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Report of Daily Path

In this app, all undergraduate requirements are completed, and the first part of graduate requirements is in the last part.

When user first open this app, permission will be checked and requested, then all current location information is shown even when with location changing, and the updating current location method and refreshing listview method are declared as synchronized, so no matter how frequent the update is, the system will always be safe as all operations are included in the two functions. When user wants to check in, a customized location name can be typed or not, once checked in, a geofence will be created, Geofence is an API that allow developers to place a customized geographically fence to be saved in the map and detect the event such as enter or exit this fence, it’s notable that only after the first exit of the most recent created fence it can be then activated. Any other check in within the geofence will use the name of fence’s owner’s name and address. In the database, a single table is made along with columns called “associated”, “named”, “marker” to determine the properties of each record, in this structure, redundancies for check in points within 30m is only name and address, and the table is easy to maintain and extend.

A Map button can lead user enter the second google map activity, in this activity, all added check in locations will be placed a draggable marker and the camera is focused on user’s current location when started. When user clicks the map, a dialog alert window shall be popped for customize location’s name, after typing the name or leaving it blank, a draggable marker will be created at the location. With enter or exit of geofence, related marker will display or hide a pop up window automatically.

Services provides background check in are available since the app starts, one service can provide auto check in every 5 minutes, the other can detect the user’s location and auto check in if the user has walked 100m away from the original position. Both services can run automatically in background even when the app is not visible to user at the same time, and the checked in locations will be named after the service method such as “autocheckinlocation” or “autocheckintime” to show the results, and a refresh button on the screen can be pressed to show updated list.

In this app, Google Maps API is mainly implemented to achieve most of the functions, a Geofence API provided by Android is utilized to monitor whether user’s location is within 30m of a previously recorded location point.

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Report of Delay and Accuracy

1. GPS:

Due to the limitation of environment, I only tested them in 5 outdoor locations around my home. The place I live is not big enough for testing indoor accuracy and delay.

The result of 5 places are as below:

Graph 1 Delay and Accuracy of GPS

The average time delay is around 7.2s, and the average accuracy is about 5.2m. The reasons about the time delay can be influenced by the task performing time and the time searching for satellite signals. The accuracy can be affected by the GPS signal strength, and the buildings or trees around testing areas which may recede the signal.

1. Network:

When it comes to the Network, the average delay is only 2.6s with average 12m accuracy, the accuracy can be determined by the number of network base stations or routers, and the distance between them. During my test, I only turned the wireless network on, so the result is completely from the wireless network instead of cellular network, as I don’t have a sim card in the phone.

The result of 5 places are as below:

Graph 2 Delay and Accuracy of Network (Wireless)

As shown from the table above, time delay of GPS is much higher than network mainly because of the signal transmitting speed and signal strength, but the accuracy of GPS is no doubt much more better than wireless network, the most accurate one is only two meters away.

For indoor situations, although I can’t test it myself, but I can infer that for GPS, the building’s structure and material used to build the building can greatly determine the result as the signal can hardly go through cement and beton, but for network, if there’re enough wireless networks, the result can still be accurate as it’s based on the location of routers or base stations.