SOFTWARE PERFORMANCE ANALYSIS: A DATA MINING APPROACH

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ABSTRACT

Software plays a critical role in businesses, governments, and societies. To improve performance and quality of the software are important goals of software engineering. Mining data has recently emerged as a promising means to meet this goal due to two main trends: The increasing abundance of such data and its demonstrated helpfulness in solving numerous real-world problems. Poor performance costs the software industry millions of money annually in the form of lost revenue, hardware costs, damaged customer relations and decreased productivity. Performance analysis and evaluation through data mining technique will result performance improvement suggestions for software developers.

Keywords: Data Mining, Performance Analyzer, Performance Analysis, Software Performance Testing.

I. INTRODUCTION

Performance is an indicator of how well a software system or component meets its requirements for timeliness. A performance test can help determine whether the product meets the performance goals or not. Performance testing is performed to determine how a system performs in terms of responsiveness and stability under a particular workload. It can also serve to investigate measure, validate or verify other quality attributes of the system, such as scalability, reliability and resource usage.

Data mining is a process of analyzing data from different perspectives and summarizing it into useful information [3]. Data Mining is an analytic process designed to
explore data (usually large amounts of data - typically business or market related) in search of consistent patterns and/or systematic relationships between variables, and then to validate the findings by applying the detected patterns to new subsets of data[2]. It is viewed as a process of extracting valid, previously unknown, non-trivial and useful information from large databases. The techniques of data mining for software defect prediction are: clustering, association mining, and classification [3].Data mining models of software testing can be utilized for recovering incomplete specification, designing a regression test and evaluating the software outputs when testing new, potentially flawed releases of the system.

II. PROPOSED FRAMEWORK

Performance problems are introduced early in the development process but are typically not found until later (during integration test or when the system is in use) when they are more difficult and more expensive to fix.

For software performance testing, different software are available in the market but they have their own limitations in different areas. But, there no framework is available to analyze and evaluate application performance in every aspects related to images, script multimedia, code execution, query execution, external resources integration, page load time, memory usage, CPU usage, cache utilization etc.

We are proposing a framework which will lead a developer to performance driven development to software quality. Application can be scanned with this new approach which in turn will give detailed report on the status of the application.

![Performance Analyzer](image)

**Fig. 1: Proposed Framework**

Performance Analyzer will indicate about performance of the page/file at the time of development. It will process the code and indicate the developer about the parameters like
code execution time, memory Usage, external file (scripts, images, multimedia) load time etc.[4]

At the time of development, developer will get clear idea about the performance of module developed by him. He can correct the indicated issues which can cause performance degradation after the product delivery [6]. Data mining technique is used to help developers to improve software performance in an efficient way.

III. SUGGESTIONS ON IMPROVEMENT OF QUALITY USING DATA MINING APPROACH

Using appropriate data mining concept comparison between Actual data (coming from performance analysis framework) and the ideal data (will be derived from industry standards and project surveys) will be performed and it will give the appropriate performance suggestions for quality improvement.

Different task involved in Data mining are divided into different data mining techniques. So, our proposed framework is one kind of Decision support system for developers. To generate the appropriate suggestions we have to collect datasets like,

- **Actual Data** are the data which is collected by the Performance Analyzer (i.e. Page load time, Query Execution time, Memory Usage, CPU Usage, etc.)
- **Ideal Data** are the past data collected by analysis of different industry standards and by surveying various projects of development companies.
- **Resultant data** are the derived suggestion for performance and quality improvement for application/software (i.e. coding and technical improvements to manage Server Response Time, Execution time, Memory Usage, CPU Usage etc.)

Results generated by this approach will give clear idea to the developer about performance issues of the application. These results will also help in identifying the actual area causing performance degradation or can cause in future and possible optimum solution.

IV. CONCLUSION

Developer can track out issues easily which can cause performance degradation and the major issues can be solved by using suggestions generated from the software performance analyzer during the coding phase itself. Using our proposed framework data can be mined with a specific purpose in mind and statistically significant results can be reported to developers and case-based reasoning can be used to create a specific Knowledge-driven performance analyzer that can be used by a developer.

On basis of the report generated through performance analyzer product quality can be improved which will lead company towards controlled work, quality work and indirectly financial gain. Because, a performance driven approach will lead industry to quality and will help in stress reduction, as “Quality is important for a product and Stress is harmful for creativity”. So this framework will be helpful in both areas and in future will result into good productivity, quality and financial gain.
REFERENCES


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