Design and Implementation of Financial Information System for Mobile Devices

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Abstract. In the economic society, the word "financial management" is no longer unfamiliar to people. A detailed income and expenditure plan can manage the income and expenditure of individuals and families well. With the rapid development of domestic economy and the rapid increase of residents' income, the following consumption and expenditure are diversified. With the rapid development of mobile applications, people's daily life is increasingly inseparable from mobile application devices. The data that should be maintained in personal financial management is becoming more and more complicated, and a large number of consumption records are easy to appear in the process of financial management, which makes it more difficult to store and consult personal financial data. The most widely used financial knowledge is in the aspect of companies and enterprises, and there is a set of relatively mature theoretical system structure, and the corresponding excellent financial management software is also emerging in endlessly. In this paper, combined with the current personal financial needs and the development of mobile devices, a financial system based on mobile phone client is proposed, and the implementation of the financial system is described.

Keywords: Financial Management System, Mobile Equipment, Finance

1. Introduction
The germination of property management activities in human society begins with surplus products. People manage their own assets every day. With the continuous improvement of science and technology, smart phones have become a necessity in people's lives [1]. With the deepening of China's financial marketization, it is more and more necessary for people to manage their personal assets. It means that in the market, the price and income of financial products will not be able to maintain a relatively stable level for a long time [2]. With the enhancement of modern concept of financial management, personal financial management has become the focus of the development of banks, insurance companies and other enterprises. The development of social security system also increases the necessity of personal financial management to a certain extent, and deepens the degree of specialization of social division of labor [3]. With the deepening of specialization, people's work is becoming more and more detailed, but it also makes personal work confined to limited professional fields. Faced with complex economic behaviors, it is impossible for us to know every income and
expenditure of our assets at any time, so personal financial management has become an essential skill for everyone [4]. With the rapid development of mobile applications, people's daily life is increasingly inseparable from mobile application devices. The maintenance of financial data based on mobile application by means of information technology can not only improve the financial management speed of individual financial users, but also increase the security degree of financial data [5].

Facing the rapid progress of computer and information technology today, personal financial management with computers and smart mobile devices can conveniently record household cash, deposits, income, expenses, transfers and so on [6]. Traditional personal financial management mainly relies on manual records, and maintains the financial status of families or individuals through manual management [7]. This kind of traditional management and operation methods can not only store financial data for a long time, but also have many unavoidable problems. Especially for students, when they live outside, their personal financial management is important, especially the control of money spending. Therefore, how to effectively control consumption and develop a good consumption habit is particularly important. With the popularity of mobile applications, people are no longer limited to the problem of food and clothing. How to improve the efficiency of financial management through mobile tools has become the main concern of users [8]. The most widely used financial knowledge is in companies and enterprises, and there is also a set of fairly mature theoretical system structure, and the corresponding excellent financial management software is endless [9]. The continuous application of smartphones has laid a user foundation for the development of mobile phone applications. In this paper, combined with the current personal financial needs and the development of mobile devices, a financial management system based on mobile phone client is proposed, and the implementation of the financial management system is described.

2. System requirement analysis
With the rapid development of mobile applications, personal financial management is gradually integrated into mobile applications, and grows rapidly with the rapid development trend. Simply speaking, personal finance is what we usually call bookkeeping, and bookkeeping is to record a person's income and consumption, as well as all financial transactions. Considering the function setting of the system from the actual needs of users, the final users of the personal financial management system have decided that there will be various demand differences due to the uncertainty of occupation and income sources [10]. Personal financial management software can not only help you keep accounts, but also help you master your input and expenditure in real time, and master the changes of your funds. At the same time, it can also count the main flow of funds so as to allocate funds more reasonably. Category is the key to distinguish different account books in the account book management function, so the maintenance of category is also indispensable. Category maintenance includes two parts: income maintenance and expenditure maintenance. Here, users can mainly realize the text boxes of added categories, which can allow users to classify property, create customized property categories, and set stocks and wages for income category maintenance.

