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Accident Prevention Control System and Detection of Lost Key

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Abstract - *Accident prevention control system and detection of lost key is a topic which is gaining popularity day by day, because of its huge advantages. One can achieve this system by simply connecting few sensors and using a micro-controller. In this project an accident prevention control system is being introduced with accident identification for vehicles that will give a higher probability to reduce the accidents taking place every day on roads and at the same time if accident occurs, the system will locate its place and will automatically inform those people who will be able to take immediate actions. Here, a controller based system has been developed by using Global Positioning System (GPS) and Global System for Mobile Communication (GSM). An accelerometer will also be used that will measure the velocity and the amount of the vehicles tilting when it will struck over something. When the velocity of the car will be more than the defined maximum velocity for the road or it tilts, a warning will be given automatically. Also, whenever an accident will take place, the GPS will locate the geographical coordinates for that particular place, and using the GSM it will send an SMS. Also various cases are been found of lost key. It will give huge market and opportunity to keep upgrading according to the needs. If in case key is lost, we can detect it using GPS which is inserted in the key.*

***Key Words*: Micro-controller, Global Positioning System (GPS), Global System for Mobile Communication (GSM), Accelerometer, Ultrasonic Sensor, DC Motors**

1. INTRODUCTION

1.1 Relevance

The Worldwide total number of road traffic deaths remains undesirably high at 1.24 million per year. Nearly 3,400 people die on the roads every day in the world. Driver fatigue is a significant factor in a large number of vehicle accidents. The development of technologies for detecting or preventing drowsiness at the wheel is a major challenge in the field of accident avoidance systems .The aim of the project is to develop a prototype to prevent accidents in the first place and detect accidents if it still occurs. Also to find the solution over the keys that are lost due various reasons. Our goal for the Integrated Automotive Safety system is to provide a level playing of all vehicles, regardless of age, when it comes to outfitting car as well as possible for any risks one can face on the road. These risks include rollovers, collision and non-responsive drivers after accidents and lack of location information after accident has occurred. This project deals with these kinds of problems.

Currently GPS vehicle tracking ensures their safety as travelling. This vehicle tracking system is found in clients vehicles as a theft prevention and rescue device. Vehicle owner or Police follow the signal emitted by the tracking system to locate a robbed vehicle in parallel to the stolen vehicle engine speed is going to be decreased and pushed to off. After switching to turning off the engine, the motor cannot restart without permission of password. This system is installed for four wheelers, Vehicle tracking is usually used in navy operators for navy management functions, routing, send off, on board information and security. The applications include monitoring driving performance of a parent with a teen driver.

In the project "Accident Prevention Control System and Detection of Lost Key" there is provision for accident detection by using ultrasonic sensor which senses the accident occurrence and can be prevented earlier. The location of accident can be found using GPS module and coordinates can be sent using GSM Module. Another solution over lost keys is that we can locate the car keys using a GPS system inserted into the keys with a buzzer circuit.

1.2 Present Practices

- Public places such as Schools, Colleges, Hospitals, Offices, Work and Accident zones have warning signs and messages displayed on a pillar or road sign poles which has to be followed by the vehicle driver according to the traffic rules.
- Helpline numbers are provided and printed on the sign boards on the roads.
- Nowadays there is a system in expensive cars that whenever the accident occurs a message is delivered to the emergency number.

1.3 Problem Definition

The aim of the project is to develop a prototype to prevent accidents using ultrasonic sensor for measuring the distance for collision and taking the necessary actions accordingly and a GPS and GSM Module to locate and send a message in case if the accident occurs anyhow. Also to find the solution over the keys lost.

2. RELATED WORK

The ever-increasing numbers of traffic accidents all over the world are due to diminished driver's vigilance level. Drivers with diminished vigilance level suffer from a marked decline in their perception; recognition and vehicle control abilities and hence pose a serious danger to their own lives and the lives of the other people.

