Intelligent Hybrid vehicle System

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***Abstract* —Road Accidents are increasing at an alarming rate in India. Delays in road works/widening, increase in number of vehicles, no strong enforcement of road laws and lack of care by drivers makes driving extremely stressful and dangerous. In this project, implementing the collision avoidance in night times. This project introduces the dim dip control of the vehicle using the light sensor to detect the light intensity of the vehicle and control the brightness of the vehicle headlight. If avoidable accident persists using the wireless communication it sends the information to the nearest accident zone areas. Then the accident zone area sends the information to the nearest hospital using the GSM communication. Prototype is a device which can be placed conveniently near the vicinity of any region where speed check is required. Road authority officials while installing the device can set the required speed limit along with the different settings for different time intervals during a day like the peak period, night period etc. The project consists of the eye blink sensor and the pressure sensor to know about the driver condition during driving the vehicle. Eye blink sensor is used to sense the driver is whether awake or sleep. The pressure sensor is used to check the pressure level of steering. Either eye blinks or pressure sensor sense the abnormal condition then microcontroller will control the vehicle automatically by decreasing the speed. This is based on a microcontroller program and interface.**

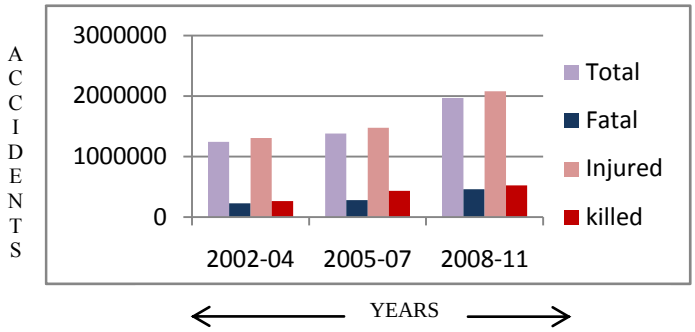
Keywords –Wireless technology, fuel lock and unlocking, sensors, buzzer system.

I. INTRODUCTION

Nowadays, science and technology growing very fast. Peoples are recruiting more convenient & safety in all the places and situation. Always peoples have a dream of newer and better machines doing tasks that could not be doing at the time. In vehicle the expectation of convenient & safety is quite high. More number of countries are trying to establish secure transportation. Security in the sense, to protect from accidents. Number of accidents will be increased in a sufficient percentage and also safety in the sense "Inner side of a vehicle and adjacent vehicles". Nowadays the project like this will be going on full swing by various companies or brands like TOYOTO, NISSAN, and VOLKSWAGEN. In vehicle lot of research process are depend upon the various thinks like

CO2 reduction, Suspension, Fuel cost, Transmission, Injector, Car wings, Engine hood. Many type of sensors used in vehicles gives opportunities to malicious user to keep sending false signal to the vehicle, hijack etc., Ultrasonic sensor measurements interference, vision system and LIDAR system measurement are three possible close proximity vulnerabilities. The human influence in vehicle [1] Human interface is not avoidable, even though embedded computation and sensor technology is involved in hybrid vehicle systems. There are many research opportunities are open to make system safer, more reliable and resilient to malicious attacks. Finally, embedded computing security need to be enhanced.
Embedded system for vehicle -C programming language is used to develop real time software for autonomous driving function. The drive compatible intelligence and behaviour is provided to steering wheel and speed control for various driving conditions.

Installation of vehicle control mechanismTo enable automatic steering an AC servomotor is installed. Displacement meter is used to measure the displacement of brake pedal. Throttle pedal used for speed control and brake pedal is automated by using linear actuator.Driving system (AUTONOMOUS) [12] Yet there are three modes in autonomous driving system. They are lane-change, lane-keeping, and obstacle avoidance. Default mode of autonomous system is lane keeping mode. If there are any obstacles in front of the car, it checks whether a safe distance or not. If it is safe, then the car continues in lane keeping mode. If the distance is less than the system will perform lane-change operation for twice. The hybrid system and its collection of embedded pre-processors require a set of multiple sensors to provide situational awareness about the physical world. This information is used by the embedded system to make appropriate decisions and actions accordingly.



The necessary component is a communication system, which is used to send information's to control room. After some period the controller will park the vehicle in left sideand send message to control room by using GSM modem.

II. Basic Components and Principles of the System

Basic concept of the project is to improve safety measurement of a vehicle (figure 1).This will be used to reduce the death and wastage.

