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GPS-GSM INTEGRATION FOR ENHANCING PUBLIC TRANSPORTATION MANAGEMENT SERVICES

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Abstract-An embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microprocessors. Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. In contrast, a microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result.GPS-GSM Integration for Enhancing Public Transportation management Services.

The "GPS-GSM Integration for Enhancing Public Transportation management Services" using PIC16F876A microcontroller is an exclusive project which is used to monitor the traffic condition and alerts through GSM modem when there is heavy traffic. GPS receiver is to find the position of the vehicle (ambulance) where the user located on the earth. This information is provided by the GPS with the help of the data it receives from the satellites.

IndexTerms-Transportation,EmbeddedSystem,,GPS,GSM,IR Sensor.

I. INTRODUCTION

The project aims in designing a system which is capable of predicting the bus travel time and sending the travel time to the user on his request. The system makes use of GSM modem and GPS receiver along with Microcontrollers to achieve the task.With the increasing number of people in opportunistic cities of Pakistan like Lahore, already existing problem of poor transportation services has grown to an alarming extent. Due to non-availability of prior information about the buses arrival schedule, people have to wait longer on bus stops especially in morning when they have to reach the offices in time. The buses are overloaded for most of the times which often results in some kind of fault occurrence in buses and people get late further.

These modules includeBUS Station Module, In-Bus Module, BASE StationModule and BUS Stop Module. Bus Station Modulecontains a GSM engine interfaced to PC and transmitsthe bus index and its license plate number to BASEStation. At the same time, it turns on GPS receiverinstalled in the bus.The bus then starts transmitting its location tothe BASE Station: The BASE Station comprises of aGSM engine interfaced to a microcontroller forprocessing user request of bus location as well as anumber of other GSM engines interfaced to various PCseach reserved for a separate bus to update the locationformation of that bus. The buses location data fromBASE Station is sent to each bus stop. BUS StopModule after receiving buses location data through GSMengine displays it on dot matrix display installed at eachbus stop.

II. EXISTING WORK OR LITERATURE SURVEY

1.Advanced Vehicle Tracking System on Google Earth Using GPS and GSM:In this paper GPS based vehicle tracking/navigation system is implemented. This is done by fetching the information of the vehiclelike location, distance, etc. by using GPS and GSM. The information can be transformed with the following features: The informationof the vehicle like location, etc. is obtained after every specified time interval defined by the user. Then this periodic information of location is transmitted to monitoring or tracking server. This transmitted information is displayed on the display unit by using the google earth to display vehicle location in the electronic google maps.

2. Vehicle tracking and accident warning System using GPS and its implementation in FPGA:In this paper also the location of the vehicle is determined by using the Global Positioning System. The information from the GPSreceiver is sent in the form of SMS to the user with the help of GSM. Once this SMS is received from the user, a response type ofmessage is sent to the owner of the vehicle through the GSM modem. A sensor which

is named as accelerometer sensor is then usedto detect any kind of mishaps or accidents happened with the vehicle also it will trigger some kind of signal in case of anymishappenings.

3.GSM& GPS based tracking system:This system is helpful for public transport vehicles such as buses and taxis, it provides Tele monitoring and management system forthe transportation of the taxis and buses within the city. In this paper the system mentioned consists of an —On- board module‖ whichis mounted in the vehicle which is to be tracked. This on-board module consists of Global Positioning System, a GSM modem andARM processor. The navigation message which is broadcasted by the GPS position satellite is received and resolved by the GPS receiver of the vehicle terminal. This satellite computes the longitudes and latitudes of vehicle coordinates, then transform it into theshort message form by using GSM communication controller and this message is sent to the monitoring center through the GSM network.

4. Design and development of GPS-GSM based Tracking system with google map based Monitoring:This system uses Global Positioning System (GPS) which is used to receive the coordinates of latitude and longitude form the satelliteduring the critical information. We all know that tracking system is now-a-days a very important in modern world. This system can beused in the monitoring of soldiers, also in tracking the theft of the vehicle and in many more other applications. This system usesmicrocontroller, Global Positioning System (GPS) and Global System for Mobile Communication (GSM). This system uses only one GPS device and GSM enable a two way communication process. GSM modem is provide with a SIM card which uses the sameand regular communication process as we are using in regular phone.

