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THEFT ALERT SYSTEM AND AUTO ARRESTING SYSTEM FOR MUSEUMS OR JEWELLERY SHOP

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Abstract:

The main aim of the project is to design a system for alerting theft and to auto arrests the theft in museums and jewelry shops. The purpose of the system is to design a system for alerting theft and to auto arrest the theft in museums and jewelry shops. This system helps the museums and jewelry shop owners by giving them security. The thesis title "THEFT ALERT AND AUTO ARRESTING SYSTEM FOR MUSEUMS OR JEWELLRY SHOPS" itself indicates that whenever someone wants to theft the jewel which is present in the shopping mall then the theft will be automatically arrested with the help of some human detecting sensors and make the doors to close automatically. That means the thief is arrested. This thesis consists of two sections. The transmitter section consists of a PIR sensor, a motor a micro controller. One such thing is using PIR sensor which is used to detecting the human motion.

Keywords— **Design; Mobile App; visually impaired; blind; Usability; low vision mobile portal; accessibility; iOS; iphone**

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I. INTRODUCTION

The thesis title itself indicates that whenever someone wants to theft the jewel which is present in the shopping mall then the theft will be automatically arrested with the help of some human detecting sensors and vibration sensor and make the doors to close automatically. That means the thief is arrested. This project consists of two sections. The transmitter section consists of a PIR sensor, a motor a micro controller, a GSM module. One such thing is using PIR sensor which is used to detecting the human motion.

Whenever someone tries to steal the jeweler at the jewellery corner in the shopping mall, there will be one PIR sensor is placed in 'ON' condition at that time it will start detecting the motion of human being. If the sensor detects then automatically the doors of that jeweler area will close within few seconds and gives the intimation to the owner of that shopping mall through the SMS using GSM communication. The buzzer will be 'on' for indicating that someone is arrested and at the same time the display will also be shown at the receiver section.

In the thesis another main thing is Vibration sensor, when the theft try to break wall or door the vibration sensor will detect the vibration automatically. In that state the controller send message to owner of shopping mall through the SMS using GSM communication. The buzzer will be 'on' for indicating that someone is arrested and at the same time the display will also be shown at the receiver section.

These day's museums theft cases are higher than ever, give your museums an excellent protection with the only reliable anti-theft device. Museums Electronic control unit ensures the best guarantee to protect your museums from different kinds of theft cases. It is a museums security device that offers excellent protection to your museums. A museum with Electronic control unit security system helps the user to lock and unlock doors at the press of a button. Mainly two types of Electronic control unit are used in Auto industry -Automatic Electronic control unit and Manual Electronic control unit that ensures smoother and secured operation. Again this system could not prove to provide complete security and accessibility of the vehicle in case of theft. So a more developed system makes use of an embedded system based on GSM technology. The designed & developed system is installed in the vehicle. The main concept in this design is introducing the mobile communications into the embedded system. Automotive industry uses Controller Area Network (CAN) as the in-vehicle network for the Engine Management, the body electronics like door and roof control, air conditioning and lighting as well as for the entertainment control.

Nowadays all most all museums manufacturers have also started implementing CAN based vehicle automation. CAN networks used in engine management to connect several ECUs. Based on the discussion and data related to stolen museums, it is observed that the museums theft is a global problem. Nobody likes his or her museums to get stolen. The museums manufacturers installed a minimum standard security system such as an alarm-based security system. Due to the inefficient conventional museums security alarm system, the possibility of the museums can be stolen is high However, this device is not effective enough. It does not have any pager system attached to it. The museums thief takes only a few minutes to deactivate the security system. Furthermore, nobody will pay an attention when the museums alarm goes off. Based on these reasons, it is proposed that a GSM-based vehicle anti-theft system development is designed and developed to improve the performance of the current vehicle security system. Somehow if there is another way of transmitting the alarm to the museums owner that is not limited to the audible and line of sight, the system can be upgraded. SMS is a good choice of the communication to replace the conventional alarm, because it can be done and does not require much cost. Although most of people know GPS can provide more security for the museums but the main reason people does not apply it because the cost. Advance museums security system is too expensive. Cost for the gadget is too high. Besides that, people also must pay for the service monthly. The main objective of this project is to design, construct and test a GSM-based vehicle anti-theft system that can be used to improve the performance of museums security system. The proposed system also allows the user to lock and unlock the engine of the vehicle remotely using the mobile phone. The objective of the project is to build an additional feature to the present security system that will warn the owner of the vehicle by sending SMS when there has been an intrusion into the vehicle. To provide a solution to avoid museums stolen in the lower cost than advance security museums system (GPS). In this project, the RFID reader will be present at the underneath of vehicle to trace out the places, which are landmark to the present place like schools, hospitals petrol bunks and temples etc. Every road will be attached with a RFID tags. These RFID tags will contain the information like name of the places around it**.**

