SMART PUBLIC TRANSPORT

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Abstract: GPS is one of the technologies that are used in a huge number of applications today. One of the applications is tracking the vehicles like public transportation vehicles or owned vehicles and keeps regular monitoring on them. This tracking system can inform you the location and route travelled by vehicle, number of passengers present in the vehicle along with time stamp and that information can be observed from any other remote location. It also includes the web application that provides you exact location of target. There is a mobile application through we can access the web page directly. This system enables us to track target in any weather conditions. This system uses GPS and GSM technologies. The paper includes the hardware part which comprises of GPS, GSM, Atmega microcontroller MAX 232, 16x2 LCD,IR sensors and software part is used for interfacing all the required modules and a web application is also developed at the client side. Main objective is to design a system that can be easily installed and to provide user friendly platform for vehicle tracking and further enhancement

I. INTRODUCTION

In this urban life transportation is very common. A lot of happenings occur on the road everyday .Therefore the need of safety and monitoring is developed. To resolve such problems, a system is developed using GPS and GSM technologies and an application is introduced in this research work. Various problems that we face:

1. Whether there are any buses are available or not.
2. If one has to go urgently .
3. To find the buses are available in one's specified route.

All these problems are overcome by the system. This system has Global Positioning System (GPS) which will receive the coordinates from the satellites among other critical information. Tracking system is very important in modern world. This can be useful in soldier monitoring, tracking of the theft vehicle and various other applications. The system is microcontroller based that consists of a global positioning system (GPS) and global system for mobile communication (GSM). This project uses only one GPS device and a two way communication process is achieved using a GSM modem. GSM modem, provided with a SIM card uses the same communication process as we are using in regular phone.

II. HARDWARE SYSTEM

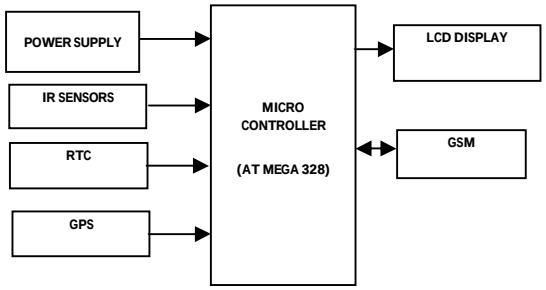

Fig 1: Block diagram

In this proposed work, a novel method of vehicle monitoring and passenger counting along with time stamp, is done by using GPS,GSM technology and a pair of IR sensors. If any interruption occurred in any side of the door, then the IR sensor senses the signals and sends to the microcontroller which effects the count of the passsengers. The location can seen in web or by using Mobile app which is developed in "APP INVENTOR 2.0" in which by clicking on a button one can obtain the required web page.

III. METHODOLOGY

Micro controller: This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

Liquid-crystal display (**LCD**) is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

ATMEGA328: The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter.

GSM:

Global System for Mobile Communication (GSM) is a set of ETSI standards specifying the infrastructure for a digital cellular service.

The network is structured into a number of discrete sections:

- Base Station Subsystem – the base stations and their controllers explained
- Network and Switching Subsystem – the part of the network most similar to a fixed network, sometimes just called the "core network"
- GPRS Core Network – the optional part which allows packet-based Internet connections
- Operations support system (OSS) – network maintenance

SM was intended to be a secure wireless system. It has considered the user authentication using a pre-shared key and challenge-response, and over-the-air encryption. However, GSM is vulnerable to different class of attacks, each of them aiming a different part of the network.

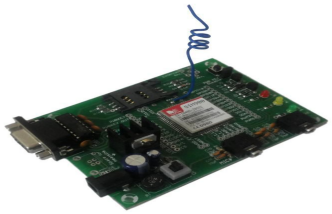

Fig 2: GSM Module

GPS:

Global Positioning System (GPS) technology is changing the way we work and play. You can use GPS technology when you are driving, flying, fishing, sailing, hiking, running, biking, working, or exploring. With a GPS receiver, you have an amazing amount of information at your fingertips. Here are just a few examples of how you can use GPS technology.

GPS technology requires the following three segments.

- Space segment.
- Control segment.
- User segment

Space Segment

At least 24 GPS satellites orbit the earth twice a day in a specific pattern. They travel at approximately 7,000 miles per hour about 12,000 miles above the earth's surface. These satellites are spaced so that a GPS receiver anywhere in the world can receive signals from at least four of them.

Control Segment

The control segment is responsible for constantly monitoring satellite health, signal integrity, and orbital configuration from the ground control segment includes the following sections: Master control station, Monitor stations, and Ground antennas.

User Segment

The GPS user segment consists of your GPS receiver. Your receiver collects and processes signals from the GPS satellites that are in view and then uses that information to determine and display your location, speed, time, and so forth. Your GPS receiver does not transmit any information back to the satellites.

The following points provide a summary of the technology at work:

- The control segment constantly monitors the GPS constellation and uploads information to satellites to provide maximum user accuracy
- Your GPS receiver collects information from the GPS satellites that are in view.
- Your GPS receiver accounts for errors. For more information, refer to the Sources of Errors.
- Your GPS receiver determines your current location, velocity, and time.
- Your GPS receiver can calculate other information, such as bearing, track, trip distance, and distance to destination, sunrise and sunset time so forth.

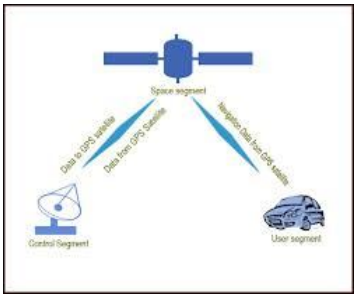

Fig 3: GPS Working

IR Tx and Rx:

Transmitter and receiver are incorporated in a single housing. The modulated infrared light of the transmitter strikes the object to be detected and is reflected in a diffuse way. Part of the reflected light strikes the receiver and starts the switching operation. The two states – i.e. reflection received or no reflection – are used to determine the presence or absence of an object in the sensing range.

