

BASE: Collaboration tool for Researchers

ABHINAV SETHI, Virginia Tech, USA

GAUTAM SHARMA, Virginia Tech, USA

NIVISHREE PALVANNAN, Virginia Tech, USA

PURNA SRIVATSA, Virginia Tech, USA

The pandemic has made the life and work of software engineering researchers virtual too. Prior to the pandemic, researchers met up physically to discuss progress, share work and papers, make updates and to assign work to each of the team members. The software tool we build is going to help researchers organize their work in common virtual space and collaborate more efficiently with other researchers. The tool will also provide a way to map out the literature review in a visually descriptive way and allow researchers to maintain, edit or add the content of their literature review in a commonly shared space.

Additional Key Words and Phrases: software engineering, web application, client-server architecture, MVC model

ACM Reference Format:

Abhinav Sethi, Gautam Sharma, Nivishree Palvannan, and Purna Srivatsa. 2022. BASE: Collaboration tool for Researchers. In . ACM, New York, NY, USA, 5 pages. <https://doi.org/10.1145/nnnnnnnn.nnnnnnnn>

1 INTRODUCTION

The COVID-19 pandemic has caused universities and offices to go under lockdown. Scientists and researchers are striving to deal with this pandemic so that people could go back to living their normal lives again [2]. Software development research involves extensive team effort where collaboration and exchange of knowledge between team members are of paramount importance [1]. Prior to pandemic face-to-face team collaborative team meetings were conducted but still there was very less utilization of technology. Organizing the reference papers and keeping track of comments and notes was challenging without a proper tool. In addition to it pandemic also increased the need for a tool to facilitate software engineering researchers to aid with their research projects. For this purpose, Base - an online collaborative tool provides variant of opportunities for researchers to collaborate and access team members research works and notes. It helps researchers to create, collaborate and organize all the knowledge and information in common place where all team members can access it.

2 RELATED WORK

There are many tools currently in use that are used by researchers to organize their data and improve their research work flow. Some of them are Zotero and Trello . We will briefly describe the tools and their functionalities.

2.1 Zotero

Zotero is a free, easy-to-use tool to help you collect, organize, cite, and share research. Zotero allows researchers to search for documents on the web and add it to their personal library of papers. It helps organize the research by sorting

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from permissions@acm.org.

© 2022 Association for Computing Machinery.

Manuscript submitted to ACM

into collections and allows to tag them with keywords. Zotero created references and bibliographies for any text editor and directly inside Word, LibreOffice, and Google Docs. Zotero can optionally synchronize your data across devices, keeping the notes, files, and bibliographic records up to date. A user can also always access their research from any web browser. Zotero lets users co-write a paper with a colleague, distribute course materials to students, or build a collaborative bibliography. One can share a Zotero library with as many people one likes.

2.2 Mendeley

[Mendeley](#) is a free reference manager that can help you store, organize, note, share and cite references and research data. It can automatically generate bibliographies for the user based on the data uploaded. It helps collaborate easily with other researchers online. Mendeley also helps easily import papers from other research software and helps in finding relevant papers based on what the user is reading. It allows for accessing one's papers from anywhere online

3 DESIGN

The design of the application consists of multiple components such as a high-level architectural design, design guidelines and constraints. These are defined in the following sections.

3.1 Architectural Design

For this project, we have opted for a layered client-server architecture. Here, the client represents the user-interface for the web application that sends HTTP requests to the back-end server and displays the response received from the server in a meaningful manner. And, the server is the back-end service hosted on a remote machine that is responsible for processing the incoming requests and returning a meaningful response. It is also responsible for interacting with the database and storing and retrieving information from it.

3.2 Design Guidelines

- **Model:** The database represents the model aspect of our design. It stores information about the registered users, their repositories and the uploaded research papers. It consists of various schema for the users, repositories, keywords in research papers, tags, and user-defined parameters.
- **View:** The user-interface consists of HTTP web-pages. The application will have three pages: 1) Login Page: This page will ask for user-credentials like the username and password. 2) Sign-up Page: This page will allow users to register using their username, email-id and password. 3) Dashboard: This page will include support for adding or modifying new repositories, adding new research papers to existing repositories, options to share repositories or papers with other users, and graphical view of the research papers based on user-defined tags and parameters. Moreover, it will convert user-inputs into http requests and send them to the server. After receiving a response from the server, it will render the response onto the web-page.
- **Controller:** Server is the core component of our application. It would receive http requests from the client. Based on the request, it would store or retrieve appropriate information from the database and send the response back to the client.

