

# Research on Software Engineering Management Method Based on Big Data

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**Abstract:** The role of software engineering management is to ensure that software projects can be completed within the prescribed time, and the quality meets the requirements. With the arrival of the big data era, data information is getting larger and larger, and the processing of the data information has become an urgent problem. Big data is a new achievement in the development of computer technology, mainly through the massive data storage, processing, analysis and mining, and then produce new information resources. Software engineering management, as a complex project, involves a lot of complicated data. In order to improve the efficiency of Software engineering management, we need to make full use of Big Data technology. In this paper, the big data-based software engineering management methods are studied in order to provide useful reference for our software engineering management.

## 1. Introduction

Software engineering is a discipline that studies how to develop and maintain software in a systematic, standardized and reliable way. It involves the overall management of software lifecycle, including requirements analysis, system design, coding, testing, deployment and maintenance, and so on. The goal of software engineering is to improve the efficiency and quality of software development, to ensure that software projects can be completed on time and meet the needs of users. However, the traditional software engineering management methods usually rely on human experience and subjective judgment, which is difficult to deal with the increasingly complex and huge software projects. Therefore, more and more organizations have begun to introduce big data technology into software engineering management to solve these challenges and improve the effectiveness of project management.

## 2. Definition of software engineering

Software engineering is an interdisciplinary subject involving engineering technology and management science. It mainly studies how to design and construct a system with specific functions. Software engineering aims to define the software development process and development methods to guide the software development process, and make it in accordance with the predetermined design principles. The aim is to improve the efficiency of software development, reduce the cost of software development and shorten the development cycle.

## 3. Basic principles of software engineering

Software engineering management is a practical activity, which completes tasks through planning, organizing, controlling and managing. Software development is a complex process, which needs to be optimized and organized by design, coding, testing and deployment. Therefore, it is necessary for us to analyze the basic principles of software engineering in order to better understand its meaning and guide practice. First, requirements analysis is the most fundamental step in software development. It includes the analysis of user's requirement and the analysis of software product's function, performance and interface. In the analysis process, we need to follow certain criteria to select the appropriate model; then we need to evaluate the feasibility and develop a development plan; finally, we need to complete the software prototyping. Secondly, the requirement and design

are based on the requirement analysis, and the software product structure diagram, database design and user interface design are made according to the user's requirement. In the phase of requirement analysis and design, we need to make corresponding function structure diagram, database structure and user interface structure diagram according to user's requirement. Third, coding is the design of functional modules through the programming language into code, and then the code integrated into the corresponding system, the final realization of software products. In the coding process, we need to follow certain standards and specifications to ensure the quality of code. Fourthly, testing is to test the function and performance of the software products after the development to ensure that the software products meet user needs and performance requirements[1].

#### **4. Status of big data-based software engineering management**

Big data technology can process and analyze a large amount of data, provide comprehensive information support for software engineering management provides new ideas and methods. Here is the status of software engineering management based on big data, including project planning, requirements analysis, development, testing, and maintenance.

First of all, in the project planning stage, big data -based software engineering management can use big data technology to predict and assess project risks. By collecting and analyzing historical project data, technical indicators, team performance and other information, we can establish a risk prediction model to discover potential risks in advance and take corresponding measures to avoid and respond to them. Secondly, in the requirement analysis stage, the big data technology is used to analyze and mine the user's requirement. Through the analysis and mining of user requirements, we can determine the functional requirements of software, including functional modules, logical structure and performance requirements. At the same time, through the analysis and mining of software requirements, we can clarify the user's needs and concerns, and develop corresponding solutions to improve the efficiency and quality of software development. Thirdly, in the design stage, using big data technology to optimize and improve the software design. Through the analysis and mining of project design, problems and defects in software design can be found in time, and design efficiency can be improved by modifying or reconstructing design. Finally, in the maintenance stage, big data -based software engineering management can use big data technology for user feedback analysis and defect management. Through the analysis and mining of user feedback data and defect reports, problems and defects in software can be found and repaired in time, and user satisfaction and software quality can be improved.

