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IOT based Multipurpose Transport Management System using Smart Intelligent Sensors

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Abstract— **Internet of Things (IOT) is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment and transfers data over a network without requiring human-to-human or human-to-computer interaction.**

This paper presents a highly sensitive and more secure management system for bus transport with a help of PIC microcontroller and various sensors. The proposed system provides information regarding moving bus to the owner of bus who is located outside the bus based on IOT.

Major aim is to transport information like number of non ticket holders in a bus, accident occurant places, location of moving bus, fuel level in bus and running speed of bus, pressure level in tires to a bus owner who is outside the bus based on IOT.

Keywords— **Internet of things, Cloud server, GPRS, GPS, Intelligent sensors.**

I. INTRODUCTION

The Internet of Things (IOT) is a scenario which has the ability to automatically transfer data over a network without requiring human-to-human or human-to-computer interaction. IOT has evolved from the convergence of wireless technologies, micro-electromechanical systems and the Internet. The internet of things also called an Internet of objects. Online monitoring system for continuous casting equipment is established based on IOT sensing technology and communication technology.

As the system contains a variety of sensor types like IR speed sensor, pressure sensor, Fuel level sensor, etc. And data transmission protocols, it will lead to a large amount of heterogeneous data of different sensors current and voltage values and the data is difficult to integrate with applications in upper layer. A data processing framework is introduced into the system to deal with such problems. A data processing framework is introduced into the online monitoring system, which is a bridge between physical layer and application layer. Finally, application in online monitoring system proved the validity of the framework. From this framework we came to know that the requirements of the equipment are used in the technology and we can also monitor system wide changes.

In order to study new methods of multipurpose transport services, researchers need to prototype integrated transport systems. We demonstrate its feasibility by presenting the integrated real-time transporting management solution, by studying signal delay and transmission robustness regarding changing communication channel characteristics, and by evaluating issues reported by the bus during the trial phase. Embracing this approach for the bus data like pressure, fuel level, and speed levels are in data acquisition unit. GPRS are used to find the location. Data are received from the LAN network and it is passed through the router to data stored data base server like .net, c sharp, MySQL. User take the information from data base server by using Ethernet IP address connected between LAN server and SQL data base.

This paper helps to reduce traffic congestion, real-time traveler information, road weather information systems, traffic signal optimization and commercial vehicle operations.

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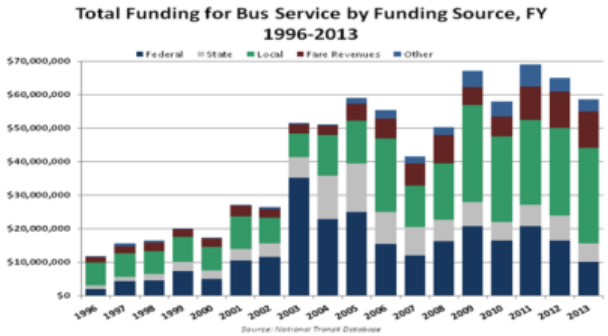

II. EXISTING SYSTEM

In the existing system, speedometer is used to measure the speed level of the bus. Fuel indicator is used to know about fuel level. Pressure level in bus tires are noted down manually by helper in bus. Location can be noted down only by the driver in bus. Owner of the bus don't know at what place bus is moving right now unless driver inform owner. If accidents occur at certain place, it won't be known to the owner all of a sudden unless someone inform owner. In order to provide ticket and check whether all have taken ticket, separate person is needed.

So major demerits in existing system is, owner of the bus has no link with bus information if the bus moves away from him. Person should count down manually to provide ticket. More resources are required to fulfill owner needs.

III. PROPOSED SYSTEM

FEATURES OF PROPOSED SYSTEM

In the proposed system, LAN internet and SQL data base are connected via Ethernet IP address, which is used to take transport information to anywhere to reach the bus owner. Number of tickets issued can be checked by ticket issuing machine using IR rays. Accidents are identified by using the vibrate sensor and information passed by GPRS. GPS are used for the position identification.

The major merits of the proposed system are, it is highly sensitive and more secured. Easy to access the information for bus owner from anywhere.

BLOCK DIAGRAM OF PROPOSED SYSTEM

Block diagram is divided into two parts namely, Transmitter side, Receiver side and ticket issuing machine.

