

IN4254 Smart Phone Sensing-Assignment 1 Report

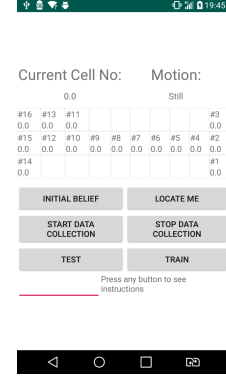
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Group Name: ceg, 6 May 2019

Phone Model: LG Stylus 3, Android Version 7.0

1 Method

The feature we have selected for RSS is the presence or absence of an Access Point, where we store the detected BSSID. The feature selected for ACC is the min-max range from each X,Y,Z values. The values are then stored as a CSV in the internal storage of the App. We have used a KNN classifier for both. The value of K we have used is square root n (15). For localization, we have used the hamming distance. When classifying a new sample, we use a number where each digit represents the presence/absence of a unique BSSID. For activity identification, we used the euclidean distance of the min-max range to determine the distance.



2 Evaluation Setup

We conducted both our training and testing at level 5 of the EWI building. We gathered samples every second for 1 minute. For localization, we did this for 4 cells, and then for activity recognition, we did this once for walking and once for standing still. For the localization, we used 4 cells linearly arranged with a 20 metre spacing between each cell.

Figure 1: App GUI

3 Analysis of Results

| | P.Still | P.Walk |
|---------|---------|--------|
| A.Still | 61 | 1 |
| A.Walk | 0 | 61 |

Table 1: Confusion matrix for motion detecting

| | P.Cell15 | P.Cell9 | P.Cell6 | P.Cell2 |
|----------|----------|---------|---------|---------|
| A.Cell15 | 59 | 0 | 0 | 0 |
| A.Cell9 | 0 | 60 | 0 | 0 |
| A.Cell6 | 0 | 0 | 73 | 0 |
| A.Cell2 | 0 | 0 | 0 | 58 |

Table 2: Confusion matrix for Cell localisation

From table 1 we can see the confusion matrix for motion detection. We collected 61 samples for keeping still, and predicted 61 samples correctly, and collected 62 samples for walking, and predicted 61 samples correctly. This nets us an overall prediction accuracy of 99.2%.

From table 2 we can see the confusion matrix for cell localization. We collected 58 samples for Cell 2 and predicted 58 samples correctly, collected 73 samples for Cell 6 and predicted 73 samples correctly, collected 60 samples for Cell 9 and predicted 60 samples correctly, collected 59 samples for Cell 15 and predicted 59 samples correctly. This nets us an overall prediction accuracy of 100%.

The 100% accuracy could be due to us collecting the testing and training data on the same afternoon.