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Retraction

Retracted: Development and Application of Sales System Software Based on Computer Network

Wireless Communications and Mobile Computing

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets 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 own 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] C. Liu, "Development and Application of Sales System Software Based on Computer Network," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 4524698, 7 pages, 2022.

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Research Article

Development and Application of Sales System Software Based on Computer Network

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In order to solve the problem that the automobile sales management becomes more and more complicated, this paper proposes a sales system software platform based on a computer network. The automobile sales management system based on the MVVM framework, with Java as the development language and MySQL as the database, is implemented by the progressive framework Vue in the front end and developed by the Spring Boot framework in the back end. Starting with the design and implementation of the system, the technical framework, functional modules, and implementation processes used to develop the system are studied. The experimental results show that the function tests are normal, the response time of the system client is generally 1-2 seconds, the processing speed is fast, and the influence ability is good. The system improves the comprehensive management ability and promotes the rapid development of automobile industry.

1. Introduction

In recent years, with the development of computer technology and the arrival of the Internet era, we have entered the information age. In this digital age, the continuous and rapid development of Internet technology also puts forward new requirements for the traditional automobile sales model. At some times, some defects in the traditional automobile sales model can be solved through the convenience of the network. According to the needs of automobile sales market management, in order to provide perfect services for the majority of car users, the automobile sales and leasing system came into being [1]. It integrates ordering, leasing, replacement, customer service and other businesses. Its successful structure will bring good social and economic benefits to the company and provide simple and fast services to our customers. With the strong support of the state for the automobile industry and the continuous improvement of people's living standards, it has become a reality for cars to enter the family [2]. The continuous expansion of the application range also puts forward further and deeper requirements for the traditional electronic information and data centralized management of automobile sales. It also makes the development and improvement of automobile sales management system. Based on the network, the mature and stable Internet platform, relevant database system, and Java language with good cross platform portability are used to complete the development of relevant program content to meet the ease of use, stability, and wide use of the system [3]. The automobile online sales management system based on the Internet makes the enterprise break through the limitations of time and space. Both consumers and employees and managers of the enterprise can access the system through the public platform of the network, which has strong timeliness and improves the competitiveness of the enterprise. Because the core part of the system adopts Java language, it solves the problem of cross platform application of software and can be used on any operating system without obstacles. It integrates the functions of ordering, leasing, replacement, customer service, and business management. Its successful structure will bring good social and economic benefits to the company and provide simple and fast services to our customers.

2. Literature Review

With the development of information technology, more and more enterprises introduce the concepts of information

management and e-commerce into their own management and marketing activities. This not only improves the quality and efficiency of enterprise management but also brings more profits and development space to enterprises. Din and Paul mainly applied data mining technology when analyzing and predicting the real estate market and demonstrated that this technology has a good application effect. Other scholars have applied this situation to issues related to customer relationship management [2]. Guo and others mainly used data mining technology to analyze customer relationship management issues from multiple perspectives, such as customer retention and customer segmentation [4]. Yang and others mainly analyzed and discussed cart decision tree comprehensively according to the actual situation and improved and optimized it under the guidance of Fayyad boundary point determination principle, so as to ensure that the decision tree technology can be widely used in the real estate industry and obtain good practical results. Specifically, the decision tree can be improved from the following two aspects. First, when the decision tree is built, the analysis is carried out after the threshold value of continuous attribute segmentation is selected. In this process, it is not necessary to check all the segmentation points. The second is to properly solve the uneven distribution by adopting specific methods to ensure that this technology has good practical application [5]. Neves and others discussed how to use b/s structure and java development language to develop and design a real estate sales management system with strong scalability and maintainability [6]. Kovács and others mainly used the analytic hierarchy process when dividing the system structure and then set the authority structure. They mainly used the MVC mode when designing the real estate sales management system [7]. After understanding the business development of the real estate market, Guo and others applied GIS and java development technology in the system design to meet the needs of relevant institutions [8]. Sussner and Campiotti took a real estate enterprise as an example to design the system. When analyzing business requirements and system architecture, they applied unified modeling language. When building the real estate sales control management system, they applied Java EE and hibernate technology [9]. In their research, Li and others mainly analyzed the role and development trend of the housing sales system under the current era background, applied Net4.0 and other technologies for system research, development and design, and then tested it, continuously improved work efficiency, optimized and improved the existing business processing process, reasonably adjusted the enterprise structure, and accelerated the development of information construction in the real estate industry [10].

