - s_Y) \quad (11)$$

$$H_{21} = z_X s_X p_X + z_Y s_Y p_Y \quad (12)$$

Assets are secure, and Each investment with an increased interest rate i is used by investors as $(z_X p_X + z_Y p_Y)$ cash. The payoff of Asset and Investor (G_{22}, H_{22}) is:

$$G_{22} = 0 \quad (13)$$

$$H_{22} = i(z_X p_X + z_Y p_Y) \quad (14)$$

3.2. Online Intelligent Framework for consumer finance based on Blockchain

There is numerous research on how to securitize the Internet's consumer financial assets, risks, and values. Here, a few surveys are conducted in conjunction with the use of the Blockchain to securitize the Internet's consumer financial assets. Only a few papers in the literature studied the value of Blockchain in asset securitization, particularly in a mix of blockchain securitization and customer financial assets. Based on blockchain technology, this study analyzes the existing situation and Internet problems in the securitization of financial assets for consumers, demonstrates that blockchain technology develops cooperative protection mechanisms for securitizing Internet financial assets for consumers and creates Internet securitization of consumer items via Blockchain.

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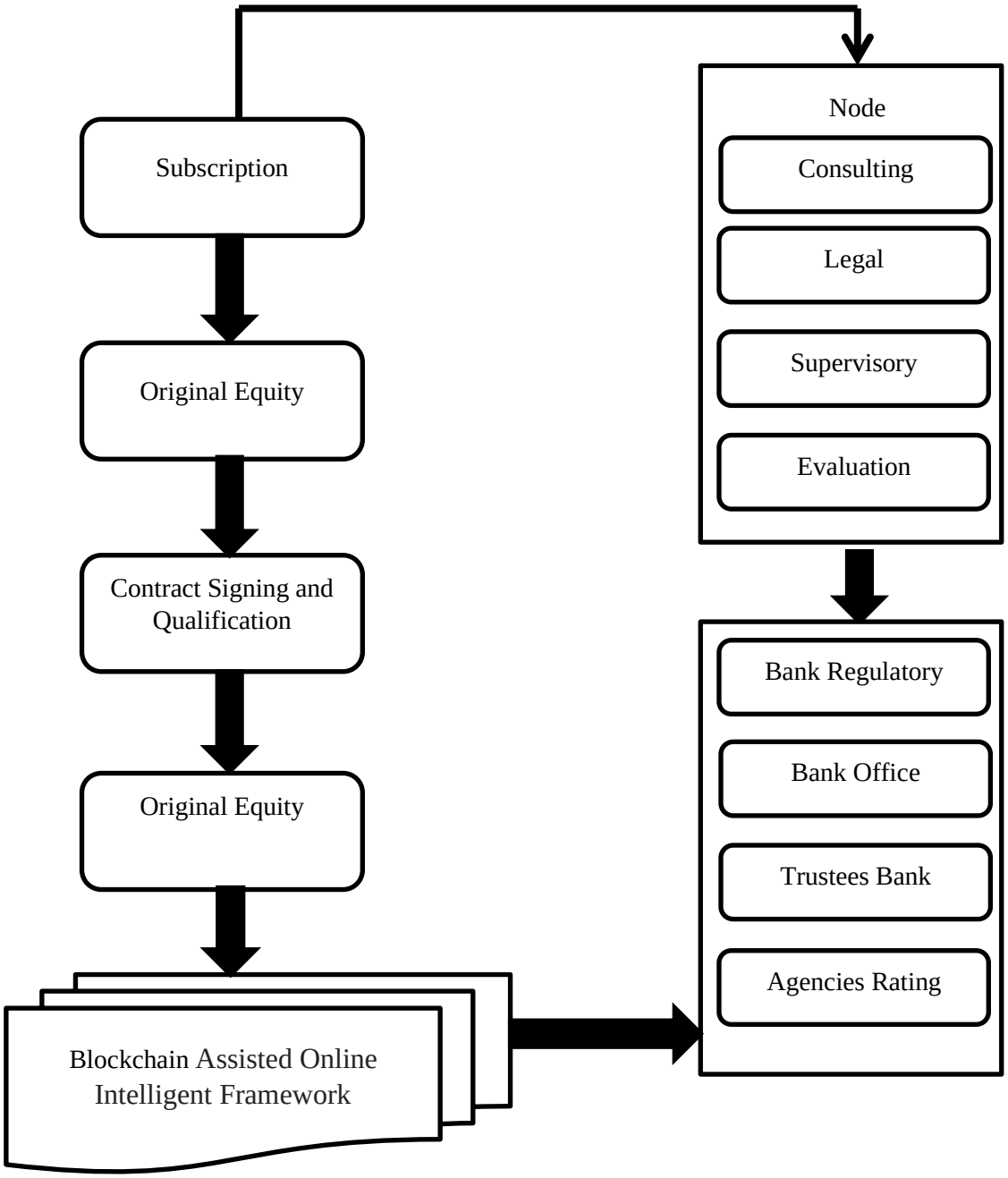