TRANSMITTER SIDE:

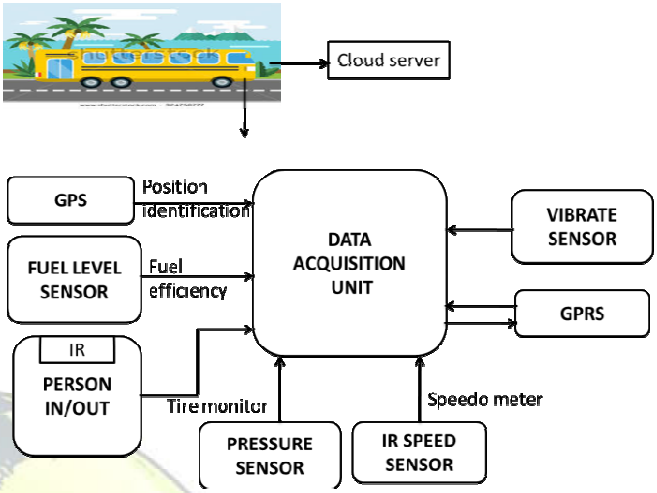

FIG.1 TRANSMITTER BLOCK DIAGRAM

In the transmitter side, various sensors namely pressure sensor, IR sensor, vibrate sensor, fuel level sensor are connected to the data acquisition unit. All these sensors plays a major important role in gathering informations and these informations are then transferred by using GPRS and are transmitted to the receiver side. The transmitter side blocks are placed inside the dash of travelling bus. Data acquisition unit is heart of this system which is used to get collect all the datas and then convert to the known format and transmitted using GPRS. Cloud server is the important wireless access in order to store all the information still now taken and keep it in the data base. When opting for cloud hosting, clients are renting virtual server space rather than renting or purchasing physical servers.

RECEIVER SIDE:

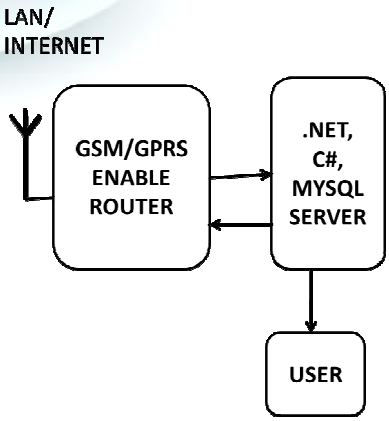

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FIG.2 RECEIVER BLOCK DIAGRAM

In the receiver side, all the gathered informations are received by the internet. Separate router with static IP address is used in order to receive the information regarding bus. Then servers like .NET, C#, and MYSQL are used in order to convert received information to the readable format to the user. CCS compiler is used which transforms source code of transmitter side to the programming language that can be read by the bus owner.SQL database is a special-purpose programming language designed for managing data held in a relational database management system.

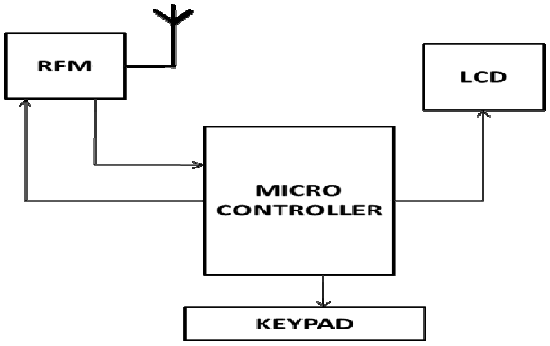

FIG.3 TICKET ISSUING DIAGRAM

TICKET ISSUING MACHINE:

In the ticket issuing section, by using IR sensors at the entry point of the bus, number of persons getting into the bus is sensed and this information is passed on to ticket issuing machine by using RFM. The PIC microcontroller inside the unit will then process the received entered person information to issue ticket and displays the count in LCD display. When the person enters, count in the display will get incremented and once ticket is issued to entered person, count will automatically get decremented.so by using this machine none of the person are left from issuing ticket. This is very much useful for the helper in the bus.