With the rapid development of China's economy, there are more and more sales orders for automobile enterprises. Therefore, an investigation is conducted on the automobile sales information of automobile enterprises. It is found that with the increase of automobile sales information, the sales management of automobile stores is becoming more and more cumbersome. Manual management can no longer meet the current needs. It is error prone and has a large amount of data. Therefore, in order to improve the efficiency of sales management in automobile enterprises, it is necessary to develop an automobile sales management system.

3. Research Methods

3.1. System Design

3.1.1. System Architecture.
The automobile sales management system is developed with b/s architecture and MVVM framework, which is an improved version of the standard MVC mode. The whole system is divided into four layers, namely, Dao layer, service layer, controller layer, and view layer. Dao layer is responsible for the interaction with the database, service layer is responsible for the application logic of the business, controller layer is responsible for the request processing and business process control, and view layer is responsible for page data rendering. The front end of the system is developed by the progressive framework Vue, and the back end is developed by the Spring Boot framework, which reduces the coupling between the front and back ends and realizes the separation of the front and back ends.

3.1.2. Function Module Design.
The system is mainly divided into two user roles: administrator and employee, which are as follows:

(1) Administrator

After the administrator logs in, the main functions include personal information, employee management, automobile information, sales information, statistical reports, system management, and announcement management [11]. The function module diagram of the administrator is shown in Figure 1.

(2) Employees

The main functions of employees after logging in include announcement information, personal information, car information, sales information, and statistical reports. The function module diagram of employees is shown in Figure 2.

(3) Coding management module

In order to ensure the consistency of relevant names during information entry, query, data statistics, and other operations of the management system, the system has uniformly coded the information of automobile brands, suppliers, sales outlets, salespeople, and so on. Users only need to select from the drop-down menu during operations.

(4) Daily business management module

The daily business management module is divided into three submodules: sales management, purchase management, and inventory management:

   (i) Sales management submodule: its main function is to complete the entry of vehicle files, owner files, sales invoices, and other information. It can flexibly handle the sales without vehicle collection, sales without Invoicing, and sales agency business (account registration, insurance, etc.) and automatically charge accounts. Handle sales returns effectively to ensure the accuracy of sales data. Query, statistics, and

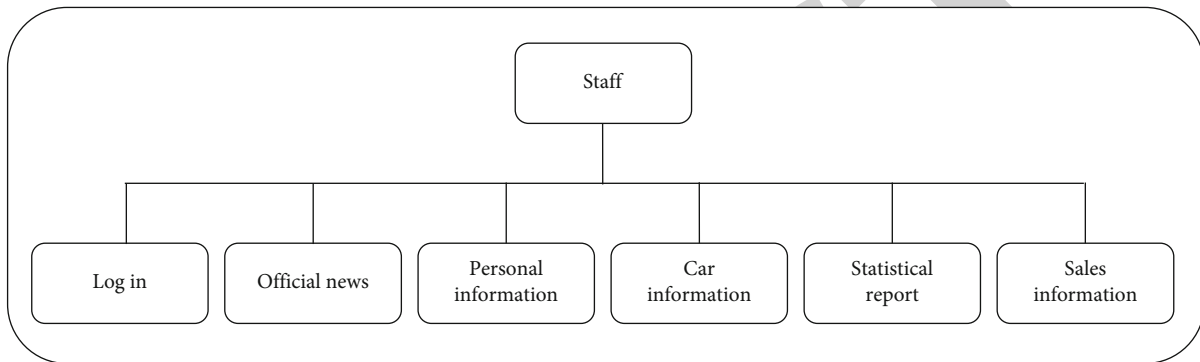FIGURE 1: Administrator function module diagram

FIGURE 2: Employee function module diagram

analysis are carried out for the sold vehicles in a variety of ways, so that the decision-makers of the enterprise can timely and accurately obtain the current market sales situation and provide a scientific and powerful basis for the sales and procurement decisions of the enterprise [12]

(ii) Purchase management submodule: its main functions are purchase entry, purchase/return processing, purchase settlement, and purchase classification query and statistics

(iii) Inventory management submodule: inventory management is an important part of enterprise logistics system. The main function and function of inventory is to establish an effective buffer zone between the supply and demand of finished vehicles, so as to reduce the contradiction between the supply and demand of finished vehicles [13]. Scientific and reasonable inventory management can not only promote sales and improve labor productivity but also reduce sales costs and increase economic benefits. The main functions of the module include the management of vehicle in/out notification, vehicle status (in/out time, main performance parameters, storage location, appearance, etc.), vehicle internal allocation management, inventory query, inventory statistical analysis,

safety inventory early warning, etc., so as to monitor the inventory status in real time, realize inventory early warning, reduce the inventory level as much as possible, and reduce the backlog of funds

(5) Order contract management module

The order contract management module is a management module for sales orders and contracts. It includes the functions of order and contract formulation, modification, summary, execution, query, and statistics.

