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An UBN (Urban Bus Navigation System) and Embodying Ideas for Urban Bus Riders using Internet of Things by using GPS, GSM, IR Technology

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Abstract:
All roads in the city have some capacity and if the number of buses is increased, it is going to increase the traffic. The number of buses has to be limited at some point. Commuting on roads in densely populated cities of the developing world is fraught with high delays and uncertainties .Wide use of public transportation can ease the load on the road infrastructure, but such use is not convenient, partly due to the unpredictable nature of public transport. Accident is an unintentional injury, an undesirable and unplanned event that could have been mitigated properly if there was a proper system in place. Human lives would be in danger in the absence of such a system. In order to avoid this circumstance we are implementing the accident detection system. In order to overcome these problems we are implementing systems 1.GlobalNavigation; 2.CAR (crowd aware recommendation); 3.Fuel monitoring system; 4.Accident detection system and 5.Overspeed detection.

Keywords: Urban Bus navigation, GPS, CAR (crowd aware route recommendation), accident detection, fuel monitoring.

I. INTRODUCTION

The main aim of our project is to develop an innovative system to simplify urban travel and save human life from risks. GPS or GLONASS technology is usually used in Vehicle tracking systems. There are also specialized software to view vehicle information in electronic maps .Urban public transit have begun to use vehicle tracking systems more commonly, particularly in the cities. Along with commercial fleet operators, urban transit agencies use the technology for a number of purposes, including monitoring schedule adherence of buses in service, triggering automatic changes of buses' destination sign displays once the vehicle approaches the bus terminus, and triggering pre-recorded (or even synthetic speech) buss top, route (and its destination) or service announcements for passengers at the stop, primarily for the benefit of visual impaired passengers. Data collected as the vehicle follows its route is continuously fed into a server program which compares the vehicle's actual location and time with its schedule, and in turn produces a frequently updating display to provide customers with real-time information through mobile applications as to the waiting time until arrival of the next bus at a given stop based on the nearest vehicle's actual progress at the time. These GPS enabled devices and software help in cost cutting as well. Also, implementation of CAR system (Using IR technology), accident detection (Piezo electric sensors) and fuel monitoring system along with vehicle tracking leads to safe and efficient Urban Bus transport system.

II. PROPOSED SYSTEM

In addition to micro navigation and Crowd aware route recommendation, the proposed system addresses the important issues of accident mitigation and fuel theft in Urban Buses. The proposed system encompasses 3 units- Bus unit, server unit and user unit. The bus unit has the controller with inputs provided by IR sensors, vibration sensor, fuel level sensor as well as position coordinates from GPS. This data is relayed to the server unit using the GSM/GPRS module and would be accessed by transport authorities and emergency care team. The user unit comprises of an android application which operates on WiFi and provides data of nearest bus stand, ETA of bus arrival and crowd recommendations to users.

III. LITERATURE SURVEY

Today's key challenge for rapidly growing cities is to provide public transport services effectively to satisfy the increasing demands for hassle free mobility. For this, progress in recent research shows that the Internet of Things (IoT) has potential to remove the existing deficiencies of public transport systems given its ability to embed smart technology into real-life urban contexts.

UBN provides two novel information services for bus users:

1) micro-navigation using GPS and GSM technology and 2) crowd-aware route recommendation using IR and GSM technology. Micro-navigation refers to fine-grained contextual guidance of passengers along a bus journey by recognizing boarded bus vehicles and tracking the passenger's journey progress. Crowd-aware route recommendation collects and predicts crowd levels on bus journeys to suggest better and less crowded routes to bus riders and study reports from Madrid, where the system has been implemented, have indicated thatit

has shown better public transport usage and a positive impact on how people feel about bus journeys.

