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Intelligent Bus stand Monitoring and Control Using Combination of GSM, GPS & IR Sensors

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ABSTRACT: This paper summarizes work on the designing and application of GPS (Global positioning system) based technology clubbed with GSM (Global system for mobile communication) for Bus stand monitoring & control provided for public transportation. This system has been categorized into two modules: 'In-Bus module, Bus-stand module. The control panel at the bus side will give information to the drivers regarding Platform availability, (vacant or un-vacant platform) if the platform is vacant for the same Bus then it will directly go to platform after that Bus travelling schedule will be display on display board . If the actual platform allotted for parking is not vacant then the driver will get information regarding the alternative platform or waiting for platform availability rather than disturbing the actual Bus stand schedule. The drivers will get information of Platform through messages on parity basis so as to reduce the transit time and congestion. The GSM clubbed GPS technology can also be used to get the current location of vehicles and the available seats in it. ARM7 LPC2148 microcontroller is the main controlling device which controls and synchronizes all the operations by receiving the data GSM Module as well as GPS. Such kind of monitoring systems can be used for various public vehicles ranging from auto rickshaws to Buses. Such types of system will assist the travellers, drivers and the Bus stand controller at the control terminals for real time monitoring of the vehicles.

KEYWORDS: GPS, GSM, Busstand(Platform) module, Bus Side Module, ARM7, IR Sensors.

I. INTRODUCTION

By understanding the future scope of technologies available today we will have a various types of application and improvement of bus stand monitoring and control. Previous work on bus tracking system there is a too vast. But can't perform many applications at the same time in past work. In bus stand monitoring and control performs total bus stand activity on basis of two module 'In bus module' and 'bus stand module'. Provide access to real time information related to bus schedules, Expected Time of Arrival (ETA), Estimated Time of Departure (ETD), etc., through Display at Bus stands, Self-service Short Messaging Service (SMS) as well as the Internet. Displaying vacant seats and vacant platforms for buses in bus stops. Counting of the persons present in the bus in bus side and counting the vacant positions of the platform on platform side.

II. LITERATURE REVIEW

There are many paper presented work on the bus tracking system in 2008. In addition to author proposed some fundamental functions such as real-time monitoring, some featured functions tightly combined with the daily operations. In Beijing Bus Company are realized in the BJ-BMS [1]. In 2010 Author proposed in this paper integration of RFID and GIS. RFID based Identification & monitor the system which is totally based on the RFID. To monitor the movement of the campus buses and their positions with help of developed system [2]. In 2011 authors identifies GIS is a system that analyses and displays geographic information. This paper focuses on the GIS application for Bus Identification and Monitoring System [3]. Again in 2011 In this paper author detect and monitor the moment of the bus

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with help of integration of radio frequency identification (RFID) and integrated sensing technologies such as global positioning system (GPS), general packet radio service (GPRS) and geographic information system (GIS). Author developed a ruled based decision algorithms and new theoretical framework are developed for the system [4].In 2012 authors proposed. Authors proposed in this system a supervisory system based on GPRS and ZigBee technology, to improve the operation efficiency of realize intelligent transportation system and bus monitoring system.[5].

III. METHODOLOGY

This system is categorized in to two segments, Bus Side as well as Bus Platform Side. As shown in Fig 1 of Bus side model GSM is clubbed with GPS & IR sensors. With the help of GPS we get longitude & Latitude of the Bus. It gives exact location of the bus. Counting the no. of person entering and exiting in the bus is using IR sensor. Receive the enquiry for location and no of person present in the bus using GSM module. If enquiry is for the location of the bus than send the correct location to the mobile no from which enquiry has been received. If enquiry is for the no of person present in the bus than send the correct no. of persons to the mobile no from which enquiry has been received. Constantly monitor the receiving SMS Bus Platform vacant status & Show the status bus platform on driver screen.

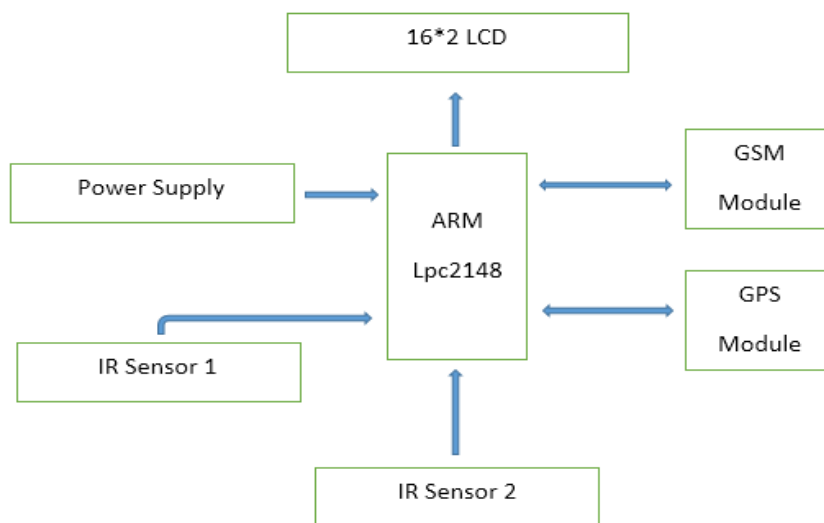


Fig.1 - Block Diagram of Bus Side Model

BUS Platform Side Model is second part of the system, in this system 8051 micro controller is clubbed with GSM as well as IR Sensors for Count the vacant and un-vacant position of the platform, GSM module is constantly send the position and status of platform to drivers screen.