Figure 6: Online Intelligent Framework for consumer finance based on Blockchain

A significant portion of current financial transactions focuses on 'centralized' financial media and trade media, which contribute to the cost of credit in business transactions. Based on blockchain technologies and principles, this paper describes a transaction model utilizing blockchain attributes such as "non-authorization and decentralization" to reduce the credit risk and involvement in the entire Internet financial asset securitization framework. The Internet digital financial asset securitization structure is classified into three separate levels. The lowest layer is a blockchain network comprising a transparent, distributed, general rule network of exchanges or trading platforms.

In the middle layers, the business theory and Blockchain are merged, and the main functions, such as accounting, legal relation, monitoring and appraisal nodes of the account center, asset monitoring, credit evaluation, and network payment, are specified in Figure 6. It demonstrates the customer's high-level company can conclude the securities business and run the asset support plan on the connection. At the same time, an online system has about a million records. Due to the reversed data docking feature, the collection and retrieval of the computer have improved. There are several exchange networks between the major parties, which

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contribute to more problems, including assets clearance and reconciliation, which therefore require a large number of resources

Any blockchain node will verify the book's integrity and credibility to ensure the transaction records' consistency and security. Since any node in the chain contains the transaction details, the information is found in a few more nodes in the Blockchain and updated the data automatically. If transaction data in the block network are modified, approximately 55% of network processing power must be considered. If the modification is efficient, the fact that the cost of change much exceeds the expected benefits will eventually proceed in an unfortunate situation.

4. Results and Discussions

The simulation analysis is performed, and the design of an encryption algorithm is carried out by way of simulation to check the efficiency of the application in data protection encryption on the social network.

