An Improved Travel Safety for Urban Commuters Using An iTracks System

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***Abstract*—The purpose of this research is to improve the travel safety among urban commuters. Even though the large amount of money has been invested to ensure user especially urban commuters can access the public transport comfortably, the safety and security measures still become a concern. Crimes such as sexual crimes on passengers, pickpocket, snatch thefts and etc reported continue to occur on trains, taxis, buses or while walking from drop-off points to another mode of transportation or destination. Therefore, this study aims to produce an improved tracking system for human while travelling in urban area.**

***Index Terms*—Public transport, crime, travel safety, system.**

I. Introduction

In Malaysia, public transportation consist variety of movement channels for community and provides an employment opportunities whilst enhancing Malaysian socio-economic development and quality of life. It brings benefits to people who would rather use public transportation or the one without personal vehicles. Public transport offers mobility and access to comfortable and safe essentials in reducing flaws of travel time, traffic congestion, oil consumption, air pollution as well as avoiding necessities to pay tolls and parking fees while travelling from one place to another. Year 2009 has illustrated transformation in Malaysia public transport services through the development of Urban Public Transport NKRA (UPT NKRA) project established by Malaysian Government. The Master Plan has collided innovative approaches in increasing network access to as numerous potential locations as possible. However, despite of the large amount on the investment, ensuring the safety and security measures for public transport users is still become a huge concern. Crimes such as sexual crimes on passengers, pickpocket, snatch thefts and etc reported continue to occur on trains, taxis, buses or while walking from drop-off points to another mode of transportation or destination. Therefore the main objective of the research is to produce an improved tracking system for human while travelling in urban area.

II. GPS as a base for safety travel

In recent time, there's been a groundswell safety studies on public transport or vehicles' movements and status monitored through GPS-GPRS based tracking system. In fact, both system and hardware has been vastly commercialized recently. However, only minimal studies exist that covers considerations of a pedestrian or commuters' safety. As in [1] indicates that commuters are very vulnerable to crime during journey. They can be victimized to different components of the public transport system and have a substantial impact on levels of safety as well as feelings of vulnerability. Existing pedestrian navigation models usually examine the relationship between cross walking and traffic condition in a virtual environment (VE). For example [2] and [3] investigate on vehicle traffic and social flow-based approaches. Reference [4] developes DDDAS-based probability function to estimate an average pedestrian delay with corresponding traffic flow rate and traffic light control at each crosswalk. It is a multi-scale framework for pedestrian behaviour decision making modelling and interactions with drivers. Lately, numbers of recent research projects demonstrate that wireless sensor network or mobile phone application can enhance pedestrian safety. [5] developes a mobile phone application that alerts pedestrians before they cross potentially dangerous streets also via VE. [6] has proposed WalkSafe an Android smart phone application that assists people that walk while talking in order to improve their safety.

Reference [7] from Australia proposes *Transafe* a 'crowdsourced' collective intelligence. The application intended as a platform to support users reporting any crimes and transgression they witness or victimized on public area or transport via mobile phone application. Similar to our study, the author proposed this application to provide emergency alert service directly to respective authorities nearby user's location plus allowing tracking path by up to three desired contacts in identifying user's position. As for our study we propose to develop a mobile application to increase the use of Malaysian public transportation effectively and safely, whereby it will help commuters to identify which public transport people take

through the Kuala Lumpur city centre. This application will comprise an information system of routes and schedule linking to in rail-related services as a form of urban rail public transportation such as Light Rail Transit (LRT) Star and Putra Line, KL Monorail and RapidKL buses system. Additionally, it will also equip with emergency alert system for users to contact local authorities in case of emergency regardless of user's location. Taking measures in having 40% (MOT) of the people use public transportation in 2012, a sustainable public transportation will increase Malaysian commuters' safety and raise their confident level on public transportation system which is relatively friendly and less costly mode of transportation.

III. CURRENT SYSTEM AVAILABLE

A. The Advanced Traveler Information System

It is generally believed that advanced traveler information systems (ATIS) are among the most cost-effective investments that a transportation agency can make. The goal of these strategies is to provide travelers with information that will facilitate their decisions concerning route choice, departure time, trip delay or elimination, and mode of transportation.

