International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 12 | Dec 2022 www.irjet.net p-ISSN: 2395-0072

Review on IoT Based Bus Scheduling System using Wireless Sensor Network

Miss. Suprabha R. Potphode[1], Mr. A. G. Patil[2]

[1]PG Student, Department of E&TC, PVPIT Budhgaon.
[2]Professor, Department of E&TC, PVPIT Budhgaon.

Abstract - *The Wireless Sensor Networks have advanced more rapidly and more effectively. They have ended up the key source for the progression of IoT. They discover use in almost all areas counting smart network, smart transportation systems, smart home, smart clinics, and so on. Bus transportation service doesn't have a correct framework to trace all buses location and so the actual time of arrival in each stop. These issues occur because current transport company system didn't apply real time tracking innovation to follow on each buses on the road additionally lack of a platform to revive most up-to-date transport activity information to move passengers. This paper presents review on IoT based intelligent bus transportation framework model with Various IoT techniques like Radio Frequency Identification RFID, WIFI module, GPS module etc. for keen Transportation. The most expected benefits emerging due to IoT based transportation framework can be developed by coordination bus scheduling, bus location detection, and payment efficiency of passengers by booking seat system so that constrain congestion and reduce waiting time of the travellers.*

Key Words: Bus, GPS module, IoT, RFID Wireless Sensor, WIFI module.

1. INTRODUCTION

An appropriate and systematic public transport plays a major part in financial growth and well-being of the individuals in any nation. But public transport in most of the developing nations isn't running appropriately since of the need of precise planning and monitoring. In this Paper, we are studying the monitoring operations of bus transportation systems. Public Transport is one of the critical infrastructures of any nation. In developing nations like India bus transport comprises of 90% of public transport. However, need of efficient mechanism to monitor and manage the bus-network is leading to need of consistency of the transport network. It gets difficult to distinguish causes behind delays, or predict the entry times. Bus transport system faces the ever-expanding issue of traffic and congestion. The operations of bus-transport systems can be significantly improved by observing the transport operations and analysing them to giving valuable information both to the travellers and transport operating authorities.

2. LITERATURE REVIEW

Paper Citation: Jayesh Ramesh Chandiramani, Sanjam Bhandari, Hariprasad S.A., "Vehicle Data Acquisition and Telemetry", 2014 Fifth International Conference on Signals and Image Processing: © 2013 IEEE. [1]

Data Acquisition (DAQ) and Telemetry are Information Securing systems which are the portion of the winning equation of any race group or vehicle producer. It is crucial to the improvement stage of a vehicle, so that design can be approved and tunable parameters adjusted to extend execution and productivity. Existing DAQ systems come up short as they are of universal application sort and turn out to be greatly expensive and power consuming. Too, the need of filtering stages is an issue for sensor data coming from a moving vehicle. In this paper the system talked about was planned particularly for car application, taking into consideration the size, cost and performance, whereas too taking care of the noise factor by counting digital filters. Within the setup, the sensor inputs are given to an embedded controller which is modified to perform signal conditioning and analog to digital change utilizing the onboard ADCs. Most of the inputs from vehicle sensors are around 0-5V for voltage-based readings and 4-20mA for current based, this was the premise of choosing the ultimate specification of the framework. The Real Time Clock (RTC) is utilized to log the timing information of the data within the log record, which is stored on the detachable

SD card in comma separated value (CSV) format. The same data is additionally transmitted over the wireless network for the telemetry part of the framework. The backend GUI part built on LabVIEW is given the CSV information from the DAQ and is modified to offer the client filtering, flag conditioning/calibration alternatives and this data is shown graphically for analysis. The system was found to be 2.2 times more cost effective than current modules, with a data rate of 9600Hz and 10 bit resolution for DAQ and the telemetry system working at a serial data baud rate of 9600 transmitted wirelessly through a ZigBee network.[1]

Paper Citation: Ahmad Rahmati, Lin Zhong, Matti Hiltunen, Rittwik Jana, "Reliability Techniques for RFID-Based Object Tracking Applications", 37th Annual IEEE/IFIP International Conference on Dependable Systems and Networks. [2]