Traditional personal finance software has a large number of redundant functions, which makes users spend most of their energy on understanding complex interfaces and tedious operations, but lacks the simple and clear characteristics that personal finance should have. With personal finance software, users can focus most of their energy on data research, rather than meaningless operation. For the personal financial management system, the core data is the information related to financial accounts such as income and expenditure, so the security of the system is the core issue to be considered. For this system, the security of the system is required to be high. The system should take certain encryption measures to ensure the security of some account data, so as to avoid the trouble brought by the leakage of account data to financial users. When the user wants to add or delete categories in the list, the system will first judge according to the corresponding conditions. If the conditions are met, the system will insert the specified data or delete the corresponding data in the background database, and update the category information in the user interaction layer.
The construction of the system can tailor-made specific financial management plans for users, can be operated by mobile terminal, can maintain personal financial income and expenditure in time, and can also carry out statistical analysis on personal finance, which is easy to use, convenient and flexible to operate, and can improve personal financial speed. In order to make the software more perfect, besides meeting the basic functional requirements of customers, the software itself also needs some necessary non-functional requirements, including simple and generous interface framework design, brisk interface switching and complete program exit. The system should ensure certain reliability, the minimum failure frequency can be controlled within one year, the maximum failure frequency can reach two years, and the worst failure resolution time will not last for three hours. The primary task of interface design is to show that any interface element should be centered on user habits. This requires us to start with the user's usage habits, then model the user's habits to get the conceptual design, then get the interface prototype according to the above design, and finally need the user test and implementation scheme. The whole design process is carried out around the needs of users from beginning to end, and the user-centered design is embodied.

3. System function design

3.1. Functions of personal financial management system
In fact, financial management is how to manage a lot of data as a whole in order to be reasonable and effective. We present these data to users after image processing, which reduces users' re-understanding of data and makes it easier for users to understand financial management. Here, we use bar graph and pie chart to visualize financial data. The financial data presented to users is simple and easy to understand. Design a full-featured personal finance APP that is suitable for most mobile device users. Among the basic functions, the management of income and expenditure is the only design function and goal. Considering the convenience of users, several pages are designed in the viewing function, which can view recent income, expenditure and property balance, as well as the balance of income and expenditure. Automatic bookkeeping includes viewing the list of automatic bookkeeping tasks, viewing automatic bookkeeping logs, adding new tasks, and deleting selected logs. The setting of financial projects includes adding financial projects and searching financial projects [11]. The significance of financial data visualization is to further improve the statistical function. The visual data is not provided to the user for every income and expenditure record, but the overall statistics of these income and expenditure, which is what the user wants most, so the system adds the function of "chart". Statistical analysis of revenue and expenditure plan execution also includes execution result table, revenue execution graph, revenue execution histogram, expenditure execution graph, balance execution graph, balance execution histogram, query, statistics and download of revenue and expenditure plan execution.

The user interaction layer is the implementation of all the component user interfaces. Make a simple and beautiful interface according to UI design tools, and create the connection of corresponding functions to operate the background database. Visual function interface, clear function, simple operation and quick interaction between users and background database. The logical control parses the user request and maps it into a model update and sends it to the data access control. After that, the data access control executes the instructions transmitted by the controller, and carries out the corresponding functional instructions and data operations on the database. The connection between the software and the background database is realized through the data processing layer. The main task is to write various functional functions and encapsulate them in classes to provide corresponding functional interfaces for user interaction functions. Through the operation of the database, the functions of adding, deleting, modifying, searching, synchronizing and accessing the remote database of the cloud server can be realized, and the changed data can be saved in a specified form by relying on specific methods. Although the account book function plays a great role in facilitating users' use, it can't meet the requirements of users for their specific consumption categories. Therefore, the personal financial management system can also customize categories to make up for this defect.
3.2. Billing Modules

