Anti-Theft Tracking System And Security System For Automobiles Using GSM And ARM

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Abstract- *Insecurity is among the challenges that the entire world is battling with, each part of the world with different security issues. Crime rate in our society these days is becoming frightening as vehicles are been used for committing crime and research shows that perpetrators of this acts make use of stolen vehicles snatched at gun points which is causing damages to live and properties .*

The issue of vehicle theft is increasing day by day in our society and despite the efforts of the security agencies, not all the stolen vehicles are always identified, found or recovered. Also, a lot of stolen vehicles used to be identified and recovered in another jurisdiction different from where they were stolen either by police or civil society but due to lack of up-to-date information system where history (i.e. profile) or information of stolen vehicles can be checked or accessed. Those identified or recovered vehicles could not get to their owners on time. In addition to the importance attached to issue of recovered vehicles identity, maintained that Identity Management Systems (IdMS) provides support for security efforts while lowering costs related to managing users and their identities.

According to there is assumption that vehicle theft only occurs in seedy areas, but vehicle theft can also occur anywhere in any area of a town. The researchers also asserted that theft is among the common attitudes exhibited by people where the ownership of property such as vehicle, land, and other physical properties can be altered without the knowledge of the owner.

I. INTRODUCTION

Recently, the role of mobile phones in the society is largely still unexplored . This was collaborated by , that because of the fast improvements in mobile phone technology, it seem that in future mobile phones would replace computers. Also, new innovative vehicle tracking systems have been developed with the capabilities of operating vehicle controls such as locking the door, action based on the error signals and coordinates that shows on the dash-board of the vehicle developed a massive vehicle security system which uses embedded and mobile technologies.

II. REVIEW OF EXISTING SYSTEMS

Designed a vehicle tracking and locking system based on GSM and GPS using GSM Modem SIM300 V7.03 as the technology. This GSM modem was designed such that it can accept SIM card. The paper further stated that the designed system is sets such that it will go into sleeping manner when the vehicle is being driven by the vehicle owner, otherwise, it will be in active status. Also, the system has the capacity such that when SMS message is sent to the controller, it has the features of sending signals to the vehicle engine motor which enable the engine of the vehicle to decreases steadily and then off, thereafter, it will locked all the doors and the engine which has to be restarted again before the door can be opened by entering the password given to the rightful owner of the vehicle.

Proposed the design and development of Global positioning system and Global system for mobile communications based vehicle tracking in a real time. The designed system gives an alert which is used for reporting any events that happens to the vehicle as it moves. The proposed system also consists of an embedded system with ARM processor which is installed in the vehicle. The system has the ability to send an SMS which consist of latitude and longitude of the vehicle by using AT commands after pressing the emergency key if there is any problem that is associated with the vehicle.

Also, designed a car authentication and accident intimation system using GPS and GSM which is used to save lives. The design of the system has three modules.

2.1 Problem Statement

Tracking systems were first developed for the shipping industry because they wanted to determine where each vehicle was at any given time. Passive systems were developed in the beginning to fulfill these requirements. For the applications which require real time location information of the vehicle, these systems can't be employed because they save the location information in the internal storage and location information can only be accessed when vehicle is

available. To achieve Automatic Vehicle Location system that can transmit the location information in real time, Active systems are developed. Real time vehicular tracking system in corporates a hardware device installed in the vehicle (In-Vehicle Unit) and a remote Tracking server. The information is transmitted to Tracking server using GSM/GPRS modem on GSM network by using SMS or using direct TCP/IP connection with Tracking server through GPRS. Tracking server also has GSM/GPRS modem that receives vehicle location information via GSM network and stores this information in database. This information is available to authorized usersof the system via website over the internet.

2.2 Design Description

The Piezoelectric Effect Piezoelectric Effect Basics A piezoelectric substance is one that produces an electric charge when a mechanical stress is applied (the substance is squeezed or stretched). Conversely, a mechanical deformation (the substance shrinks or expands) is produced when an electric field is applied. This effect is formed in crystals that have no center of symmetry. To explain this, we have to look at the individual molecules that make up the crystal. Each molecule has a polarization, one end is more negatively charged and the other end is positively charged, and is called a dipole. This is a result of the atoms that make up the molecule and the way the molecules are shaped. The polar axis is an imaginary line that runs through the center of both charges on the molecule. In a monocrystal the polar axes of all of the dipoles lie in one direction. The crystal is said to be symmetrical because if you were to cut the crystal at any point, the resultant polar axes of the two pieces would lie in the same direction as the original. In a polycrystal, there are different regions within the material that have a different polar axis. It is asymmetrical because there is no point at which the crystal could be cut that would leave the two remaining pieces with the same resultant polar axis. Figure 1 illustrates this concept. In order to produce the piezoelectric effect, the polycrystal is heated under the application of a strong electric field. The heat allows the molecules to move more freely and the electric field forces all of the dipoles in the crystal to line up and face in nearly the same direction (Figure 2). The piezoelectric effect can now be observed in the crystal. Figure 3 illustrates the piezoelectric effect. Figure 3a shows the piezoelectric material without a stress or charge. If the material is compressed, then a voltage of the same polarity as the poling voltage will appear between the electrodes (b). If stretched, a voltage of opposite polarity will appear (c). Conversely, if a voltage is applied the material will deform. A voltage with the opposite polarity as the poling voltage will cause the material to expand, (d), and a voltage with the same polarity will cause the material to compres

The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.