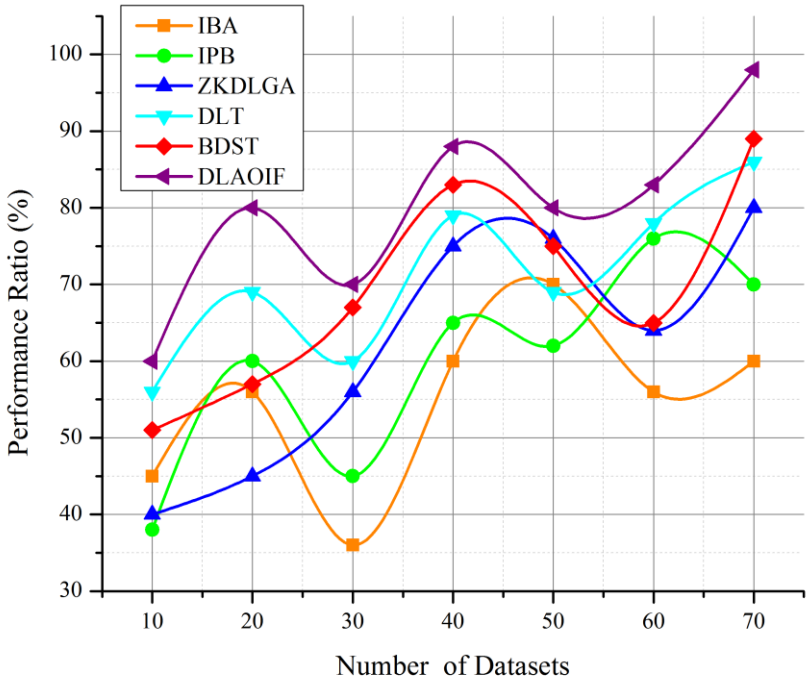

Figure 7: Performance Ratio

The costs and delays might not be necessary for specific companies; here, the securitization sector generally has low default rates and may often obscure the potential risk of incorrect and late information in most private asset classes. For example, suppose another slowdown with losses and volatile portfolio performance. In that case, service managers need to review decades of thousands of individual loans stored in various locations and formats, in which residential loan problems may be monitored and resolved. Figure 7 shows the performance ratio of the proposed DLAOIF. The proposed DLAOIF performs better than other traditional methods such as IBA, IPB, ZKDLGA, DLT, and BDST.

Blockchain uses sophisticated encryption with cryptographic techniques and algorithms to encode securely, transfer, and process information to ensure the data and transactions between various node's reliability. The speed at which blockchain technology transactions can be processed and registered may exchange inefficiency and security management. Trust in the reliability and accuracy of details offers greater certainty and level of payment in the whole securitization sector. Figure 8 shows the reliability ratio of the proposed DLAOIF. The proposed DLAOIF has a better reliability ratio than traditional methods such as IBA, IPB, ZKDLGA, DLT, and BDST.

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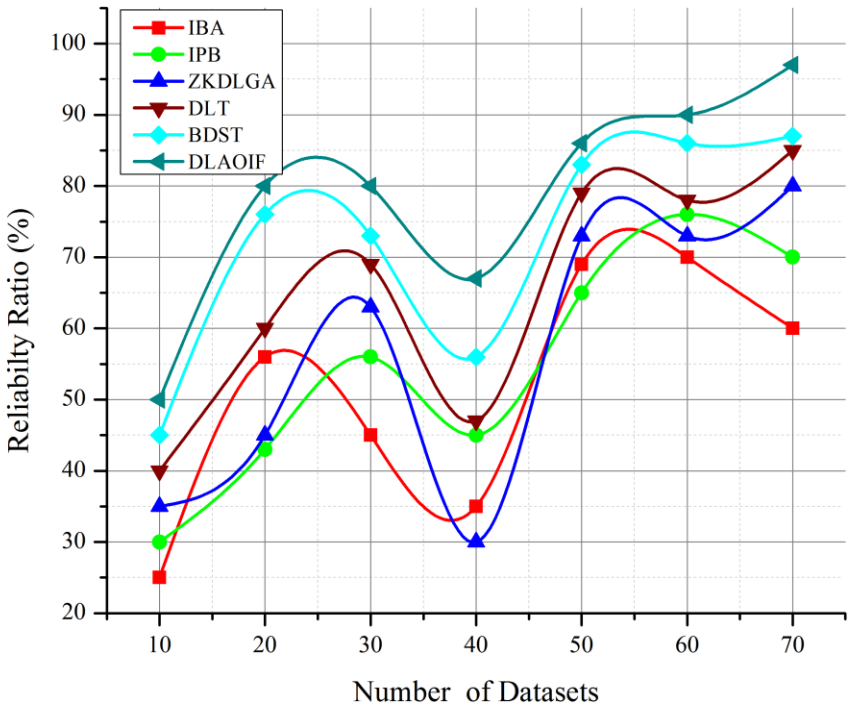

Figure 8: Reliability Ratio

The Blockchain, or "distributed ledger system," more formally defined, has the ability, as seen by the growth of a wide variety of FinTechs, to revolutionize aspects of the financial service industry. Formal finance is one of the ways in which blockchain technology can be utilized to minimize storage and processing expenses, create data management efficiencies and improve financial efficiency through securitization from the origination of assets through secondary trading. This paper looks at some of the advantages of the securitization industry by implementing blockchain technology. The role of Blockchain in providing a centralized, reliable repository of knowledge for everyone will significantly minimize inefficiencies and costs, further promoting the monetization of currently highly leveraged long-term financial assets. Figure 9 shows the efficiency of the proposed DLAOIF. The proposed DLAOIF has better ability than traditional methods such as IBA, IPB, ZKDLGA, DLT, and BDST.