IV. CIRCUIT DIAGRAM OF PROPOSED SYSTEM

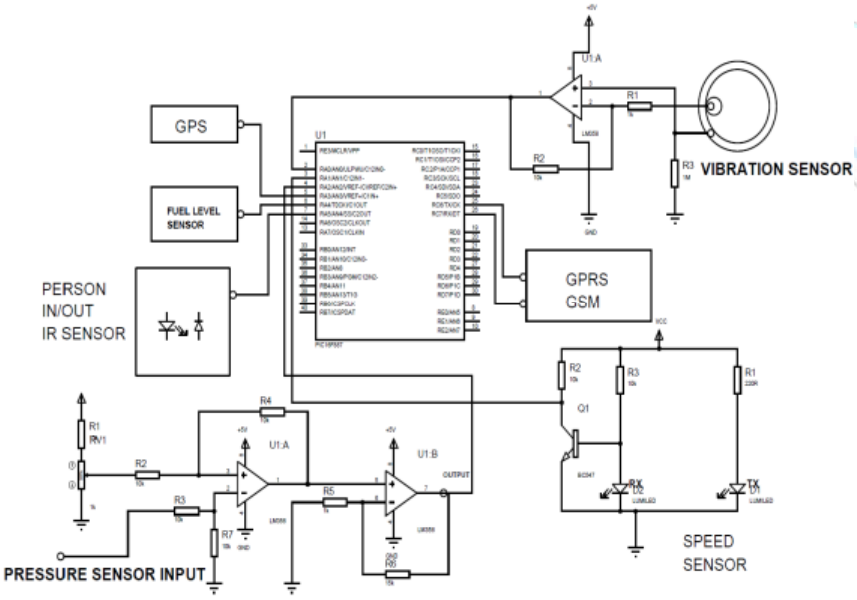

FIG.4 CIRCUIT DIAGRAM

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V. HARDWARE IMPLEMENTATION

The various hardware components are explained in this section.

PIC MICROCONTROLLER 18F4250:

It is heart of the proposed systems which gets all the datas and processes it and send it to the receiver. The major advantage of using PIC is ,it has variety of choices (8-bit to 32-bit),Affordable (Low Cost),Low Power, Reasonable Size and Convenient Packaging may be through Hole Dip or SMD.

The main feature of PIC 18F4250 is, it has High-Performance RISC CPU with Operating speed as DC – 20 MHz oscillator/clock input, DC – 200 ns instruction cycle and Interrupt capability.

SPEED SENSOR:

A wheel speed sensor or vehicle speed sensor (VSS) is a type of tachometer. It is a sender device used for reading the speed of a vehicle's wheel rotation. It usually consists of a toothed ring and pickup. Wheel speed sensors are in anti-lock braking systems in conjunction with the Electronic Stability Control system. Wheel speed sensors are installed directly above the ring wheel and ring wheel is connected to wheel hub. Sensor consists of permanent magnet and the magnetic field extends to the pulse wheel.

The rotational movement of the pulse wheel and the associated alternation of teeth and gaps effects a change in the magnetic flux through the pulse wheel and the coil. The changing magnetic field induces an alternating voltage in the coil that can be measured.

Electronic in the sensor converts resulting sinusoidal signal to digital signal and send to microcontroller.

PRESSURE SENSOR:

The real time sensing of the exact pressure inside the tire is done by the sensing device located in the tire. This pressure measurement information must then be carried to the driver and displayed in the cabin of the bus. Christo Ananth et al. [6] proposed a system about Efficient Sensor Network for Vehicle Security. Today vehicle theft rate is very high, greater challenges are coming from thieves thus tracking/ alarming systems are being deployed with an increasingly popularity .As per as security is concerned today most of the vehicles are running on the LPG so it is necessary to monitor any leakage or level of LPG in order to provide safety to passenger. Also in this fast running world everybody is in hurry so it is required to provide fully automated maintenance system to make the journey of the passenger safe, comfortable and economical. To make the system more intelligent and advanced it is required to introduce some important developments that can help to promote not only the luxurious but also safety drive to the owner. The system "Efficient Sensor Network for Vehicle Security", introduces a new trend in automobile industry.

These modes are coded through two input pins controlled by the microcontroller. The coding is chosen so as to make the standby mode coded with logic zero on both pins.

VIBRATION SENSOR:

It is a device that uses the piezoelectric effect to measure force of vibration and converting them to an electrical charge/ voltage. Piezoelectric Effect is the ability of certain materials to generate an electric charge in response to applied mechanical stress i.e. vibration. Piezoelectric materials such as quartz or ceramic have the ability to output an electrical signal proportional to applied stress. By using this electrical charge effect of vibration is calculated. So Vibration sensor is used in order to find accident in buses by using piezoelectric effect.

IR SENSOR:

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object i.e. temperature as well as detects the motion of the object. It works on the principle of emitting IR ray and receiving reflected ray by using receiver. When an object is close to the sensor, the light from the LED bounces off the object and into the light sensor. This results in detecting person entering into and exit from the bus.

