IOT-ENHANCED VEHICLE SECURITY AND CHILD PRESENCE DETECTION IN PARKING AREAS

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ABSTRACT

With the advancement of science and technology, most common applications are now virtually connected to each other. This aspect of the kid safety division is worth looking into because it integrates IOT technologies. Some parents choose to leave their kids inside parked cars due to their busy lifestyles. The goal of the project is to create a notification or alert for parents utilising smartphones, the most common gadget that almost everyone owns. The safety pad and the keychain alarm device are the two essential components of the design. The safety pad's first component is a vibration sensor that detects a child's presence within a child car seat and notifies parents via a smartphone. Second, the keychain alarm devices use Radio Frequency (RF) transceivers, which serve as a safety precaution for kids in the event that their parents' smartphones are lost, stolen, or run out of power. Through a server, this system automatically updates the location and sensor status. The TCP Telent Terminal app, which is accessible in the play store, is used to connect the smartphone to the server. The solution effectively utilised the most crucial technology and obliquely added the baby care safety feature to the smartphone.

1. INTRODUCTION

Once a car is turned-off and parked, keeping its window glasses closed, the temperature inside the car increases rapidly even on a day with atmospheric temperature of about low degrees. As the thermoregulatory system of the child is not well developed, this condition may lead to hyperthermiaor heatstroke which can be fatal. As we know, the child entirely depends on elders but, unknowingly, in a busy schedule, the driver or passengers may forget to take the child (who may be sleeping) in the infant seat, usually kept in the back seat of the car. Such incidents can be prevented by sensing the presence of a child soon after a car is turned-off and then generating/sending a suitable warning signal to the driver or parents who can take timely action to save the child. A child presence detection system based on a combination of optical detector, mechanical switch and vibration sensor is taken as reference. In this paper, we propose a simple and compact child detector sensor that can be placed in an infant seat to detect presence of a child. It has PIR sensor to detect the child inside the car and GPS module to send location (i.e. longitude and latitudes) to driver or parents/guardians as soon as a child left in the car in an infant seat is detected and the car is found to be turned-off. By using the IOT technology the status of the sensors and location of the car will automatically updated in the server. By connecting the parents or guardians Smart phone to the server using TCP Telent Terminal app the status of the sensors and location of the car is continuously updated. The Key Switch (push button) attached to the handle of the door is used to turn on the motor connected to the circuit of the windows to lower the windows. The implication of this study will kept from these unfortunate occurrence happens where the vehicle need to be equipped with a system that alert the parents or caretaker from leaving their kids behind in the car that can jeopardize their lives.
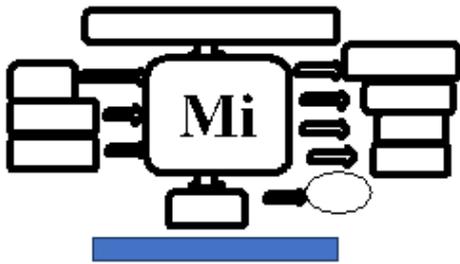
Block Diagram for Vehicle Security at Parking Areas along with Child Presence Detection in vehicles over IOT.

2. LITERATURE SURVEY

Fairuz R. et al., reported about the cases that involving the death of a child in a vehicle. It happens almost every year because of negligence committed by parents who often abandons their children alone in a car. The tragic events happen frequently and it makes every person feel scared and worried. When a driver has safely arrived to their destination, they sometimes forget and overlook the presence of children in the car because of his hasty exit from the vehicle. A baby is susceptible to dehydration and this can cause them to become coma or something worse that will cause succumb to death. So, to avoid incidents like this from ever happen, a vehicle must be equipped with an alarm or sensor that can be placed under or on the seat. If an alarm is success to detect the presence of a human body or any movement, it will produce a sound to tell the parents about it.

Greg C. Kautz proposed a system to detect presence of occupants of an automobile.

In particular, the invention relates to systems that detect the presence of a child in a child's seat without other passengers and the automobile is not in an operational mode. In this case, to minimize injuries to the child, corrective action is need to be taken. This system is generate the control signals that can activate an alarm, open the doors of the car, and roll down the windows if there is a child in a car that had left.

Marc A. Rossi reported that child safety seats are required by law when transporting young children in motor vehicles.

