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Retraction

Retracted: Regulatory Mechanism of Financial Market Resource Management Driven by Big Data

Mobile Information Systems

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This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of systematic manipulation of the publication and peer-review process. We cannot, therefore, vouch for the reliability or integrity of this article.

Please note that this notice is intended solely to alert readers that the peer-review process of this article has been compromised.

Wiley and Hindawi regret that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] W. Xie and J. Cao, "Regulatory Mechanism of Financial Market Resource Management Driven by Big Data," *Mobile Information Systems*, vol. 2022, Article ID 4339456, 12 pages, 2022.

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Research Article

Regulatory Mechanism of Financial Market Resource Management Driven by Big Data

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In order to further understand the current situation of the financial market and better supervise the resource management of the financial market, combined with big data and cloud computing technology, through the construction of big data cloud platform resource management system and the integration of various technical computing frameworks, we can realize the effective supervision of big data resources in the financial market. Using J2EE technology, this paper analyzes, designs, implements, and tests the investment data management system, analyzes the content of the software engineering subject, and obtains the demand function description of the business. According to the software development process and the actual situation of enterprise investment, this paper expounds the basic requirements of the investment data management business, system architecture requirements, user use case status, and the operation and configuration environment of the investment data management system. This paper analyzes the technical characteristics and operation indicators of the software, and establishes the data flow for the data related to investment data management, such as information statistics, data query, information classification and so on. Finally, the system is verified, operated and tested, and the business use cases and parameters of the system are tested according to the two indicators of software testing. The basic functions of the investment data management realized by the system are correct, the design is reasonable, the operation is stable, the operation response time is short, the operation accuracy is high, and the data access efficiency is good.

1. Introduction

Today, with the advent of the information network era, data and information are becoming more and more important, especially for all areas of life. The understanding of big data directly affects the development of an enterprise or industry. With the advancement of communication and dataization, the integration of finance and big data industries in the new economic era is crucial. The emergence and continuous improvement of big data can increase the transparency of financial markets. With the help of new technologies such as big data and cloud computing, financial services can discover more important and useable data from big data and enhance this data to promote the health of the financial system. At the same time, big data can support research on Internet business management and financial markets, help financial markets achieve greater influence, better avoid business risks, and improve the performance of financial service businesses [1]. However, with the continuous increase of financial market resources, especially the fact that more and more idle funds of the public are handed over to financial institutions for asset management, the supervision of financial institutions is becoming more and more important. Under the dual influence of internal and external regulatory policies and regulators, the financial market urgently needs to strengthen the construction of resource management and supervision mechanism, as shown in Figure 1. Based on this, the article combines big data and cloud China technology to achieve better management of big data in the finance industry and maintain multi-inclusive management and integration by creating a big data cloud platform experience. At present, the research and discussion

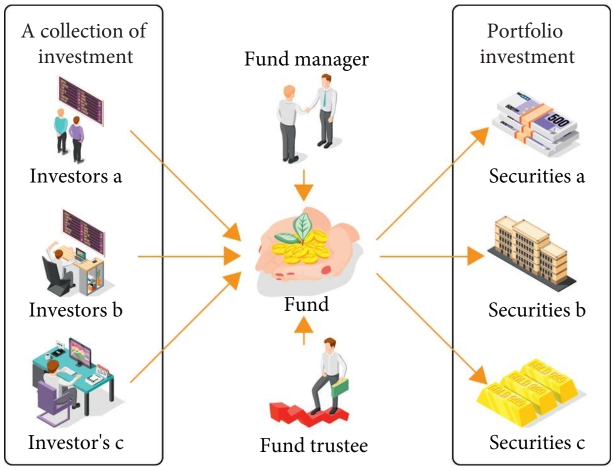

Figure 1: Financial market resource management.

mainly focus on restricting the investment of asset management business in nonstandard business. The system recently introduced at the regulatory level also reflects the opinions and clear attitude of standardizing nonstandard asset investment [2]. At present, the development trend of the financial industry is mixed operation and financial innovation. Nonstandard assets have played an important role in activating the financial market, enriching financial instruments and serving the investment and financing of the real economy. The return to simplicity can only be relative, and the return to simplicity of financial derivatives is completely inconsistent with the reality of development.

2. Literature Review

Huang et al. [3] studied the investment system of enterprises and made some achievements in the research process [3]. Sultanaw et al. [4] put forward the theory of "reference design model" for the investment management system in South Korea. The theory adopts a strategic way to sort and manage the investment information, and handles the information security problems in the task of the management system through effective means. It forms a unique theory for the actual investment management system [4]; Phiboonbanakit and Horanont [5] solved the demand analysis of investment management system, improved the quality of system analysis report from the aspect of reliability, combined analysts and business personnel, and eliminated some obstacles between them [5]. Qu [6] believed that the essence of the model is based on the "cooperation mechanism." Process capital analysis can solve existing problems and solve problems in investment management level assessment from the perspective of cooperation and collaboration [6]. Yan et al. [7] said that the investment management system is carried out around services, through high-quality services, shaping and strengthening a good public image of investment, creating a favorable public opinion environment, striving for favorable investment policies, and finally realizing the long-term development of investment management [7]. Watson et al. [8] believed that the investment management platform, as an important part of digital investment, is a scientific management guarantee for realizing investment, involving all links and multi-level comprehensive application of investment management. The investment management system with scientific management as the core, effectively supports the implementation of digital enterprises, improves the management efficiency of enterprise parks, and becomes an irreplaceable platform for investment management of enterprises [8]. Hyers [9] said that for capitalist countries, the main goal of market supervision is simple and clear, that is, to maintain market order by relying on mandatory laws, systems and norms, and its market supervision behavior is controlled by the nature of capitalism. Therefore, with the development of capitalist market and the change of government functions, there are various studies on market supervision [9]. For example, Connolly Barker et al. [10] believed that market regulation is the comprehensive control of various factors in the market by the government in order to ensure social stability and sustainable economic development, to standardize market behavior, and to ensure orderly operation of the market and maintain stable economic development [10]. Keane et al. [11] said that market regulation is a passive government behavior. Since the market cannot spontaneously maintain good order, the government needs to participate in regulation. Therefore, market regulation must have mandatory elements. With the continuous development of the market, the market supervision implemented by the government must achieve dynamic follow-up, that is, the government supervision can meet the needs of market development [11]. Guan et al. [12] believed that if the market supervision implemented by the government cannot meet the needs of the current market, it will lead to the lack of supervision in some supervision and many problems; although the government's market supervision comprehensively includes market factors, if the supervision is too frequent, or even the supervision strength exceeds the market bearing capacity, it will restrict the benign self-development of the market to a certain extent [12]. Maddumala et al. [13] said that the characteristic of market supervision is that functional departments not only supervise in accordance with relevant laws and regulations, but also manage all aspects and links in the market. Due to the characteristics of socialist economy, the government also supervises its own market behavior to comprehensively ensure the stability and order of the market [13].