II.DESIGN FOR USABILITY USERS

CAN Architecture:

Each node requires a Central processing unit or host processor the host processor decides what received messages mean and which messages it wants to transmit itself. Sensors, actuators and control devices can be connected to the host processor. CAN controller; hardware with a synchronous clock.

Receiving: the CAN controller stores received bits serially from the bus until an entire message is available, which can then be fetched by the host processor (usually after the CAN controller has triggered an interrupt).

Sending: the host processor stores it's transmit messages to a CAN controller, which transmits the bits serially onto the bus.

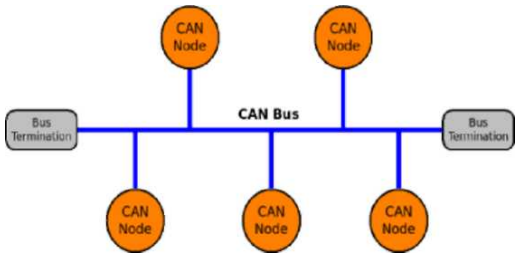

Fig : CAN Architecture

Transceiver

Receiving: it adapts signal levels from the bus to levels that the CAN controller expects and has protective circuitry that protects the CAN controller.

Transmitting: it converts the transmit-bit signal received from the CAN controller into a signal that is sent onto the bus.

Each node is able to send and receive messages, but not simultaneously. A message consists primarily of an ID (identifier), which represents the priority of the message, and up to eight data bytes. The improved CAN FD extends the length of the data section to up to 64 bytes per frame. It is transmitted serially onto the bus. This signal pattern is encoded in non-return-to-zero (NRZ) format and may be received by all nodes.The devices that are connected by a CAN network are typically sensors, actuators, and other control devices. These devices are not connected directly to the bus, but through a host processor and a CAN controller. Fig. 1 shows that the CAN network topology, follows the bus network topology, which gives it the advantage of easily adding new CAN nodes to an existing network. Furthermore, the standardization of the protocol means all ECUs will conform to the CAN standards while transmitting data.

Data messages transmitted from any node on a CAN bus do not contain addresses of either the transmitting node, or of any intended receiving node. Instead, the content of the message is labeled by an identifier that is unique throughout the network. All other nodes on the network receive the message and each performs an acceptance test on the identifier to determine if the message, and thus its content, is relevant to that particular node. If the message is relevant, it will be processed; otherwise it is ignored.

Each CAN message has an identifier which is 11 bits (CAN specification part A) or 29 bits (part B). This identifier is the principle part of the CAN arbitration field, which is located in the beginning of each, CAN message. The identifier identifies the type of message, but is also the message priority. The bits in a CAN message can be sent as either high or low. The low bits are always dominant,

which means that if one node tries to send a low and another node tries to send a high, the result on the buses will be a low. A transmitting node always listens on the bus while transmitting. A node that sends a high in the arbitration field and detects a low knows that it has lost arbitration. It stops transmitting, letting the other node, with a higher priority message, continue uninterrupted. Two nodes on the network are not allowed to send messages with the same id. If two nodes try to send a message with the same id at the same time arbitration will not work. Instead, one of the transmitting nodes will detect that his message is distorted outside of the arbitration field. The nodes will then use the error handling of CAN, which in this case ultimately will lead to one of the transmitting node being switched off (bus-off mode).

