A CHILD-LEFT-BEHIND WARNING SYSTEM IN VEHICLES

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ABSTRACT

The Technology is increasingly extended as the demand from various of usage is growing. Although many inventions has taken place, there are still the incidents that involve to death of children which has been left in vehicle. In this project, a child left behind in the vehicle when parents in a hurry forget to take their children alert system is provided. Also, a temperature monitoring is provided since thermoregulatory system of the child is weak when the doors are closed and there is no ventilation. For this, sensors are used along with GSM technology to alert the parents with message and call. A buzzer alert is produced to indicate that the child has been found. A USB camera is placed inside the system, so that parent can see/monitor the behaviour of the child, with the help of video through mobile phone. When someone (e.g. driver) is wantedly sitting inside car the entire system is switched off using a remote .this operation is done only when the vehicle is in off condition.

Keywords -- Buzzer,Capacitive sensor, Fan, GSM modem, Microcontroller, Mobile phone, PIR sensor, Remote, Power supply, Temperature sensor, USB camera

I. INTRODUCTION

According to kids-cars census about 500 children have died in USA between 1998 and 2010.Another incident has also happened in Tamilnadu, India where 3 children have died. 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 21^{o} [3]. As the thermoregulatory system of the child is not well developed, this condition may lead to hyperthermia or 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 capacitive sensor, it detects the presence of child on the infant seat, if the parents leave the child in an infant seat of a car and go out forgetting the child due to some urgent situations, then they have to manually come in search of the child. Also when the chid falls down from infant seat presence of child cannot be detected and child may be affected with health problems Also, the ventilation inside the closed car is not monitored when the child is left. Due to increasing temperature, the child can be affected by health problems since their thermos regulatory system is weak compared to adults. When parents are

very far away they cannot come soon to help the child stuck inside the car .Even when the parents mobile is switched off child will be in complete danger since parents are unaware of it. Also there is no alarm system only parents can come for help and public cannot product the child.

Alternative methods have been proposed based on movement of child and also temperature is monitored .So ventilation can be provided with the help of FAN and by opening window. In this project we proposed a system consist of GSM, USB camera, PIR sensor, capacitive sensor, temperature sensor, and buzzer.

II. PROPOSED SYSTEM

In this proposed system, automation is made to find the child left inside the car unknowingly when the parents are in some urgent situation and also to monitor the internal temperature. The car module consists of a capacitive sensor in under the seat. It also consists of a temperature sensor for monitoring the temperature inside the car if it has been stopped. Once the car is turned off and the child is found to be left alone using the capacitive sensor, and also PIR sensor is used inside the car for identify the motion. If the temperature is exceeding some limitation car window will automatically open for adjusting the temperature and also a fan is connected inside the car for adjusting the temperature. Remote control is used for controlling open and closes the door. The microcontroller will generate an alarm using buzzer. It also sends a message to the parent's mobile using a GSM modem inside the car. Also, Bluetooth is used to identify left or lost objects inside the vehicle when the user is away from the vehicle. The user can pair their mobile Bluetooth with the stored Bluetooth address of the object they have lost so that on pairing, a buzzer rings to indicate the presence of the object. A

USB camera is placed inside the car, which is send continuous video stream to the owner's mobile phone. This above all system will work only when the car is in off mode.