RFID innovation has the ability to do drastically progress various industrial processes. But it still faces numerous challenges, counting security and unwavering quality, which may constrain its utilization in various application scenarios. In this paper, the author examines the reliability challenges in RFID-based tracking applications, where objects like pallets, packages, and people was labelled with low-cost passive RFID tags pass by the RFID reader's read zone. The application of RFID innovation requires RFID tags joined to objects and a framework for reading the tags and preparing tag data. The framework typically comprises of antennas, readers, and a back-end system with edge servers, application servers, and databases. Their result shows that the reliability of tag identification is influenced by a few variables like the inter-tag distance, the distance between the tag and antenna, the orientation of the tag with regard to the antenna, and the area of the tag on the object. They illustrate that RFID framework reliability can be altogether improved with the application of simple redundancy techniques. This work conducted broad controlled estimations to characterize the reliability of passive RFID labels for tracking portable objects and people. Results uncovered critical insights into how reliability depends on different practical variables, such as inter-tag distances, location of the tag on an object, and tag orientation. To improve reliability, they investigated basic and cost-effective reliability strategies, to be specific repetition at the tag level, the antenna level, and the reader level. The results state that the high effectiveness of tag-level redundancy, taken after by antenna-level redundancy results in increasing framework reliability. [2]

Paper Citation: TareqBinjammaz, Ali Al-Bayatti, Ashwaq Al-Hargan, "GPS Integrity Monitoring for an Intelligent Transport System", 2013 10th Workshop on Positioning, Navigation and Communication (WPNC) ©2013 IEEE.[3]

The integrity of positioning systems has ended up a most vital prerequisite for location-based ITS applications. GPS collectors are utilized to supply vehicle position and speed information. In any case, GPS cannot give the high-quality positioning data required by ITS applications due to climatic impacts, receiver measurement errors, and multipath errors. Also, a few ITS applications, such as traffic law enforcement systems, have lawful or financial consequences and require integrity in both position and speed data. Subsequently, the integrity of GPS information is required to ensure that navigation systems will not deliver misleading or flawed data. In this article, a modern method for giving high integrity GPS data for land vehicle observing systems is proposed. The proposed strategy gives a three-level integrity check. The integrity algorithm consists of three stages of integrity check (position, speed, and map coordinating integrity). Each level uses a diverse method to check the consistency of the GPS data. A receiver autonomous integrity monitoring (RAIM) algorithm is utilized to measure the quality of GPS positioning output. GPS Doppler data is utilized to check the integrity of vehicle speed, which includes a new layer of integrity and may improve the execution of the map coordinating process. The final level within the integrity check requires confirming the integrity of the map coordinating algorithm. These three levels will improve the integrity of the complete framework, providing enhanced results. [3]

Paper Citation: Peng Chen, Shuang Liu, "Intelligent Vehicle Monitoring System Based on GPS, GSM and GIS", 2010 WASE International Conference on Information Engineering © 2010 IEEE. [4]

To reach the requirements of a few intelligent vehicle monitoring system, the computer program integrates Global Position System (GPS), Geographic Information System (GIS) and Global System for Mobile communications (GSM) in the whole. The structure, network topology, functions, main technical highlights and their execution standards of the system are presented. At that point hardware plan of the vehicle terminal is given in brief.

Communication process and data transmission between the server and the client and client through TCP/IP and UDP protocol are examined in detail in this paper. Testing result utilizing Load Runner software is too analyzed. Practice appears the robustness of the software and achievability of object-oriented programming. This paper has examined the structure, capacities, main technical highlights and their usage standards of a vehicle monitor system and given cases of the utilize of MapX under Visual Studio within the execution of a particular GIS application. It emphasized the peculiarity and key plan of the communication computer program, at the same time, offered the comparing strategies and working process of the client and the server. The research within the paper gives scientific and referenced bases for the improvement of Com GIS in Visual Studio. Experiences show that developing applications with object-oriented is simple, quick and effective. [4]

Paper Citation: Ganesh Venkat Sundar, Balaji Ganesh Rajagopal, "IoT based Passenger Information System Optimized for Indian Metros", International Conference on Electronics, Communication and Aerospace Technology ICECA 2017 ©2017 IEEE. [5]