Based on this research, this paper proposes a regulatory mechanism based on big-data-driven financial market resource management. In this paper, using the J2EE technique, analyzed, designed, implemented, and tested the investment data management system, to analyze the content of the software engineering project, get the business requirements function description, based on the software development process, according to the actual situation of enterprise investment, the basic requirements of the investment data management business, the system architecture requirements, the status of the user use case are expounded. For the operation and configuration environment of the investment data management system, the technical characteristics and operation indexes of the software are analyzed, and the data related to investment data management, established the data process, such as information statistics, data query, information classification, and other contents, at last, verify the running and tested the system, according to the two aspects of the software testing indicators, service case and parameters of the test system. The basic functions of the system are correct, with reasonable design, stable operation, short operation response time, high operation accuracy, and good data access efficiency. The test results show that the investment data management system of the investment enterprise operates normally, and the various operating parameters of the software meet the design requirements and software engineering standards.

3. Design of Supervision Platform for Financial Market Resource Management

3.1. System Functional Requirements. According to the construction objectives, the basic functions of the investment data management platform are shown in Figure 2 below.

(1) Design the enterprise basic information management module, the main functions are: manage the basic situation of the enterprise, list statistics of subordinate enterprises, and manage the basic business of the enterprise;

(2) Management and investment project information module: manage high-risk financial investment projects, foreign investment projects, and fixed asset investment projects;

(3) The investment summary and analysis module includes enterprise basic information summary, foreign investment project summary, and fixed asset investment project summary;

(4) Management of investment implementation: quarterly progress of major projects, annual implementation of projects, annual implementation of fixed asset investment projects, foreign investment projects, and high-risk financial investment;

(5) Statistical risk data, investment risk management module shows the risk of investment projects;

(6) The system login module provides user login. At the same time, only the system administrator can add, modify, and delete business operators. The system administrator can only add from the database [14].

3.2. System Use Case Status. Use case diagram is a key factor in the software development engineering. It reflects the relationship between all users and system business functions in a system. The drawing of use case diagram will clearly reflect the operation permissions of different users, as shown in Figure 3.

The administrator of the investment data management system can handle the following businesses in the system: managing investment risk, managing investment project information, managing enterprise information, managing system data, managing investment execution, user login, investment summary, and analysis, etc., The investment user of the investment data management system can handle the following businesses in the system: management of investment risk, management of investment project information, management of enterprise information, management of investment execution, user login, investment summary analysis, and other permissions [15].

3.3. System Data Flow Requirements

3.3.1. Top Level Data Flow. As shown in Figure 4, the top-level data flow is designed to display the data interaction process and reflect the investment data management system. The main business data processed are: investment execution data, project risk basic data, enterprise basic data, investment project data, and user basic data. The data flow fully shows the flow direction of system design.

3.3.2. Query Data Flow. As shown in Figure 5, the data information of the investment data management system for investment enterprises mainly deals with the query data, including project risk data, investment department data, system user data, and investment execution data. Through the query flow chart, the final query flow direction of the investment data is the storage table of the database, which is the main feature of an information management system [16].

3.3.3. System Login Data Flow. As shown in Figure 6, the user login process of the investment data management system is established, and the window provided for user login is displayed on the operation interface. In the test process, input their own login information first. After confirming that the information is input correctly, operate the "login" button below. The interface program will analyze whether the user information exists and verify their user identity. The test shows that if the login information is operated correctly, the main interface of the investment data management system will be opened, otherwise, the interface with error message will appear.

3.4. Overall System Design

3.4.1. Network Structure Design. Since the design should meet the actual needs, the solution of the investment data management system of the investment enterprise should realize the management and analysis of the investment data management information when designing the investment data management system, and the selected network equipment should meet the requirements. This is a relatively advanced model in the industry and is composed of the data network system [17]. The manager manages the data in the database. For the network products widely used in the world, when selecting the products of internationally well-known manufacturers and designing the network equipment of the investment data management system, the principle of safety, stability, and reliability shall be followed to ensure the smooth implementation of investment data management.