Road Accident Prevention System Using Driver's Drowsiness Detection by Combining Eye Closure and Yawning By - Dr. Sheifali Gupta and Er. Garima published in 2014. In this project a camera was used to detect the eye closure and yawning of mouth and a threshold level was set for eye closure and opening of mouth because during yawning a person at a time opens mouth and close the eyes. If driver is in drowsiness state and camera detects the drowsiness then automatically alarm would be triggered so that the driver stops the vehicle and takes rest.

Automatic speed control and accident avoidance of vehicle using multi sensors By - S Nagakishore Bhavanam and Visujadevi M published in 2014. In this project various sensors were used to build the prototype. Ultrasonic sensor continuously sends signal to detect the obstacle. If the car is at 4m distance from the obstacle then it will send signal to embedded board and then embedded board sends a signal to the motor to reduce the car speed automatically which can further control the car speed immediately. Vehicle is controlled automatically without any manual operation also alarm will turn ON to alert the driver.

Design and Development of Accident Prevention and Control System By-Rachita Shettar, Sandeep Dabhade, Basavaraj Viraktamath, Amit Dalal and Varsha B Vannur published in 2017. In these project three basic circuits for prevention of accident and control measures are been explained. One is accelerometer circuit which is used for detection of drowsiness and second is alcohol sensor circuit which is used for detection and control of a vehicle due to alcohol consumption. Accident due to drowsiness can be prevented using alert mechanism which is controlled by relay when tilt motion is detected and it is sensed by single step accelerometer. Similarly relay turnoff the ignition process of a vehicle if level of the alcohol is sensed above the normal by a sensor. Along with this brake failure detection is also done by checking the continuity if not the vehicle owner is made alert to prevent the accidents from brake failure.

3. ADVANTAGES OF THIS SYSTEM

[A] The system will detect every action happening which could further lead to an accident and hence prevent it from happening.

[B] Considering some other external factors if the accident still occurs, in such scenarios the system reduces the impact as much as possible and further informs the emergency listed person about the location and incident.

[C] This system is build from some very basic components such as a microcontroller and sensors due to which it can be implemented at a very low cost.

[D] This system not only helps in safety of the human beings but also enhances the security and safety of the vehicles.

[E] The design of this system is very simple and thus the installation is very easy process. Managing this system also becomes an easy task because of this.

[F] It is a very easy to use system on the user end and the power consumption of it is very low.

[G] It has a very high accuracy as the exact coordinates are being shared of the accident location and the motors are automatically being controlled by the microcontroller itself.

4. SYSTEM DESIGN AND IMPLEMENTATION

The main aim of the project is to develop a system to automatically monitor the distance between the vehicles and alert the driver about it to prevent the accident using. The ultrasonic sensors placed on the car transmit an ultrasonic wave which after collision with the obstacle is reflected back. The reflected ultrasonic waves are known as echo signals. These echo signals are received by the ultrasonic sensor, now with the help of time taken by the wave to return the distance is calculated between the vehicle and its obstacle.

The distance is continuously fed to microcontroller and threshold values are set for every command. Now depending on the distance between the vehicle and obstacle the microcontrollers will act accordingly.

Distance	Command
Below 60m	Turn on the alarm.
Below 30m	Turn on the trigger.
Below 10m	Kill the ignition.

