

DESIGN AND IMPLEMENTATION OF PRODUCTION PLANNING MANAGEMENT SYSTEM OF SURVEYING AND MAPPING PROJECT

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Commission IV, SS-17

KEY WORDS: GIS, Design, Analysis, Application, Management, Production

ABSTRACT:

With the development of photogrammetry and spatial information sciences, we have found many new methods to solve the technical problem in surveying and mapping project. But there is a little research on the project management. Traditional management method is complex and time-consuming. Now, we need use new technique to improve the management method for enhancing management level. Taking “National Western Surveying and Mapping Project on 1:50000 Topological Maps Blank Area” as an example, this paper focus on production planning management. The project is remarkable, not only the task and extent is tremendous, but also the staff and stuff are excessive. The Blank Area has atrocious weather and extreme hypsography. All of the conditions increase the project management difficulty. For reasonable planning and logical budget, we designed and realized a production planning management system to give the decision support to the managers. This paper studies the system’s requirement analysis, system structure and function in detail.

1. INTRODUCTION

Nowadays, Geographical Information Systems(GIS) are powerful and useful as means of information, visualization and research tools(Quan Bao,2004). Most GIS software is more suited to providing limited types of output than as a tool to support, at anything other than a superficial level, tactical or strategic decision-making processes. To improve the usefulness of GIS as a decision support tool, two needs are apparent. First, decision-makers require methods that allow them to easily select alternatives across a number of relevant criteria. Second, it is necessary to explicitly recognize that most decision-making processes involve multiple participants. Since problem solving is often characterized by multiple and conflicting objectives, methods that contribute toward more a completely aiding decision system are required.

Topographic map plays an important role in the field of society development and national security. Because of the limit of weather, environment and traffic condition, a continent area of 2,000,000 square kilometers in the west of China doesn’t have 1:50000 topological maps. This situation restrict the continuable development stratagem severely. National Western Surveying and Mapping Project on 1:50000 Topological Maps Blank Area(it can be short for National Western Surveying and Mapping Project) is an important project of surveying and mapping. It aims to finish the surveying and mapping task of 1:50000 Topological Maps Blank Area, build the fundamental geographical information database and thematic information database.

With the development of photogrammetry and spatial information sciences, we have found many new methods to solve the technical problem in surveying and mapping project.

But there is a little research on the project management. Traditional management method is complex and time-consuming. Now, we need use new technique to improve the management method for enhancing management level. Production Planning Management System of National Western Surveying and Mapping Project processes a great amount of data related to all aspects of production planning. The data include geographical data, attribute data, difficult grade data, metadata, etc.

In this paper, we present a software architecture and demonstrate the function of the production planning management system.

2. REQUIREMENT ANALYSIS

National Western Surveying and Mapping Project have many characteristics, such as wide extent, long period, new technical, advanced equipment, etc. The management of the project is trivial and changeful, it is difficult to manipulate. In order to improve implement efficiency, the management of the project need to get breakthrough in the aspect of work-flow, resource collocation, aided decision, etc.

Production Planning Management System faces to two lever user:

1. Decision level: the main users are the leader of project, they want to know the information about task collocation, budget, implementary department. They like this information can express as maps, figures, tables. They want this information can provide proof for decision making.

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2. Management level: the main user is the production planning constitutor. They want the system have the function of block dividing, working procedurechoosing, difficulty grade dividing, charge budgeting, report form making, etc.

3. SYSTEM STRUCTURE

3.1 System architecture

The system adopted distributed computing architecture. Fundamental to the system are the concept of the basic relationship between the server and the client.

A server can provide a service that compute and get result of the request come from client. Client can search and find the result of server and represent in many forms to users.

The optimization of database structure, which includes logical and physical optimization, is the most basic and important method of all optimization method of database capability because database structure design can directly affect the capability of application(Bin Li,2005). The logical structure is logically conceptual organic mode, such as table, index, etc. The physical structure denotes actual location of data. Both of them are correlative each other.

