Arm7 Based Vehicle Tracking using Rfid and Gsm

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Abstract—Device-free object tracking provides a promising solution for many localization and tracking systems to monitor non-cooperative objects, such as intruders, which do not carry any transceiver. However, existing device-free solutions mainly use special sensors or active RFID tags, which are much more expensive compared to passive tags. In this paper, we propose a novel motion detection and tracking method using passive RFID tags, named Twins. The method leverages a newly observed phenomenon called critical state caused by interference among passive tags. We contribute to both theory and practice of this phenomenon by presenting a new interference model that precisely explains it and using extensive experiments to validate it. We design a practical Twins based intrusion detection system and implement a real prototype by commercial off-the-shelf RFID reader and tags. Experimental results show that Twins is effective in detecting the moving object, with very low location errors of 0.75 m in average (with a deployment spacing of 0.6 m).

Introduction

In the last few decades, India has progressed at such an enormous rate that many companies have strongly established themselves here. These companies bring a huge amount of workforce with them. Arranging transportation to such a huge mass is a cumbersome task involving many intricacies. Generally, this transport is arranged through the local transport vendors on a yearly contract basis, recently happen mishaps such as burglary, rape cases etc. The development of satellite communication technology is easy to identify the vehicle locations. Vehicle tracking systems have brought this technology to the day-to-day life of the common person. Today GPS used in cars, ambulances, fleets and police vehicles are common sights on the roads of developed countries. All the existing technology support tracking the vehicle place and status

Existing method

Security in travel is primary concern for every one. This Project describes a design of effective alarm system that can monitor an automotive / vehicle / car condition in traveling. This project is designed to inform about an accident that is occurred to a vehicle to the family members of the traveling persons. This project uses a piezo-electric sensor which can detect the abrupt vibration when an accident is occurred. This sends a signal to microcontroller.

This Project presents an automatic vehicle accident detection system using GPS and GSM modems. The system can be interconnected with the car alarm system and alert the owner on his mobile phone. This detection and messaging system is composed of a GPS receiver, Microcontroller and a GSM Modem.

The Microcontroller processes this information and this processed information is sent to the user/owner using GSM modem A GSM modem is interfaced to the MCU. The GSM modem sends an SMS to the predefined mobile number and informs about this accident. This project is designed with AT89S52 controller. In this project we are using different modules such as microcontroller, GSM, GPS, 16X2 LCD, Accident alert sensor(vibration sensor) to detect the theft.

Block Diagram
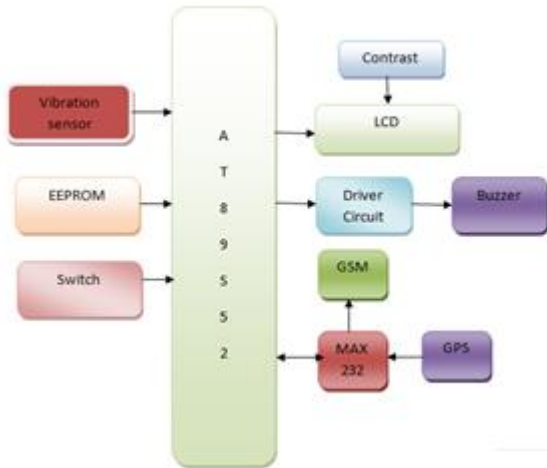

Proposed method

The proposed system utilizes RFID based localization. The RFID tags are patched in Different Places and the robot has the RFID reader connected to it. Whenever the RFID reader nears a tag, it reads the data from the tag. The position coordinate of the tag is previously stored in the Micro Controller. According to the data received from tag, Location is Send to Mobile through SMS. Micro Controller reads the RFID tag data and passes to the GSM through serial port. This status display on LCD And send SMS to authorized Person Mobile Number.
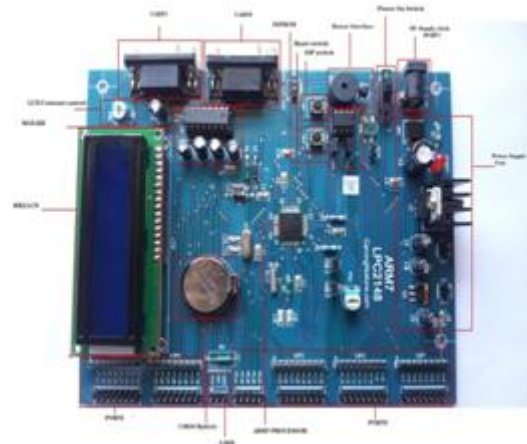
Block Diagram
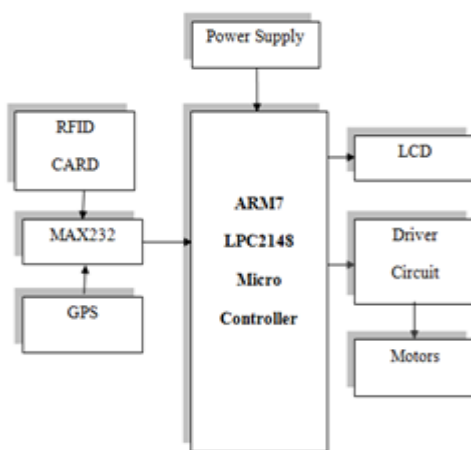
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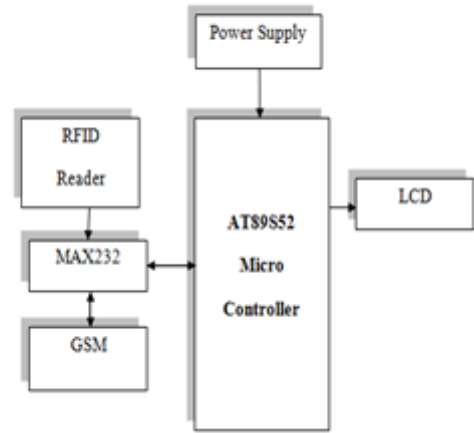

