

Real Time Code Editor

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Abstract: *The world of Internet is growing rapidly, many applications that previously created on the desktop start moving to the web. Many applications could be accessed anytime and anywhere easily using Internet. Developers need tools to create their applications, one of them named code editor. The purpose of this research is to design and develop a real-time code editor application using web socket technology to help users collaborate while working on the project. This application provides a feature where users can collaborate on a project in real-time. The authors using analysis methodology which conducting on a study of the current code editor applications, distributing questionnaires and conducting on literature study. CodeR is a web application that provides workspace to writing, perform, display the results of the code through the terminal, and collaborate with other users in real-time. The application main features are providing workspace to make, execute and build the source code, real-time collaboration, chat, and build the terminal. This application supports C, C++, and Java programming languages.*

Keywords: Real-time code editor, React, Javascript, Student groups collaboration, Online editor.

I. INTRODUCTION

The technological development trend in software engineering has been improving, where the design of software began move from the desktop to the web. Nowadays, many code editors application has been made, such as Eclipse, Visual Studio, etc, but IDEs which based on desktop still have significant disadvantages such as long time for configuration and installing the plug-in needed for IDE to run the project. This problem could be a huge waste of time when there are many devices that have to be configured. Many software applications have been run in the cloud, and use a web browser as a user interface that allows ubiquitous access, instant collaboration, and avoid installation and configuration on desktop computers². One of the technologies used for instant collaboration is single IDE (like pair programming). Pair programming is the practice of having two programmers access and work on the same code in a single development environment³. In pair programming, programmers have the abilities to create, edit and delete source code in real-time. Pair programming could solve the synchronization problem of program code in order to remain valid, and whenever the code changes any programmer who is working on the same project could see the one who changed the code. Collaborative technologies could help programmers work together while fixing bugs or discuss the program in the same single environment but in different geographical area. Therefore, it needs to make an application that can improve performance while creating program such as real-time collaboration, create, execute and display the result of the program using terminal

1.1 Real Time Communication

Real-time Communication (RTC) is merging of communication and collaboration systems, which combined of communication technologies, like Voice-over-IP (VoIP) telephony and instant messaging, and various collaborative application. RTC technologies consist of four interconnected building blocks; consist of unified communications, presence awareness, contextualization and E- Collaboration portfolio. RTC systems usually enable two-person communication and support multi-person conference. By providing and integrating a range of synchronous communication media in one integrated environment, RTC systems allow users to collaborate in real-time, for example editing a document, voice call, multi-person video conference. RTC technology could help to solve the synchronization problem, especially when working in a team. RTC systems offer flexibility and interacting remotely with other users,

also it has been facilitated and improved in terms of interaction and communication that could help construct the project more efficiently. State of the art of this research is to design a code editor application which has the ability to do a collaboration while working on specific file, syntax checking, run and build those source code through terminal, and users could communicate with the others using chat as media. This application provides workspace where users can create, edit, run and build source code which has been written before and some useful feature like auto complete in C, C++, and Java. For users who want to export the source code files to desktop or import project files from desktop could use upload and download features. Hopefully, this application could be able to help programmer to do some project collaborate in real-time with others, and increase project development performance.

II. LITERATURE WORK OR RELATED STUDIES

2.1 Real-time Collaborative Programming

While working on development projects, any programmers working on the project by team. Any programmer who has the access to the project can create, change, and add code inside the same project file. So synchronization process is required between programmers to avoid code duplication, and to solve this synchronization problem integrated real-time collaboration is needed in a single environment. The Integrated Development Environment (IDE) is focused to provide collaborative setting for programming teams which has the ability to do real-time text editing, run and build code, chat, and various other features. The ability for editing text in real-time allows multiple users to work together while editing a document and display the changes directly to other users who has the ability to access the same document. There are a number of free applications that support real-time text editing feature, such as Google Docs. This feature not only makes excellent collaboration for common users, but can also very effective in programming. There are also a wide variety of web-based systems that provide collaboration. For example is EtherPad that allows real-time text editing. Ace, CodeMirror are web-based text editing component which designed to be embedded into the IDE or application. Project or software development requires the coordination and collaboration between programmers, so that the collaboration systems are very useful to improve the efficiency in making project. The effectiveness of collaboration in programming can improve the productivity and quality of project or software . Collaborative programming in real-time support programmers to work on the same programming file. Real-time system will automatically combine the code typed by a programmer without manual command from the programmer (such as update, commit)⁸ . Multiple programmers enable to access and edit the same source code directory, even at the same time. In real-time sessions programmer can collaborate with other programmers by joining and leaving a session of real-time during collaborative programming. There are steps to join and leave the session using the join protocol with two-way client to receive a request from a new client who wants to join.

2.2 Real-Time Collaborative Coding in a Web IDE

Now IDE is not only a tool that helps programmers in making projects or softwares, but the IDE now developed into tools that could help programmers communicate and collaborate with other programmers to make project more efficiently. One of the IDE that has been created to support real-time collaboration is Collabode. Collabode is a collaborative web-based IDE that supports Java programming language. In Collabode when multiple users make changes, the result of the changes will be distributed to other users immediately without control requires programmers manually⁷ . In addition, more than one user in the same project module can access this application simultaneously. Collabode made in order to improve the quality of collaboration and project produced. To be able to collaborate on projects, user only need to visit the same URL where the other users are in. Collabode use EtherPad to support collaboration among multiple editors. To manage the projects, Collabode using Eclipse that provides syntax highlighting, compile errors and warnings, continuous compilation, code formatting and refactoring, and the execution of the program code. There are three interesting models used for close synchronous collaboration⁷ : Test Driven Programming, Micro Outsourcing, and Mobile Instructor. The three models above give much different collaboration between one programmer to another programmer. Each of them has different ways such as using pair programming, side-by-side programming, and other collaborative models

2.3 Problem Domain and Problem Statement

The technological development trend in software engineering has been improving, where the design of software began move from the desktop to the web. Nowadays, many IDE (Integrated Development Environment) applications has been made, such as Eclipse, Visual Studio, etc., but IDEs which based on desktop still have significant disadvantages such as long time for configuration and installing the plug-in needed for IDE to run the project. This problem could be a huge waste of time when there are many devices that have to be configured. Many software applications have been run in the cloud, and use a web browser as a user interface that allows ubiquitous access, instant collaboration, and avoid installation and configuration on desktop computers. Collaborative technologies could help programmers work together while fixing bugs or discuss the program in the same single environment but in different geographical area. Therefore, it needs to make an application that can improve performance while creating program such as real-time collaboration, create, execute and display the result of the program using terminal.

III. FUTURE SCOPE

It provides plenty of customization options via themes. Comes with some of the most powerful search functions in the market, can handle massive files with ease. Also includes a smart code completion feature that supports most languages.

IV. CONCLUSION

This application provides a collaboration with the user in real-time. The user can invite other users to collaborate working on the same project through a friend list in the box on the right. After receiving an invitation to join another user in the same project, the user can communicate via chat.

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