IV. BLOCK DIAGRAM OFPROPOSED SYSTEM

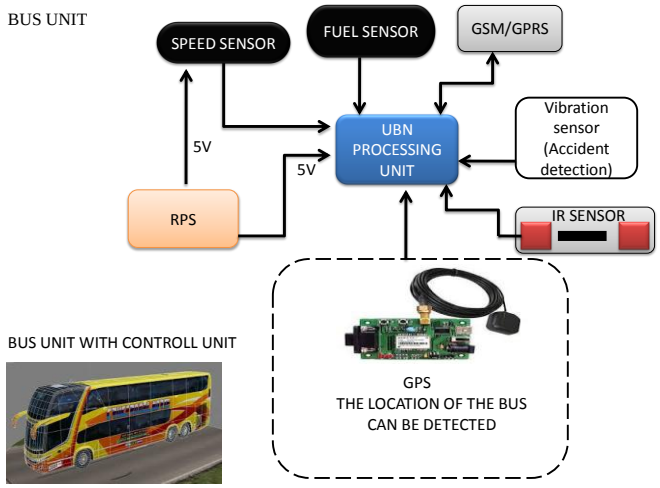


Figure.1.Block Diagram of Bus Ssection

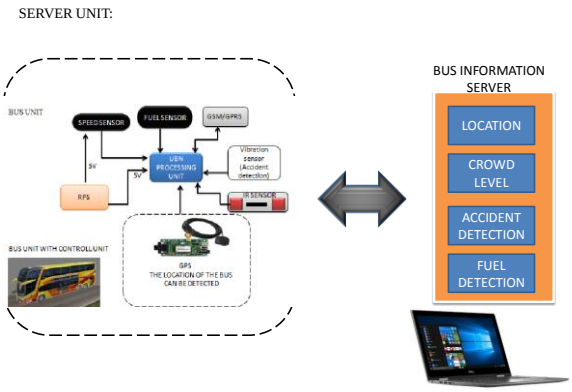


Figure.2. Block Diagram of Server Section

User unit:

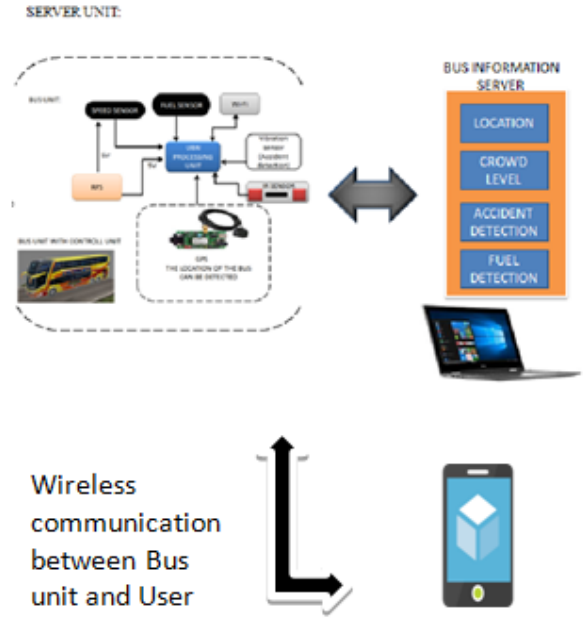


Figure.3. Block Diagram of User Section

V.DESCRIPTION

Almost all electronic devices used in electronic circuits need a dc source of Power to operate. From the power supply, 5v is given to PIC16F884/887 microcontroller .The AC power supply is converted to DC and filtered in each and every stage of the RPS. It consists of an SMPS inside it .This SMPS converts 250 v ac to 12 v dc. Then this 12v is given to 7805 regulator .This regulator converts 12v to 5v dc and is given to speed, IR sensor, vibration sensor, fuel sensor and micro controller.

GPRS

Global package radio service moves and saves the data to the server. Using this one can browse the information.

VI. BRATIOVIBRATION SENSOR

Vibration sensor is a piezoelectric sensor, a device that uses the piezoelectric effect to measure pressure, acceleration, strain or force by converting them nonelectrical charge. Vibration causes voltage amplification and if it crosses the threshold level, accident is detected and further steps are taken.

IR SENSOR:

Infrared radiation is the portion of electromagnetic spectrum having Wavelengths longer than visible light wavelengths, but smaller than microwaves. Infrared sensor is used for counting the number of people within the bus.

FUELLEVFUEL SENSOR:

DUT-E sensors are used for accurate level measurement in fuel tanks of Vehicles and stationary tanks. SKDUTE used for communication of sensor and PC for setting and configuration. The Fuel Level Sensor is a magnetic, on-contacting Angular position sensor that converts rotary motion into an electrical signal to Provide accurate fuel level measurement and enable reliable fuel gauge read out.

SPEED SENSOR

A 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.

Used types of sensors

- Speed sensors based on theHall Effect
- Speed sensorswith mechanical tendon
- Inductive speed sensors

VI. CIRCUIT CONNECTION:

The SMPS and regulator circuits are connected to VCC pin of PIC controller.
The various sensors are connected to ADC pins

AN0- Speed sensor

AN1- IR sensor

AN2- Fuel sensor

AN3- Vibration sensor as they input analog data to controller.