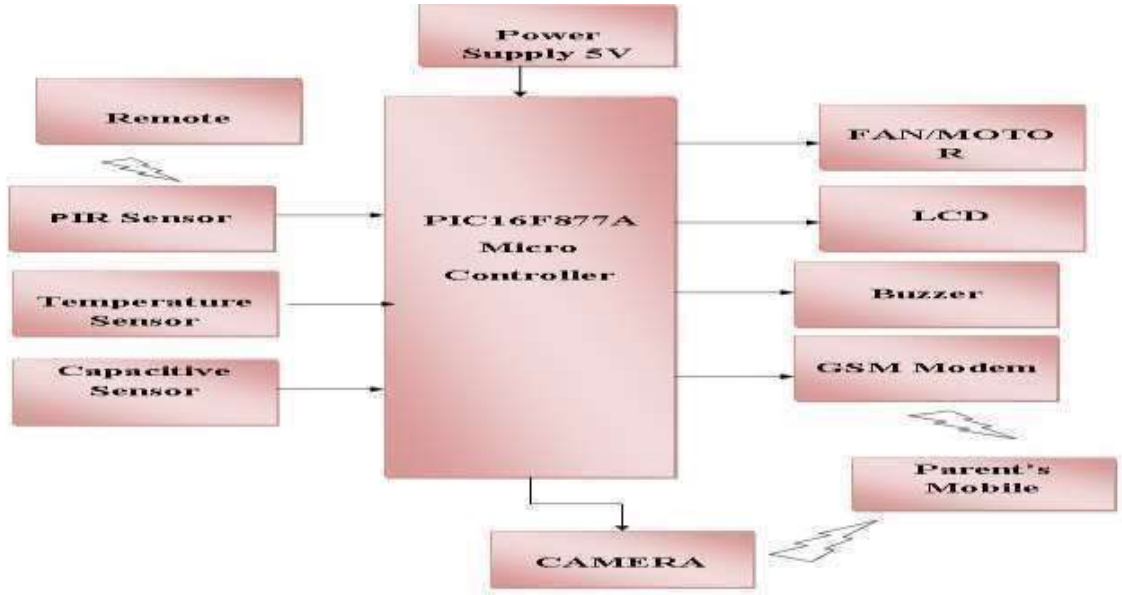

Figure 1 Block diagram of proposed system

The Capacitive sensor senses the presents of child in infant seat of the car. If a child is present, through Gsm modem it sends message to parents mobile and with help of Camera, it sends video to parents Mobile. If the child falls down from infant seat, PIR sensor senses the movement of child and with the help of Buzzer, it gives alarm so that public can come for help. If public also doesn't come to help the Temperature sensor senses the temperature and if the temperature exceeds normal range, the FAN is switched ON and window opens little bit(to avoid theft) to provide ventilation .The Lcd is used for displaying the output and the status of sensors. When a person wantedly sits inside a car we can switch OFF the entire setup using Remote.

2.1 Working of the proposed system

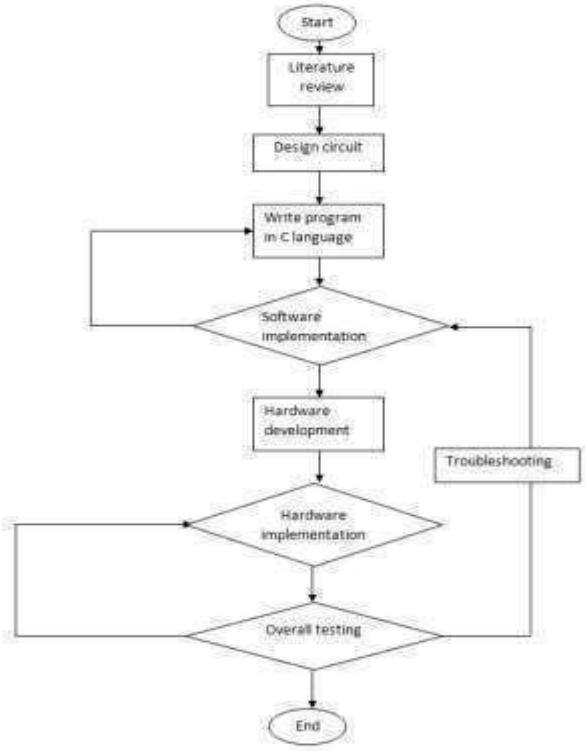

Figure 2 Flow chart of the system.

A. Capacitive sensor

The sensor works on the principle of capacitive changes when a human finger is near the pad. The sensor has two types of output. The first output is called proximity output which gets activated when finger is around 2 cm above pad. Another output is touch output which gets activated when finger is just above the pad around 1mm above. Even that small distance is considered as touch. This is since your design might have a layer of plastic to protect the touch design. You might have already seen Samsung touch mobile phone using this principle to switch off LCD to save power when you are taking phone near your ear. They use the same principle of proximity sensing using capacitive discharge. Also many modern home automation units implements capacitive keypads which are covered by a thin plastic printed adhesive without any physical contact switch.