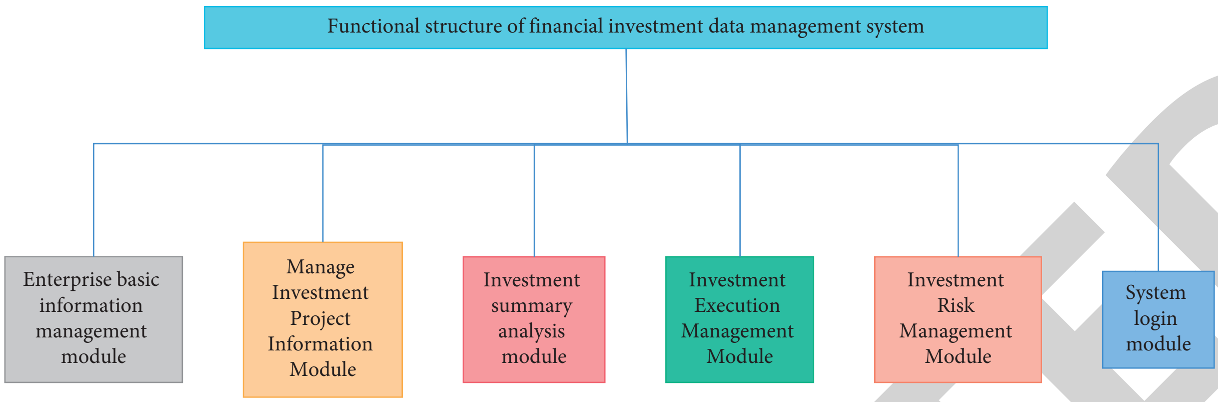

Figure 2: Functional structure of financial investment data management system.

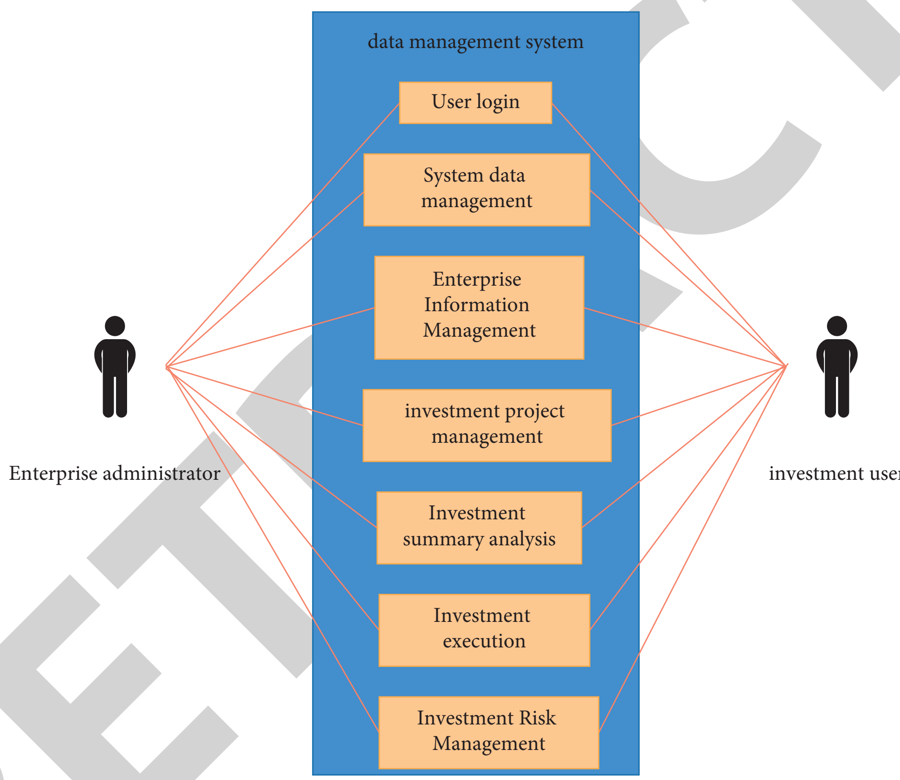

Figure 3: Use case diagram of financial investment data management system.

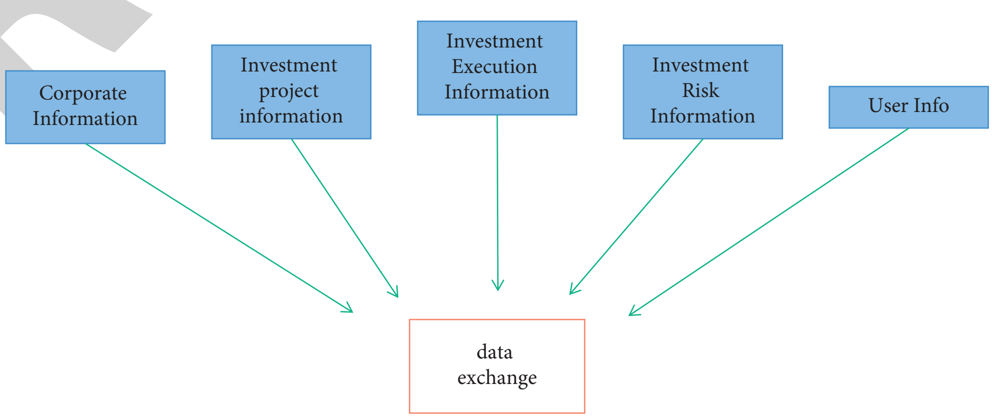

Figure 4: Top level data flow diagram of financial investment data management system.