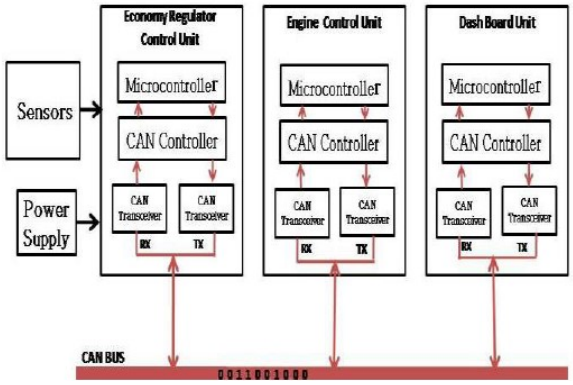

Fig: Information Exchange of a message on the CAN Bus (Broadcast Principle)

III. Existing System

Commercially available anti-theft vehicular systems are very expensive. Unit racking Vehicle Tracking Unit has the ability to integrate the GPS tracking system with existing vehicle alarm or provide alarm features when someone is tampering with owner vehicle. It allows detecting the security threat before the vehicle is driven away and gives the ability to track the vehicle over the internet. The ability to track the vehicle over the internet is done by utilizing Global Positioning Satellites. Data such as Global Position, Speed Velocity and Time (PVT) are transmitted over the Cellular network. The information transmitted from the tracking device is disseminated and stored on your private confidential account or sent over the wireless network. The data is cross referenced on a street level map for viewing. The positioning information provided is cross reference to the closest geographic address and displayed in residential /commercial address format.

The main disadvantage of the existing system is that the system provides only a broad layout of the geographical address, providing and does not provide street wise address. Speed of the vehicle and engine is no way controlled by the existing systems, thus exposing the vulnerability of a system that provides only tracking.

Fig: Mobile App Portal.

The block diagram of the proposed system is as shown in Fig. 3.The design & development of the proposed system carried out in two modules, first the design of module to retrieve the location and second module to control the vehicle engine by either to lock or unlock the engine by sending ON/OFF message from the user to the Theft Control Unit.

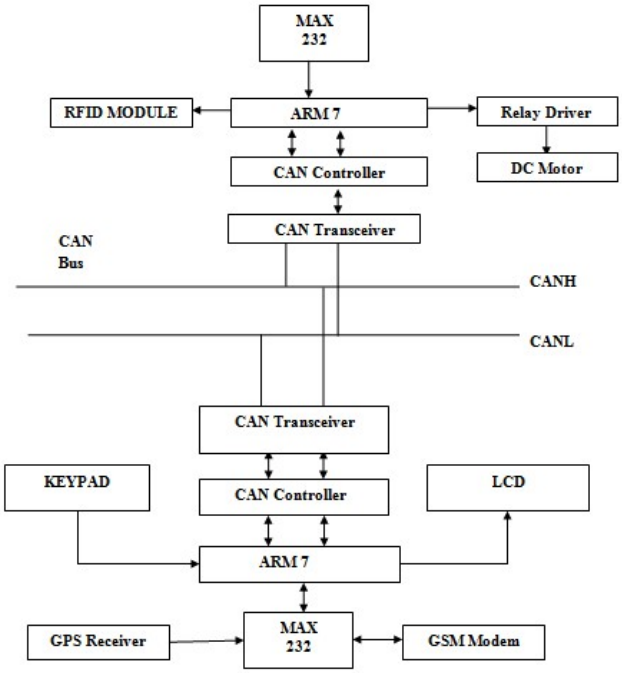

Fig: Block Diagram of the engine ignition control Module

Whenever the vehicle is started, a msg with the GPS coordinate of the location of the vehicle is sent as an SMS to the owner's number. An RFID device can be fixed to the vehicle to give the information about the particular places like hotels, hospitals etc., whenever the vehicle crosses that instance. On receiving the message the owner can send a reply to lock or antilock that is stop the vehicle or allow the vehicle to run through a keypad. The system