The advanced traveler information system (ATIS) is a type of intelligent transportation system application areas that implements emerging computer, communication, and information technologies to provide vital information to the users of a system regarding traffic regulation, route and location guidance, hazardous situations and safety advisory and warning messages. [8] stated that advanced traveler information systems (ATIS) has very much is provided travelers with information that will facilitate their decisions concerning route choice, departure time, trip delay or elimination, and mode of transportation .ATIS requires a large amount of data for processing, analysis, and storage for effective dissemination of traveller information to users.

A geographical information system (GIS) allows large data to be effectively processed, stored, analyzed, logically associated, and graphical displayed. Thus, GIS-based ATIS provides a convenient and powerful tool for storage and graphical representation of information, which can be useful for users. [9] said that GIS also allow a user to conceive a problem and allow the appropriate software to assist him in the decision-making process regarding optimum route selection and trip planning. A study conducted in Hyderabad City in India by [9] shows that the use of ATIS has become user-friendly system that provides comprehensive information about Hyderabad City, such as road networks, hospitals, government and private offices, stadiums, bus and railway stations, and tourist places within the city limits. This system can be used effectively in bus stations, railway stations, airports, and tourist information centers, as well as in personal computers to provide information to travelers and to facilitate travel. Study by[10] demonstrate the ability of GIS to respond to the needs of many players in the transport industry as well as widening the viewpoints and crossing boundaries in the evaluation of transport systems.

There are many other ATIS services in Europe. In Madrid, Spain, DMSs are used on the M-30 (inner beltway) to display travel times to the next three exits to drivers [8]. In addition, a website is available that shows a map of real-time traffic in Madrid.

PROMISE also has become important projects in Europe. PROMISE (Personal Mobile Traveler and Traffic Information Service) is an ATIS in development for use in several European countries, including Finland, Sweden, Great Britain, the Netherlands, France, and Denmark. Information is provided through a mobile device, in some instances two mobile devices. The devices can access the Internet for or receive text messages about a variety of information, including trip planning information, travel information, yellow pages, bus stop timetables, maps, and flight delays. SmarTraveler is another favorite ATIS project, which is available in multiple cities across the U.S., including Boston, Mass., Palm Beach and Miami, Florida, Camden, N.J., and Philadelphia, Penn. It is run by a private company that has partnerships with public agencies to obtain traffic information. For each location, highway and freeway real-time traffic information is available on a website. The site also provides information for airports and transit agencies, such as rail or subway conditions and route service changes [8].

The effects of ATIS applications towards improving passengers journeys are therefore many; A study conducted in Wisconsin, by [11] indicated that 79.4% of respondents rank real-time information as the most important factor contributing to bus riders' perception of bus performance. Research carried out by [12] indicates that 84% of visitors who experienced automated onboard next-stop message announcements reported these services made it easier to get around. [13] further convinces that the usage of PDA/In-vehicle with Traveler Information has resulted up to 80% of users changed their commute route, up to 50% of users changed their commute time, up to 10% changed their mode.

IV. ITRACKS SYSTEM METHODOLOGY

The purpose of iTracks is to improve the travel safety among urban commuter. Likelihood with the benefits of the proposed system, methodical approach towards the planning, development, and execution of iTracks, a system methodology were formed to meet the targeted end results to complete on estimated time and budget. Table 1 below is the application requirement for proposed iTracks.

TABLE I. APPLICATION REQUIREMENTS FOR PROPOSED ITRACKS

NO	ITEMS	REMARKS
1.0	**Application Requirement**	
1.1	***User Profile Registration*** User can set their profile by filing their contact details and minimum 3 emergency/Favorite contact numbers for emergency distress system.	