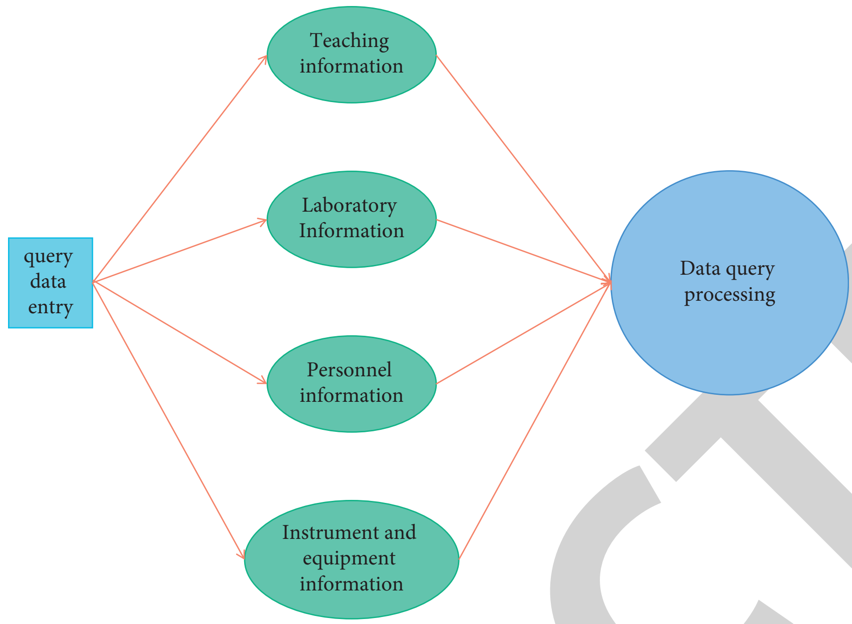

Figure 5: Data flow diagram of data information query.

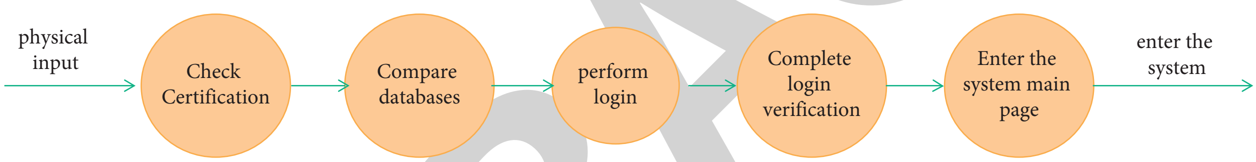

Figure 6: System security access data flow diagram.

The investment data management business data takes the front-end switch as the buffer library, integrates the data into the central database through the data exchange platform, accesses all hosts to the server in the internal LAN, and accesses the system with the external Internet. VPN technology can be used on the Internet. For users without an external network, the data center is deployed on the external network of the enterprise. The resources of the investment data management data center can be accessed safely through the Internet network, and the users of the network can access in the same network [18]. The remote control of the client can be realized through the network data exchange. The investment data management system of the investment enterprise can actively initiate the connection to the network and has the wired communication function between the server and the client. It can obtain the current system status of the client and the data of the investment data management business in real time, so as to realize the controllability of the whole investment data management information transmission process.

3.4.2. System Function Structure Design

(1) First, Software Data Layer. Data layer maintenance is the application-oriented data existing in the system. Through the storage medium, the system-related information is stored in a certain medium and saved in a regular way. The upper end of the system can carry out various effective operations on the information in the database through the program software, so as to achieve the business function, data storage, and data access of the client of the investment management system. Its main core operation is the input and output of data. If these two points are handled well, the business function of a management system can be handled accurately [19]. In the investment data management system studied in this paper, various tables of relevant data are stored in the database environment. The client can call and access the information of enrollment management, plan management, personnel management, and so on.

(2) Second, Software Middle Layer. In the investment data management system of investment enterprises, in addition to the traditional data storage mode, the database access middleware technology is also designed and used. A layer of middleware system is designed between the database and the logic layer. Its main function is to quickly connect the business layer and the database. Through the connection of this interface, the encapsulated function events will be called when the data is input and output, which reduces the programming of the program end. It also improves the data transmission efficiency and realizes stable high-level applications in the process of communication interaction. It is of great value for maintaining, transplanting, and upgrading the management system in the future expansion [20].

3.4.3. Software Presentation Layer. In the business layer, the interface of software client is designed and developed through J2EE technology, and the operation code is programmed. According to the design of investment data management module, the management function is designed in detail. According to the business needs, the enterprise network is established: investment summary and analysis module, investment project management module, investment risk management module, investment execution module, data management module, user login module, enterprise information management module, etc., As shown in Figure 7.

3.4.4. Risk Management Module. The design of investment project risk management function is shown in Figure 8. By analyzing the risk data existing in the implementation of the investment project, the risk problems that have been handled can be updated and deleted. The system user can add, view, analyze, and process the risk data of the investment project. The function of data binding, display, management, and maintenance of investment project risk realizes the maintenance of the investment risk data.

Realize the data update, as shown in Figure 9. Execute the update operation, enter new data in it, and update the data through the inputable dialog box after completing the input.

According to the security strategy of hierarchical protection and combined with the characteristics of management business, the community management system should be divided according to the construction of security protection system of each security domain, external network platform domain, and internal network platform domain [21]. The terminal machine room shall ensure safety and security: fire prevention, anti-theft, dust prevention, waterproof, anti-static, and anti-power failure. The security system design of the investment data management system follows the security system model. Under the guidance of the unified hierarchical protection security strategy, the security system design of the whole online management platform is divided into several important contents, such as the construction of security technology security system, emergency response system, and security management security system. The construction of security technology guarantee system includes security infrastructure (including unified authentication, password service system, trusted timestamp service system, etc.,), and security service system (monitoring and detection system, etc.,). The construction of emergency response system includes emergency response objects, processes, institutions, and other aspects. The construction of safety management guarantee system includes organization, system, management means, safety audit, and so on.

