Mobile Enabled RFID-GPS Based Bus Tracking System

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ABSTRACT

Public transportation in many countries is being used as a means of transport for travelling and accordingly people would prefer these public transportation to be scheduled properly, on time and the frequency be adequately fixed for commuters to make good use of it. It has been found that quite an amount of research work has been carried out, by way of using RFID technology in the public transportation systems towards the tracking of passengers when they board and exit buses. In addition research has also been carried out in using GPS towards the tracking of buses along with RFID technology at traffic lights, bus stops, intersections etc and also displaying expected arrival times on LCD screen at bus stops along with their current positions. Taking these aspects into consideration, an intelligent mobile bus tracking system for the Jamaican Urban Transport Corporation has been proposed and validated as a case study. The proposed system also enables commuters towards tracking the bus of their choice and also knowing their expected arrival times. So taking the above aspects into consideration, in this research the authors have proposed and validated on how control center of a bus company could track the location of a bus based on information received from RFID reader and GPS Transmitter positioned at various Bus stops and in the Bus and accordingly the expected time of arrival calculated for displaying the information on commuter’s handset via Gmap. The implementation of the bus tracking scheme has been carried out using Adobe Flash player and Java.

Keywords: Adobe, GPS, LCD, RFID, Tracking Systems

1. INTRODUCTION

Any public transportation system having hundreds of vehicles would employ numerous resource entities to keep them functional and also efficiently serve the public’s needs. However, the efforts of these entities are thwarted by inappropriate trip scheduling, which see the companies suffering from substantial losses and the commuters largely inconvenienced. Inadequate and improper scheduling, enable empty buses idly parked at termination points on account of rigid departure times being followed, while the potential passengers get crowded at bus stops due to unforeseen circumstances. This scenario results in passengers getting stranded

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on one hand and a loss for the bus company in the form of wasted fuel and other resources due to trips in otherwise no crowd time.

The scheduling and tracking of buses will also rely heavily on the proper use of ICT in real time, in respect of the numerous actual events taking place in the field with regard to bus scheduling and commuter interaction and to facilitate the mitigation of common problems resulting from the unpredictable nature of the variables involved. With ICT now facilitating communication via wireless/mobile signaling, the network of buses, commuters and reference points such as bus stops and traffic lights, will be strengthened. This capability to function will hold true and be able to cover as much ground as is covered by the existing telecommunications networks. With widespread use of cellular phones, landlines and even the presence of cable television, sending messages now within the network will be virtually trouble free. In the event where there are no landline or cable television infrastructure, cell phone towers (base stations) or GPS satellites will take over the task of relaying messages. With a message being sent each time the position of a bus is registered and when a commuter keys in, there is an almost instant notification of that event sent to the respective recipient and depending on the processing requirement associated with the message, a response is issued in a like manner, if necessary. This efficient method of message passing is really ideal for optimal scheduling of buses, as drivers may be issued updated schedules, informed of anomalies and presented with a view of the wider network with reference to their location and points of interest (Harter et al, 2010).

Accordingly an intelligent system architecture (Hamilton and Suresh, 2013; Suresh and Hamilton, 2014) towards tracking the bus and ticketing was proposed and the same validated using Android. This system has been shown to track the bus of their route anywhere and knowing the expected arrival time of bus using GPS and also the reason for delay in bus arrival like traffic congestion, bus breakdown etc. In addition to tracking, it would be nice if the commuter be also reminded towards topping up the ticketing credit also, once the credit value runs low, thereby disabling travel which could be another novel feature.

Having already talked on how commuters would interact with bus company control center (Hamilton and Suresh, 2013; Suresh and Hamilton, 2014) towards retrieving the location of bus on GMAP and knowing the expected arrival of the bus on their mobile handset, we here in this research study have proposed and validated, using Adobe Flash player and Java, as how the bus company control Centre could keep track of the location of bus based on information being communicated wirelessly by RFID Readers installed at bus stops and GPS transmitter fitted on each bus. The information so received on the location of the bus along with timing information would enable the software at the control center of bus Company towards calculating expected arrival time and make an update in the database. This information is then communicated to commuter’s handset wirelessly once queried and displayed on their GMAP (Suresh and Hamilton, 2014). The rest of paper is organized as under. Section II, gives the literature survey on Tracking in public transportation using RFID & GPS system. Section III provides the details on the system architecture of the Mobile Enabled RFID-GPS bus tracking system. Section IV gives the implementation of proposed bus tracking system using Adobe Flash player and Java. Section V provides the conclusion and Future work envisaged.

2. LITERATURE SURVEY

In this section we will in brief survey the various literatures that cite the ICT usage in public transport towards tracking and scheduling.

2.1. GPS Tracking in Public Transportation

Automated Fare Collection (AFC) System also known as the Transit Smart Card System provides advantages over a manual fare collection system towards lowering labour costs
Distributed HPC UFS ACM Optimizing the Risk for All the Time on Every Time
[www.igi-global.com/article/distributed-hpc-ufs-acm-optimizing-the-risk-for-all-the-time-on-every-time/117618?camid=4v1a](www.igi-global.com/article/distributed-hpc-ufs-acm-optimizing-the-risk-for-all-the-time-on-every-time/117618?camid=4v1a)

From E to U: Towards an Innovative Digital Era
[www.igi-global.com/chapter/towards-innovative-digital-era/37874?camid=4v1a](www.igi-global.com/chapter/towards-innovative-digital-era/37874?camid=4v1a)