

MASTER'S THESIS

Wireless LAN positioning in indoor environment

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Wireless LAN Positioning in Indoor Environment

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Master of Philosophy

Principal Supervisor: Prof. NG Joseph Kee-Yin

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Abstract

The communication technology has explosively grown in last decade, and the rise of the Internet changed the life style of all people on this planet. Nowadays, wireless communication is essential to our daily life. People can retrieve information from the Internet through a mobile device, and we are stepping to the age of ubiquitous computing. In order to provide proper information to users according to their location, we need a positioning system which can estimate the location of a user. Although Global Positioning System (GPS) can provide the location of a user with good precision, it doesn't work when the user stays in an indoor environment. However, the IEEE 802.11 wireless network has become popular in past few years, and most of the urban areas are covered by wireless LAN (WLAN) now, especially the indoor environment, such as commercial buildings and shopping mall. Therefore, a WLAN positioning system can be a solution to provide location based services in the indoor environment.

In this research, we propose a new positioning algorithm which can have higher accuracy in challenging environment, such as library, which has crowded metal bookshelves.

While most of the existing WLAN positioning systems obtain Received Signal Strength (RSS) information at either the access points or at the mobile device, in this research, we propose a new WLAN positioning approach by making use of the RSS collected at both the access points and mobile device and hence, achieving better precision. Moreover, the proposing positioning model is algorithm independent, which means that it can be applied with any RSS-based positioning algorithm. Based on the proposing approach, we developed a WLAN positioning system, which provide two different techniques, Composed Distance and Probability, to utilize the RSS data to enhance the positioning performance.

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