Modules used in this project

The **LPC2148** are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory.

A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB PORT,PWM channels and 46 GPIO lines with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access

control and point-of-sale. With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.

Power supply circuit
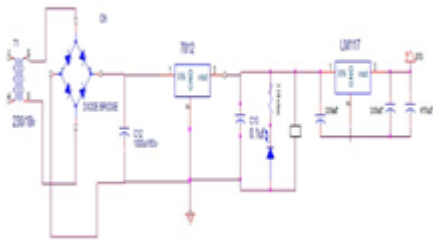
This project uses regulated 3.3V, 500mA power supply. Unregulated 12V DC is used for relay. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer.

AT89S52

Features

• Compatible with MCS-51® Products

• 8K Bytes of In-System Programmable (ISP) Flash Memory

    – Endurance: 1000 Write/Erase Cycles

• 4.0V to 5.5V Operating Range

• Fully Static Operation: 0 Hz to 33 MHz

• Three-level Program Memory Lock

• 256 x 8-bit Internal RAM

• 32 Programmable I/O Lines

• Three 16-bit Timer/Counters

• Eight Interrupt Sources

• Full Duplex UART Serial Channel

• Low-power Idle and Power-down Modes

• Interrupt Recovery from Power-down Mode

• Watchdog Timer

• Dual Data Pointer

• Power-off Flag

RFID

Radio-frequency identification (RFID) is the use of a wireless non-contact system that uses radio-frequency electromagnetic fields to transfer data from a tag attached to an object, for the purposes of automatic identification and tracking. Some tags require no battery and are powered by the electromagnetic fields used to read them. Others use a local power source and emit radio waves (electromagnetic radiation at radio frequencies).

Global System for Mobile Communication (GSM)
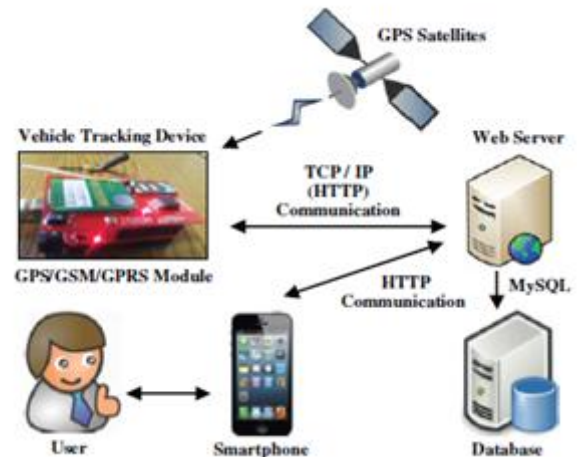
Definition:

GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication.

General Features:

- Tri-band GSM/GPRS900/1800/1900Mhz
- GPRS multi-slot class 10
- GPRS mobile station class –B
- Complaint to GSM phase 2/2+
    i. -class 4(2W @900MHz)
    ii. -class 1(1W @/18001900MHz)
- Dimensions: 40x33x2.85 mm
- Weight: 8gm
- 7. Control via AT commands
- (GSM 07.07, 07.05 and SIMCOM enhanced AT commands)
- SIM application tool kit
- supply voltage range 3.5…….4.5 v
- Low power consumption
- Normal operation temperature: -20 'C to +55 'C
- Restricted operation temperature : -20 'C to -25 'C and +55 'C to +70 'C
- storage temperature: -40 'C to +80 'C

Basic concept of GPS

A GPS receiver calculates its position by precisely timing the signals sent by the GPS satellites high above the Earth. Each satellite continually transmits messages which include

- the time the message was transmitted
- precise orbital information (the ephemeris)

- The general system health and rough orbits of all GPS satellites (the almanac).

