LIVELABS
SINGAPORE MANAGEMENT UNIVERSITY

SMU SINGAPORE MANAGEMENT UNIVERSITY
School of Information Systems

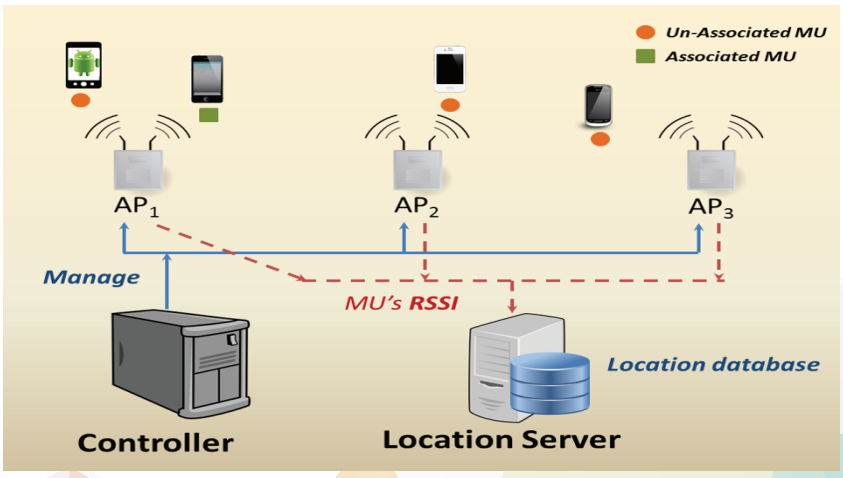
Wi-Fi based Indoor Positioning System

Location System Service

The Indoor Location System by the LiveLabs Urban Lifestyle Innovation Platform tracks any WiFi-enabled client device, including iPhones and other devices which do not allow client-side RSSI measurements, without any additional client-power. The technology requires no additional upgrades to the WiFi infrastructure, beyond just the base operational network. It benefits operators and owners of public venues by providing both real-time and retrospective, low-cost, tracking of the location and movement of all visitors within the indoor urban venue.

Overview

LiveLabs Indoor Location System is equipped with the capability of locating any device which is Wi-Fi enabled, in an indoor space where the Wi-Fi infrastructure is already in place. This technology does not demand any additional cost in terms of Wi-Fi infrastructure and also the individual battery power of the client devices. The technology works by analysing the uplink transmissions that any WiFi-enabled mobile device makes to the neighbouring WiFi APs. It provides accuracies typically in the range of 6-8 meters, and works with most products from popular WiFi vendors and the location information refreshes once every 10-20 seconds. Thus, unlike most of the available client-side indoor location systems in the market which supports only some mobile devices, our technology supports all the Wi-Fi enabled client devices irrespective of their make, model or OS.



Features & Specifications

The technology comprises of a WiFi fingerprint-based location system which has an initial phase of WiFi fingerprinting of the areas of interest (AOI), followed by the real-time location tracking. Our solution includes custom code to

(a) *transform the layout of the indoor space into a set of landmark coordinates, and*

(b) *process incoming WiFi RF measurements in real-time to provide concurrent location updates for thousands of mobile clients.*

Our solution provides:

(a) *an accuracy of about 6 to 8 meters within the indoor spaces with a reasonable Wi-Fi infrastructure;*

(b) *a location refresh latency between 10 sec - 3 mins, depending on the configuration of the WiFi infrastructure.*

http://livelabs.smu.edu.sg

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Potiential Applications

This technology may be used by the following market segments:

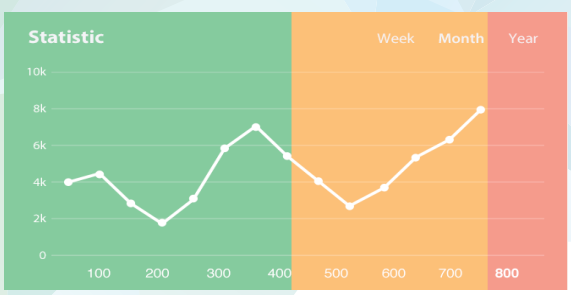
Venue partners/owners
- *To track any device for various applications*
- *To understand how the space is being utilised*

Other companies/ partners
- *Those who are interested in licensing the technology for possible use in offices, hotels etc. to support location-aware applications*
- *Understand and work with LiveLabs on our technology*

System integrations/Smart Nation vendors
- *To integrate real-time in-building visitor location tracking and awareness in public sector applications, across domains such as security, energy management and operations optimisation.*

Market Trends and Opportunities

Keeping in view of the ongoing Smart Nation initiatives in Singapore, this project is of high potential in the current market. As most of Singapore is Wi-Fi covered, locating and tracking any Wi-Fi enabled device within the island is very much possible with our technology. Combining with the Location Analytics project, the applications of such a data is tremendous. Moreover, WiFi infrastructure is now being rapidly deployed across all countries in SE Asia (at malls, hotels, meeting venues etc.)—hence, this technology is broadly applicable across the entire region.



Customer Benefits

This technology may be used by the following market segments:

- *Venue partners/owners*
- *Other companies/partners*

And the benefits include:

- *No additional cost on the infrastructure and on the individual mobile devices*
- *Supports all devices with Wi-Fi enabled*
- *Accuracy of 6 – 8 meters*
- *Able to locate all Wi-Fi enabled devices in the premise*

National Research Foundation
Prime Minister's Office
Singapore

For enquiries on testing and collaborations, please send enquiries to **livelabs@smu.edu.sg**
LiveLabs conducts all data collection activities and experiments in accordance with the prevailing Personal Data Protection laws of Singapore. *This research is supported by the National Research Foundation, Prime Minister's Office, Singapore under its IDM Futures Funding Initiative.*