4. Key Technologies of Resource Management for Big Data Drive

4.1. Big Data Platform Computing Framework. There are many computing frameworks for different scenarios of big data processing, including MapReduce parallel computing model, spark memory computing framework, and some streaming computing frameworks. MapReduce parallel computing model is mainly used in large-scale batch computing scenarios. Due to its poor performance in iterative algorithms, spark memory computing framework appears. Spark memory computing framework greatly improves the performance of data mining and machine learning algorithms [22]. The streaming computing framework mainly deals with the application scenarios with strong real-time and interactive requirements. Different computing frameworks have their own advantages. A large-scale system often faces a variety of application scenarios, and a variety of computing frameworks can play their respective roles. This paper mainly uses MapReduce parallel computing model. Traditional parallel computing models include data parallel model and message parallel model, data parallel models such as HPF and message passing models such as MPI and PVM. When using the traditional parallel computing model to write programs, users need to intervene in the division of data and the synchronization of tasks and the burden of programmers is heavy. In order to reduce the programming difficulty of parallel processing massive data, MapReduce program can run on a cluster composed of cheap commercial machines because it does not care about the performance of a single node and has high fault tolerance [23]. MapReduce parallel computing model shields the detailed implementation of the underlying parallel program. Users only need to use map function and reduce function to define their own business processing logic, which is simple and easy to learn, freeing programmers from the heavy burden of traditional parallel programming model, and greatly promoting the development of massive data processing and analysis ability.

4.2. Joint Optimization of System Resources

4.2.1. Virtual Machine and Physical Server Model. This paper assumes that CP provides a total of K different types of VMs, where $k \in k := \{1, 2, \ldots, K\}$ represents the k type of VM. Each type of VM is preset with different types and quantities of resource requirements, such as CPU, memory, and hard disk, and $g(k)$ is used to represent the demand for VM resources of type k. In addition, this chapter assumes that there are m physical servers in the DC, and the resource capacity of each physical server $m \in M := \{1, 2, \ldots, M\}$ is denoted by $c\ (m)$.

4.2.2. Virtual Machine Request Model. It is assumed that there are a total of H different types of VM requests arriving, and each request type $h \in H$ corresponds to different types and quantities of VMs. At the same time, this chapter assumes that the number of different types of VMs required by each VM request is randomly distributed and independent of each other, and uses $r\ (l, k)$ to represent the number of VMs of type k required by VM request l. Therefore, the total resource requirement of VM request l can be expressed by formula (1):

$$r_l = \sum_k r(l,k) g(k). \quad (1)$$

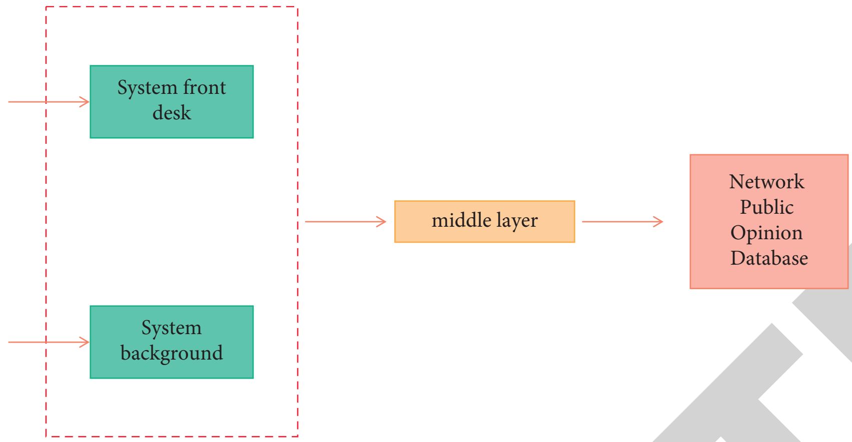

Figure 7: Overall functional architecture of the system.

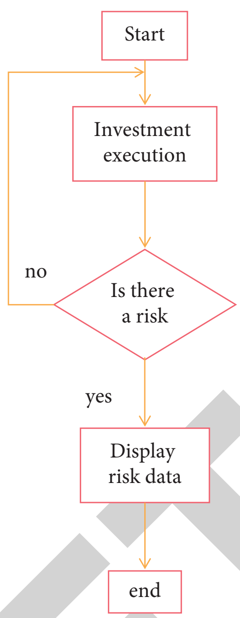

Figure 8: Risk management operation process.

4.2.3. Income Model. Usually, the CP will bring certain benefits for each VM request it receives. This chapter assumes that instantiating a VM of type k can bring $p(k)$ to CP per unit time. Although the CP can actively reject some VM requests so that there are enough remaining resources to accommodate subsequent VM requests with higher revenue value, rejecting VM requests will still bring certain negative impacts to it, such as affecting its reputation, etc., [24] Therefore, this paper introduces a "penalty" mechanism to characterize the indirect loss caused when the CP rejects a VM request, and uses $\varphi(k)$ to represent the unit time loss caused by the CP rejecting a VM of type k. Thus, the actual benefit that CP obtains from VM request l can be expressed by (2) and (3):