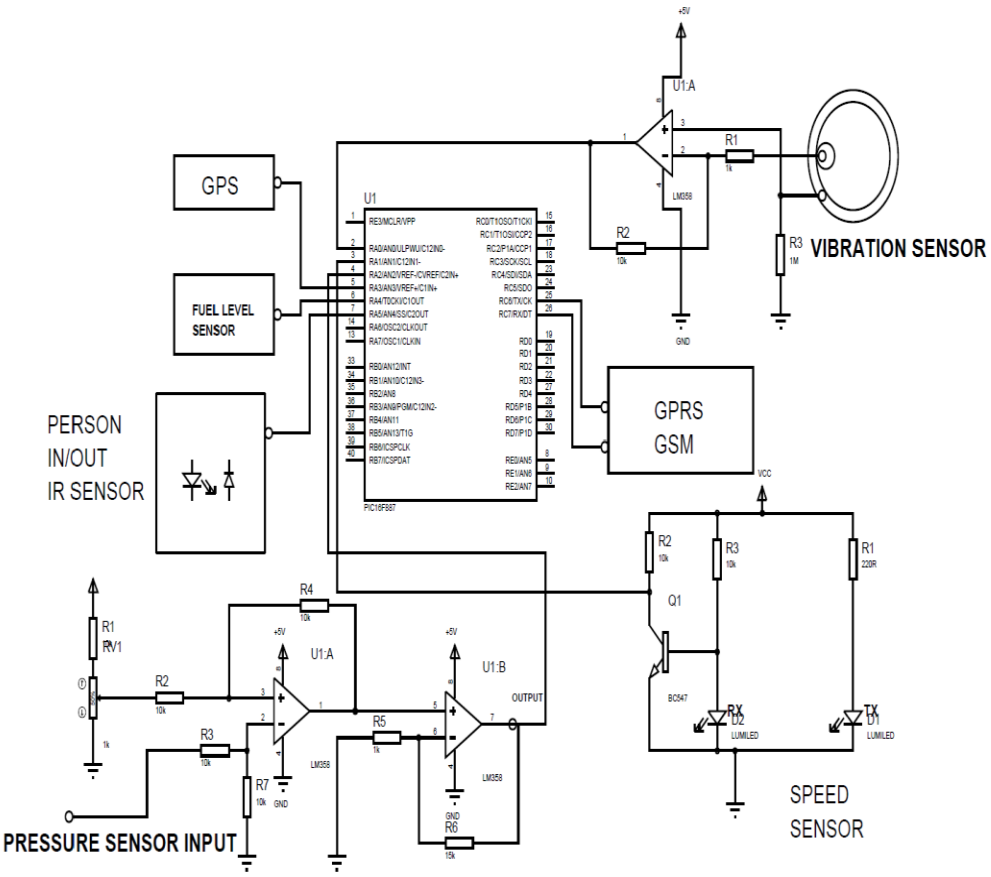


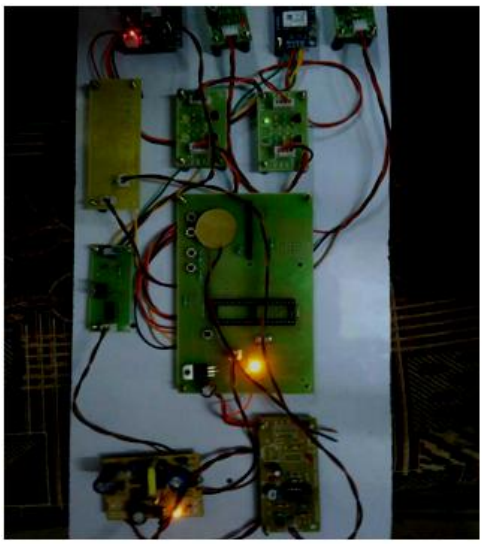
Figure.4. Circuit connection

GPS module TX/RX pin is connected to AN 12/INT pin. TX of GSM/GPRS module is connected to Rx/Rc7 of PIC and RX of GSM/GPRS is connected to Tx/Rc6 of PIC controller. It communicates with PIC using AT commands. Mobile application and GSM/GPRS module communicate via WIFI standard.

SOFTWARE USED: Eclipse android suite, Proteus, MP LAB X IDE.

LANGUAGE USED: Embedded C, Java

VII. HARDWARE IMPLEMENTATION:



VIII. RESULT AND DISCUSSION

The position, arrival and departure time of the bus are exactly known. The intimations regarding accident are sent to the emergency services and concerned people with location of the accident. It is implemented by combination of hardware and software and verified.

IX. CONCLUSION

In this article, we have first introduced a distributed IOT system architecture. A new outdoor safety system with accident detection has been introduced and implemented. 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 tremor causes vibrations to cross a particular threshold, data is immediately sent to server to ensure on time mitigation services. Apart from this, CAR data as well as fuel level data are regularly updated to server for monitoring purposes to ensure detection of fuel theft as well as people count in each bus.

X. REFERENCES

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

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

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

[4].NTSC' s National Center for Statistics and Analysis," School transportation 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 enlargement sbymerce desbenz," in 23rd International Technical Conference on the Enhanced Safety of Vehicles (ESV),no.13-0194,2013.

[6]. NTSCs National Center for Statistics and Analysis, Critical reasons for crashes Investigated in the national motor vehicle crash causation survey, " U.S. Department of Transportation, Tech.Rep, February2015.

[7].R.Jurecki,M.Ja´skiewicz,M.Guzek,Z.Lozia,andP.Zdanowicz, Driver' sreaction Time under emergency braking a car-research in a driving simulator, Maintenance and Reliability, vol.14, no.4, p.295301, 2012.

[8].X.MaandI. And reason, " Driver reaction time estimation from there altar 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, 1628:17, 1998.