at first checks and verifies the owner number and if exact it checks the SMS sent and performs the corresponding action. All this process is achieved through vehicular network, CAN. When the engine is started it sends the information to the Master node in CAN which in turn fetches the location coordinates attached with it and generates the SMS. On receiving locking or anti-locking code it sends the respective command to the slave node which takes the intended action. If the vehicle is in danger then the speed of the car will be decreased by using dc motor. At a time buzzer also giving alert when the vehicle is in danger.

Ignition/fuel flow Control of the Vehicle

Design of ignition/fuel flow control module involves stimulus to drive the process. This stimulus is obtained through an owner's message. Upon receiving the location of the vehicle, the owner can either stop or start the ignition of the engine. The design parameter that is considered in this moduleis receiving a message from the owner to perform further action. Another design parameter considered is authenticating the genuine nature of the message. Design involves processing the message only if it is from the owner. Even if the locking code is known to others, locking cannot be performed. Owner thus has a discrete control over the ignition of the engine. Thecrux of the design involves controlling the ignition the engineering at a remote place by sending a message.

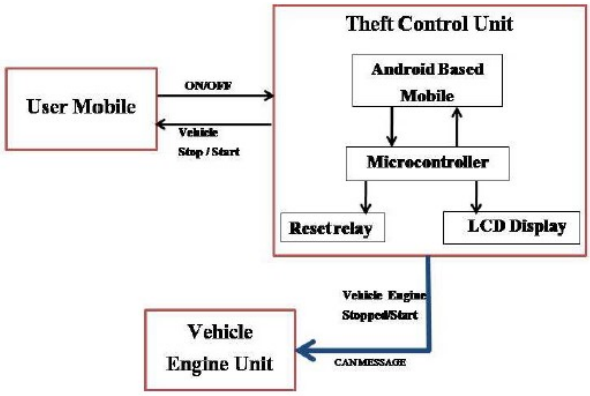

Fig: Block Diagram of the engine ignition control Module

Key Features	PIC16F877A
Operating Frequency	DC – 20 MHz
Resets (and Delays)	POR, BOR (PWRT, OST)
Flash Program Memory (14-bit words)	8K
Data Memory (bytes)	368
EEPROM Data Memory (bytes)	256
Interrupts	15
I/O Ports	Ports A, B, C, D, E
Timers	3
Capture/Compare/PWM modules	2
Serial Communications	MSSP, USART
Parallel Communications	PSP
10-bit Analog-to-Digital Module	8 input channels
Analog Comparators	2
Instruction Set	35 Instructions
Packages	40-pin PDIP 44-pin PLCC 44-pin TQFP 44-pin QFN

Table: Key Features

Upon receiving the message and verifying its authentication, the micro controller installed on the vehicle would send a signal to the relay to lock or unlock the engine. A SIM card on GSM module installed on the vehicle would receive the message and would forward it to the microcontroller. A MAX232 would perform the action of both driver and receiver to forward the message to and from the micro controller as shown in Fig. 5. An LCD display is used to notify the changes. Corresponding messages would be display on the LCD when anew message is received, when locking or starting the engines performed. This kit however is not essential for actual deployment of the system and is used only for demonstration purpose.

IV. Experimental Result

This section gives the details about the experimental results of the proposed approach. The implementation of realization of locking and unlocking of theft vehicles using can document is done successfully. The communication is properly done without any interference between different modules in the design. Design is done to meet all the specifications and requirements. Software tools like keil uvision simulator, proload to dump the source code into the microcontroller, orcad lite for the schematic diagram have been used to develop the software code before realizing the hardware.