Software tools

Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.
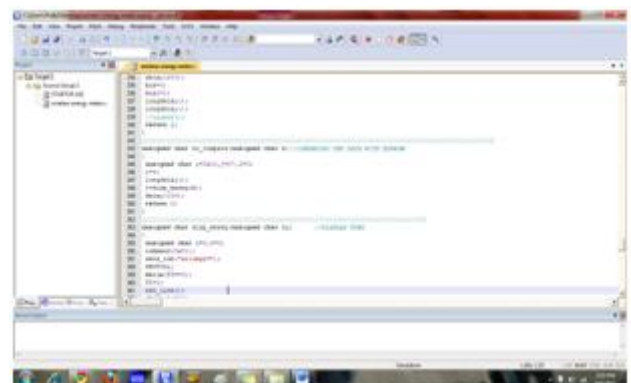
Flash Magic

Flash Magic is a tool which is used to program hex code in EEPROM of micro-controller. It is a freeware tool. It only supports the micro-controller of Philips and NXP. It can burn a hex code into that controller which supports ISP (in system programming) feature. Flash magic supports several chips like **ARM Cortex M0, M3, M4, ARM7 and 8051.**
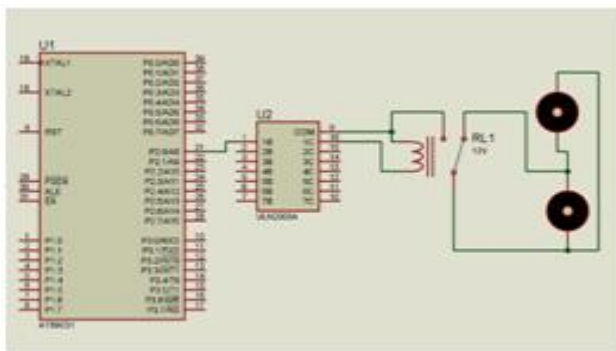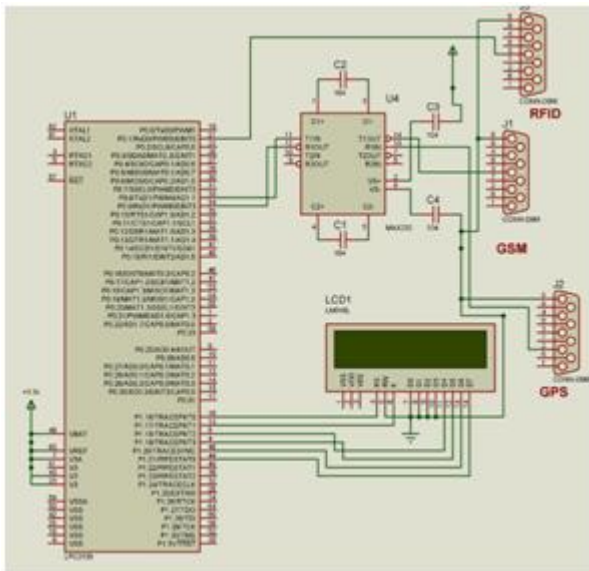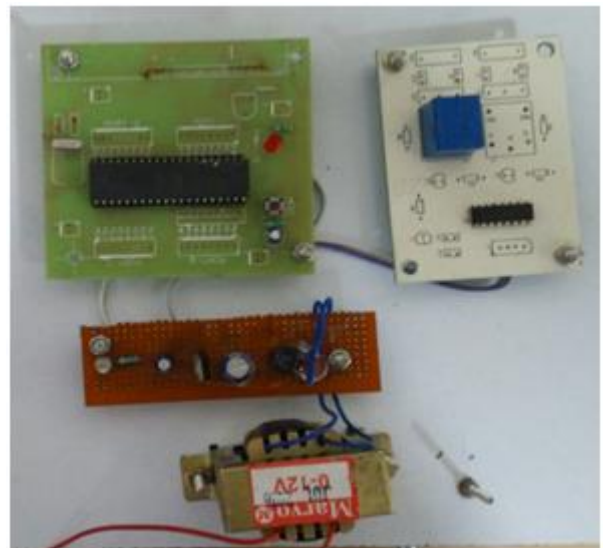
Schematic Diagram:

Results:
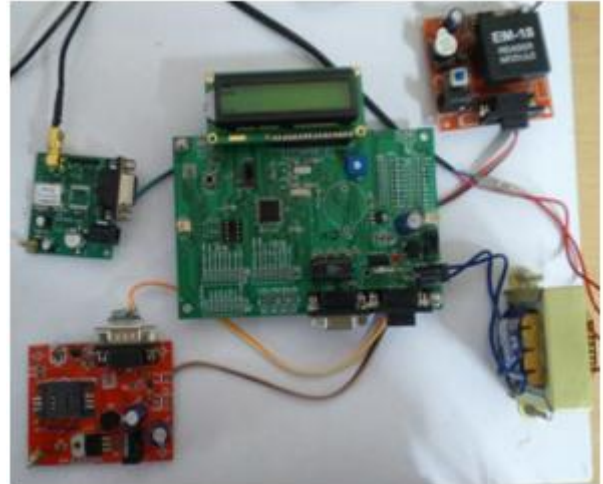
Advantages

- This project is easy to install and easy to use.

- We get the exact co-ordinates of location. So there is no chance of errors.

Applications:

- GPS Car theft detection can be used in transportation vehicles of Companies, schools, colleges and industries.

- This project can be used in our cars and even in bikes.

Conclusion

In this paper, we have proposed a novel method of vehicle tracking used to track the theft vehicle by using GPS and GSM technology. When the theft identified, the receiver send SMS to the concern person. In this method, easily track the vehicle place using GPS.

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