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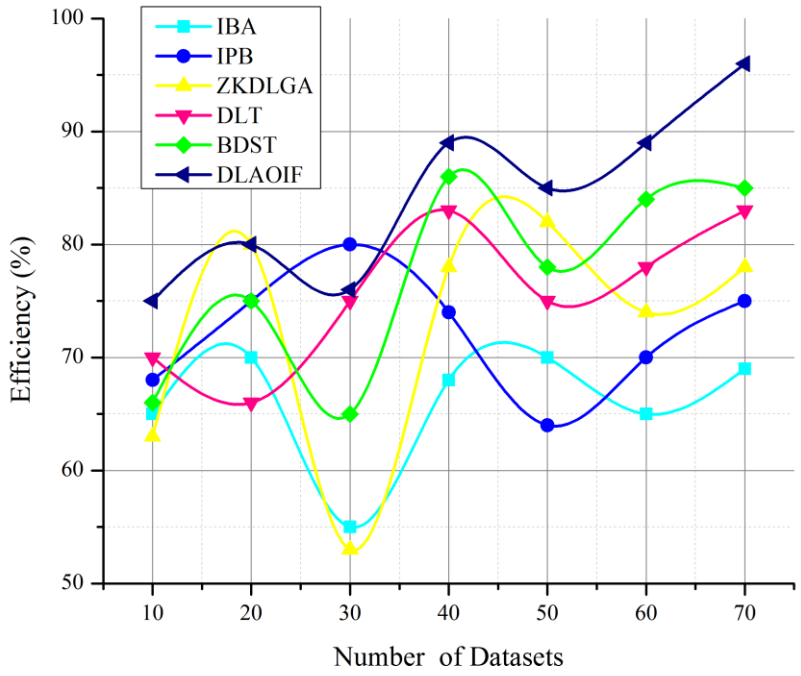

Figure 9: Efficiency ratio analysis

With several applications of this technology already in use, blockchain technology is rapidly emerging. However, those attributes underpin the system and remain in all the various iterations. Without the need for the trusted broker to continue and record all transactions, Blockchain technology provides an intangible and secure, open, and automatically correct transaction management system. The decentralized design of the network makes it much more reliable than a single authority database. It enables smoother transaction handling because this system integrates the idea of empirical 'consensus' for the validity and accuracy of transactions. Figure 10 shows the accuracy ratio of the proposed DLAOIF. The proposed DLAOIF has a better accuracy ratio than other traditional methods such as IBA, IPB, ZKDLGA, DLT, and BDST.

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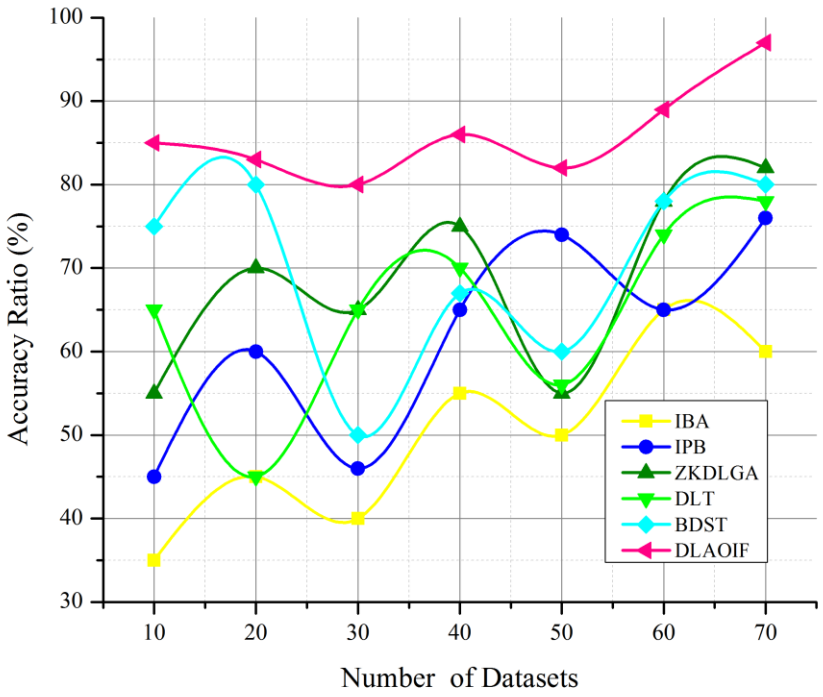