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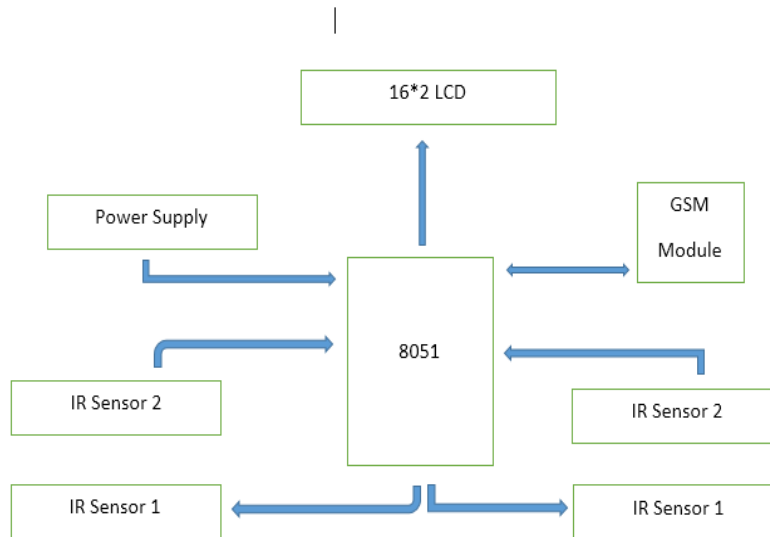


Fig.2- Block Diagram of bus Stand Platform side

Power Supply: In this project I used 12 volts transformer for continuous power supply. Why I am using this means to continuous power will come. Otherwise If I use a battery sometimes the total currents will loss so that's way I am using A.C Transformer. A.C transformer is giving the input to Bridge Rectifier. Bridge Rectifier converts A.C to D.C. After that we are using one filter capacitor 1000uf/25v electrolytic capacitor .We connecting this capacitor in parallel section. The main purpose of this capacitor is if there is any alternate peaks we need to reduce that peaks. Nothing but a filtering that repull's. After that we are using LM7805 Regulator Most digital logic circuits and processors need a 5 volt power supply. To use these parts we need to build a regulated 5 volt source. We make a 5 volt power supply, The LM7805 is simple to use. First connect the positive lead of our unregulated DC power supply Input pin, connect the negative lead to the Common pin and then when we turn on the power, we get a 5 volt supply from the Output pin. Here we are using one red colour led to indicate the power.

GPS: How to interface the GPS with microcontroller. The GPS module continuously transmits serial data (RS232 protocol) in the form of sentences according to NMEA standards. The latitude and longitude values of the location are contained in the GPGGA sentence (refer NMEA format).To communicate over UART or USART, we just need three basic signals which are namely, RXD (receive), TXD (transmit), GND (common ground). So to interface UART with LPC2148, we just need the basic signals.

GSM: How to interface the GSM with microcontroller. The GSM module is communicate the microcontroller with mobile phones through UART. To communicate over UART or USART, we just need three basic signals which are namely, RXD (receive), TXD (transmit), GND (common ground).GSM modem interfacing with microcontroller for SMS control of industrial equipment's. The sending SMS through GSM modem when interfaced with microcontroller or PC is much simpler as compared with sending SMS through UART.Text message may be sent through the modem by interfacing only three signals of the serial interface of modem with microcontroller i.e., TxD, RxD and GND. In this scheme RTS and CTS signals of serial port interface of GSM Modem are connected with each other. The transmit signal of serial port of microcontroller is connected with transmit signal (TxD) of the serial interface of GSM Modem

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while receive signal of microcontroller serial port is connected with receive signal (RxD) of serial interface of GSM Modem.

IR sensors: For the counting of the persons present in the bus in bus side and Counting the vacant positions of the platform on platform side

IV. EXPERIMENTAL RESULTS

More than one application perform in this paper by using this features control bus stand monitoring BUS stand activity helps to reduce waiting time of the passenger as well as helps to manage arrival and departure of buses to avoid unwanted traffic.

V. CONCLUSION

The proposed system provides real time information to monitor bus stand activity done by bus stand management as well as prospective passenger. It provides information regarding real time location of bus, arrival and departure time as well as available seats in the bus through enquiry message sent by passenger via using mobile. This system also guides bus stand management/controller by providing information regarding bus location, platform availability, and available seats in the bus. Propose system is more efficient and cost effective, it is possible to implement commercially.

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