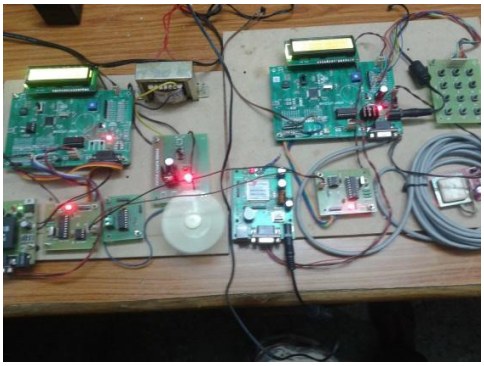

Fig : Hardware part of project

In order to ensure a good user experience, it will be important that all the apps use the same kind of controls to interact with the low vision user. The way the user navigates through views within the app should be similar across different apps.

To make this possible, the first step is to identify those controls used by sighted users that would be also valid for low vision users. A button type control seems to be valid for both blind and sighted users. But other controls such as toolbars, segmented controls, tables or data pickets would need to be adapted in order to meet the low vision user requirements. At this stage, new controls for visually impaired users could be also created.

Once we have defined those controls, the next step is to create usability tests for those controls. The tests are used to study how the low vision user interacts with a specific control. On the usability test we can also measure the ability of the users navigating across different views, identifying the controls and interacting with them.

Fig : Location details received

The definition and the test of these controls will give the low visual users the needed user experience that will help them to identify view components and to navigate easily across any app of the portal. Voice Over or any other TTS (text to speech) library would are used as complement to the usable accessibility design.

Once we have all the needed ingredients to build a solid low vision user app, the final step is to start with the design of the portal apps. Following are some of the mobile apps that will be included in the basic low vision mobile portal. The majority of these apps are traditional apps that have been redesigned to meet the needs of visually impaired and blind users.

- **Phone:** This App will facilitate the user making phone calls. Figure 5 shows a snapshot of the App. Simple design with buttons and high contrast. As the user moves around the screen touching numbers, the text to speech feature reads those numbers.

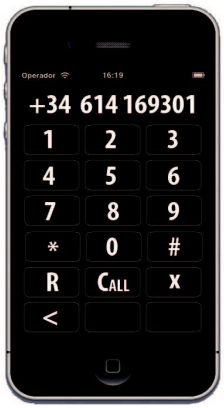

Fig: Phone App for low vision users

- **Contacts:** This App will allow the user to navigate through his contact list. Voice over combined with special gestures will make it easier to locate a specific contact in the list.
- **SMS:** By means of this app, the user will send SMS messages to his contacts in a very simple way.
- Alarm: Date, Time and alarms can be set using this App.
- **Calendar:** The low vision user will use a special context, which will help him adding and editing notes to the calendar.
- **Battery:** Text to speech is used to notify the user about the battery level.
- **Email:** Special email client designed for low vision users.
- **Magnifier:** The iPhone camera works as a magnifier, facilitating the low vision users the reading of books, newspaper, etc. Special image filters are used to create a high contrast inverting the image to obtain a dark background.
- **GPS Location:** This simple App will inform the user about his location: street number, city.
- **Social network clients:** A collection of apps will be developed to allow visually impaired and blind users the connection with social networks, such as twitter or facebook.

In order to help developers to add their own apps to the mobile portal, a specified API will be designed. This API will include the low vision mobile app portal features, which will facilitate developers the design of Apps for low vision users. Design for usability is an essential premise in order to achieve the best user experience.

V.PRELIMINARY RESULTS

The base station subsystem (BSS) is the section of a traditional cellular telephone network which is responsible for handling traffic and signaling between a mobile phone and the network switching subsystem. The BSS carries out transposing of speech channels, allocation of radio channels to mobile phones, paging, quality management of transmission and reception over the air interface and many other tasks related to the radio network. It also provides and manage radio transmission path between mobile station and mobile switching station.

