



Indoor Navigation Systems Using Annotated Maps in Mobile Augmented Reality

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A Mobile Augmented Reality indoor navigation framework composed of several modules to reduce human cognitive workload and save time by blending the digital and physical worlds seamlessly through aligning the appropriate 3D path with features in the real world through ground detection. The framework helps in better understanding the surrounding especially unfamiliar buildings such as offices, shopping malls and libraries etc. It determines the users starting location via scanning the reference image which is placed at the entrance. The system was tested at the Centre for Academic Information Services (CAIS), Universiti Malaysia Sarawak (UNIMAS). The results proved that the system provides a good platform to show the location information without requiring hardware installation and a strong wireless connection.

Key words: *Mobile augmented reality, indoor navigation, annotated maps, global positioning system (GPS), WiFi, sensors, mobile computing.*

Introduction

Indoor navigation is the idea of navigating the user in an indoor environment. Conventionally, people use a paper map or facility directory to see the location of an object and figure out the route to their desired destination. Although GPS-based mapping is introduced and well known for being a precise-positioning tool, it is only applicable for outdoor environments not for indoor because the signals from the satellite to determine a location are attenuated and dispersed by objects such as roof and wall.

The rapid evolution of technology in recent years offered a variety of techniques to facilitate indoor navigation such as Wi-Fi, Bluetooth Beacons and annotated maps. WiFi-based positioning technology is a good alternative solution as WiFi are commonly installed in buildings and it can act as access points. Its data can be used to calculate the current position