



Emergency Operations Application

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Introduction:

When an emergency occurs at Trine University, Campus Safety refers to their Emergency Operation Plans held inside physical binders. The Emergency Operations Application project was brought forward by Trine University's Chief of Campus Safety, Stuart Hamblen, addressing the need to make the physical Emergency Operation manuals into a digital outlet via mobile and web applications. For this project, the mobile application is view only, being available on Android and Apple operating systems. The web application side has a viewable portion and a writable portion, where changes to the manuals can be made. The group used Flutter design software and the programming language Dart to create mobile applications. The web server and database are hosted on a Heroku cloud server. Overall, creating mobile applications and digitalizing emergency operation plans will allow Campus Safety Officers to have ease of access to any emergency plans or building floor plans at the touch of their fingers.



Figure 1: The Mobile Application Login Screen



Figure 2: The Mobile Application Main Screen

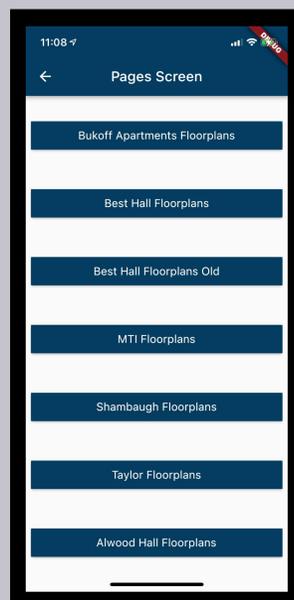


Figure 3: The Mobile Application Page Screen

Future Work:

Additional Security Measures

- Adding Duo Authentication which is a standard here at Trine for its connected products.
- Integration with Trine Accounts over the custom users made here to allow any applicable staff to use and release burden from director to the system already in place was not realistic for our time frame.

App Store Release

- Creating builds to be released on both iOS and Android App stores to allow the app to actually be installed locally through the compatible app stores.
- Lengthy and expensive process that could not be done in the few weeks after mobile app was completed.

Design:

Mobile Application:

- **Login Screen:**
The user starts at the "Login Screen", where they are offered with the option to type in their username and password. Once their login credentials are inputted, they can click the login button to proceed into the application. The application sends the inputted credentials to the server to get authorized. If the server deems the login credentials as correct, it will send back a token. With the correct token the application will allow the user to pass to the "Main Screen" of the application.
- **Main Menu Screen:**
At the "Main Screen" of the application, the user has the option to logout of the application. Second, the user has the option to go to the "Settings Screen". Third, there is a search button that brings the user to the "Search Screen". The last buttons available on the "Main Screen" are the dynamic list of manuals pulled from the server.
- **Search Screen & Search Results Screen:**
At the "Search Screen" the user can input any word or phrase they would like to search in the database. With the inputted text, clicking the search button takes the user to the "Search Results". Here the user will be greeted with all the document options that the searched word brought up based on related tags in alphabetical order for user convenience. The user can then click on whichever option they would like. That option will take them to the "Page Viewer" to display the document.
- **Manuals/Chapters/Pages Screens:**
These manuals include the Emergency Operation Manual (EOM) and the Safety Assessment Plan (SAP). Clicking the manual of choice will guide the user to the manual's specific "Chapter Screen". Here the user will be prompted to choose the specific chapter they would like to see. Clicking on any of the dynamic chapters will guide them to the chapter's "Page Screen". At the "Page Screen" the user will be prompted to choose the specific page they would like to see.
- **PDF Viewer:**
Clicking on any of the dynamic pages will guide them to the "Page Viewer", which will show them the PDF they wanted. The PDF viewer includes a variety of accessibility features like pinch to zoom, double tap to zoom, as well as a search feature for searching supported PDF docs for relevant words. Back navigation to view a different page can be done with the back button in the menu bar or via back swipe on supported devices.
- **Settings Screen:**
The "Settings Screen" allows the user to change the font size and button size of every piece of text and button in the entire application.

Website:

- The website is used to make additions and corrections to emergency operations material that is held on the server and data base for the mobile application. The super user has permissions to make changes to the data and add other users. Django was used to connect the front end of the website to the backend of the sever.

Server/Data Base:

- **Server Hosting:**
The server was hosted on Heroku which is a free platform that shuts down after inactivity and boots up in under 5 seconds when a request is sent. The database is saved on Heroku, and the actual files is on an Amazon Web Service bucket which is a free large file storage system.
- **API:**
The API allows for a completely headless design for the Mobile app to access the database structure and retrieve the files in a secure manner using JSON Web Tokens. No files are stored locally on the device and is update instantly from the website this way.

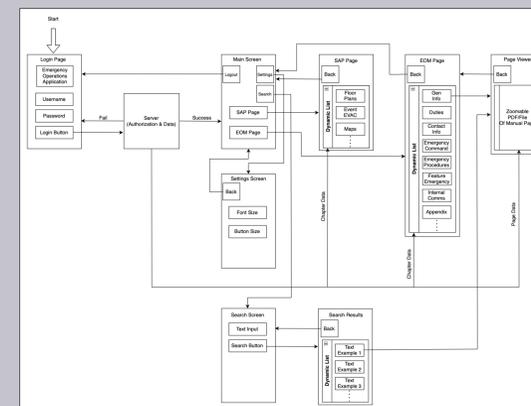


Figure 4: The Mobile Application Block Diagram

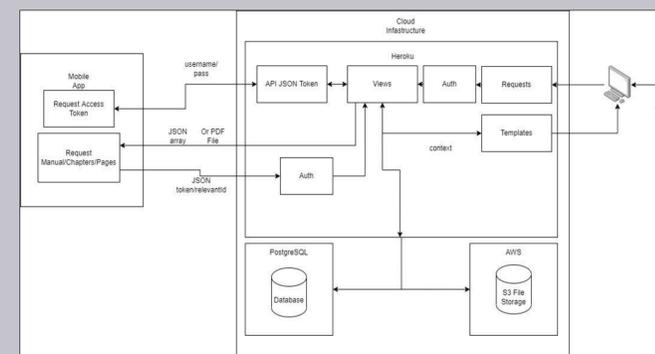


Figure 5: The Website Cloud Block Diagram

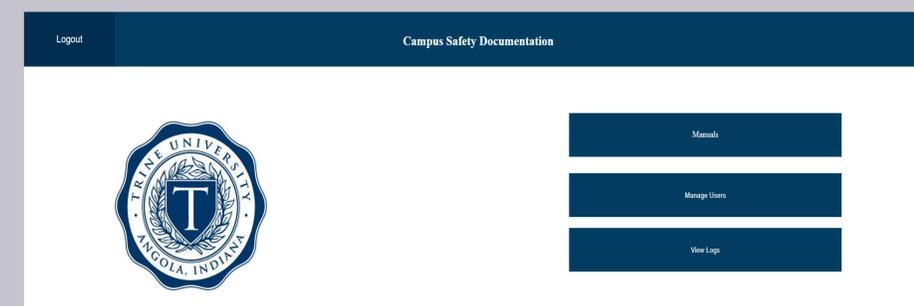


Figure 6: The Website Main Page

Conclusion:

Our main purpose with creating the app and website was getting the manuals online and easily accessible through the app and website as well as being able to create and edit the manuals through the website. While there were a few kinks to work out along the way, we were able to get the app and website to a point where the app and website are both usable in the way we initially intended.

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