Typically, the child seat is securely positioned in a back seat of the vehicle and the child secured in the child seat via a child seat safety belt. These laws have been established and strictly enforced to protect children from injury when being transported in motor vehicles. However, there have been instances where children have been left behind in unattended vehicles due to various circumstances. Unfortunately, some of these children have suffered serious injuries and in some cases even death, particularly during extreme temperature conditions in the summer and winter.

3. PROPOSED SYSTEM CONFIGURATION

The Arduino Nano, as the name suggests is a compact, complete and bread-board friendly microcontroller board. The Nano board weighs around 7 grams with dimensions of 4.5 cms to 1.8 cms (L to B). This article discusses about the technical specs most importantly the pinout and functions of each and every pin in the Arduino Nano board. Arduino Nano has similar functionalities as Arduino Duemilanove but with a different package. The Nano is inbuilt with the ATmega328P microcontroller, same as the Arduino UNO. The main difference between them is that the UNO board is presented in PDIP (Plastic Dual-In-line Package) form with 30 pins and Nano is available in PQFP (plastic quad flat pack) with 32 pins. The extra 2 pins of Arduino Nano serve for the ADC functionalities, while UNO has 6 ADC ports but Nano has 8 ADC ports. The Nano board doesn't have a DC power jack as other Arduino boards, but instead has a mini-USB port. This port is used for both programming

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and serial monitoring. The fascinating feature in Nano is that it will choose the strongest power source with its potential difference, and the power source selecting jumper is invalid.

Global Positioning System (GPS) is a U.S. space-based radio navigation system that provides reliable positioning, navigation, and timing services to civilian users on a continuous worldwide basis -- freely available to all. For anyone with a GPS receiver, the system will provide location and time. GPS provides accurate location and time information for an unlimited number of people in all weather, day and night, anywhere in the world.

PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use and don't wear out. For that reason they are commonly found in appliances and gadgets used in homes or businesses. They are often referred to as PIR, "Passive Infrared", "Pyroelectric", or "IR motion" sensors. PIRs are basically made of a pyroelectric sensor (which you can see above as the round metal can with a rectangular crystal in the center), which can detect levels of infrared radiation. Everything emits some low level radiation, and the hotter something is, the more radiation is emitted. The sensor in a motion detector is actually split in two halves. The reason for that is that we are looking to detect motion (change) not average IR levels. The two halves are wired up so that they cancel each other out. If one half sees more or less IR radiation than the other, the output will swing high or low.

Liquid Crystal Display is a flat panel which uses liquid crystals in its primary form of operation and can display characters (alphabets/numbers). In this fault detection system LCD is used to indicate the operating conditions at each pole.

Regulated Power Supply is used to supply the Arduino board. Usually, Arduino requires 5v Dc supply. The RPS converts 230v AC into 5v DC so as to supply the Arduino board. RPS consists of several blocks like a transformer those steps down 230v AC to 12v AC, then a rectifier which converts the AC power output from transformer into pulsating DC. Then the filter smoothens the pulsating DC and finally there is a regulator connected which is a component of the power supply unit that ensures a steady constant voltage supply through all operational conditions. It regulates voltage during power fluctuations and variations in loads.

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or electronic. Typical uses of buzzers and beepers include alarms, timers and confirmation of user input such as a mouse click or keystroke.

The vibration sensor is also called a piezoelectric sensor. These sensors are flexible devices which are used for measuring various processes. This sensor uses the piezoelectric effects while measuring the changes within acceleration, pressure, temperature, force otherwise strain by changing to an electrical charge. This sensor is also used for deciding fragrances within the air by immediately measuring capacitance as well as quality.