This system safely detects all objects that have sufficient reflection. For objects with a very bad degree of reflection (matt black rough surfaces) the use of diffuse reflection sensors for short ranges or with background suppression is recommended.

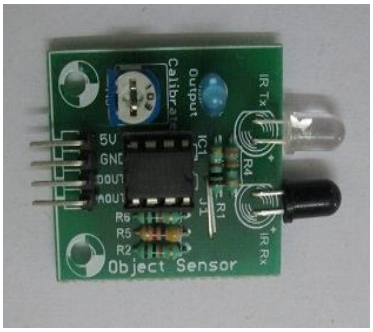

Fig 4: IR sensor

IV. RESULTS

Fig 5: Mobile App.

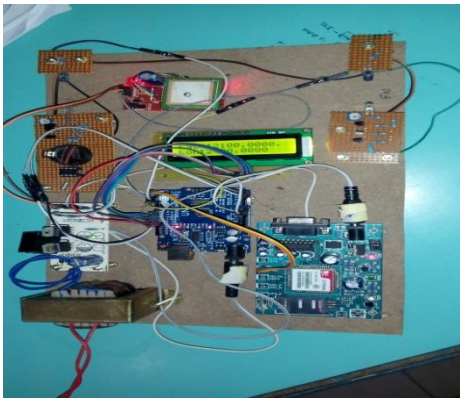

Fig 6: Hardware Kit

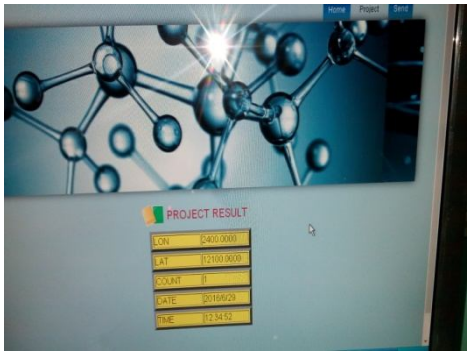

Fig 7: Outputs in web page

V. CONCLUSION AND FUTURE SCOPE

The project is all about monitoring of a vehicle. The system is about making public transport more user friendly by the use of GPS, GSM technology and a web application. It can also be beneficial for:

1. To students,whose main source of transport is bus
2.Parents to look after their children.
3. Delivery services.

This project can be further enhanced by the use of WI-FI technology to get faster responses, which would be more convenient for the user to track the target.

V. REFERENCES

[1] El-Medany,W.;Al-Omary,A.;Al-Hakim,R.;Al-Irhayim,S.;Nusaif,M.,"A Cost Effective Real-TimeTracking system Prototype Using Integrated GPS/GPRS Module," Wireless and Mobile Communications (ICWMC), 2010 6th International Conference on,vol.,no.,pp.521,525,20-25Sept.2010 International Journal of Computer Science, Engineering and Applications (IJCSEA) Vol.3, No.3, June 2013 40

[2] Hu Jian-ming; Li Jie; Li Guang-Hui, "Automobile Anti-theft System Based on GSM and GPSModule," Intelligent Networks and Intelligent Systems (ICINIS), 2012 Fifth International Conference on , vol., no., pp.199,201, 1-3 Nov. 2012

[3] Nagaraja, B. G.; Rayappa,R.; Mahesh, M.; Patil, C.M.; Manjunath, T. C., "Design & Development of a GSM Based Vehicle Theft Control System," Advanced Computer Control, 2009. ICACC '09.International Conference on , vol., no., pp.148,152, 22 -24 Jan. 2009

[4] Fleischer, P.B.; Nelson, A.Y.; Sowah, R.A.; Bremang, A., "Design and development of GPS/GSM based vehicle tracking and alert system for commercial inter-city buses," Adaptive Science &Technology (ICAST), 2012 IEEE 4th International Conference on , vol., no., pp.1,6, 25-27 Oct.2012

[5] Le-Tien, T.; Vu Phung-The, "Routing and Tracking System for Mobile Vehicles in Large Area,"Electronic Design, Test and Application, 2010. DELTA '10. Fifth IEEE International Symposium on ,vol., no., pp.297,300, 13-15 Jan. 2010

[6] Iman M. Almomani, Nour Y. Alkhalil, Enas M. Ahmad, Rania M. Jodeh "Ubiquitous GPS VehicleTracking and Management System", IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT) 2011

[7] Abed khan M.E.(Student), , Ravi Mishra, "GPS – GSM Based Tracking System" SSCET, CSVTU,Bhilai, India International Journal of Engineering Trends and Technology - vol.3,no.,pp,161-164, 2012

[8] El - Medany, W.M.; Alomary, A.; Al - Hakim, R.; Al - Irhayim, S.; Nousif, M., "Implementation of GPRS- Based Positioning System Using PIC Microcontroller," Computational Intelligence, CommunicationSystems and etworks (CICSyN), 2010 Second International Conference on , vol., no., pp.365,368,8-30 July 2010

[9] Iman M. Almomani, Nour Y. Alkhalil, Enas M. Ahmad, Rani a M. Jodeh "Ubiquitous GPS Vehicle Tracking and Management System", IEEE Jordan

Conference on Applied Electrical Engineering and Computing Technologies (AEECT) 2011

[10] Lita, I.; Cioc, I.B.; Visan, D.A., "A New Approach of Automobile Localization System Using GPS and GSM/GPRS Transmission," Electronics Technology, 2006. ISSE '06. 29th International Spring Seminar on , vol., no., pp.115,119, 10 - 14 May 2006.