Design and Implementation of Macroeconomic Situation Analysis Application System Based on J2EE Technology

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Abstract. It is of great significance to analyze the current economic situation, accurately implement policies, and make breakthroughs in key areas. Using advanced information technology, fully using shared economic data resources, using mature basic economic theories and analysis tools, the application system of macro-economic situation analysis is constructed, which can timely and accurately understand the changes of economic information, study and judge the current economic operation situation, crack down on the development constraints, improve the level of public services, and achieve efficient governance. It provides real-time technical support. In this paper, combined with work practice, using J2EE technology, the economic situation analysis system construction process of demand analysis, functional design and development are briefly described, and the application prospects of the system are made for the next step.

Keywords: Macro Economy, Situation Analysis, J2EE, Application System

1. Introduction

Analysis of the current economic situation, research and promote the transformation of new and old kinetic energy, precise implementation of policies, and key breakthroughs are of great significance to do a good job in high-quality economic work, and ensure the effective completion of economic and social development goals and tasks. General secretary Xi Jinping pointed out that innovation is the first power to lead development. The core is "scientific and technological innovation" [1]. We should make full use of advanced information technology to make full use of the sharing of economic data resources, and build an analysis and application system for macroeconomic situation. We should fully grasp the basic data of economic and social development, understand the changes of information in a timely and accurate manner, and judge the current economic operation. It provides real-time technical support for the ideas and objectives of the situation, breaking the development constraints, improving the level of public services, and achieving efficient governance [2].

2. Principles of Development of Economic Situation Analysis System
After China's economic development has entered the new normal, it is difficult to respond to the needs of economic situation analysis brought by the new development concept and strategy by using the traditional single index or disordered multiple index analysis methods, and cannot directly reveal the situation and law of economic operation [3]. Using advanced information technology, we should actively build an application system for economic situation analysis, use mature basic economic theories and tools, and from different perspectives and dimensions, we can deeply explore and analyze the correlation between economic indicators from available economic data, monitor and warn the abnormal of economic indicators and predict the future trend of each index, which is conducive to the exploration of economic indicators. Under the new normal, the new laws of economic operation, the level of economic management and decision-making are improved, and the provincial control system is improved, which provides new support for improving the government governance ability and promoting the precision of government governance [4].

The current application of economic situation analysis system in each province (city) is different, most of which are still in the exploration stage. In the process of development and application, the main difficulties encountered are not only the matching of dimension relationship of analyzable indexes, the selection of threshold of moving indicators, the applicability of monitoring and warning models, but also the constraints of data conditions. The construction of economic situation analysis system must be based on the full sharing and exchange of data resources, and in accordance with the principle of applicability and effectiveness, we will gradually develop, apply and improve the current mainstream technology [5].

3. Demand Analysis of Economic Situation Analysis System
(1) Functional requirements are the main body of software requirements, which mainly include two main functions. First, according to the indicator type, it is divided into 10 major themes, such as comprehensive, industrial, agricultural, service, investment, consumption, opening, and new economy, and each subject is subdivided into leading index, synchronous index, result index and constraint index according to the actual situation, providing index correlation analysis, change analysis, monitoring and forecasting results of main indicators, and generating theme reports [6]. The second is to show the economic operation situation by means of graphs, tables and thematic reports, and provide functions such as economic situation analysis, data query, and automatic generation of thematic reports [7].

(2) As a supplement to functional requirements, non-functional requirements are mainly manifested in three aspects: first, scalability requirements. Because the business requirements of the economic situation analysis system are flexible and real-time, when functional modules need to be added or upgraded, they can be quickly supplemented on the basis of the current functional architecture system[8]. Second, maintainability requirements. The configuration function of the system design should consider the subject name, data source, index name, measurement unit, frequency and other information without modifying the program configuration for maintenance. The third is the requirement of easy operation. The system should effectively combine the flat interface design with the key business content, which can display intuitively and reduce the interaction times [9].

(3) Design constraints. Mainly follow the principle of domestic software priority, including database, web middleware, etc.

4. Functional Design and Technical Realization of Economic Situation Analysis System
According to the functional requirements and maintainability requirements of the economic situation analysis system, the system is divided into three modules: the application design of the front and the back end of the economic analysis and the portal display [10]. The overall functional structure of the economic situation analysis system is as follows:
Figure 1. Overall structure of economic situation analysis system

4.1. Main Functions of Economic Analysis System
1) Multi-dimensional analysis of indicators under different themes. It includes comprehensive, industrial, agricultural and other topics, and different topics are divided according to different index types, such as leading indicators, synchronous indicators, result indicators, and binding indicators.
2) Index analysis under different index types. That is to discuss the multi-dimensional analysis of subject indicators by different index types;
3) Correlation analysis. That is to compare and analyze the allocation of all related indicators under the same theme, mainly in the form of curve chart and scatter chart;
4) Change analysis. At present, there are two kinds of judgment forms: continuous change and threshold change. If there is a change of index, it will prompt the change information and add auxiliary line on the graph to indicate the position of the change;
5) Index data query. It supports data fuzzy query of different subjects and different index types;
6) Early warning and prediction. Through the analysis of the early warning model, the color of the warning lamp reflects the hot and cold situation of the current monitoring indicators; through the analysis of the prediction model, the trend of the prediction index is visually displayed by the broken line chart, and the actual value and the predicted value are distinguished;
7) Theme report. By writing into the fixed module, the PDF economic situation analysis report is automatically generated according to the data update.