GPRS:

It enables mobile phone/ GSM networks to carry data along with voice over their network with high data rate. The key element of GPRS technology is, it uses packet switched data which means that data is sent over the line, which has less traffic. So, data can be expected to travel comparatively fast. Advantages of GPRS are it enables internet access over small handheld devices, provides great way of sharing information over a wide area, it is more cheap to setup and operation cost is very low. A further advantage of GPRS is that it offers an "Always On" capability. When using circuit switched techniques, charges are based on the time a circuit is used, i.e. how long the call is. For packet switched technology charges are for the amount of data carried as this is what uses the services provider's capacity.

FUEL LEVEL SENSOR:

It has a float and resistor. When the fuel tank empties,

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the float drops and slides a moving contact along the resistor, increasing its resistance. In addition, when the resistance is at a certain point, it will also turn on a "low fuel" light on some vehicles. Indicator unit is measuring and displaying the amount of electric current flowing through the sending unit. When the tank level is high and maximum current is flowing, the needle points to "F" indicating a full tank. When the tank is empty and the least current is flowing,

Needle points to "E" indicating an empty tank.

VI. SOFTWARE IMPLEMENTATION

CCS C COMPILER:

Code Composer Studio (CCS) uses the term 'Workspace' to refer to a location of folder on computer where your program will be stored. There can be more than one workspace for CCS on your computer but CCS uses only one workspace at a time. To keep things simple you can put all your programs in one workspace. A compiler is a computer program that transforms source code written in a programming language into another computer language.This integrated C development environment gives developers the capability to quickly produce very efficient code from an easily maintainable high level language. The compiler includes built-in functions to access the PIC microcontroller hardware such as READ_ADC to read a value from the A/D converter. Discrete I/O is handled by describing the port characteristics in a PROGRAM.Discrete I/O is handled by describing the port characteristics in a PROGRAM. Functions such as INPUT and OUTPUT_HIGH will properly maintain the tri-state registers. Variables including structures may be directly mapped to memory such as I/O ports to best represent the hardware structure in C.

CCS compiler include pro-level optimization, the largest library of built-in functions, powerful PIC MCU specific pre-processor commands, and ready-to-run example programs to quickly jump-start any project. Massive customer base provides access to understanding requirements while developing advanced features with frequent releases and rare bugs.

SQL DATABASE:

A database is a base collection of data. The data is organized in some manner so that the information contained within the database can be easily retrieved.SQL is a special-purpose programming language designed for managing data held in a relational database management system (RDBMS). Originally based upon relational algebra and tuple relational calculus, SQL consists of a data definition language and a data manipulation language. The scope of SQL includes data insert, query, update and delete, schema creation and modification, and data access control.

The most common operation in SQL is the query, which is performed with the declarative SELECT statement. SELECT retrieves data from one or more tables, or expressions. Queries allow the user to describe desired data, leaving the database management system (DBMS) responsible for planning, optimizing, and performing the physical operations necessary to produce that result as it chooses

CLOUD SERVER:

"The Cloud" is a common term that refers to servers connected
to the Internet that are available for public use, either through paid leasing or as part of a software or platform service. A cloud-based service can take many forms, including web hosting, file hosting and sharing, and software distribution. "The Cloud" can also be used to refer to cloud computing, which is the practice of using several servers linked together to share the workload of a task. Instead of running a complex process on a single powerful machine, cloud computing distributes the task across many smaller computers.Cloud computing is internet-based computing
in which large groups of remote servers are networked to allow sharing of data-processing tasks, centralized data storage, and online access to computer services or resources.Cloud Server is an on-demand virtual machine that is engineered to deliver customizable performance and reliability. Cloud hosting means site may runs on a virtual server somewhere up in the cloud; depending on how it's set up, a cloud server might be an actual computer, but it's just as likely to be a chunk of a much bigger machine—as with other kinds of cloud computing, the point is that it shouldn't matter either way to you as an end user.