(6) Plan management module

Based on the current management system of the enterprise, to meet the actual needs of integrated plan management, an integrated plan management subsystem with purchase plan generation, sales plan management, and other functions is established, which takes the contract as the entry point and aims to meet the needs of enterprise sales and improve work efficiency. Shorten the preparation time of various plans (annual, quarterly, monthly purchase plans, contract to sales plans, etc.), improve the effectiveness and scientificity of the plans, and provide detailed management information. The formulation of the plan is based on the

TABLE 1: Administrator information table.

Field name	Field meaning	Field type	Field length	Primary key	Can it be empty
adminId	Number	Int	10	Yes	No
adminName	User name	Varchar	20	No	Yes
adminPassword	Password	Varchar	15	No	Yes
adminPhone	Telephone	Varchar	20	No	Yes
adminSex	Gender	Int	10	No	Yes
adminAge	Age	Int	10	No	Yes
AdminXingming	Full name	Varchar	10	No	Yes

TABLE 2: Employee information.

Field name	Field meaning	Field type	Field length	Primary key	Can it be empty
userId	Number	Int	10	Yes	No
Username'	User name	Varchar	20	No	Yes
userPassword	Password	Varchar	15	No	Yes
userXingming	Full name	Varchar	20	No	Yes
userSex	Gender	Int	10	No	Yes
userAge	Age	Int	10	No	Yes
userPhone	Telephone	Varchar	20	No	Yes
userMark	Remarks	Varchar	255	No	Yes
userDate	Entry time	Datetime	15	No	Yes

orders, contracts and market forecasts of the enterprise in each period.

(7) Report management module

The report management module is a module for managing reports related to the management of enterprise purchase, sales and inventory. Process various forms and time periods of statistical reports according to users' specific needs, such as sales year, quarter, month, daily report, issue details, and receipt details. This module involves a large number of data query, statistics and report generation, so it is a key and difficult point of the system.

(8) Human resource management module

The human resource management module contains the comprehensive functions of enterprise personnel management. It consists of the following functions: personnel file management, labor and personnel management, personnel business assessment, attendance management system, personnel education and training, recruitment management, etc.

3.1.3. Database Design

(1) Database E-R Diagram Design. E-R diagram is an entity connection diagram, which provides a method to represent entities, attributes and connections. It is a conceptual model used to describe the real world [14]. Entities are what we call objects or fields, attributes, and methods, that is, the attributes and methods of an object. E-R diagram is a data description method to describe and display the relationship between data types. E-R diagram can completely map the relationship between real models. The three most important elements in the E-R diagram are entity, attribute and relationship. The E-R diagram is composed of these three points.

(2) Database Table Design. The automobile sales management system needs a background database. The system uses MySQL database to store data. The following describes the details of each table in the database.

(1) Administrator information table is used to store administrator information, as shown in Table 1

(2) Employee information table is used to store employee information, as shown in Table 2

(3) Automobile information table is used to store automobile information, as shown in Table 3

(4) Sales information table is used to store car sales information, as shown in Table 4

In order to overcome the impact of the dynamic changes of the network on the database transmission, the network QoS monitoring technology is introduced, and real-time monitoring is used to lay a good foundation for intelligent transmission control. Add a timestamp at the protocol layer to monitor the network delay, add two fields to each message, and record the last received timestamp (LRT) and the currently sent timestamp (CST). After receiving the message, the receiving end calculates the local packet delay according to the LRT and SCT of the message. At the same time, the processing delay of the message in the network can be obtained by

TABLE 3: Vehicle information table.