$$R(l) = \sum_{k} \rho(k) r(l,k) \tau(l). \tag{2}$$

means l is accepted

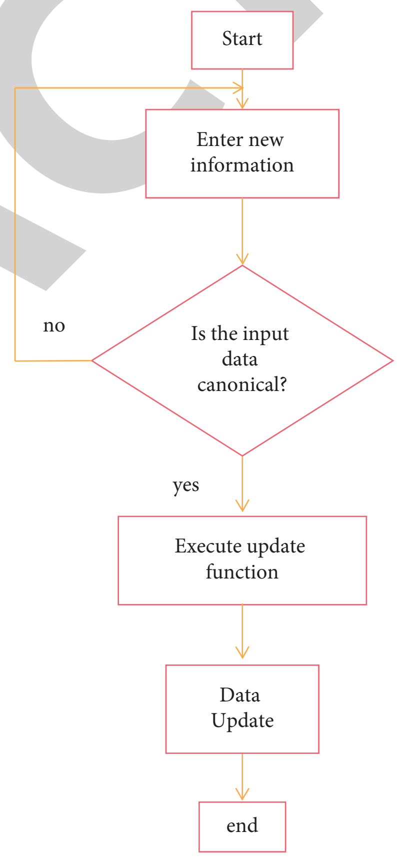

Figure 9: Risk data update operation flow chart.

$$R(l) = -\sum_{k} \rho(k) r(l,k) \tau(l). \tag{3}$$

means l is rejected.

4.2.4. Virtual Machine Request Joint Optimization Decision Making Problem. The core problem of the joint decision optimization of VM access control and resource allocation is to design a strategy that can evaluate the impact of the current resource allocation decision on the future resource utilization and the potential benefits of CP, so that the comprehensive optimization decision that is the most conducive to improve the long-term benefits of CP can be selected for the currently arrived VM requests. Therefore, under the joint optimization strategy, for any VM request that arrives, CP needs to consider whether it needs to be accepted and how to allocate resources to it after acceptance, and judge the probability of resource blocking or resource waste by quantitatively evaluating the impact of this decision on subsequent decision-making. Maximize the benefits of the final decision [25].

4.3. Joint Optimization Problem Modeling Based on Markov Decision Process. When the system is in any state SL, the CP determines the decision corresponding to the VM request of type h currently arrived. Therefore, for any specific system state SL, as shown in formula (4):

$$\pi(s_l) = a_l \in A(s_l). \tag{4}$$

Each decision a_1 includes whether to accept the current request l and the corresponding resource allocation strategy. Therefore, a_1 can be expressed by formula (5):

$$a_l = \begin{cases} (1, \overline{a_l}), & l \text{been accepted}, \\ (0, \overline{0}), & l \text{be rejected}. \end{cases} \tag{5}$$

The goal of VP problem is to design an optimal decision function π^*, so as to maximize the expected discounted revenue (EDR) of CP in a long time, as shown in (6):

$$\max R_{s_0}^{\pi} = E_{s_0}^{\pi}\left\{\sum_{l=1}^{\infty} R_l(s_l, \pi(s_l))\gamma^{t_l}\right\}. \tag{6}$$

The joint optimal strategy of virtual machine access control and placement can be expressed as (7):

$$\pi^* = \arg\max R_{s_0}^{\pi}, \quad \pi \in II. \tag{7}$$

It is not difficult to obtain through the observation of equation (6), and it will be very difficult to solve it directly. Therefore, this paper uses the method of Bellman recursive equation to solve the MDP problem defined by appeal. In addition, it is not difficult to conclude from the above description that the difficulty of the JAC-VP problem is how to quantitatively evaluate the impact of the current decision on the follow-up. To solve this problem, this chapter introduces the “value function” of the state in the MDP model. Reference [26]. Its function is mainly to evaluate the benefits brought by the current decision and the impact on the subsequent income acquisition trend, so as to quantitatively evaluate the potential benefits under each system state. By combining the value function of the state with the Bellman recursive equation, the recursive solution equation under the MDP model of JAC-VP problem can be obtained, as shown in (8):

$$V^{\pi}(s_l) = \sup_{\pi(s_l)\in A(s_l)}\left\{R(s_l, \pi(s_l)) + \gamma \sum_{s_l+1\in S} P(s_l+1|s_l, \pi(s_l))V^{\pi}(s_l+1)\right\}. \tag{8}$$

When$V^{\pi^*}(s_1)$is the optimal state of the system, then SL is the optimal state. Therefore, when the value function of each state of the system is determined, the corresponding strategy function can be obtained by using the following formula, as shown in formula (9):

$$\pi(s_l) = \sup_{\pi(s_l)\in A(s_l)}\left\{R(s_l, \pi(s_l)) + \gamma \sum_{s_l+1\in S} P(s_l+1|s_l, \pi(s_l))V^{\pi}(s_l+1)\right\}. \tag{9}$$

The strategy obtained by the above formula is the optimal decision $\pi^*(s_1)$ corresponding to each state.

Any VM request can arrive and any VM request can leave. Since this paper assumes that the decision of any VM request is determined when it arrives, the state of the system will not change at the middle time of two adjacent random events. Therefore, CP only needs to make corresponding decisions on the VM request when it arrives. Thus, the state transition probability of the system can be defined as the probability that the next random event is the arrival of VM request or the departure of any deployed VM request under a given system state and its corresponding decision. Since the resource reallocation of deployed VM requests is not considered, when any VM request l reaches the DC and the CP adopts the decision, the conditional state transition probability of the system in the case of the next random event can be expressed as three cases by the following formula, as shown in formulas (10)–(12):

$$P(s_l+1|s_l, a_l) = \frac{\lambda_h}{\overline{\lambda}(s_l, a_l)}, p_l+1 = h, \overline{s_l}+1 = \overline{s_l} + \overline{a_l}, \tag{10}$$

$$P(s_l+1|s_l, a_l) = \frac{nh'\mu h'}{\overline{\lambda}(s_l, a_l)}, p_l+1 = 0, \overline{s_l}+1 = \overline{s_l} + \overline{a_l} - \overline{a}_{l'}^{h'}, \tag{11}$$

$$P(s_l + 1|s_l, a_l) = 0. \quad (12)$$

First, consider the system state transition probability when a VM request arrives, as shown in equation (10). Then, this chapter analyzes the transition probability under any VM leaving event, that is, equation (11). In other cases, the system transition probability is 0. Equations (10) and (11) show the total transfer strength of the system under the current system state SL and the decision al taken by CP, which is represented by equation (13):

$$\overline{\lambda}(s_l, a_l) = \sum_{h \in H} \{\lambda_h + n_h \mu_h\}. \quad (13)$$