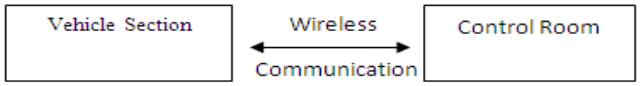


Fig 1. General block diagram of the project

A. *Authentication*

First process of this project is authentication. By using this keypad interfaced with microcontroller by using signal conditioning circuit. When the user enters its secret code that will be displayed in the liquid crystal display (LCD).At the same time that entered code will be compared in microcontroller to check whether it is right or wrong. If the code is right the controller will automatically open the doors of the vehicle. If it is wrong, the controller will send the message to authenticated user like "UNSANCTIONED PERSON TRYING TO INGRESS THE VEHICLE"

B. *Check for driver's drowsiness*

In this section, after doors are opened the driver will be seated. The EYE-BLINK SENSOR uses an infrared ray to check whether the driver is drunk or drowsiness. If the driver is alright then the vehicle will start and keep on running. This process will be continuously checks the condition of a driver. If in between the driver is drink means the sensor will send some voltage levels to controller, then controller will take the control of vehicle and vehicle will be parked automatically on the left side of the road.

C. *Check for driver's abnormal condition*

For this process one pressure sensor will be placed in steering of the vehicle (figure 2). Once the driver is takes, both the hands from the steering the sensor will send information to controller then the controller will take the control of the entire vehicle and it will park on the left side. Even if some vehicles in left side the controller will hold the current position of a vehicle

D. *Obstacle sensing*

Obstacle sensing is a technology used to know the nearby vehicles. If a driver didn't take remedy actions when the vehicles comes one to another. In that time controller will measure the distance between the nearby vehicles to make slight change in the path of a running vehicle.

E. *For night time view*

In night time if two vehicles are coming oppositely to one another, by this concept using (LDR) LIGHT DETECTION AND RANGING. to measure the light intensity level of an upcoming vehicle for equalizing the intensity level of an particular two vehicles. This will be used for getting clear view of a road during night times.

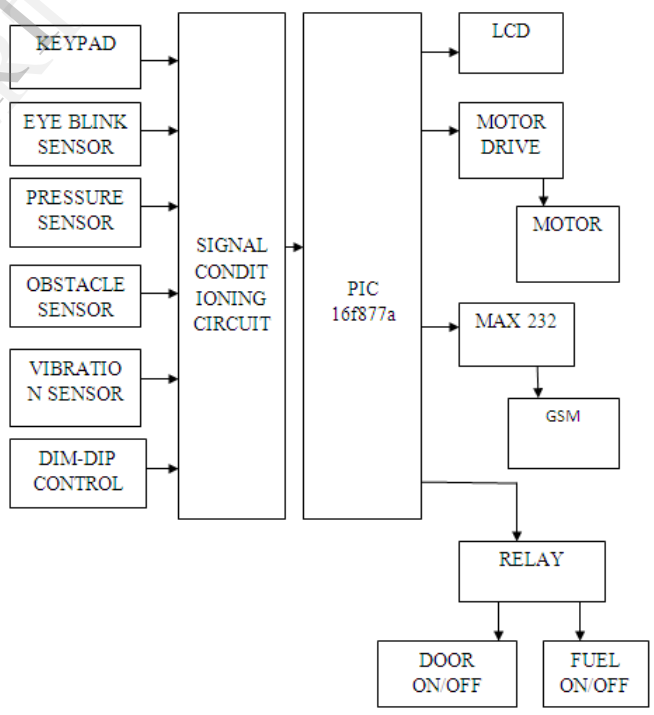


Fig 2. Block diagram of the project

F. *Accident detection*

There is one more vibration sensor placed in front of the vehicle. In controller previously we save some particular range of pressure. And also it will send information (MESSAGE) to a control room and some user related persons mobile number.

During the car running if in case of any accidents happen means the heart of the project controller will compare the range of vibration with previously stored. If it is exceeded means first the controller will shut of the fuel valve in fuel tank itself by using relay. The second think is the doors of a particular vehicle will automatically.

III. SIMULATIONRESULTS

General simulation forIntelligent hybrid vehicle system embellish the techniques. By using different sensors for disparate purpose. The microcontroller is the heart of this project.

MPLAB is a software program that runs on personal computer & it yield development for design of embedded controller.

MPLAB IDE features

1. Create and edit source code using built in editor.
2. Assembling, Compiling &Linking the codes.
3. Built – in simulator (or) in real time with in circuit emulator (or) in circuit debugger is used to debug the executable logic by observing the flow of program.
4. Make timing measurement for simulator and emulator.
5. View variable in watch window.

MPLAB IDE is a package of all the tools for graphical user once is written it will be converted into executable format and it will be dumped into microcontroller (PIC 16f877a) to know how it works. An editor is used to write the code. Files and settings are organized by Project manager. Hardware and software that connect with either target microcontroller or simulate the operation of microcontroller, and waiting for assembler and compiler is used to convert source code to machine level codes.

