INDOOR POSITIONING

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INTRODUCTION

The typical way one might think to position an electronic device is to use GPS, which for most applications works well enough. However, when a device is located in an indoor environment, the accuracy of the GPS diminishes. For this reason, it could be useful to have an alternative positioning technology, with a higher accuracy indoors. In collaboration with Axis Communications, this thesis evaluated one of these alternative positioning systems which use nearby WiFi and Bluetooth signal strengths to calculate a position. The evaluation of this indoor positioning system (IPS) consisted of testing the accuracy, and then testing the indoor positioning system according to real-world use cases.
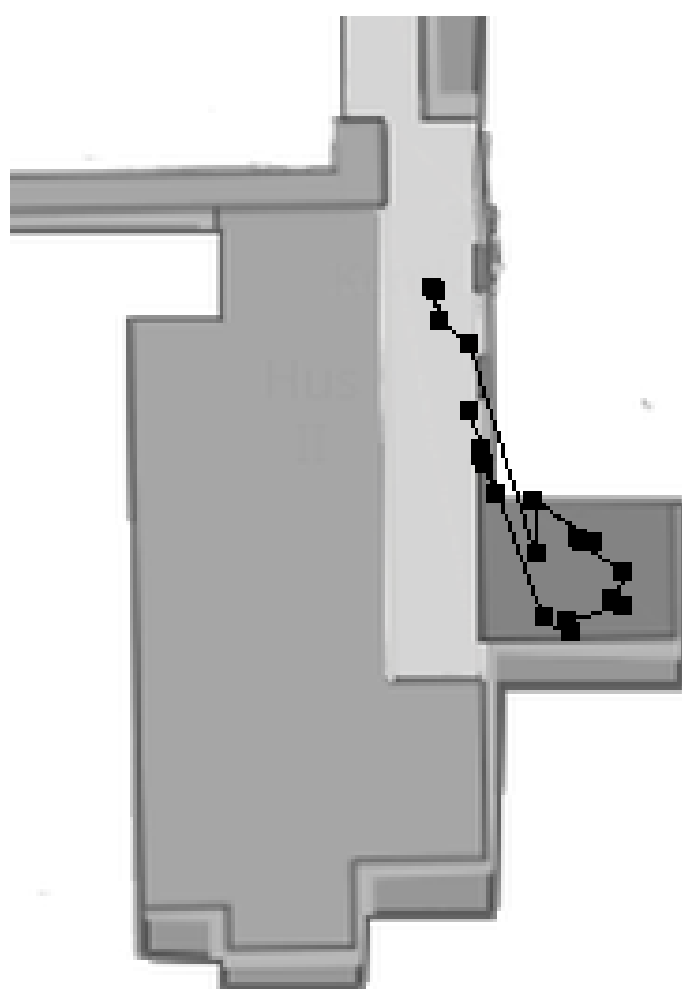
ACCURACY TESTING

For the accuracy testing, a single test was performed as following: Picking a certain coordinate, placing the device to be located in that position, and using the IPS to locate it five times. The average difference between the result and the actual position was calculated, along with the standard deviation.

USE CASES

To further test the IPS, three use cases were elicited by performing an interview with a security guard. Tests to simulate these use cases were created and performed. The results of these tests helped evaluate whether the IPS had the accuracy required to be used for those use cases.

RESULTS & DISCUSSION

The accuracy testing resulted in the IPS achieving an average accuracy of 9m with an average standard deviation of 2.5m. In areas where a large amount of Bluetooth and WiFi signals were nearby, the accuracy was as high as ~3m (Standard deviation ~1.2m).

When evaluating the results of the use case tests, the authors were only certain that one out of the three use cases would be an improvement to the systems already in place. Additional information about the remaining two use cases is required to make a conclusion. This could be done through user testing with a security guard.

The resulting positioning data from the indoor positioning system when walking into the dark gray room, walking a lap and then walking out and back to the starting position.