Walking UnDead

Group 13
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Percentage of Contribution: 50%. Implemented the search and sorting functionalities. Designed and developed the profile skills screen, as well as the map and menu screens. Added functionality for map filters to enhance usability.
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Percentage of Contribution: 50%. Developed the navigation structure and implemented the register and login screens. Designed and built the interface for displaying resource lists.
Link to code repository: https://github.com/sofmlopes/Project-CM.git

1. INTRODUCTION

Walking UnDead is a mobile application set in the universe of the TV series "The Walking Dead". It focuses on survival and community building in a post-apocalyptic world where survivors need to share resources, safety concerns, and information with other users to protect themselves from the threat of zombies, known as the "walkers".

Our motivation was to empower survivors by providing tools for real-time information sharing and resource coordination, which are essential features of our application.

2. RELATED WORK

We adapted functionalities from emergency-focused applications like PROCIV.GOV.PT to create features such as real-time alerts and resource management tailored for a post-apocalyptic scenario. Inspiration was also drawn from navigation apps such as Waze and Google Maps with regard to the presentation of services and real-time location sharing.

3. METHODOLOGY

We developed our application using Android Studio, utilizing Kotlin as the programming language. Our development methodology was incremental, involving stages such as initial prototyping, iterative feature implementation, and continuous testing phases to ensure stability and usability. Our app follows a navigation-driven design that allows seamless transitions between different screens (Skills, Menu, Medicine, Food, Shelter, Profiles, and Authentication).

To implement the real-time data synchronisation features, we integrated Firebase's Realtime Database [7]. For the user authentication feature, we used Firebase Authentication. And finally, for the location services and managing location-based data, we employed Google Maps SDK [6] for Android Studio in conjunction with GPS sensors. For user interface design, we utilized Jetpack Compose and for navigation, Jetpack Navigation.

The main features developed in our app are a zombie reporting feature that allows a user to mark a zombie on the map if it is within a 3 km radius of the user, accompanied by a notification that pops up when there are zombies in the user's vicinity (3 km). There is also a sound grenade feature that emits a loud sound [5] to distract zombies in case of an emergency and an SOS feature that allows the user to call one of their emergency contacts. There is also an option to filter the main map by the location of the zombies, medicine, food and shelter.

Resource management allows users to register resources (medicine, food and shelter) with their assigned name, type, location, quantity, expiry date, number of beds or number of beds occupied. Users can also sort by these categories or search using the search bar. Our application allows the user to click on each item and be directed to the location of the resource on the map, as well as edit the number of resources and delete them if desired.

Finally, the profile screen displays the user's selected skills and allows the user to modify or add new skills and manage emergency contacts.

4. PROJECT DEVELOPMENT PROCESS

The project development began with defining the rough idea and features, followed by creating a low fidelity prototype. We then developed the app in stages, adhering to initial guidelines and incorporating the professor's suggestions.

In the initial pitch, we included the possibility of integrating group communication between people's profiles, but chose to exclude this feature since other communication applications already exist and perform the task effectively.

In terms of the first checkpoint, where we presented our high-fidelity prototype, instead of integrating a generic banner notification, we decided to implement real-time push notifications triggered by specific in-app events. One of the features included in our high fidelity prototype was the use of the camera to automatically populate the resource attributes. This feature would have improved the usability of the app by allowing users to quickly track resources in case of an emergency. We were unable to implement this feature in time, but it remains a useful addition for the future.

As for the second checkpoint, where we showed a demo version of our application, there were still some features that were not yet implemented, some that needed polishing, and others that did not serve their proper purpose. The bottom navigation bar was visible on the authentication screen, the user icon was also in the bottom navigation bar, and all the "REPORT ZOMBIE", "SOS" and "SOUND GRENADE" buttons were not implemented. The resource markers were also not displayed. In the remaining screens, the search bar and sorting options were not implemented. However, the

database and Google Maps were correctly integrated at this stage of the project.

Following this checkpoint, we focused on implementing and refining the remaining features. This included adding the four distinct markers (zombies, medicine, food and shelter) to the map, enabling the functionality of the three buttons mentioned earlier, and incorporating the real time push notifications system. Furthermore, we completed the implementation of the search bar and sort functionality, skill selection and emergency contact management, and the food and profile screens, which were previously incomplete.

Finally, we polished the user interface to ensure a cohesive and visually appealing experience. This included optimising layout designs, improving usability and ensuring consistency across all screens.

5. RESULTS

With regard to the outcomes we successfully implemented all of the aforementioned features, delivering a functional and engaging application.

As far as the project guidelines are concerned, our project adheres to several key principles:

- Our app is specifically designed for the fictional universe of *The Walking Dead*, where the zombie reporting feature only fits that narrative and not the real world.
- Integrating the Google Maps API enhances the user experience by enabling location-based features, such as navigation and resource tracking.
- Our app is distributed because it uses Firebase as a real-time database, allowing seamless data synchronization and interaction across multiple devices and users. Also, Firebase provides persistent data storage, enabling users to store and retrieve information effectively.
- Our app is designed for mobile use, as it relies on outdoor functionality and GPS to determine the user's location and provide contextually relevant features.
- Our app includes rich features such as push notifications and alerts, providing a dynamic user experience.

- Finally, our app adheres to mobile conventions (material design principles).

For future improvements, we have identified a number of areas for improvement. Implementing the ability to delete a zombie by clicking on its marker; Improving the SOS feature by integrating an accelerometer so that users can trigger the alert by shaking the device rather than pressing the "Yes" button; Automatically focus the Google Maps camera on the user's current location when registering the location of a resource; Adding functionality to reverse the current behaviour of resource markers, allowing users to select a marker on the map and view the corresponding resource details in the list; Improve usability by rethinking the user input process, such as integrating photo recognition systems to identify medicine or food, allowing users to access and manage resource information more efficiently.

6. CONCLUSION

In conclusion, our Walking UnDead application effectively achieved its results and produced a useful, feature-rich application that is consistent with the Walking Dead's fictional world. Real-time data synchronization and location-based services provided key features like zombie reporting, SOS, sound alarm, resource management, and skills selection. With a simple user interface and smooth navigation, the app was created with usability and engagement as its top priorities.

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