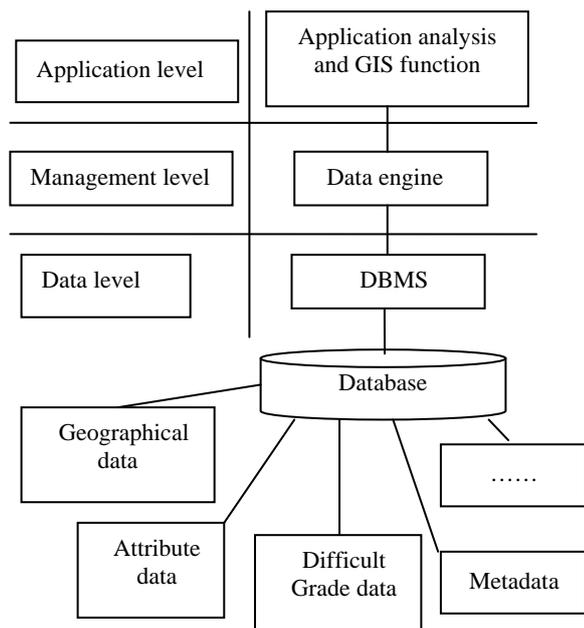


Figure 1. The architecture of system

3.2 System function

Production Planning Management System of National Western Surveying and Mapping Project have powerful function. It include of map basic function, data management, information service, planning making and extended function.

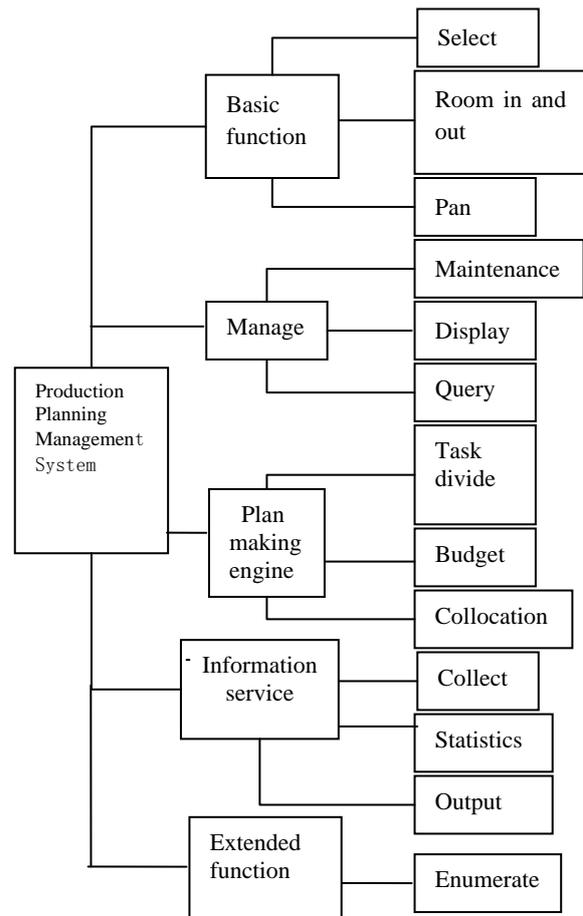


Figure 2. The function of system

3.2.1 Map basic function: The system achieved the function include Zoom In, Zoom Out, Pan, Label, Full Extent, Select Elements and Layer Control.

3.2.2 Data management: The system achieved data display, data query and data maintenance. Data display can present the data which store in the database directly on the map according to user requirement. Data query provide many modes including condition query, fuzzy query and advanced query. Data maintenance affords the function of data collect, revise, delete and update.

3.2.3 Information service: The system achieved information collect, information statistics and information output. Information collect can complete the information collect of map divide, cost ration and difficult grade. Information statistics can statistic the task by department and year. Information output can make the production planning report forms.

3.2.4 Planning making: The system achieved task divide, budget assistant and task collocate. Task divide abstract the working procedure into control surveying, investigating and mapping outdoors, digital photography indoors and mapping. Budget assistant can compute the budget according the number of map block, difficult grade and cost ration. Task collocate can assign the task to the department.

3.2.5 Extended function: Extended function implement the maintenance of enumerate value. Include department information maintenance, personnel information maintenance, material information maintenance, product location information maintenance, value unit information maintenance.