5. GSM and GPS based vehicle location and tracking System :This paper uses to a RF transmitted; the RF transmitter is attached with the vehicle which consists of its own identification. The datawhich will be continuously transmitting to the RF receiver that is connected to the microcontroller. The GPS will receive thelocation of the vehicle and will transmit this data to the microcontroller. Supposedly the RF transmitter is not receiving the signalfrom the RF transmitter then the receiving unit triggers a signal to the microcontroller, and from this signal we can identify the theft.If it is identified that the vehicle is theft then it automatically sends location of the vehicle to its user as the owner of the vehiclereceives the information in the form of SMS through the GSM modem. This system is much simpler and cost effective than theothers. The vehicle is automatically stopped if a password like SMS sent by the user.
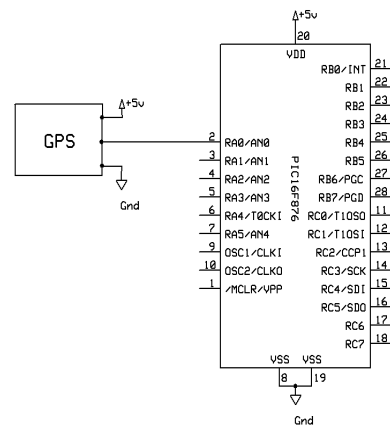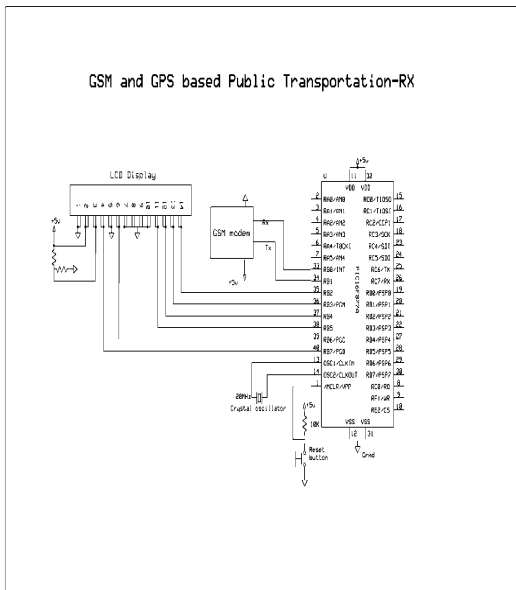
III. PROPOSED WORK

Schematic diagram and interfacing of PIC16F876 microcontroller with each module is considered.

Schematic diagram of GPS-GSM Integration for Enhancing Public Transportation management Services Transmitter.

GPS and GSM based Public Transportation-TX
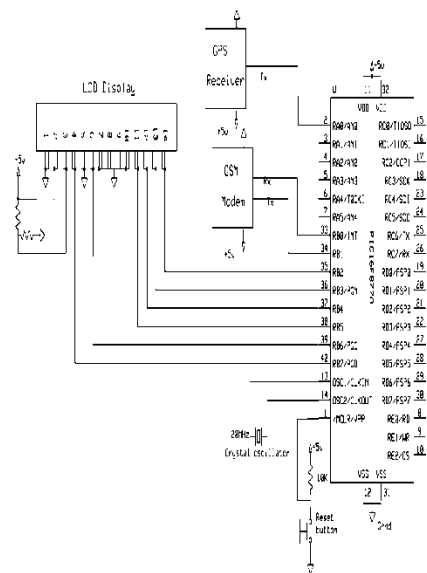
Schematic diagram of GPS-GSM Integration for Enhancing Public Transportation management Services Receiver.

The above schematic diagram GPS-GSM Integration for Enhancing Public Transportation management Services explains the interfacing section of each component with micro controller and GPS module for the location which is to be identified according to the user requirement. Crystal oscillator connected to 9th and 10th pins of micro controller and regulated power supply is also connected to micro controller and LED's also connected to micro controller through resistors. The detailed explanation of each module interfacing with microcontroller is as follows:

Interfacing crystal oscillator and reset button with micro controlle**r:**Crystal oscillator is connected to micro controller in such way that two pins of oscillator connected to the 9th and 10th pins of micro controller, the purpose of external crystal oscillator is to speed up the execution part of instructions per cycle and here the crystal oscillator having 20mhz frequency. The 1st pin is connected to reset input pin of the microcontroller.

Interfacing GPS receiver with micro controller**:**

IV. RESULTS AND DISCUSSIONS

The project "GPS-GSM Integration for Enhancing Public Transportation management Services" was designed such that which is capable of predicting the bus travel time and sending the travel time to the user on his request. The system in the bus calculates the time required to reach the user location basing on the GPS data of current location and predefined user location data and sends this time information to the user mobile using GSM.

V.CONCLUSIONS

Integrating features of all the hardware components used have been developed in it. Design and development of a low cost transportation management system based on integration of GPS and GSM data is described. The system comprises of various modules which are wirelessly linked with GSM modems. Cost effective SMS service of GSM network is used for the transfer of data between the modules. A new service, to facilitate the people who use public transport for traveling, is introduced inside the city. The service provides the user with current location information of desired buses based on which the user can adjust his schedule accordingly. The service therefore vanishes the need of waiting at the bus stop thus saving a lot of time.Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly

advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

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