Field name	Field meaning	Field type	Field length	Primary key	Can it be empty
shangpinId	Number	Int	10	Yes	No
shangpinName	Name	Varchar	20	No	Yes
shangpinMark	Manufactor	Varchar	20	No	Yes
shangpinMark1	Color	Varchar	10	No	Yes
shangpinMark2	Model	Varchar	20	No	Yes
shangpinMark3	Other	Varchar	40	No	Yes
shangpinDate	Purchase time	Datetime	15	No	Yes
shangpinZong	Total	Int	10	No	Yes
shangpinType	Type	Varchar	10	No	Yes

TABLE 4: Sales information.

Field name	Field meaning	Field type	Field length	Primary key	Can it be empty
spchuId	Order no	Int	10	Yes	No
spchuDate	Time	Datetime	15	No	Yes
spchuZong	Total	Int	10	No	Yes
spchuJine	Unit Price	Double	20	No	Yes
spchuZe	Total	Double	20	No	Yes
shangpinId	Car number	Int	10	No	Yes
shangpinName	Vehicle name	Varchar	20	No	Yes
userId	Employee number	Int	10	No	Yes
userName	Employee name	Varchar	20	No	Yes
consumerName	Customer name	Varchar	20	No	Yes
consumerPhone	Customer telephone	Varchar	20	No	Yes

subtracting the processing delay of the opposite end according to the last time stamp (LST) saved by the receiving end and the time when the message is currently received [15].

When end B replies a message,

$$
\begin{aligned}
\text{LRT} &= \text{TB} + \Delta t1, \\
\text{CST} &= \text{TB} + \Delta t1 + \Delta t2.
\end{aligned}
\tag{1}
$$

When end A receives the message from end B, its local

$$
\text{LRT} = \text{TA} + \Delta t1.
\tag{2}
$$

And its current time is

$$
\text{CT} = \text{TA} + \Delta t1 + \Delta t2 + \Delta t3.
\tag{3}
$$

At this time, it can be calculated that the bidirectional delay of message sending is

$$
\text{CT} - \text{LST} - (\text{CST} - \text{LRT}).
\tag{4}
$$

3.2. System Realization. The implementation of this system is divided into two modes: administrator and employee. The system adopts b/s architecture and MVVM framework development, separates the view UI from the business logic, realizes the separation of the front and back ends, and achieves the pur-

pose of understanding the coupling. The interaction between the front and back ends is realized through Axios cross-domain. The front end of the system is developed by the progressive framework Vue. The Vue framework is based on modularization and componentization. The modularization idea is to encapsulate the modules and provide external interfaces. The componentization idea is to piece together complete pages with components to realize code reuse. The front end sends a request to the back end by calling the interface API provided by the back end. After receiving the data returned by the back end, the front end stores the data first and finally renders the page through two-way binding of data [16].

The back-end of the system is implemented by the Spring Boot framework. It is mainly responsible for receiving and processing the front-end requests, interacting with the database and returning the required data to the front-end. The back-end does not need to care about how the data is loaded into the front-end and how the front-end pages are rendered [17]. The back-end is mainly divided into three layers, namely, Dao layer, service layer, and controller layer. The controller layer is responsible for receiving and processing the front-end requests and providing the front-end with the interface API to be called. After receiving the front-end requests, it calls the service layer and Dao layer in turn, and finally returns the data to the front-end in JSON format.