4. DATA ORGANIZATION

The core of the Production Planning Management System is the planning scientific and rational. The key point of planning include map block divide, difficult grade divide, working procedure, cost ration, etc. In the surveying and mapping project, besides some produce have close relationship with spatial position and working procedure, there are many produces have no relationship with spatial position and working procedure, they can not use cost ration to do the budget, but these produces are indispensable parts in surveying and mapping enterprise. So we divide the produce into two types: The produces which have relationship with spatial position (for example, map drawing)(short for Type A) and the produces which have not relationship with spatial position (for example, area design) (short for Type B).

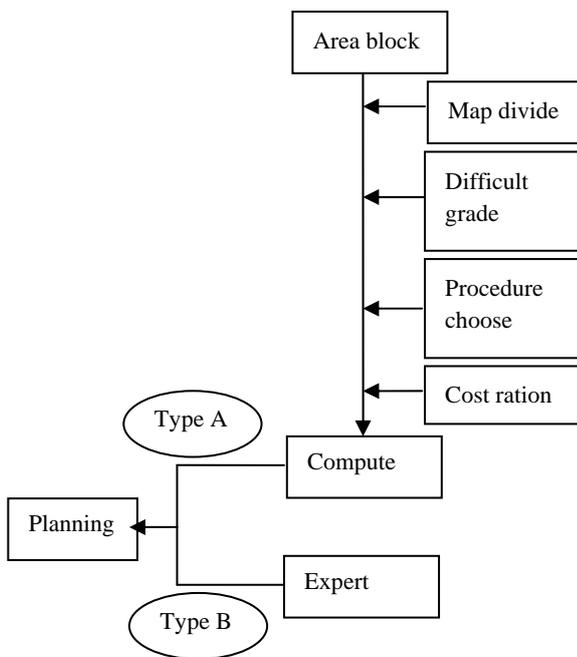


Figure 3. The data organization of system

4.1 The produce which have relationship with spatial position

The produces which have relationship with spatial position must integrate the factor of map divide, difficult grade, procedure choosing, and cost ration. Computer system are famed for their ability to take the data and process it into information.

4.2 The produce which have not relationship with spatial position

The produces which have not relationship with spatial position can not satisfy a range of criteria in multiple stages. So this part

budget must be confirmed by GIS experts by their experience.

5. IMPLEMENTATION

A presentation system has to comply with the requirement of the interactive, iterative, and participative involvement of users. The system should provide an interface which

1. Is easy to use in order to be effective;
2. Has communication systems capability;
3. Facilitates the easy selection of parameters, data output;
4. Is transparent, to facilitate visualization of the process represented within the analysis model.

According to the technical approach above-mentioned, we design and develop the Production Planning Management System. The system adopt ORACLE database in background, use C# procedure language foregrounding. The system interface as follows:

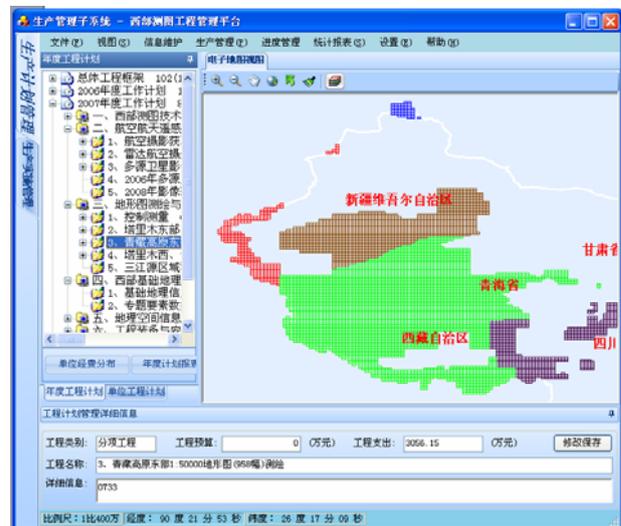


Figure 4. The interface of system

6. CONCLUSIONS

The production planning management system is effective and satisfies. However, it can certainly be further refined. The presented framework for surveying and mapping project management has been adopted to National Western Surveying and Mapping Project Management System. The approach thus presented can be very successful adopted for a wide surveying and mapping project management.

ACKNOWLEDGEMENTS

The authors thank the National Fundamental Surveying and Mapping Project (Project Name: Construct of National Western Surveying and Mapping Project Management System)for its support. Our gratitude extends to Mr. Gan Yuhang and Mr. Zhou Ping(Chinese Academy of Surveying and Mapping) for their help in system implementation.

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