GPS based Movable object locating system

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ABSTRACT

Now days, the Smartphone with GPS system-A can trace its own position and this can also be plotted in Google map. But another system-B cannot locate the position of system-A. Tracing and controlling anything by anyone from anywhere on the planet has been mankind’s unfulfilled wish. Integration of GPS and GPRS can be proved as a good solution for this goal. This proposed system is installed in every cab which will receive the free address sent by GPS. With the help of GPRS module, cab will send it again to the web server. At the client side, all addresses of cab position will be collected and displayed on Google map.

Keywords: GPS, GPRS, tracking server, client PC.

I. INTRODUCTION

Three Geo-stationary GPS satellites revolve around the earth to send information of longitude and latitude for each and every place on the planet. By receiving this free of cost information, one can find his exact location on the earth. GPS-GPRS module which is already with moving vehicle will receive the address from GPS satellite and will transmit to the ARM-7 controller. The controller can display the information on LCD panel which it has received. The GPRS module with SIM-900 will now accept the address information from the controller and will establish the connection with local mobile network. With the help of internet connection (GPRS), the address information will be send to web server. The information from the vehicles will be collected on this web page. At the client side, the coding is done in VB.net to access the addresses stored in web page. This information is collectively shown in google map to get integrated information.

II. BACKGROUND OVERVIEW

A. Existing System

Now days, many GPS systems are available in the market. Few of them are listed below:

1.1 Automotive Navigation system:

This is satellite navigation system designed to use in high cost automobiles. The GPS navigation device is installed in moving vehicle to acquire position data to locate the user on a road. The road map information is already installed in unit database which will further used to plot the exact location on the road map. Further parameters like speed, city landmarks, hotels, malls, road diversions can be displayed with the stored information, dead calculations and few sensors attached to it. This system can also guide the driver to lead the desire destination.
This is good for the driver but owner of the vehicle cannot know the current position of the vehicle.

1.2 GPSylon System:
This system downloads and shows map from the expedia map servers. It able to read GPS data in the NMEA standard from a serial GPS device. It allows the user to navigate around like in a digital atlas. It shows maps of different scale. This also provides download mouse mode which allows user to choose single map or by dragging a rectangle with the mouse, the user may choose to download maps for a larger area. This facility allows the user to download maps in the given scale for a larger area.

1.3 Open GTS system:
This is an open source project designed specially to provide web based GPS tracking services for a ‘Fleet’ of vehicles. It has designed to fill the need of an entry level fleet tracking system.

Above all systems are one way displaying systems. They do not provide feedback or controlling from centre unit. Control unit cannot find the location of moving object or vehicle.

III. THE PROPOSED SYSTEM

The physical components of tracking systems are
GPS satellite
GPS receiver
Max-232
ARM-7 controller
GPRS Module
Web server
Client PC
VB.net

B. Block Diagram
**Explanation of block:**

GPS satellite sends GPS data to the device which temporarily stores the data in case of car we use AVL (Advance Vehicle Locator) and in case of person we use a specially prepared device for personal tracking containing the panic button for the purpose of emergency. This device contains a SIM card which is used to communicate with the local GSM network thus the device uses GPS as well as GSM network. The data on the device is send to the tracking server via GPRS through the local network. On the tracking server there is a software component called as Socket Listener to get the data from the device on a particular socket. After the data is received in hexadecimal format it is parsed and converted to readable format by the parser and converter, the data is then stored into the database and further processing is done for alerts and reports generation. Geo fence can be created on the Google maps provided so whenever the device enters the geo fence or leaves it, an alert will be sent to the registered mobile number. There are web pages integrated with Google map and other APIs for the purpose of viewing the vehicle or a person on the GUI.

**C Main components of the Blocks**

The following are the brief explanations of the working principle of the various major blocks or sections used in the system…

- **Power Supply**

This unit will supply the various voltage requirements of each unit. This will be consists of transformer, rectifier, filter and regulator. The rectifier used here will be Bridge Rectifier. It will convert 230VAC into desired 5V/12V DC. Another power supplies needed is 3.3V for a ARM-7.

- **Microcontroller**

This unit is the heart of the complete system. It is actually responsible for all the process being executed. It will monitor & control all the peripheral devices or components connected in the system. In short we can say that the complete intelligence of the project resides in the software code embedded in the Microcontroller.

The controller used here is ARM-7. Code will be written in Embedded C and will be burned or programmed into the code memory using programmer.

- **MAX 232**

This section will be used to convert TTL logic into RS232 logic and vice-versa. In TTL---logic 1 is +5V and logic 0 is 0V. In RS232---logic 1 is -10V and logic 0 is +10V. This unit will provide interface that is required to communicate microcontroller with RS232 based devices using serial communication link. The MAX232 IC is dedicated for the logic conversion. This unit is also called as Logic Convertor OR Level Convertor. This unit requires +5VDC for it proper operation.

- **GPRS MODEM**

This is SIM-900 type GPRS modem used to have a communication with internet. This module receives information from microcontroller which was already sent by GPS satellite and sends this to the web server. On the web server we collect the information from every module of vehicle and stored for a fixed time period.

**D. Technology & Programming Languages**

As microcontrollers are the core of these days digital circuit design in industry, this system uses it for the centralized operation and digital processing. The technology used here is embedded technology which is the future of today’s modern electronics. The followings are the various Programming Languages & Technologies that are going to be used in the proposed system…

*For Embedded System…*

- Embedded Technology,
- ARM-7 Controller,
- Embedded C - Keil Compiler,
- Eagle Software for PCB Designing,

*For PC System…*

- VB.net 2008 Based Application Software,
- File Handling,
- Serial Communication Protocol,

**F. Project Development Methodology or Steps**
The following will be development steps so as to achieve the working Prototype Model of the above proposed system…

- Defining the Problem,
- Understanding the Need & Usability in industry and society (Market Analysis),
- Developing Block Diagram,
- Designing Circuits of individual blocks,
- Testing circuits in LAB & Finalizing,
- Developing PCB on PC,
- Getting the PCB printed from market,
- Soldering the components,
- Performing various Basic Experiments to test the PCBs,
- Developing Flowchart for the entire process,
- Writing actual Software Program,
- Compilation & Burning,
- Testing and Debugging,
- Developing Flowchart for PC Side Software,
- Developing Data Flow Diagram,
- Writing actual code.
- Finally Running the system and,
- Documentation.

IV. SCOPE & APPLICATIONS

Only the imagination can limit the applications of the above proposed system.

Though the following are some examples…

- Vehicle tracking for transport.
- Train position locator.
- Goods transport company.
- TAB cab services.
- ST mahamandal company
- Private vehicles of company
- Bus services etc.

CONCLUSION

By the realization of the above proposed system one can learn many aspects of a GPS based system. This will give the complete knowledge of designing microcontroller based system and developing embedded software. This project ideas will be more effective if more than 100 vehicles are installed with GPS trans-receiver systems.

ENHANCEMENTS

C. Future Modifications

There is always chance to improve the any system as research & development is an endless process. Our system is no exception to this phenomenon. The following improvements can be done…

- USB can be used,
- Any type of files can be stored,
- Large file support can be integrated,
- Data transfer rate can be increased,
- Can be designed for pen drives.
- Map can be shown in google earth.
- Module can be made very compact.
- Can think of single power supply of 3.3V

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