The database of this system is MySQL database, the server uses the Tomcat server built in springboot, and the development
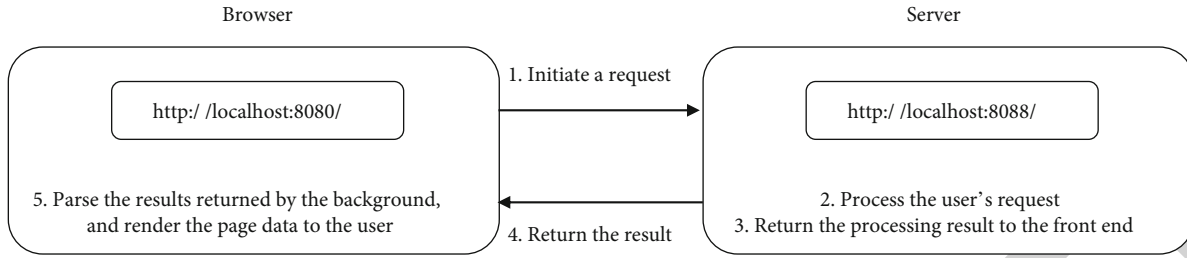
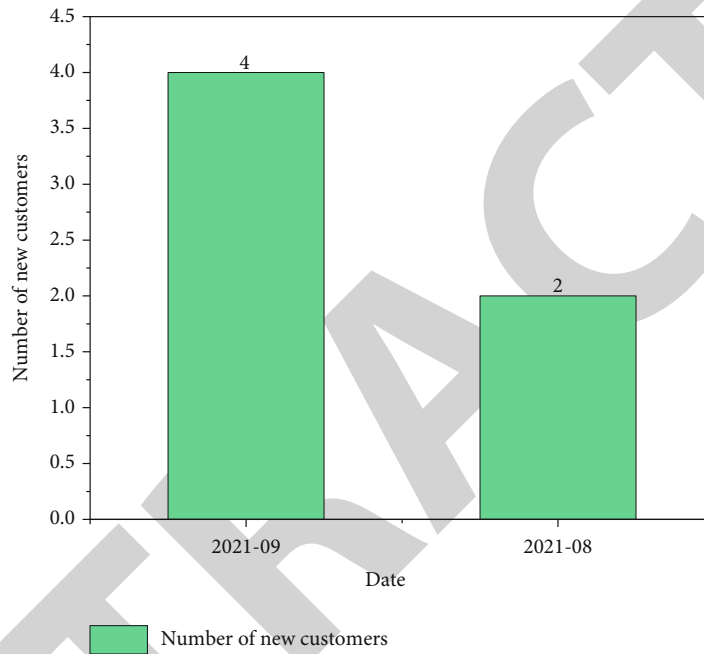FIGURE 3: Front and rear end interaction diagram.

FIGURE 4: Statistics of customer information by month.

environment is JDK1.8.0. The reason why MVVM framework is adopted is that it has the advantages of low coupling, reusability, independent development, and convenient testing. The operation of the system only requires the user to call the API interface to send a request to the background. The background will process the received request and then return the processing result to the front end. After receiving the data returned from the background, the front end will render it to the page. The interaction process between the front end and the back end of the system is shown in Figure 3.

4. Result Analysis

System function test includes link test, programming language test, form test, data addition, editing, deletion test, and input and query test. Figure 4 shows the current number of customers counted by the system. After querying the database for comparative analysis, it can be seen that the system can correctly count the number of customers, and the data calculation is correct and can meet the corresponding requirements. Other content items of this system function test can also meet the needs of dealers, including links, forms and page display,

which will not be listed in detail here. The system performance test is used to check whether the system can return the prompt for correct processing and whether the system exception handling meets the expectations. In addition, it also includes whether the system architecture can withstand the heavy load business capability, the system response capability, the system throughput, etc. This system test verifies the login reminder of the system [18].

The system designed in this paper can make friendly reminders for the abnormal conditions of login. The test results are consistent with the expectations. Other abnormal conditions can also be reminded, which will not be listed in detail here. For the test of system architecture load capacity, response capacity and throughput, in the local test phase, the response time of the system client is generally 1-2 seconds, with fast processing speed and good impact capacity. In the remote test stage, the response capability of the system is related to the user's hardware and network performance [19]. This test has only been tried in a small range. Therefore, at present, the load test and stress test cannot be fully implemented, which will be the focus of the next test of the system. System availability test is to evaluate the availability of the system and check whether

the system meets the availability standard. According to the classification of evaluators, it can be divided into expert evaluation and user evaluation. According to the evaluation stage, it can be divided into formative evaluation and summative evaluation. For this availability test, system users are invited to make a summary evaluation. After testing, the system has been well received in interface design and navigation, but some functions are insufficient and need to be further improved.

5. Conclusion

Automobile sales management system is an important part of automobile sales enterprises. The development of this system strengthens the management of automobile sales information, improves the comprehensive management ability, and promotes the rapid development of automobile industry. This paper designs and implements an automobile sales management system based on the sales orders of automobile enterprises. The system adopts IntelliJ idea and visual studio code compilation software, Tomcat server, MySQL database, jdk1.8.0 development environment, and Google Chrome browser, including two modes of employees and managers. The development of this system will promote the application and development of information technology in automobile sales enterprises and improve the core competitiveness of automobile enterprises.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that he/she has no conflicts of interest.

References

[1] X. Lv and M. Li, "Application and research of the intelligent management system based on internet of things technology in the era of big data," *Mobile Information Systems*, vol. 2021, Article ID 6515792, 6 pages, 2021.