4 DESIGN SKETCHES

4.1 Use-case Diagram

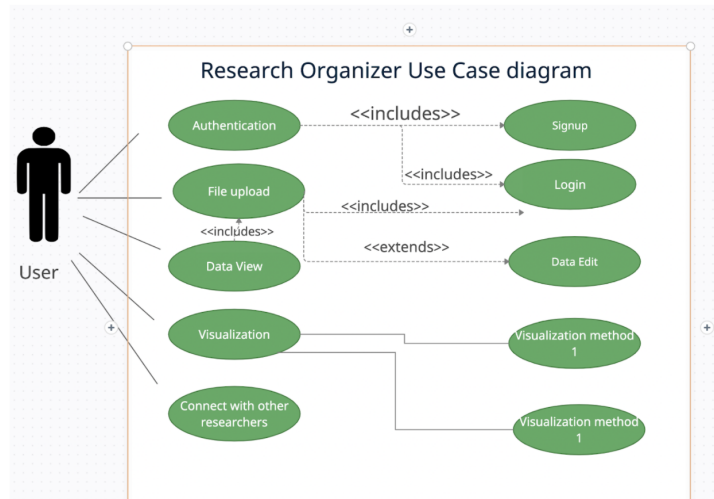


Fig. 1. Use Case Diagram

4.2 Wireframe Diagrams

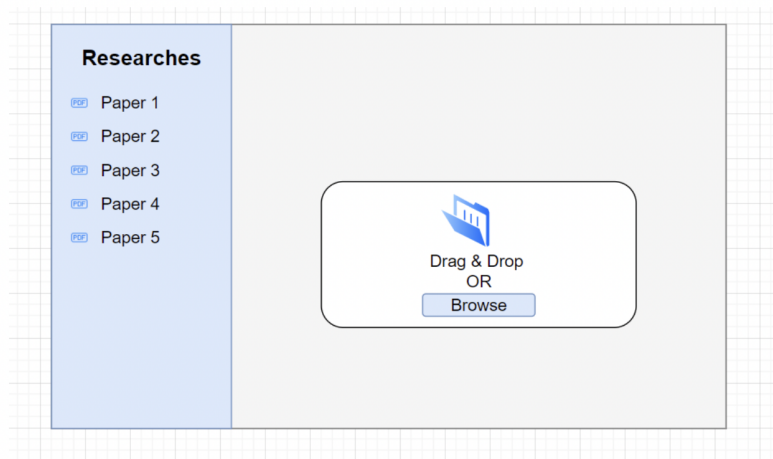


Fig. 2. Wire Frame of Dashboard's Browsing Page

The wire frame shows a page for managing repository items. On the left is a sidebar with two sections: 'Research Topic 1' containing 'Paper 1', 'Paper 2', and 'Paper 3'; and 'Research Topic 2' containing 'Paper 1', 'Paper 2', and 'Paper 3'. The main content area is titled 'Paper1.pdf' and has a 'Next' button. It contains three input fields: 'Title' (with a 'Date' label), 'Keywords', 'Parameters', and 'Methodology'. On the right is a sidebar with 'Parameters' (with the placeholder text 'Type to add new parameter') and 'Methodology' (with the placeholder text 'Type to add new Methodology').