In the SPADP algorithm, the method based on the sampling path (sample path) will be used to sample the possible arriving VM request sequence according to the arrival statistical characteristics of the VM request, and obtain a set composed of the arrival sequences of multiple VM requests. After that, each sampled VM request sequence will be used as the input of the system and processed iteratively. On the cloud computing or DC side, when the system detects that any VM request arrives, the CP will make corresponding decisions based on the type of the VM request and the corresponding revenue. Correspondingly, the state of the system also changes accordingly [27]. At this time, SPADP updates the state value function of the current system according to the decision of CP, the income obtained, and the value function update rules. Because SPADP algorithm considers the corresponding arrival statistical characteristics of VM requests when sampling the arrival sequence of VM requests, some system states will be accessed frequently under a given decision, while other system states will be accessed less or not. The frequently accessed system state and its value function will also participate in the formulation of the final CP strategy as the main body. The biggest difference between SPADP algorithm and DP algorithm is that SPADP algorithm only continuously updates the value function of this part of the frequently accessed system state. Therefore, the number of system states to be maintained is greatly reduced and the solution of JAC-VP problem is accelerated. And because SPADP algorithm specifically considers the VM requests that may arrive, although it does not explore the whole possible system state space, it can still obtain a better policy choice for the VM request sequence under the current statistical characteristics. In this paper, the performance of SPADP-D algorithm based on single-policy VM request duration and SPADP-M algorithm based on multi-policy are evaluated. Use Eviews software to describe and analyze the basic statistical characteristics of the daily return of the index. The results of CSI Internet financial index are shown in Figure 10 and KBW NASDAQ financial technology index are shown in Figure11.

As can be seen from Figure 10, the mean of the daily return series of CSI Internet financial index is 0.015543, the standard deviation (std. dev) is 2.091259, and the skewness is −0.583515, which is less than 0, indicating that the sequence distribution is a longer left tail. Kurtosis coefficient is 5.833321, which is higher than kurtosis value 3 of normal distribution. The Jarque-Bera statistic is 554.3814 and the $p \leq 0.001$. The assumption that the return of the index obeys normal distribution is rejected. Therefore, the daily yield of CSI Internet financial index shows an obvious left deviation nonnormal distribution, and the standard deviation is small, indicating that the gap between most of the values and the average value is relatively small, and the data is relatively concentrated. On this basis, we give the Q-Q diagram of the yield series of CSI Internet financial index, and the results are shown in Figure 12.

In Figure 12, it can be seen that there are many points outside the normal line, and the tail swing trend of the curve formed by each point is obvious, indicating that the yield series has the characteristics of thick tail distribution. This shows that the distribution of CSI Internet financial index has the characteristics of "peak and thick tail".

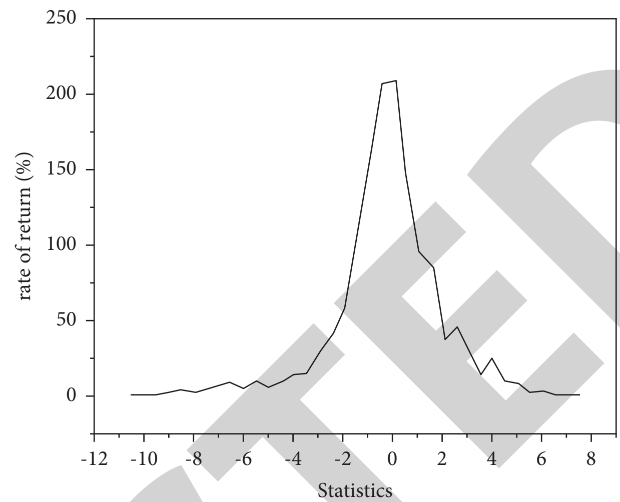

Figure 10: Statistical chart of daily yield of CSI Internet financial index.

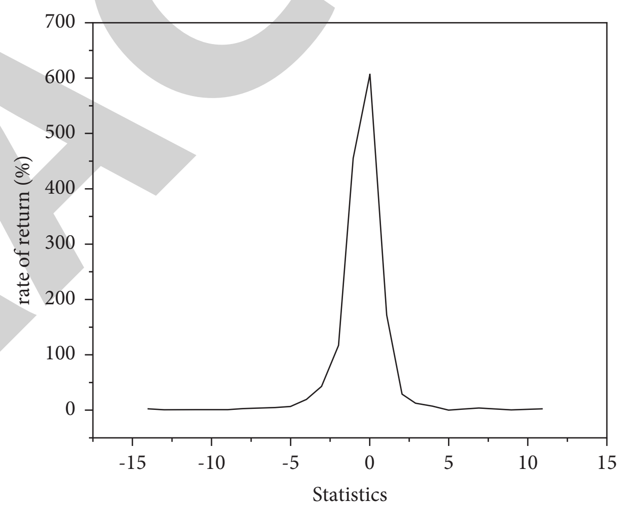

Figure 11: Statistical chart of daily yield of KBW NASDAQ fintech index.