[2] S. Din and A. Paul, "RETRACTED: Erratum to "Smart health monitoring and management system: toward autonomous wearable sensing for Internet of Things using big data analytics [Future Gener. Comput. Syst. 91 (2019) 611-619]"," *Future Generation Computer Systems*, vol. 108, no. Jul., pp. 1350–1359, 2020.

[3] Z. Liu, A. Mohammadzadeh, H. Turabieh, M. Mafarja, and A. Mosavi, "A new online learned interval type-3 fuzzy control system for solar energy management systems," *IEEE Access*, vol. 9, pp. 10498–10508, 2021.

[4] Y. Guo, W. Zhang, Q. Qin, K. Chen, and Y. Wei, "Intelligent manufacturing management system based on data mining in artificial intelligence energy-saving resources," *Soft Computing*, vol. 1, pp. 1–16, 2022.

[5] Y. Yang, R. Ren, and P. M. Johnson, "VetLink: a livestock disease-management system," *IEEE Potentials*, vol. 39, no. 2, pp. 28–34, 2020.

[6] L. S. Neves, L. C. Alberto, and H. D. Chiang, "A fast method for detecting limit-induced bifurcation in electric power systems," *Electric Power Systems Research*, vol. 180, no. Mar., pp. 106101–106101.8, 2020.

[7] L. L. Kovács, B. Ghotbi, F. González, P. Niksirat, K. Skonieczny, and J. Kvecses, "Effect of gravity in wheel/terrain interaction models," *Journal of Field Robotics*, vol. 37, no. 5, pp. 754–767, 2020.

[8] X. Guo, P. Zhang, C. Wang, B. Sun, and S. Sun, "A novel deep learning model for palmprint/palmvein recognition," *IEEE Access*, vol. 9, pp. 122847–122854, 2021.

[9] P. Sussner and I. Campiotti, "Extreme learning machine for a new hybrid morphological/linear perceptron," *Neural Networks*, vol. 123, pp. 288–298, 2020.

[10] H. Li, T. Wang, W. Pan, M. Wang, and J. Wang, "Mining key classes in java projects by examining a very small number of classes: a complex network-based approach," *IEEE Access*, vol. 9, pp. 28076–28088, 2021.

[11] S. Rostami-Javanroudi, M. Moradi, K. Sharafi, and N. Fattahi, "Novel hydrophobic deep eutectic solvent for vortex-assisted liquid phase microextraction of common acaricides in fruit juice followed by HPLC-UV determination," *RSC Advances*, vol. 11, no. 48, pp. 30102–30108, 2021.

[12] A. Conrad, "Chris McCord on phoenix's LiveView functionality," *IEEE Software*, vol. 37, no. 3, pp. 98–100, 2020.

[13] S. Achour, M. Benattou, and J. L. Lanet, "Formal model of conformity analysis method of java bytecode programs annotated with BML specifications," *IAENG International Journal of Computer Science*, vol. 48, no. 2, pp. 343–355, 2021.

[14] B. Rja and C. Sa, "Multi-way sparsest cut problem on trees with a control on the number of parts and outliers," *Discrete Applied Mathematics*, vol. 289, pp. 281–291, 2021.

[15] A. Sharma, G. Rathee, R. Kumar et al., "A secure, energy- and SLA-efficient (SESE) E-healthcare framework for quickest data transmission using cyber-physical system," *Sensors*, vol. 19, no. 9, p. 2119, 2019.

[16] J. Jayakumar, S. Chacko, and P. Ajay, "Conceptual implementation of artificial intelligent based E-mobility controller in smart city environment," *Wireless Communications and Mobile Computing*, vol. 2021, Article ID 5325116, 8 pages, 2021.

[17] Q. Liu, N. Cheng, Q. He, Y. Chen, and Q. Zhan, "Meteorological conditions and their effects on the relationship between aerosol optical depth and macro-physical properties of warm clouds over Shanghai based on MODIS," *Atmospheric Pollution Research*, vol. 11, no. 9, pp. 1637–1644, 2020.

[18] P. Ajay, B. Nagaraj, R. A. Kumar, R. Huang, and P. Ananthi, "Unsupervised hyperspectral microscopic image segmentation using deep embedded clustering algorithm," *Scanning*, vol. 2022, Article ID 1200860, 9 pages, 2022.

[19] G. Veselov, A. Tselykh, A. Sharma, and R. Huang, "Applications of artificial intelligence in evolution of smart cities and societies," *Informatica*, vol. 45, no. 5, p. 603, 2021.