SMART ENGINE MANAGEMENT SYSTEM

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Abstract: Cars are the most important means of transportation for our society. Without them, we can barely imagine our work, trips, daily chores etc. If not handled properly, they can cause millions of deaths. Car accidents due to speeding, drunken driving, reckless driving etc. are some of the major causes. ***Most of these can be easily resolved by social awareness but the most important factor that causes car accidents is one of our human imperfection i.e. DISTRACTION.*** **This factor cannot be removed no matter how hard we try to do it. In other factors, we know the reason behind them, but this particular factor has a variety of reasons due to driver's lack of concentration.**

Nowadays, the mobile industries are growing rapidly throughout the world that pumps in the level of distraction at the highest peak.

Keywords: Distraction, Engine, ECU, CAN, Tactile sensor, capacitive sensor, Special heat based sensor.

I. INTRODUCTION

Out of the estimated 1.4 million serious road accidents/collisions occurring annually in India, hardly 0.4 million are recorded. Further, only a minimal percentage of these collisions are scientifically investigated, in the absence of which, the real causes and consequences are never known. Therefore remedial measures as well as punishment for the violators are also arbitrary.

On account of various political and socio-economic conditions, generally, the larger vehicles are often labelled the culprit in cases of vehicle-to-vehicle crashes. Road safety can only be improved when we understand its causes and consequences of road accidents/collisions so as to work out remedial measures.

World Health Organization (WHO) in its first ever Global Status Report on Road Safety pointed to speeding, drunk driving, seat belts and driver carelessness as the main contributing factors. Every hour, 40 people under the age of 25 die in road accidents around the globe. According to the WHO, this is the second most important cause of death for 5 to 29 year olds.

In India alone, the death toll rose to 14 per hour at the ending of the last decade as opposed to 13 the previous year. The total number of deaths every year due to road accidents has now passed the 135,000 mark, according to the latest report of National Crime Records Bureau or NCRB.

II. AIM

In order to avoid the accidents caused due to carelessness of the driver, various technologies and methods have been developed. This project is one of such contributions.

The aim of this project is to implement a 'Smart engine management system' that automatically detects the status of driver's hands on the steering wheel and takes action accordingly.

III. BASIC PRINCIPLE

In this project, the speed of the engine will be controlled in accordance with the status of driver's hands (i.e. whether they are on the steering wheel or not). We will be dealing with the sensors on the steering wheel, that'll input the status of the driver's hands' placement on the steering wheel, a microcontroller for receiving the inputs and processing the data accordingly and sending the output to the ECU for further processing and the ECU that will carry out the required task i.e. controlling the speed of the engine.

Here are some particular things that we intend to do to make a car safe from road accidents:

- The parameters written within an ECU will be changed by an external microcontroller.
- The new changed parameters will be corresponded to the changed speed of the engine that was done in accordance with the placement of driver's hands on the steering wheel.
- The parameters will be kept on changing as long as the driver's hands' status changes i.e. if the driver removes his/her hands, the car will be slowed down and vice versa.

IV. BLOCK DIAGRAM

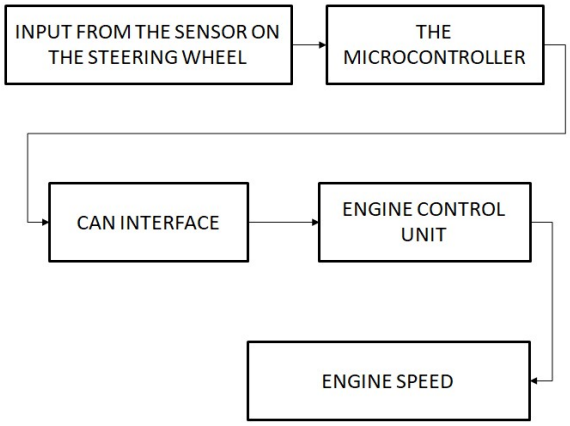


Fig 1: Block Diagram

- The above figure shows the connection between the inputs (i.e. the steering wheel) and the output (controlled engine speed).
- The input from the sensors that are mounted on the steering wheel is sent to the microcontroller.
- The microcontroller takes a decision based on the algorithm monitoring the sensors.
- The decision taken results in the generation of a map that is sent to the engine control unit (ECU), which will update its parameters' values.
- The communication is realized using CAN interface, which is an abbreviation of controller area network. The ECU having received the required data will in turn control the speed of the engine.

V. HARDWARE USED

The hardware that we are intended to be working on it are listed as follow below:

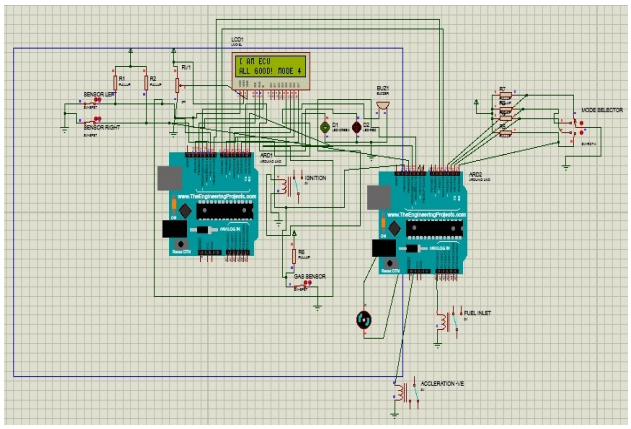
- Tactile sensor,
- Buzzer
- LCD,
- Arduino UNO
- Relays
- Alcohol sensor (MQ-3)
- Battery and variable adaptor
- Fuel valve (solenoid valve)
- Engine.

VI. SOFTWARE USED

In this project, our intended software that we are going to use is:

1. Arduino IDE.
2. Proteus.

VII. PROJECT RESULT



- The project started with the idea of reducing the number of road accidents. It aimed at reducing the rod accidents causing due to careless driving.
- The project started with the study of various components.
- The stoppage of the engine prevents the mismanagement of the steering wheel thus preventing the accidents.

- The stoppage of the engine when the alcohol is detected by the alcohol sensor also prevents the accidents due to drinking.

VIII. CONCLUSION

This project is one of the important sensor based project. The recent survey report shows the decrease in number of road accidents in the first two major causes. This has been pulled through social awareness, prohibitions and other safety techniques. But the remaining one i.e. distraction is increasing day by day due to advance in mobile industries, fast food chain etc. These industries can't be stopped because it affects the rise of the humans' living standards. But still, we can't ignore the lives of billions of people and hence we want to make this project for the sole purpose of reducing the number of road accidents occurring due to the distraction of driver.

IX. FUTURE SCOPE

1. In future implementation of the project will handle other vehicle controlling parameters like engine temperature, alcohol consumption, drowsiness of driver, seat belt state, position of vehicle, speed of the vehicle, etc.
2. In Future more real datum or more parameters of vehicle like millage, tier pressure, fuel level in vehicle, parking information and expected distance travel that to be monitored and controlled by using different controllers and comparing those results with the designed system and efficiency of system is identified.
3. Those real time parameters are necessary for the crash analysis for the insurance agencies, crime cases etc. to investigate on accident cases further.

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