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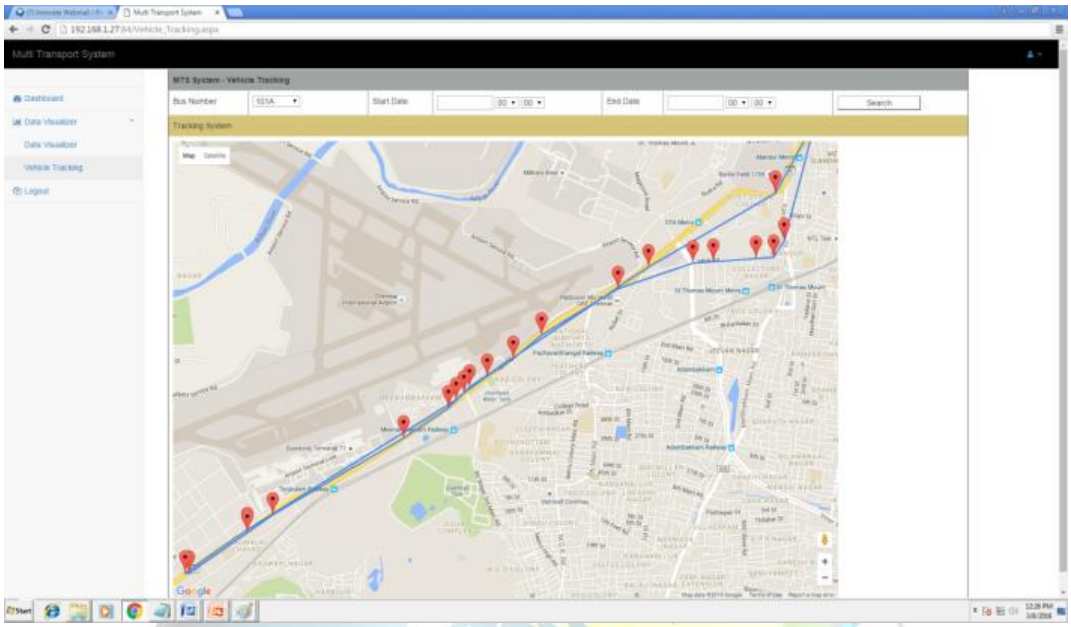

FIG.5 MONITOR SECTION RESULTS

VII. CONCLUSION

In this article, at first we have introduced a distributed IOT system architecture and subsequently we have also introduced and analyzed an authentication mechanism for GPS enable GPRS in distributed IOT applications. The development of a new advanced outdoor safety system for buses in urban environments at low speed has been introduced and tested. The proposed authentication scheme comprises of Multipurpose Bus transport system. Our proposed scheme provides more security features with the assurance of less computational overhead. Accordingly, our proposed scheme is suitable for the resource-constrained based IOT system. Moreover, a set of haptic feedback interfaces has been developed. Such devices are intended to evaluate any risky situation in order to make the bus driver aware of the danger of certain maneuvers once pedestrians moving around the vehicle have been detected. The effectiveness of the developed safety system has been analyzed through some experiments carried out using a simulated scenario. These experiments show that, when a dangerous maneuver happens, the proposed system improves safety significantly. The number of medium and high risk situations as well as the number of collisions is clearly reduced, given that driver's time of reaction when braking is also lower and average time to collision increases with respect to situations where the system is disabled.

REFERENCES

[1] ERF, "European road statistics," European Union Road Federation, Tech. Rep., 2012.

[2] CARE Database, "Traffic safety basic facts: Heavy goods vehicles and buses," European Road Safety Observatory, Tech. Rep., 2015.

[3] Traffic safety basic facts: Pedestrians," European Road Safety Observatory, Tech. Rep., 2015.

[4] NHTSA's National Center for Statistics and Analysis, "Schooltransportation- related crashes," National Highway Traffic Safety Administration (USA), Tech. Rep., 2014.

[5] H. Schittenhelm, "Advanced brake assist – real world effectiveness of current implementations and next generation enlargements by mercedesbenz," in 23rd International Technical Conference on the Enhanced Safety of Vehicles (ESV), no. 13-0194, 2013.

[6] Christo Ananth, I.Uma Sankari, A.Vidhya, M.Vickneshwari, P.Karthiga, "Efficient Sensor Network for Vehicle Security", International Journal of Advanced Scientific and Technical Research (IJASR), Volume 2, Issue 4, March-April 2014,pp – 871-877

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ISSN 2394-3785 (Online)
Available online at www.ijartet.com
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[7] R. Jurecki, M. Ja´skiewicz, M. Guzek, Z. Lozia, and P. Zdanowicz, "Driver's reaction time under emergency braking a car - research in a driving simulator," Maintenance and Reliability, vol. 14, no. 4, p. 295–301, 2012.

[8] X. Ma and I. Andr´easson, "Driver reaction time estimation from the real car following data and its application in gm.-type model evaluation," Transportation Research Record, 2006.

[9] T. Magister, R. Krulec, M. Batista, and L. Bogdanovi´c, "The driver reaction time measurement experiences," in Innovative Automotive Technology (IAT'05) conference, 2005.

[10] D. Fambro, R. Koppa, D. Picha, and K. Fitzpatrick, "Driver perception brake response in stopping sight distance situations," Transportation Research Record, 1628: 1–7, 1998.

[11]"Introduction to cloud server with cloud computing" http://blog.rackspace.com/introduction-to-cloud-servers/

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