# Universiti Teknologi MARA

# Bluetooth-Based Location Aware for Mobile Application

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*In the Name of ALLAH, Most Gracious, Most Merciful and big Gratitude to Prophet, Muhammad SAW*

# ABSTRACT

Indoor positioning has become very highly demanded and increasing in popularity to promotes a high-quality information based on user location in indoor environments. An indoor positioning application allows user to moves around in an indoor environment while getting information based on their current location. It improves the user experience in a whole new level leading to a productive industry. However, most researches conducted focused on outdoor positioning and the weakness of outdoor positioning is that the signal weakens when it penetrates into buildings producing an inaccurate output to the user. There were several researches that have been conducted on indoor positioning such as Wi-Fi, Bluetooth, QR Code, RFID, Infrared, and BLE. Nevertheless, these works only focus on one technology leading to a less precise indoor positioning measurement. Yet, works related to indoor positioning are still lacking and is still highly demanded by the industry. This is to improve the effectiveness of indoor positioning. As a result, this project proposed a hybrid of Wi-Fi and BLE Indoor Positioning Location Awareness for Mobile Application. This application allows users to gain accurate and immediate information during their experience in an indoor environment. Results produced from the analysis proved that this project application provides accurate readings and information. In conclusion, the Bluetooth-Based Location Aware for Mobile Application can greatly provide a quality information proving the concept of indoor positioning location awareness.

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# CHAPTER 1

# INTRODUCTION

This chapter presents the background and overview of the study.

## 1.1 Project Background

Location awareness is a very important mechanism needed in a shopping mall as it fulfills the need to locate and track users inside buildings. With location aware system installed in a shopping mall, shopping outlets are able to promote their products directly through the users' mobile devices without any human intervention as they move to a particular area related to the shopping outlets. However, to be able to locate users using 1 technology only might be limited. This is due to its drawback of a small signal distance. When the user moves out of the device's signal range, then they cannot be tracked anymore.

As my project subject is a shopping mall, I am focusing on indoor positioning. There are several research that have been done on indoor positioning systems using sensors such as RFID (G. Y. Jin, X. Y Lu, & M. S. Park, 2006) (L. M. Ni, Y. Liu, Y. C. Lau, & A. P. Patil, 2004), Infrared (D. Hallaway, T. Hollerer, & S. Feiner, 2003), Bluetooth (G. Anastasi, R. Bandelloni, M. Conti, F. Delmastro, E. Gregori, & G. Mainetto, 2003) (S. Feldmann, K. Kyamakya, A. Zapater, & Z. Lue, 2003) and Bluetooth Low Energy (S. A. Thakkar, S. Patel, B. Kamani, 2016) with different techniques. To the best of my knowledge most of the research are based on 1 technology only and it limits the location awareness when the user moves out of range.