#### **5. Software engineering management model architecture in big data system**

The classical CS model of software engineering can organize and analyze data, but under the background of big data era, it needs to be tried and updated gradually, and then develop into BS model. By analyzing the data of big data system, BS model can extract effective information from the data and build a model based on it to help software engineers make decisions. The traditional CS model can't deal with the mass data in the big data system, and can't analyze every link in the software engineering, while BS model can process and analyze the data. The first module is the data acquisition module, which is mainly responsible for collecting a large number of software engineering data and saving these data to the database; the second module is the database management module, which is mainly responsible for the management of the information in the database, including the addition, deletion and modification of data. In this architecture, there are three types of databases: relational, non-relational, and NoSQL. Relational databases include Oracle and IBM's Sybase, while non-relational databases include MySQL, PostgreSQL, Hive, and more. NoSQL database mainly includes MongoDB, TensorFlow, PySpark and Kafka, which are relatively new database technologies. Because of their different characteristics and advantages, they are widely used in big data systems. In this architecture, the data stored in relational database is suitable for large-scale data processing, while the data stored in non-relational database is suitable for small-scale data storage. Non- relational database is more and more widely used in big data systems

because it is more suitable for processing massive data. The third module is data mining and analysis module, which is mainly responsible for mining and analyzing the massive data in the database to extract effective information[2].

## **6. Effective method of big data-based software engineering management**

### **6.1 Build a sound regulatory mechanism for software engineering management**

In the software engineering management of our country, we need to make full use of big data technology to grasp the data of software engineering and provide scientific data support. Therefore, in software engineering management, we need to make full use of big data technology to carry out technical training for software developers, so as to ensure that they can combine big data technology to improve software engineering management. At the same time, we still need to actively introduce new technologies, new ideas, new methods, in the specific application of continuous improvement and improvement. For example, in the actual application process, it is necessary to build and improve the computer system platform, and integrate it with big data technology, so as to achieve effective integration and optimization of various information resources. In the actual application process, we need to make full use of big data technology to carry out software system management. At the same time, rules and regulations are established based on the actual situation of software engineering management. In the concrete management process, operations and implementations need to strictly adhere to the laws and regulations formulated by the national governing bodies. Therefore, in the process of software engineering management, we need to make full use of big data technology to analyze and collate the relevant information, and based on this to establish the corresponding regulations.

### **6.2 Strengthen the key point control of software engineering management progress**

In order to strengthen the key point control of software engineering management progress, big data technology can be used to provide real-time and accurate data support. First, by collecting and analyzing a large amount of project data, the critical path and risk points of the project can be determined, as well as the key nodes of the project schedule. This allows the team to better plan and allocate resources to ensure that the project is completed on time. Secondly, big data technology can be used to monitor and track the progress and workload of the project. If there is a deviation, data analysis can be used to identify the cause of deviation and timely adjustment. In addition, Big Data technology can assist some staff members in the implementation of projects who are unable to complete tasks for some reason. For example, if a person's capabilities do not meet project requirements, Big Data technology can help that person improve their capabilities and work longer hours.

### **6.3 Strengthen the training of software engineering management team**

In the big data era, the software engineering management team needs to improve its ability and the quality of the management team to improve the software engineering management level. First, strengthening the training of team members is one of the important ways to improve the management level of software engineering. Before carrying out software engineering management, it is necessary to train the team members systematically to ensure the quality of software engineering management. This requires the software engineering management team to learn the relevant knowledge, work practice and theoretical knowledge, and master the relevant knowledge. Second, it is necessary to strengthen the training work according to the actual situation of software engineering, and according to market demand for regular or irregular training work. The training of software engineering team members can be divided into two aspects: one is the training of advanced management methods and technologies; For example, in software engineering project management, we should strengthen the communication with team members in the process of project implementation, so as to understand the problems and difficulties among team members.

## 7. Conclusion

In the big data era, software engineering management needs to make full use of big data technology for information integration and analysis to improve the efficiency and success rate of project management. At the same time, we should pay attention to the quality supervision and key points control of software engineering, strengthen the monitoring of all stages of the project development process and the inspection and acceptance of the development results to ensure the quality and progress of the project. In addition, we need to strengthen the training of the software engineering management team, improve the ability and quality of team members to meet the needs of the big data era. To sum up, the influence of big data technology on software engineering management is comprehensive, which needs to be optimized and improved in practice to meet the needs of the times.

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