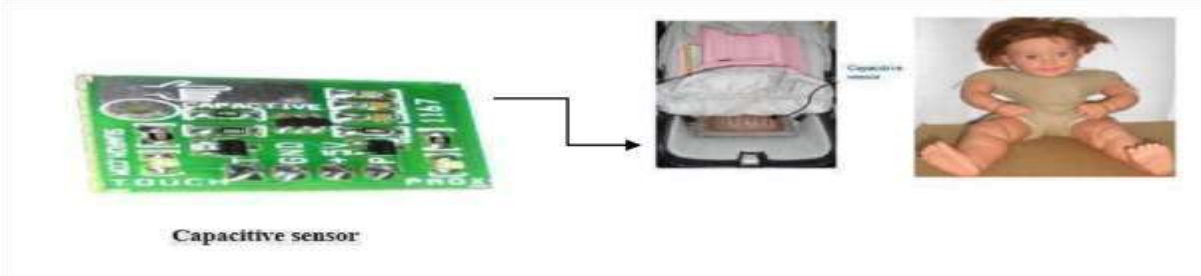

Figure 3 Capacitive sensor

B. PIR Sensor

A passive Infrared sensor (PIR sensor) is an electronic sensorthatmeasures infrared(IR)light radiating from objects in its field of view. They are most often used in PIR-based motion detectors.ThePIR (Passive Infra-Red) Sensor is a pyroelectric device that detects motion by measuring changes in the infrared levels emitted by surrounding objects. This motion can be detected by checking for a high voltage on a single I/O pin.

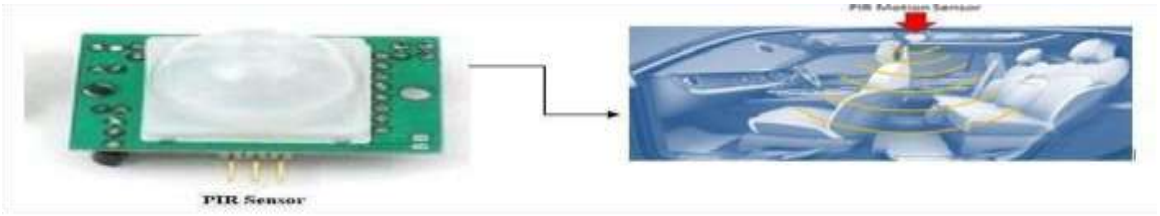

Figure 4 PIR Sensor

C. Temperature Sensor (LM35)

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°C over a full -55 to +150°C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 µA from its supply, it has very low self-heating, less than 0.1°C in still air. The LM35 is rated to operate over a -55° to +150°C temperature range, while the LM35C is rated for a -40° to +110°C range (-10° with improved accuracy). The LM35 series is available packaged in hermetic TO-46 transistor packages, while the LM35C, LM35CA, and LM35D are also available in the plastic TO-92 transistor package. The LM35D is also available in an 8-lead surface mount small outline package and a plastic TO-220 package. Figure-1 below shows the flow chart of the steps that are used to activate an alarm if there are children that are left in a car.

Figure 5 Temperature Sensor

III. MATERIALS AND METHODS

This system involved two parts of the implementation as shown in Figure. There are the hardware and software development. The proposed notification system is intently to be a simple and low-cost so that it can be easily implemented and installed in any types of vehicle. The system will require a microcontroller, a PIR motion detector and a GSM module for its major components. The algorithm will also be kept as simple as possible so that the system can function smoothly without any complex instruction to be performed. From the Figure, it shows how the system works. When the sensor had detected any types of movement, it will send the message and video to alert parent. The PIR motion sensor needs to be set to trigger when detecting movements that only occurred inside the vehicle during its parking situation. This situation can be set in several conditions such as the vehicle's doors have been locked, the engine ignition is off or the transmission-gear is set to 'P' in automatic transmission vehicle. When a movement is detected, the microprocessor will generate a command with an alert message and video to the GSM module to be sent to the driver as an SMS text message and video.

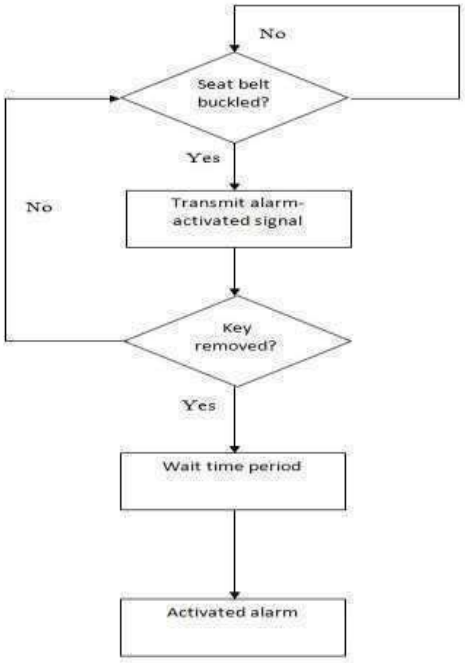

Figure 6 The steps that are used to activate an alarm if there are children that are left in a car

In 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.