The base station controller (BSC) provides, classically, the Intelligence behind the BTS's. Typically a BSC has tens or even hundreds of BTSs under its control. The BSC handles allocation of radio channels, receives measurements from the mobile phones, controls handovers from BTS to BTS (except in the case of an inter-BSC handover in which case control is in part the responsibility of the anchor MSC). A key function of the BSC is to act as a concentrator where many different low capacity connections to BTSs (with relatively low utilization) become reduced to a smaller number of connections towards the mobile switching center (MSC) (with a high level of utilization).A BSC is often based on a distributed computing architecture, with redundancy applied to critical functional units to ensure availability in the event of fault conditions. BSC controls the BTS and handoff management.

Its function is encryption channel selection, allocation and deal location. It also does monitoring of radio channels whether busy or idles in status. The base transceiver station, or BTS, contains the equipment for transmitting and receiving of radio signals (transceivers), antennas, and equipment for encrypting and decrypting communications with the base station controller (BSC). A BTS is controlled by a parent BSC via the base station control function (BCF). The BCF provides an operations and maintenance (O&M) connection to the network management system (NMS), and manages operational states of each TRX, as well as software handling and alarm collection. Frequency hopping is often used to increase overall BTS performance; this involves the rapid switching of voice traffic between TRXs in a sector. A hopping sequence is followed by the TRXs and handsets using the sector.

ISDN is a circuit-switched telephone network system that also provides access to packet switched networks, designed to allow digital transmission of voice and data over ordinary telephone copper wires, resulting in better voice quality than an analog phone. It offers circuit-switched connections (for either voice or data), and packet-switched connections (for data), in increments of 64 Kbit/s. Another major market application is Internet access, where ISDN typically provides a maximum of 128 Kbit/s in both upstream and downstream directions (which can be considered to be broadband speed, since it exceeds the narrowband speeds of standard analog56k telephone lines). ISDN B-channels can be bonded to achieve a greater data rate; typically 3 or 4 BRIs (6 to 8 64 Kbit/s channels) are bonded.

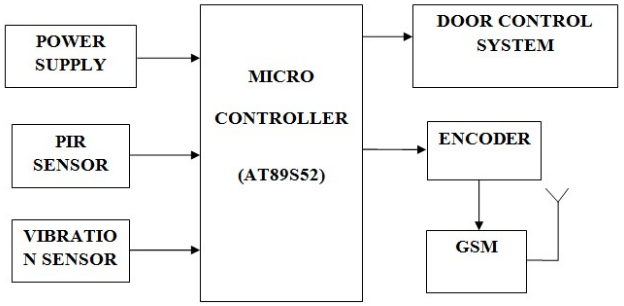

Fig : Block diagram

The thesis title itself indicates that whenever someone wants to theft the jewel which is present in the shopping mall then the theft will be automatically arrested with the help of some human detecting sensors and vibration sensor and make the doors to close automatically. That means the thief is arrested. This project consists of two sections. The transmitter section consists of a PIR sensor, a motor a micro controller, a GSM module. One such thing is using PIR sensor which is used to detecting the human motion.

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VI. CONCLUSIONS AND FUTURE WORK

To limit crimes and robbery, there are many types of equipment that have been designed till date. The design that we've created is very efficient, and will be the best in the future. In the use of equipments will be increased the security to avoid robberies in every commercial areas.PIR sensor and vibration sensor is very sensitive sensor to detect single human motion and it is using to shopping

mall owner will detect maximum of robbery in their shop.
The developed system in this paper for avoiding vehicle theft makes use of an mobile phone that is embedded in the vehicle with an interfacing to Engine Control Module(ECM) through Control Area Network(CAN) Bus, which is in turn, communicated to the ECM. The vehicle being stolen can be stopped by using GPS feature of mobile phone and this information is used by the owner of the vehicle for future processing. The owner sends the message to the mobile which is embedded in the vehicle which has stolen which in turn controls the vehicles engine by locking the working of the engine immediately. The developed system accept the message and broadcasted to the Vehicle Network through CAN Bus. The engine can be unlocked only by the owner of the vehicle by sending the message again. The goal behind the design is to develop security for vehicles and embedded system to communicate with engine of the vehicle.

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