1.2	***Setting Target Destination*** User can set their destination FROM and TO and the apps will show the route that they should take according to GPS.	It is a safety apps, that required the user to SET the destination From and To within the apps. It use GPS feature for user to insert the required information only and capture in a database.
1.3	***Connect with MyRapid Website*** It can connect to MyRapid website (link directly to LRT, Monorail and RapidKL buses route, schedule and etc).	1.There's no API provided by MYRapid portal 2.Setup the route and schedule detail (LRT,Monorail, and RapidK) into CMS and assign the GPS location for each route / station - Route and schedule based calculation on current GPS location and request time
1.4	***SOS Button*** It has a button that allow users to link directly contact the local authorities (police/999/DBKL) via sms or call in case of users in emergency.	1. For example if user trapped in a bus accident, they been snatch in public transport etc. 2. It allows the local authorities to track the victim regardless of their location based on the victim GPS coordinate. 3. From the last Tracked / Info updated in the apps and before the apps / mobile phone goes missing / turned off.
1.5	***SMS to Friends*** Plus based on the GPS coordinate, user can send it to numeral desired friend in identifying user's position.	1 .A button / function, user can click and send the Distress Call to the contact list the user has set into. 2 .A button / function, user can click and send the Distress Call to the contact list the user has set into.
2.0	**OS/Platform**	**YES/NO**
	a) IOS b) iPad c) Android d) Blackberry	YES YES YES NO
3.0	**App submission (with existing account)**	**YES/NO**
	a) App store b) Google Play	YES YES
4.0	**4.0 Content Management System (CMS)**	
4.1	CMS for app.	
	- User detail - Route and Schedule for MYRapid (LRT, Monorail and RapidKL) - User's setting details - Local authorities detail (PDRM/999/DBKL)	
4.2	CMS for Local Authorities - To manage Distress alerts - Track Victims - History / Log - User detail	
	CMS Reserved for further enhancement	
5.0	**Application Programming Interface (API)**	
5.1	API route and schedule	
6.0	**User interface design**	
6.1	App and CMS interface design	
7.0	**Testing**	
7.1	User Application Test (UAT)	YES

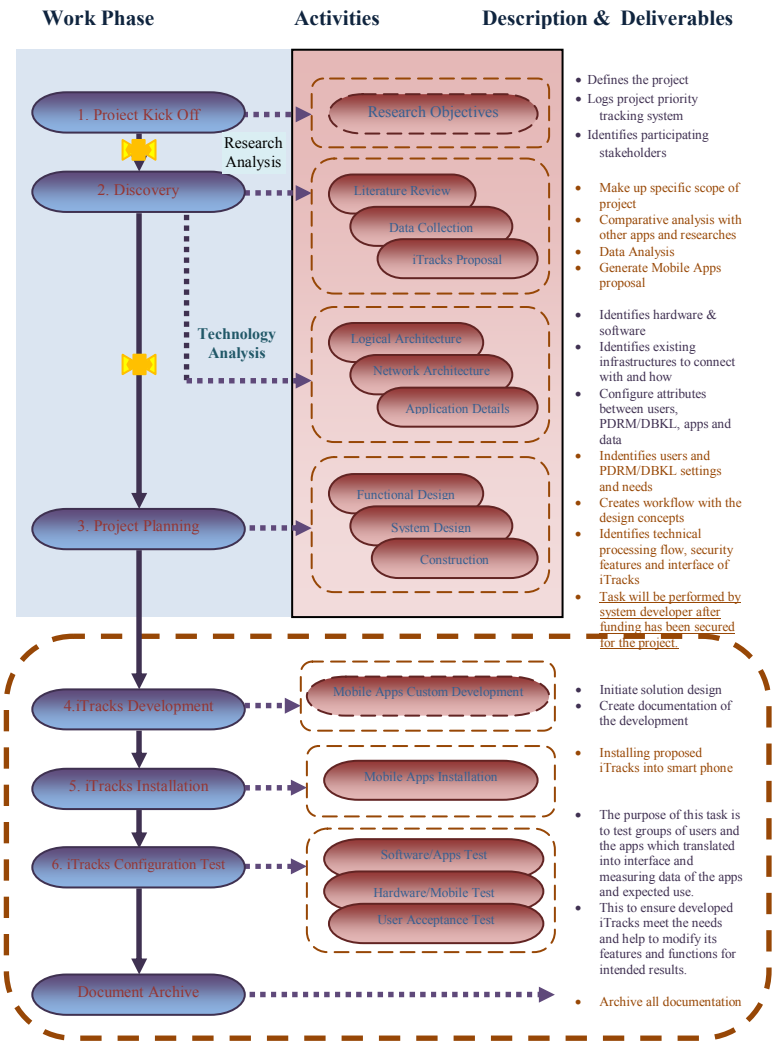

Fig. 1. iTracks system methodology

V. CONCLUSIONS

Looking at today's scenario of the crime occurrence in urban area had leave a huge impact and trauma towards many urban dwellers especially the women travellers and their family members who had been a crime victim before. Having an improved iTracks system would enhance their level of safety and reduce the fear among the travellers and the rest of the society. A real time travellers in handy were believed to improved the level of safety and reduce the level of fear while travelling. Based on the literary analysis, it is important to convince the government of Malaysia on the implementation of iTracks system all telecommunication providers and also land transport companies.

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