Fig. 3. Wire Frame of Repository Management Page

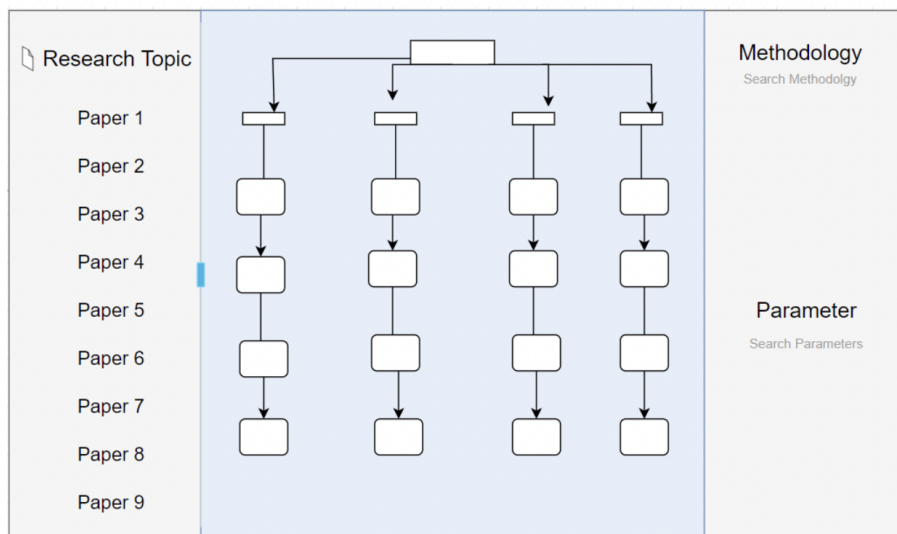


Fig. 4. Wire Frame of Visualization View

4.3 Activity Diagram

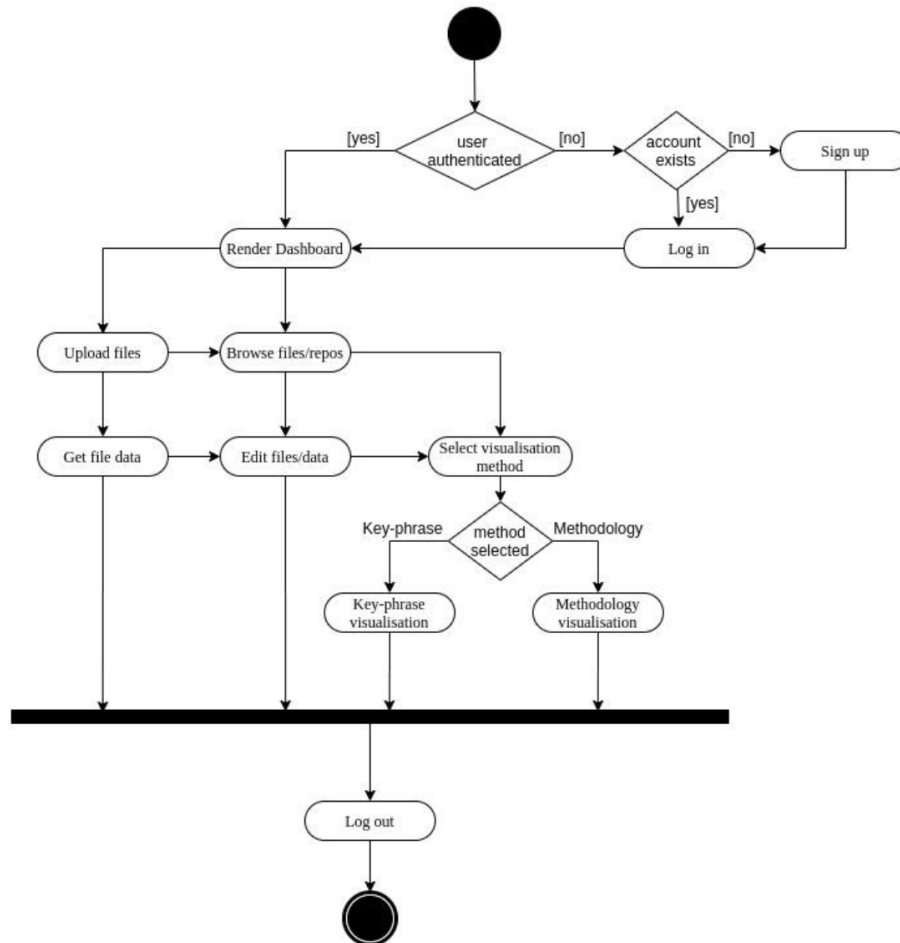


Fig. 5. Activity Diagram

ACKNOWLEDGMENTS

To Dr. Chris Brown, for the feedback on this project.

REFERENCES

- [1] İbrahim Akman, Cigdem Turhan, and Tuna Hacaloglu. 2021. Utilization of Online Collaborative Tools in Software Engineering: An Empirical Study on Review Meetings. In *2021 6th International Conference on Computer Science and Engineering (UBMK)*. 654–659. <https://doi.org/10.1109/UBMK52708.2021.9558995>
- [2] Anthony Watkinson Blanca Rodríguez-Bravo Abdullah Abrizah Chérifa Boukacem-Zeghmouri Hamid R. Jamali David Sims Suzie Allard Carol Tenopir Jie Xu Marzena Świgoń Galina Serbina Eti Herman, David Nicholas and Leah Parke Cannon. 2021. The impact of the pandemic on early career researchers: what we already know for the internationally published literature. *Profesional de la información* 30, 8 (March 2021), 1. <https://doi.org/10.3145/epi.2021.mar.08>