Financial management is a tedious matter, not only because there are many contents to be recorded, but also because the process of recording is a long and highly repetitive one. The main function of data access layer is to process the data generated by user interaction. In order to better understand how the functions of personal financial management system are realized in hierarchical structure, this paper analyzes the realization process of bookkeeping function in this system from the data frame level with examples. Security involves the security of confidential data and related core data, which requires that the system can effectively prevent external malicious attacks and various virus attacks, set up access rights management, and back up the internal data of the system. The bookkeeping function is the most basic function of this system. First, enter the bookkeeping interface to select the income category, set the information such as date and amount, and save it after confirming all the information selections to complete the bookkeeping function. After the implementation of personal finance software, it can ensure normal and smooth operation in daily office. Because the system is highly dependent, it is necessary to strictly check whether the database is stable and its functions are smooth, and avoid the phenomenon of data loss [12]. The controller updates the view whenever the data control layer changes. Here, the view update uses the observer mode instead of being directly controlled by the controller. Every time a view is registered as an observer in the data model, the controller sends an observer request to the data model, and then the data model sends a view update request. After functional test, the usability, security and reliability of personal financial management system are tested. After testing the personal financial management system, it is known that the system can ensure the interface style is clear and concise, the functional hierarchy is clearly divided, and the navigation design can meet the operating habits of financial users and provide necessary prompt dialog boxes.

The original financial information system outputs traditional financial data, converts it into financial data by appropriate conversion methods and outputs it to data demanders, and stores it by appropriate storage methods. The financial data conversion and storage mode selection and combination scheme are shown in Table 1.

### Table 1. Financial data conversion and storage method selection and combination plan

| Conversion mode          | File system storage | Database storage | Relational data storage |
|--------------------------|---------------------|------------------|-------------------------|
| Manual conversion        | 2                   | 2                | 3                       |
| Converter conversion     | 4                   | 3                | 1                       |
| Integrated transformation| 3                   | 2                | 3                       |

Make an evaluation of the financial status of users at various stages, and make a revision to the model:

$$I_{\omega} = F_{r}d - K_{\omega}\delta - C_{\omega}\delta - K_{\omega}e\delta$$  \hspace{1cm} (1)

Therefore, you can get:

$$U = RI + L \frac{dl}{dt} + E$$  \hspace{1cm} (2)

In order to eliminate the influence of different dimensions of original data, data preprocessing is based on data mining. It is necessary to standardize the collected raw data. Standardized formula is:

$$n = \sum_{i=1}^{g} PW_{i,j} + b$$  \hspace{1cm} (3)

Need to meet:
\[ n = W^*P + b \]  \hspace{1cm} (4)

The degree of closeness between two indicators can be measured by the distance between two points in P-dimensional space. Define the distance formula:

\[ y_i = f \left( \sum_{j} w_{ij} x_j - \theta \right) \]  \hspace{1cm} (5)

With the rapid development of China's economy, personal financial management in the modern sense is no longer just savings and investment, it is no longer just the accumulation of wealth, but also the guarantee and arrangement of wealth. The core of wealth protection is to manage and control risks, that is, when any accident happens to an individual's life and health, or when the economic environment in which the individual lives suffers an unpredictable blow, the living standards of the individual and his family will not be seriously affected. Test the reliability of personal financial management system, the system can ensure a certain degree of reliability, the minimum failure frequency can be controlled within one year, the maximum failure frequency can reach two years, and the worst failure resolution time will not last for three hours. If you want to ensure your quality of life, people need not only to work hard, but also to control their own lives and manage their personal property scientifically and effectively. We must fully understand the importance of financial management and realize our life goals by using our own financial management tools.

4. Conclusion
With the wide popularization of Internet application technology and the improvement of wireless terminal equipment technology around the world, wireless Internet will inevitably become the development direction of Internet in the future. With the rapid development of China's economy, personal financial management in the modern sense is no longer just savings and investment, it is no longer just the accumulation of wealth, but also the guarantee and arrangement of wealth. With the deepening of specialization, people's work is becoming more and more detailed, but it also makes personal work confined to limited professional fields. The most widely used financial knowledge is in companies and enterprises, and there is also a set of mature theoretical system structure, and the corresponding excellent financial management software is also emerging one after another. Because of the uncertainty of occupation and income source, the final users of personal financial management system decide that there will be various demand differences. If you want to ensure your quality of life, people need not only to work hard, but also to control their own lives and manage their personal property scientifically and effectively. Personal financial management system, as a part of mobile phone application, uses mobile terminals to manage personal finance, which greatly improves the efficiency of personal financial management, and is also an important condition for personal scientific and formal management and integration with advanced science and technology.

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