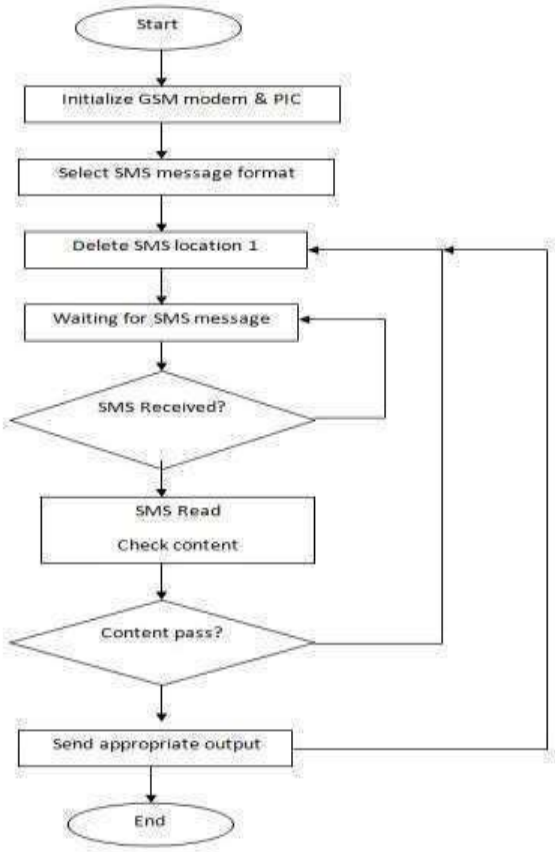

Figure 7 Flow chart of SMS through GSM

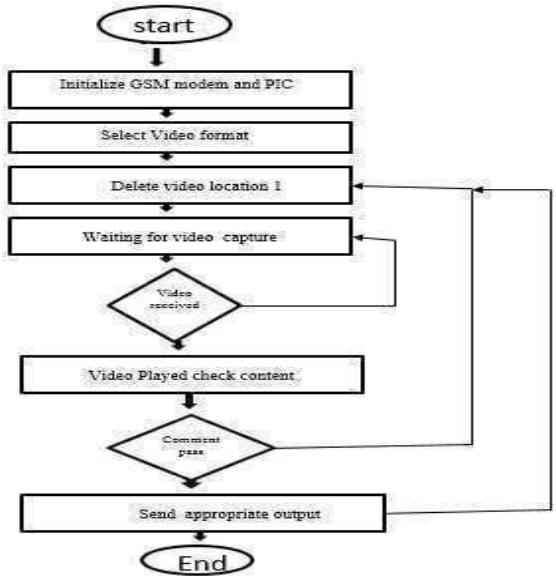

Figure 8 Flow chart of Video through GSM

IV. RESULTS AND DISCUSSIONS

This car alarm system is proposed to be used by parents to always alert them about their children. By using this system, it can avoid from death cases of dying child increase every year. The death cases are very tragic because it involves child or person that very young. This system is created and develops by using simple components that easy to get in any types of component store. It also comes in very small of product that can easy to install inside the car.

From Figures it shows the block diagram of the system and how the system is working. By using capacitive sensing system suitable for

Detecting presence of a child in an infant car seat. It can detect a human body above the sensor with in distance of 300mm (long) and PIR motion it will detect the movement that is make by child in a car. The PIR motion will set so that it will detect the motion in the specific range only to avoid from any disturbing from outside of the car. Temperature sensor device is that they are tools specially designed to measure the hotness or coolness of the object. It is because to make sure the system can work or function when the engine is off. After it senses motion, the PIC16F877A will generate a command with an alert message and video to the GSM module. After it generates command, the message and video will be send to the driver and parents through their mobile phone.

Figure 9 Illustration of the system

V. CONCLUSION

This paper has concluded designing ,analysing and building a simple and low cost model for a Child left behind Warning System using PIC microcontroller and sensors .The child left behind Warning System has been built and test runs have been carried out for the analysis of the system. The system that has generated is expected to continue to expand with concomitant change in time with the developed and equipped with a great technology. It is envisaged that the system is able to overcome the problem of accidents involving children that often left in the car. With the creation of this system, hopefully parents more responsible for ensuring their children's safety is not compromised. However, the system is capable of being treated to better ensure of the resulting system will become more efficiently.

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