The AVR core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in one single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers.

The ATmega16 provides the following features: 16K bytes of In-System Programmable Flash Program memory with Read-While-Write capabilities, 512 bytes EEPROM, 1K byte SRAM, 32 general purpose I/O lines, 32 general purpose working registers, a JTAG interface for Boundary-scan, On-chip Debugging support and programming, three flexible Timer/Counters with compare modes, Internal and External Interrupts, a serial programmable USART, a byte oriented Two-wire Serial Interface, an 8-channel, 10-bit ADC with optional differential input stage with programmable gain (TQFP package only), a programmable Watchdog Timer with Internal Oscillator, an SPI serial port, and six software selectable power saving modes. The Idle mode stops the CPU while allowing the USART, Two-wire interface, A/D Converter, SRAM, Timer/Counters, SPI port, and interrupt system to continue functioning. The Power-down mode saves the register con- tents but freezes the Oscillator, disabling all other chip functions until the next External Interrupt or Hardware Reset. In Power-save mode, the Asynchronous Timer continues to run, allowing the user to maintain a timer base while the rest of the device is sleeping. The ADC Noise Reduction mode stops the CPU and all I/O modules except Asynchro- nous Timer and ADC, to minimize switching noise during ADC conversions. In Standby mode, the crystal/resonator Oscillator is running while the rest of the device is sleeping. This allows very fast start-up combined with low-power consumption. In Extended Standby mode, both the main Oscillator and the Asynchronous Timer continue to run.

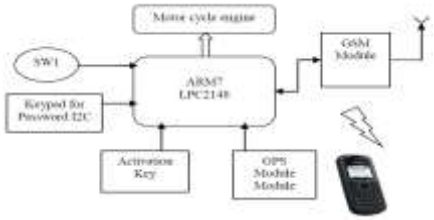
III. ARM7 MICROPROCESSOR

The LPC2138 is embedded with ARM7TDMI-S microprocessor. The TDMI-S stands for 16-bit **T**humb + JTAG **D**ebug + fast **M**ultiplier + enhanced **I**CE + **S**ynthesizable core. Where **T**: supports both ARM (32-bit) and

Thumb (16-bit) instruction sets, **D**: Contains Joint Test Action Group (JTAG) **D**ebug extensions, **M**: Enhanced 32x8 **M**ultiplier block, **I**: Embedded In-Circuit Emulator (**I**CE) macro cell, **S**: **S**ynthesizable (i.e. distributed as Register Transfer Level (RTL)rather than a hardened layout).The ARM7TDMI-S is a general purpose 32-bit microprocessor, which offers high performance and very low power consumption .

The ARM architecture is based on Reduced Instruction Set Computer (RISC) principles, and the instruction set and related decode mechanism are much simpler than those of micro programmed Complex Instruction Set Computers (CISC).

IV. BLOCK DIAGRAM



V. METHODOLOGY

In this project, Tracking systems were first developed for the shipping industry because they wanted to determine where each vehicle was at any given time. Passive systems were developed in the beginning to fulfill these requirements. For the applications which require real time location information of the vehicle, these systems can't be employed because they save the location information in the internal storage and location information can only be accessed when vehicle is available. To achieve Automatic Vehicle Location system that can transmit the location information in real time, Active systems are developed. Real time vehicular tracking system incorporates a hardware device installed in the vehicle (In-Vehicle Unit) and a remote Tracking server. The information is transmitted to Tracking server using GSM/GPRS modem on GSM network by using SMS or using direct TCP/IP connection with Tracking server through GPRS. Tracking server also has GSM/GPRS modem that receives vehicle location information via GSM network and stores this information in database. This information is available to authorized users of the system via website over the internet.

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VI. ADVANTAGES

- It has low design cost.
- System provides protection.
- They are Small in size.
- Uses for security purposes.

VII. APPLICATIONS

- For automobile purposes.
- For Bikes.
- For Security Purposes.

VIII. CONCLUSION

The results presented in this paper contain execution of Startup routine, execution of SMS Configure routine, Logs of Tracking Server and Pointing out current location of vehicle. For vehicle tracking in real time, in-vehicle unit and a tracking server is used. The information is transmitted to Tracking server using GSM/GPRS modem on GSM network by using SMS or using direct TCP/IP connection with Tracking server through GPRS. Tracking server also has GSM/GPRS modem that receives vehicle location information via GSM network and stores this information in database. This information is available to authorized users of the system via website over the internet. Currently In-Vehicle unit was implemented with two boards. Microcontroller board was externally connected to GM862-GPS interface board. Single board can be designed to incorporate Microcontroller circuitry on the GM862-GPS interface board. It will reduce the overall size of In-Vehicle unit and it will also reduce the number of components so will the cost.

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