Figure 10: Accuracy Ratio determination

The ability to control access to approved blockchains through reading and writing allows it to be suitable for securitization. The details accessible to customers can vary from what the authorities, borrowers, shareholders, or credit rating agencies have available. This instance will allow regulators to obtain access to all blockchain details while investors can access the required information. This ability to grant regulators broader access rights is even more relevant because of continually growing compliance criteria in this sector. Figure 11 shows the intensity ratio of the proposed DLAOIF. The proposed DLAOIF has a better intensity ratio than other traditional methods, such as IBA, IPB, ZKDLGA, DLT, and BDST.

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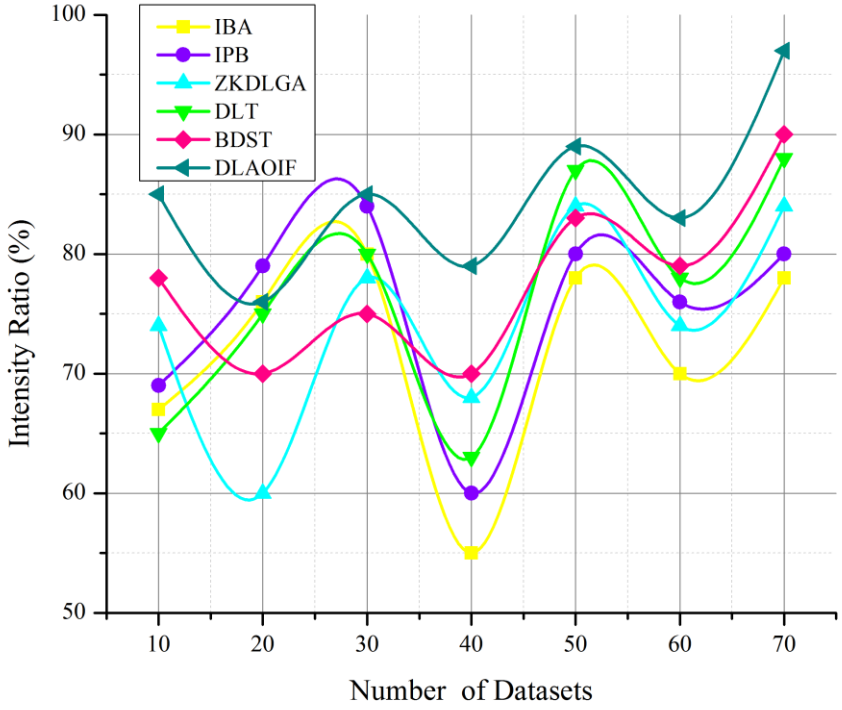

Figure 11: Intensity Ratio analysis

Based on the above discussion, the deep learning-based Adaptive Online Intelligent Framework (DLAOIF) achieves better performance in securitization. The benefits can be significant, from reduced costs, time, and fraud risks to increased safety, trust, and accuracy.

5. Conclusion

Blockchain technologies and conventional intermediaries of securities should not be antagonistic compatible. It can support the real economy and maintain the financial industry through development and support research. This paper discusses the possible benefits of Blockchain during the securitization process using the Deep learning-based Adaptive Online Intelligent Framework (DLAOIF). From reduced expense, time, and fraud costs to better protection, efficiency, and accuracy can be significantly beneficial. Tracking financial assets on a blockchain can reduce credit-rated organization dependence and enable investors to closely monitor asset performance and associated risk. Blockchain technology allows point-to-point investor transactions, decreases dealer trading costs, and improves the Internet sector accessibility for the securitization of customer financial products.

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