4.2. Design of Main Function Modules of Economic Analysis System
Due to the wide perspective and multiple dimensions of economic situation analysis data, the front desk shows real-time effect and the result data requirements are high, so the background must have flexible configuration function and interface. Through the parameter configuration, the system can run
according to the specified state without modifying the state and reprogramming; through the good interface service, the front and back-end data transmission is realized, and the complexity of data storage of the index system is not required to be isolated from the foreground.

1) Index data storage and collection design. The sorted index system is stored in the database, and the index system structure tree is stored in the index system structure table. The obtained index data (shared exchange resources of each economic unit) are stored in accordance with the index system in terms of the dimension, frequency and statistical attributes of each index. The function of data acquisition is to configure the data in Excel format as a template to store the data obtained periodically.

2) Index data interface design. It mainly provides help for various applications to flexibly call index data.

3) Change analysis function design. The first is the configuration of change rules, such as the number of judgment periods of continuous changes and the judgment criteria of threshold changes; the second is index change analysis. After the new data of indicators are put into storage, the operation command of change analysis is triggered immediately, which can analyze, calculate and judge the new data and historical data of each indicator according to the configured change rules; the third is the change information query function, which can view the change score in real time Analysis results and detailed query; fourth, the foreground transaction analysis display interface, which provides support for the latest transaction analysis information under the topic [11].

4) Correlation analysis function module design. It mainly refers to the configuration rules of related indicators, that is, flexible configuration of comparable indicators.

5) Early warning and prediction function design. That is to read the result value sequence of each early-warning index and prediction index under the corresponding subject from the model platform system (integration), so as to show it in the economic analysis foreground.

6) Theme report function design. By configuring the subject report template, the PDF subject report can be generated automatically.

4.3. Main Technologies of Economic Situation Analysis System

1) Development Technology Framework: The main body of the project still adopts J2EE platform architecture which is suitable for multi-level distributed application model. The overall technical framework is as follows:

![Development framework of economic situation analysis system](image)

**Figure 2.** Development framework of economic situation analysis system

a) Performance layer. In order to make the front-end display and back-end interaction more flexible, it is mainly based on HTML5 and JSP, combined with the main characteristics of jQuery and Echart's highly personalized data visualization chart technology.

b) Business layer. The business layer is based on the open source spring framework, which can facilitate module decoupling and simplify development. The data displayed and queried by the economic analysis foreground interface are obtained through the HttpServlet internal interface running in the background of the server. The foreground accesses the data by calling the Servlet. The query parameters and returned data are packaged and sent in JSON format.
c) Data layer. On the basis of index system and index data, the database of economic situation analysis system stores the information of foreground display configuration, change rules and change information, subject report configuration, etc., and adopts relational database management system DM7.

2) System Deployment Design. Based on the overall planning of government informatization construction, the application server of economic situation analysis system is actually deployed on the virtual machine of cloud operation platform. The economic analysis server and portal server read the configuration information and intermediate data information by accessing the database server. Other system servers provide data interface services to the economic analysis server to provide data such as model, subject report, etc. For the backup requirements of the system, in addition to the necessary database backup mechanism, because the application server of the actual system is deployed on the virtual machine of the cloud operating platform, the hot backup of the system is realized through the virtual machine backup management mechanism, and the failure can be recovered at any time.

5. Summary of System Development of Economic Situation Analysis
The main module of economic situation analysis system is based on J2EE. Due to mature technology and mainstream technology, in the actual development process, the front and back-end function modules can be divided into different teams and developed by different teams. The coupling degree is very low, which is conducive to improving the maintainability of the whole system and optimizing separately [12]. The overall development framework of the system is based on spring, using the IOC mechanism of spring framework, combining spring AOP, spring Dao, spring ORM, spring MVC, etc., to achieve hierarchical coding, and decompose the major modules into single functional sub modules. The sub modules are responsible for scheduling under the spring framework to achieve functional cohesion and indirect coupling, and improve the maintainability of each sub module.

However, in the construction process of economic situation analysis, limited by the complex data docking conditions, although the unified framework is adopted and the configuration function can realize the expansion of theme business, it restricts the flexible expansion of business theme and analysis content, which brings technical challenges for the in-depth application of economic situation analysis.

6. Application Prospect of Economic Situation Analysis System
Although the establishment of the economic situation analysis system meets the multi-dimensional and multi perspective analysis of the current mainstream indicators to a certain extent, and provides certain auxiliary decision support for the daily work of economic situation analysis, the depth of the whole platform needs to be strengthened due to the restriction of economic data resources. In the next step of work, the economic situation analysis system will be upgraded and further expanded. In terms of technology, one is to introduce statistics and correlation calculation appropriately; the other is to upgrade the technical framework of economic analysis, so as to realize the configurable analysis subject page and realize the rapid modification, expansion and addition of topics. In the application, one is to keep pace with the times, increase the urgent economic analysis theme, and refine the analysis strength. Second, push the content of economic situation analysis to different business departments through App.

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