Public transport plays a pivotal part in meeting a city's transportation needs. In addition, it makes a difference decrease traffic congestion and vehicular contamination. In India, buses are the preferred mode of travel due to their cheap charges and extensive routes. The major deterrents to their utilization are: 1) overcrowding and 2) instability in entry time. Crowd estimation techniques using cameras, infrared lasers at passages are not appropriate for Indian metros. This paper proposes an arrangement leveraging the Web of Things. The authors have simulated the handheld Electronic Ticketing Machines (ETMS) utilized by Tamil Nadu State Transport Corporation (TNSTC) conductors through an android application. Crowd estimation is done by keeping up a list of "live" tickets (on-board travelers) of each transport at the server side. The ETMs communicate with the server by means of an Application Programming Interface (API). The

Global Positioning System (GPS) receiver built into the ETM is utilized for real time following of the buses subsequently. [5]

Paper Citation: Ms. A. Deebika Shree, Ms. J. Anusuya, Dr. S. Malathy, "Real time bus tracking and location updation system", 2019 5th International Conference on Advanced Computing & Communication Systems (ICACCS) ©2019 IEEE.[6]

Public transportation system plays a significant role in each side of life. it's a bigger impact on economic development of the country. Tracking, monitoring, scheduling, alert services are the foremost challenges visage by this system. Currently, major services of this system are operated by hands that are approximate and simple access is denied to the people. This paper aims in automating the services of the system which will offer the real time tracking expertise of the public transport systems. The buses are having RFID tags among them and RFID readers will be placed in every bus stops. Arduino serves as the central controller for this system. GSM modules are going to be used to send the tracking messages to the authorized persons for continuous monitoring. GPS is employed for obtaining the location of the buses. Users will be getting the bus tracking details as notifications in their mobiles through IoT. The inputs from RFID readers are updated to Arduino for process the information. The processed data is distributed to the cloud that is the interface between the user and therefore the system. [6]

Paper Citation: U. K. Fernando, Ruwani M. Samarakkody, Malka N. Halgamuge, "Smart transportation tracking system on the internet of things vision" First Online 14 January 2020, Publisher Name Springer, Cham. [7]

This chapter points to look at the IoT-based vehicle tracking frameworks. For this reason, author investigates 30 publications from 2014 to 2018. Choice was based on certain basic parameters such as: measuring attributes of the moving vehicle, sensors and actuators utilized for data getting in tracking gadgets, information exchanging methods for transmission, networks and protocols utilized for communication, utilized stock for information storage, programming language or frameworks, and algorithm utilized for raw information analysis. The investigation illustrated that (i) a huge portion of the IoT sensors and actuators were centered on the primary location tracking system in cloud data centers that can be dealt with remotely by retrieving real-time data, (ii) The GPS sensors broadly utilize in vehicle tracking system were based on the RFID innovation, (iii) Wi-Fi systems were the most well-known systems whereas GSM/GPRS and TCP/UDP protocols were the best transport layer protocols, (iv) most utilized storage method was cloud for smart vehicle tracking system. In addition, the foremost critical advantage of utilizing IoT for tracking systems was the effectiveness, security, and intrusion of protection for the passenger. [7]

Paper Citation: Saurabh Chatterjee, Prof. Balram Timande, "Public Transport System Ticketing system using RFID and ARM processor", 2012 International Journal of Electronics and Computer Science Engineering, volume 1. [8]

This paper is based on ticketing and identification of the traveler within the public transport. Within the metropolitan city like Mumbai, Kolkata we have a serious breakdown of public transport and different security issues. This paper propose a user friendly computerized ticketing framework which is able to automatically deduct the traveler's fare according to the travelled distance as well as identify the passenger. the authors utilized RFID tickets and GPS which used to make the transaction and for distance calculation and identification of the passenger. This paper basically deals with the identification and ticketing of the travelers sitting within the public transport. [8]