Table 1: Commands for the System

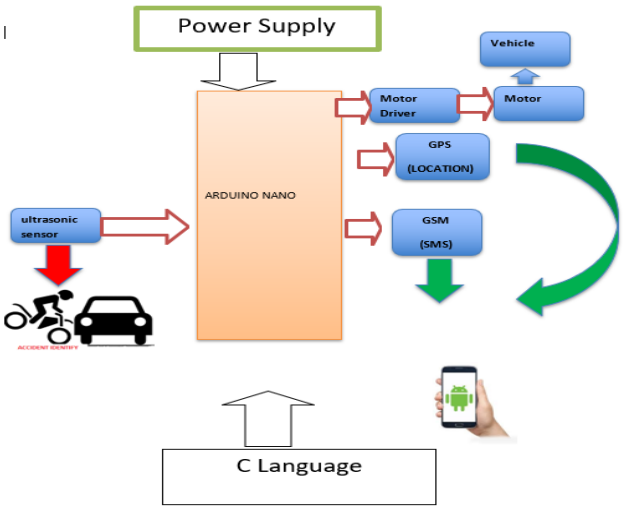

Figure 2: Block Diagram of System

At the first two thresholds the driver is alerted using an alarm and triggers and if still the speed doesn't decrease and the distance goes on decreasing below the last threshold, then the ignition to the vehicle is turned off. Hence instantly killing the power and avoiding the accident. If still the collision takes place then irrespective of the situation immediately a alert message is sent to the registered emergency contact of the driver using Global System for Mobile Communication (GSM) with the information of the accident and the coordinates of the location where it has occurred using the Global Positioning System (GPS).

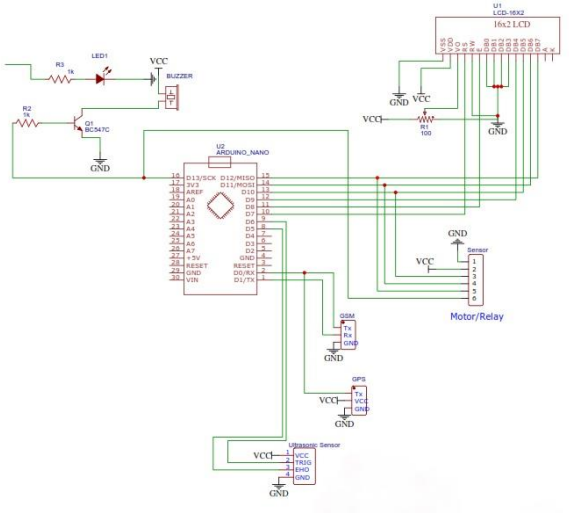

Figure 3: Circuit Diagram of System

We will be inserting a GPS Module in the key to locate it on the map using phone whenever it is lost. It will be inserted with a small rechargeable battery. A buzzer will also be placed in it to make it easy for locating in the scenarios when it can be hidden.

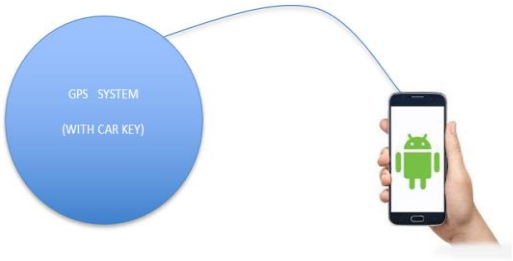

Figure 2: Block Diagram of Lost Key Detection System

4. COMPONENTS USED

[A] **Arduino Nano (ATmega328P)** is a small, complete, and breadboard-friendly board based on the ATmega328P; offers the same connectivity and specs of the UNO board in a smaller form factor. The ATmega48PA/88PA/168PA/328P is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, ATmega328P achieves throughputs approaching 1 MIPS per MHz allowing the system designed to optimize power consumption versus processing speed.

[B] **LCD (Liquid Crystal Display)** screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

[C] **Ultrasonic Sensor** is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound. Ultrasonic sensors have two main components: the transmitter and the receiver. In order to calculate the distance between the sensor and the object, the sensor measures the time it takes between the emissions of the sound by the transmitter to its contact with the receiver. The formula for this calculation is D = ½ T x C

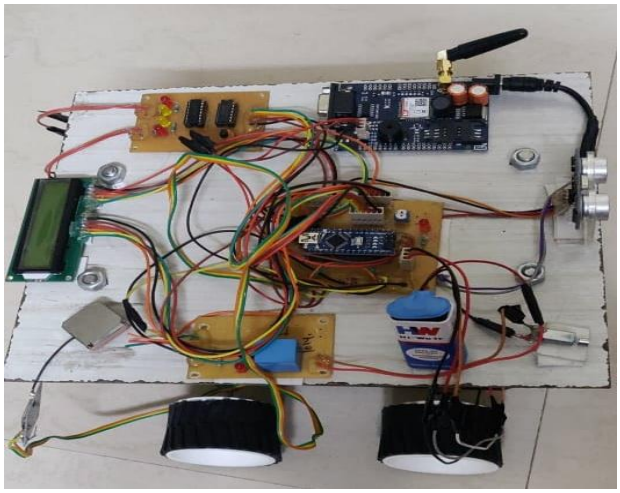

Figure 4: Components Used

[D] **GSM (Global System for Mobile Communications)**, is a standard developed by the European Telecommunications Standards Institute (ETSI). It was created to describe the protocols for second-generation (2G) digital cellular networks used by mobile phones and is now the default global standard for mobile communications – with over 90% market share, operating in over 219 countries and territories.