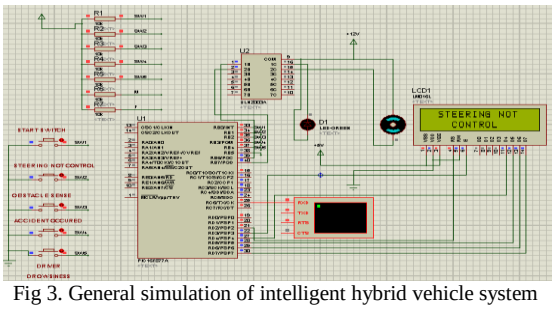


Fig 3. General simulation of intelligent hybrid vehicle system

Components of MPLAB

1. Project manager
2. Editor
3. Assembler / linker & language tools
4. Debugger
5. Execution engine

The operation of this project is user enter its authenticated codes in vehicle by using keypad. This will be verified with formerly stored in microcontroller if it is correct the user able to access the vehicle. If wrong means the controller will send information to original user that someone trying to access the vehicle by using GSM modem. After driver seated the infrared sensor will sense the drivers eyes whether drunk or not. If yes means vehicle will not be started. If no means the user able to access the vehicle. Pressure sensor will be placed in steering (figure 3). This will be used to know the condition of a driver. If the driver takes both the hands from the steering it send some voltage level to microcontroller by using signal conditioning circuit. After that the controller will control the vehicle and to park to left side of the road.

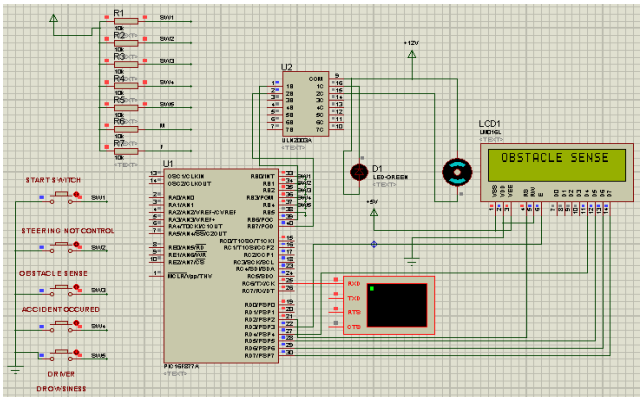


Fig 4. Simulation result for Obstacle sensor

The obstacle sensors placed in the both sides of the vehicle (figure 4). This will be send light source, depending upon the reflected light source the controller will be understand the circumstance and depended upon distance it will change the path if it is required. One more vibration sensor is placed in front of the vehicle. This will be used to detect the accident occurred this will send some values to controller, the controller will compare the level of vibration with already stored.

Once if it is identified this the controller will immediately shut of the fuel valve and also the doors of the vehicle will be automatically opened by using relay & the information will be send to control room and also an important persons (figure 5).

The last thing is during the night times, by using LDR the upcoming vehicles light intensity will be measured and the intensity level of a light will be controlled by using microcontroller. The communication will be takes place by using GSM modem interfacing with serial communication cable. And speed of the motor will be controlled by motor drive, which is placed near to the motor.

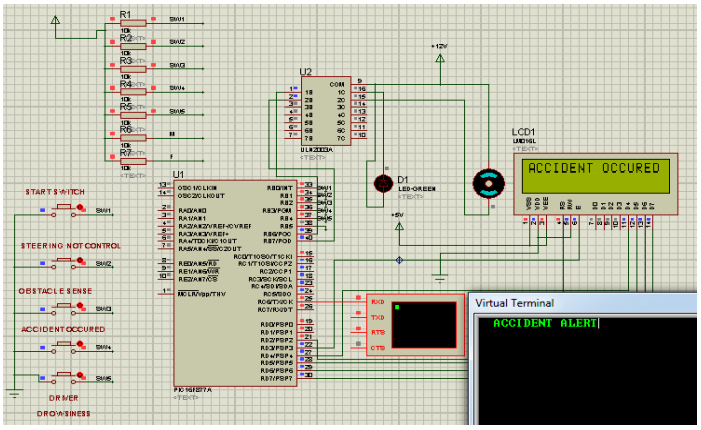


Fig 5. Simulation result for vibration sensor during accident occurred

The LCD display will be placed in the circuit to know the codes what they are entered. Signal conditioning circuit will be used for converting the sensor inputs into controller known language.

IV. CONCLUSION& FUTURE ENHANCEMENT

The future enhancement of this project is to increase the stability of a vehicle. Stability of the vehicle will depends only on load, the particular vehicle have capable of processing some amount of load, if that load increased means stability of the vehicle will be reduced. It is also possible to design an unmanned car in such a way that, it detects its location automatically without the use of human. It operates despite of having much load and its stability remains better for varying load. The significant enhancement is that the car itself can troubleshoot the problems which occur on it on operating. It calculates the quantity of fuel and optimize the cooling system, fuel system, breaking system and clears the faults in all the working systems which defines the performance of the vehicle.

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