Wi-Fi Based Indoor Localization is Not Easy

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1. INTRODUCTION

Indoor localization has been a particularly active area of research in the last few years. Many solutions have been proposed. Among those, RF-based approaches [1][2][3] received more attention since it is easy to implement and has relatively high accuracy.

In this demo, we take a step back and to show that even with these many solutions proposed in the last few years, indoor localization is still a hard problem. We draw this conclusion from results by our recent efforts to provide a practical indoor location system at three different dense (i.e., they have large numbers of people in a very small area) public urban environments; 1) our university campus, 2) a large shopping mall, and 3), an airport. In particular, we find that the heterogeneity, power management mode, density of people in an environment, and even the relative placement of devices can have significant impacts on the RSSI values observed by the devices. This in turn can significantly affect the accuracy of localization algorithms causing errors of multiple landmark distances. Figure 1 and Figure. 2 show some of the results. In Figure 1, we see the result of RSS measured by similar devices from the same location at very similar times. Figure 2 shows another interesting result that the RSS value switched completely with the low device becoming high for phone and vice versa while in dongle case.

2. DEMONSTRATION DETAILS

We prepare a video demo to show some potential interesting observations under different scenarios and settings. In this demonstration, we change power management of either dongle or phone to see the impact on RSS measurement. In addition, the change of device location reveals a particular set of results where the RSS values read by a client device changes significantly if it is close proximity to another device. Moreover, this demo show the impact of people movement on RSS as well. When people walking around or simply stand, the change of population density can affect RSS directly. Finally, we will also show result from 802.11a v.s 802.11g. Some phones return much more stable 802.11a measurements while others may have revise experience.

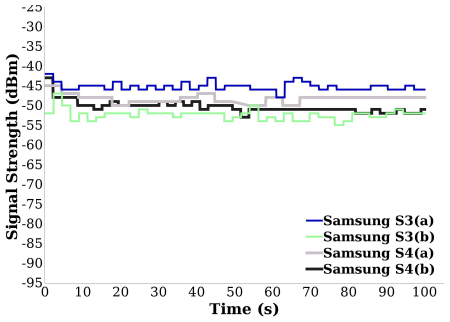

Figure 1: RSS measurement by different devices at same location

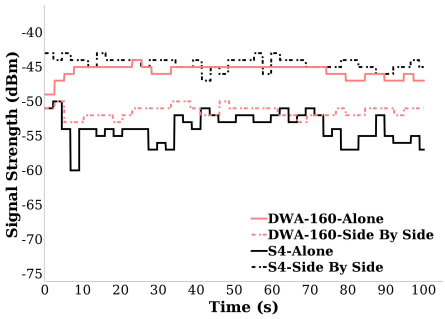

Figure 2: Impact of placing devices side by side on RSS measurement

We plan to allow participants to manipulate the devices and conduct measurement. This is subjected to the availability of AP infrastructure at the meeting site.

3. DEMO SETUP & REQUIREMENTS

For this demo, we will use laptop with D-Link dongles and several smart-phones from different vendors.

4. REFERENCES

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