[E] **GPS (Global Positioning System)** smart antenna will acquire up to 66 satellites at a time while providing fast time-to-first-fix, one-second navigation update and low power consumption. It can provide you with superior sensitivity and performance even in urban canyon and dense foliage environment. Its far-reaching capability meets the sensitivity requirements of car navigation as well as other location-based applications.

5. RESULTS

The image below shows the completely ready and working prototype of the proposed project with all the mentioned components. The prototype follows all the commands given upon the changing distance.

Figure 6: Distance Measured By Ultrasonic Sensor

The LCD display which is used in the system shows the distance that is being fed to the microcontroller by the ultrasonic sensor. The image shows the measured distance between the vehicle prototype and the object that is being introduced.

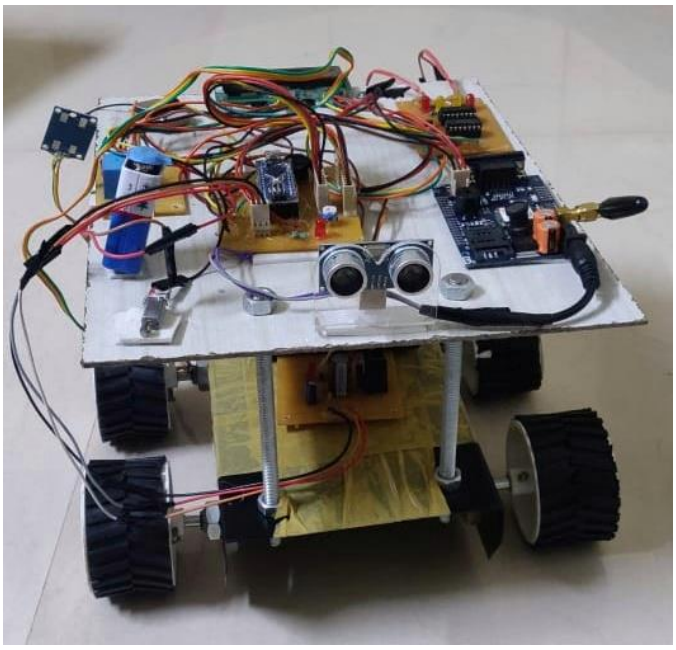

Figure 5: Ready Prototype

Incase if the key is lost the Global Positioning System (GPS) module attached to the system gives it location to registered user through a application or a web page. The buzzer alarm placed with it makes the task much easier.

6. FUTURE SCOPE

The present Accident Prevention Control System and Detection of Lost Key prototype can be further improved by implementing more number sensors. The addition of sensors will make it much more advance and accurate. Due to it the microcontroller can use number of parameters to judge the situation and take necessary actions accordingly.

It can be also improved in future in the sense of security and safety by using advance and expensive technology. The size of this system can be reduced to make it more compact and efficient so make it a great success.

7. CONCLUSIONS

The proposed project undertakes a viable solution of the need of accident prevention at the very basic level. The paper proposed and developed a system to prevent accident and in case if accident occurs, then detect it with the help of GPS and locate the co-ordinate values (i.e. latitude and longitude) and display on the LCD, also send signal to microcontroller which will send message using GSM module to the emergency contacts which are pre-saved for

immediate action. Also we have developed prototype for lost key. This system, though primarily aimed to reduce human effort, will be of much importance to old aged people and physically handicapped people. It provides security and saves energy. The system is fully functional and controlled through the wireless system with good accuracy of performance.

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