DC motors are configured in many types and sizes, including brush less, servo, and gear motor types. A motor consists of a rotor and a permanent magnetic field stator. The magnetic field is maintained using either permanent magnets or electromagnetic windings. DC motors are most commonly used in variable speed and torque. Motors are the devices that provide the actual speed and torque in a drive system. In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in

an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field.
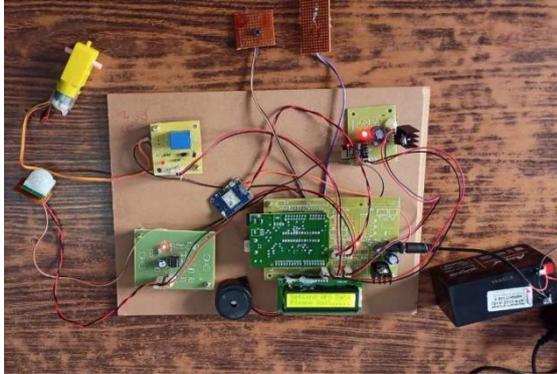
Working model of the project

Wi-Fi is a mechanism for wirelessly connecting electronic devices. A device enabled with Ethernet, such as a personal computer, video game console, Smartphone, or digital audio player, can connect to the Internet via a wireless network access point. An access point (or hotspot) has a range of about 20 meters (65 ft) indoors and a greater range outdoors. Multiple overlapping access points can cover large areas

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism, but other operating principles are also used. Relays find applications where it is necessary to control a circuit by a low-power signal, or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits, repeating the signal coming in from one circuit and re-transmitting it to another. Relays found extensive use in telephone exchanges and early computers to perform logical operations.

The proposed proto type system has components like Arduino Nano, GPS (Global Positioning System), Vibration Sensor, PIR Sensor, Relay, Wi-Fi Module, DC Motor and Buzzer. The Child presence is detected analysed and classified by the system automatically with the help of PIR Sensor, Vibration Sensor and uses IOT technology to update automatically through the server to the parents or take care person.

Advantages:

- Parents or take care person will always get updated about the scenario on his smart phone once his mobile is connected to the server.
- By using the switch (push button) to lower the windows from outside the car makes the rescue easier.
- High efficient and user friendly model.
- Easy to operate.

Applications:

- This project can be used to provide high level security to our vehicle.
- Project will display basic information about the vehicle.

4. CONCLUSION

The project entitled "Vehicle Security at Parking Areas Along with Child Presence Detection in Vehicles over IOT" which saves the child. This proto type model consists of PIR sensor, vibration sensor and IOT technology which are key requirements in this project. It can be prevented by sensing the presence of a child soon after a car is turned-off. Generating/sending a suitable warning signal to the parents or take care person who can take timely action to save the child. The circuit is force, which detect the presence of the child inside the car through vibration sensor which is kept behind the seat of the car. The System is further more enhanced due to the presence of the DC motor and GPS module. The key or switch used outside the car, turns on the DC motor to unwind the windows, GPS establishes the communication between a mobile phone and GPS system, the IOT or Wi-Fi module is used to update the status to the sever. LCD is used to display the Longitudes, Latitudes

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and show the status of the sensors. The future work may include enhancement of the system by using smaller prototype such as using printed circuit board (PCB). Therefore, it can be fit nicely inside the vehicle's cabin. The next project will also include the integration of the proposed system with the vehicle's electronic system.

REFERENCES

1. Fairuz R. M. Rashidi and Ikhwan H. Muhamad. Vehicle's Interior Movement Detection and Notification System. IEEE Journal.

2. Greg C. Kautz, 2983 NE. Ivy La., Jensen Beach, FL (Us) 34957-6605. 2010. Method and System for Preventing Leaving A Child in an Unattended Vehicle. August, 31.

3. Marc A. Rossi. 2000. Warning System for Detecting Presence of a Child in an Infant Seat. IEEE Journal August 15.

4. Fred Mesina. 2005. Baby Seat Belt Alarm System. IEEE Journal, August 2.

5. Joseph Kinman Lee and Darren Paul. 2008. Wireless System to Detect Presence of Child in a Baby Car Seat. January, 22.

6. Asaad M. J. Al-Hindawi and Ibraheem Talib. 2012. Experimentally Evaluation of GPS/GSM Based System Design. Journal of Electronic Systems. 2(2).

7. R. Ramani, S. Selvaraju, S. Valarmathy, R. Thangam and B. Rajasekaran. 2012. water-level monitor for bore well and water tank based on GSM. International Journal of engineering science and technology (IJEST), ISSN: 0975-5462. 4(10).

8. Axelson J. 1998. Serial port complete: programming and circuits for RS-232 and RS-485 links and networks. United States of America: lakeview research llc.

9. Bies L. 1997. RS232 serial cables pinout. Retrieved from http://www.lammertbies.nl/comm/cable/RS-232.html#pins.