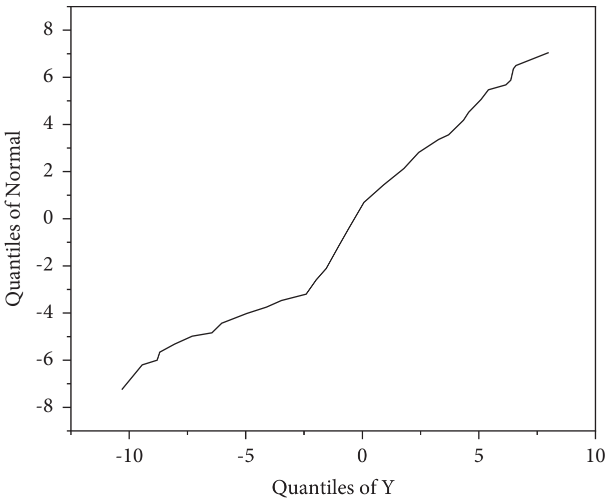

Figure 12: *Q-Q* chart of the yield of CSI Internet financial index.

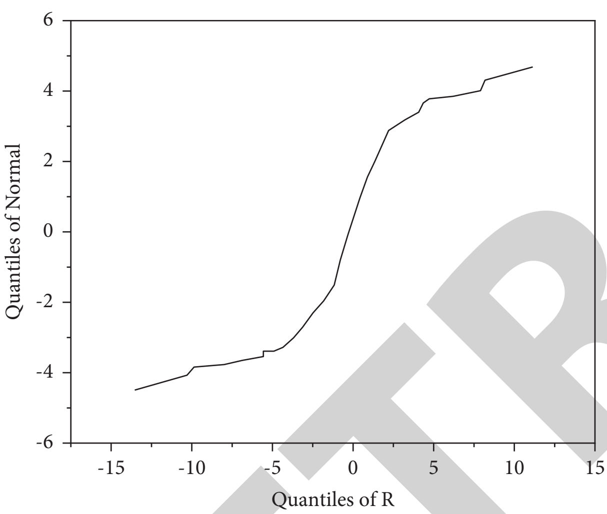

Figure 13: KBW NASDAQ fintech index yield *Q-Q* chart.

As can be seen from Figure 11, the mean (mean) of the daily return series of the KBW NASDAQ fintech index is 0.056499, the standard deviation (std. dev) is 1.347074, and the skewness (skewness) is −1.010451, which is less than 0, indicating that sequential division is a longer left trail. The kurtosis coefficient (kurtosis) is 20.86, which is greater than the kurtosis value of 3 for a class. The Jarque-Bera statistic was 19766.78 and the $p \leq 0.001$, rejecting the assumption that the regression of the indicator conforms to a normal distribution [28]. Therefore, the daily yield of KBW NASDAQ fintech index shows an obvious left deviation nonnormal distribution, and the gap between most of the values and the average value is relatively large, and the data is relatively scattered. On this basis, this paper draws the *Q-Q* diagram of the yield series of KBW NASDAQ fintech index, and the results are shown in Figure 13.

In Figure 13, it can be seen that there are many points outside the normal line, and the swing trend of the head of the curve formed by each point is obvious, indicating that the yield series has the characteristics of thick peak distribution. Therefore, this paper can draw a conclusion that the distribution of KBW NASDAQ fintech index has the characteristics of "thick peak and sharp tail".

5. Conclusion

With the rapid development of investment enterprises, the quantity and quality of their investment have increased rapidly. How to manage these numerous investments uniformly, so as to improve the efficiency of investment and prolong the service time of equipment, has become a problem that investment enterprises must face in investment data management. As an important part of digital investment, investment data management platform has become an important symbol to measure the degree of enterprise informatization. The investment data management system plays an important role in effectively promoting the efficiency of enterprise investment data management through management and statistical functions. Therefore, the subject uses J2EE technology to analyze, design, implement, and test the investment data management system, and designs the investment data management system, which is based on the basic process of software development engineering and the network situation of enterprise investment, designs the network architecture of the whole system, and designs the overall investment data management system, which decomposes the system of three-level architecture into various business modules. Then, gradually carry out UML design for the main business of the investment data management system, and design the key elements such as sequence diagram, flow chart, and state diagram. Through UML design, the main functional modules of investment data management are designed in detail. The enterprise investment business is designed and formed by means of operation process and software model. On the basis of business requirements, a college student investment database is designed, and the security module of the system is processed. Then, the investment data management system is realized in detail, and the three architecture contents of the system are established by making full use of J2EE programming and development technology. Firstly, the investment data management page is designed and run, such as investment summary and analysis module, investment project management module, investment risk management module, investment execution module, data management module, user login module, enterprise information management module, etc. According to the J2EE programming principle, the data about the investment data management process in these modules are programmed with functions such as adding, modifying, retrieving, and deleting. By optimizing the programming code, the operation efficiency of the interface function business is improved. Finally, the system is verified, run, and tested. According to the two indicators of software testing, the business use cases and parameters of the system are tested. The basic functions of the investment data management realized by the system are correct, the design is reasonable, the operation is stable, the operation response time is short, the operation accuracy is high, and the data access efficiency is good. The performance test is carried out around the software running environment. After formulating the test scenario, it focuses on testing the CPU utilization, memory utilization, and average response time of the server when the software is running. The test results show that the investment data management system of the investment enterprise operates normally, and the operation parameters of the software meet the design requirements and software engineering standards.

Data Availability

No data were used to support this study.

Additional Points

The authors declare that the manuscript is an original manuscript, without plagiarism, and the repetition rate is qualified.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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