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Java Project Milestone

Abstract

In the interest of doing a more challenging and interesting project, I decided to change to an Android app. This app will use location services to determine the user's current location and tell them where they are on the Marist campus. To date, most of the work has involved learning how to program with Java in an Android environment, as well as other important systems such as UI and testing the app. The app currently has a modified UI and a working map with custom start and zoom locations. The methods to load the location configuration file and algorithm to determine if the user's location is within the bounds of coordinates in the configuration file are still in progress.

Introduction

Navigating a college campus can be difficult, especially when someone has never been to the school. Whether you are a prospective student, a member of the public coming for an event, or a student or professor who has recently joined the college community, it can become easy to get lost. The only true way to become familiar with a college campus is to spend time on it, but while you are learning you may find yourself asking what a certain building is or how to get somewhere else on campus. Enter FoxFind, a simple app which helps the directionally-challenged find their way on the Marist campus.

Detailed System Description

The app is extremely simple for end-users to operate. All they must do is launch the app and it will display their current location on a map as well as the building they are in. The app works by accessing the Android device's fine location. It takes the location and compares it against a pre-loaded configuration file of buildings and their coordinates. The configuration file contains four pairs of latitude and longitude coordinates, each defining a corner of the building. When the algorithm determines that a user has entered within the bound of these coordinates, it will display the building associated with them from the configuration file.

The app currently has two main class files: MapsActivity and Locator. MapsActivity contains code required by Android to work properly. This includes initializing the map object and setting

up location permissions to allow the app to access the device's location. Additional files include PermissionUtils, which is a file provided by Google which contains methods designed to make working with the nuts and bolts of Android permissions easier, and locationConfig, which contains building coordinates and their corresponding names.

MapsActivity
-mPermissionDenied: boolean -mMap: GoogleMap
+onCreate(savedInstanceState): Bundle +onMapReady(map): GoogleMap -enableMyLocation() +onMyLocationButtonClick(): boolean +onRequestPermissionsResult(requestCode):int, (permissions): String[] +onResumeFragments() -showMissingPermissionsError()

Locator
+locatorInit() -loadConfig() parseConfig(file): double[]

Requirements

The system must address many factors in order to accomplish its task. First, the system must be given the ability to access location services on the devices and be told how to manage the information. The app must determine if it has permissions to open a map, and if it does not, then to prompt the user to grant these permissions. The app must also determine how often it should request location updates, and adjust the map view accordingly. The app must also have the ability to load and parse a configuration file, and then constantly check if the device's current coordinates are within the bounds of the coordinates defined in the file.

Some difficult requirements set by this project are the various Android objects and settings that have to be learned. Having never developed an Android app, this project resulted in much more

work since it required that I work in a different development environment (Android Studio), design a UI and output data to it, and handle location services and data. As of this report, the biggest issue has been the development environment breaking after moving the location of the project folder.

Literature Survey

Many mapping projects and applications, particularly Google Maps, have labels for many buildings on them, even Marist buildings. This solution is limited as it doesn't label all buildings and isn't as precise. The advantage of the FoxFind app is that it can tell a user the exact building they are in based on their location, instead of them having to zoom all the way in on a map and hoping that a label is accurate. The app could even potentially determine areas of interest in a single building (eg. the Cabaret in the Student Center) by using more precise coordinates or, if necessary, altitude.

User Manual

The application is fairly simple and intuitive. Simply open the app and the user's current building will be displayed. Users can also drag, zoom, and rotate the map just as they can in many other map applications. Pressing the Current Location button in the upper right-hand corner will move the map back to the user's current location.

Conclusion

This system effectively solves the problem at hand by using an Android device's location services to inform the user of their current location on the Marist campus. This can prove very helpful to those visiting or new to the Marist campus that may still be learning how to navigate it, or by helping current students who are in unfamiliar areas of the campus.

References/Bibliography

https://developer.android.com/guide/index.html

https://developers.google.com/maps/documentation/android-api/

https://developers.google.com/android/guides/overview