3. PROPOSED METHOD

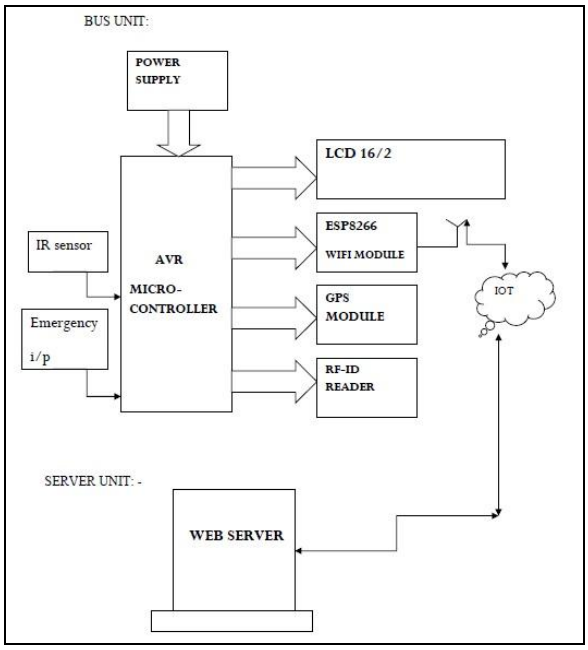

Fig -1: Block diagram of proposed model

Each bus is equipped with an on-board device that stores the service schedule information and links to the system on the bus. With this on-board technology buses can compare the real-time location to the assigned schedule and report the deviations to the Transit Control Center. The "Next-stop" display, passengers will know where they are and when to get off the bus. The next bus stop passenger can receive early message.

The proposed model consists of an App for bus tracking through GPS tracking unit installed in bus which will send data to Microcontroller and GPS tacking will be carried out with help of WIFI Module. The WIFI module is connected with centralized server and then app will be providing the

location so that passengers can monitor the bus which is travelling on that route.

A smart card is to be designed like RFID card reader which having some amount balanced for ticket booking. The amount balance will be directly reduced when the passenger swipes that card for ticket booking.

In this model there are IR sensors which will count the No. of passengers travelling into that bus as well as this system will provide an emergency I/P switch with emergency I/P response for any accidental or medical emergency. When emergency I/P will be provided by the driver a specific data will be send to the website so that emergency help will be provided at that location or bus.

4. CONCLUSIONS

The quickly developing populace in today's huge cities adversely influences the transportation. Subsequently, in smart city, IoT-based administrations for transportation are highly requested to supply productive and more secure transport conditions to citizens. In this study, it is pointed to address smart transportation systems for more secure streets in smart cities. For this reason, a literature survey has been conducted to present the current state of understanding of IoT-based smart transportation systems for payment efficiency, bus scheduling, bus location detection, and to reduce waiting time of the travelers. RFID technology to public transport businesses could be an appropriate solution for all businesses working in this segment and gives wide scope for information collection. The Smart RFID card helps to reduce chaos and ensure a better travel for passengers. IoT based public bus transport tracking system is an advanced strategy that can locate and track the buses. It uses GPS, GSM and Google map for tracking the bus. Taking all of the above into thought, it is evident that the proposed model will help in resolving the challenges that passengers encounter in public transport like waiting for correct bus, ticket generation, proper time require for travel, etc.

REFERENCES

[1] Jayesh Ramesh Chandiramani, Sanjam Bhandari, Hariprasad S.A., "Vehicle Data Acquisition and Telemetry", 2014 Fifth International Conference on Signals and Image Processing: © 2013 IEEE.

[2] Ahmad Rahmati, Lin Zhong, Matti Hiltunen, Rittwik Jana, "Reliability Techniques for RFID-Based Object Tracking Applications", 37th Annual IEEE/IFIP International Conference on Dependable Systems and Networks.

[3] TareqBinjammaz, Ali Al-Bayatti, Ashwaq Al-Hargan, "GPS Integrity Monitoring for an Intelligent Transport System", 2013 10th Workshop on Positioning, Navigation and Communication (WPNC)©2013 IEEE.

[4] Peng Chen, Shuang Liu, "Intelligent Vehicle Monitoring System Based on GPS, GSM and GIS", 2010 WASE International Conference on Information Engineering© 2010 IEEE.

[5] Ganesh Venkat Sundar, Balaji Ganesh Rajagopal, "IoT based Passenger Information System Optimized for Indian Metros", International Conference on Electronics, Communication and Aerospace TechnologyICECA 2017©2017 IEEE.

[6] Ms.A.Deebika Shree, Ms.J.Anusuya, Dr.S.Malathy, "Real time bus tracking and location updation system", 2019 5th International Conference on Advanced Computing & Communication Systems (ICACCS)©2019 IEEE.

[7] U. K. Fernando, Ruwani M. Samarakkody, Malka N. Halgamuge, "Smart transportation tracking system on the internet of things vision" First Online 14 January 2020, Publisher Name Springer, Cham.

[8] Saurabh Chatterjee, Prof. Balram Timande, "Public Transport System Ticketing system using RFID and ARM processor", 2012 International Journal of Electronics and Computer Science Engineering, volume 1.