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Design of Smart ECU for Automobiles

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ABSTRACT

This paper aims at giving an overview of implementing safety and security systems in automobiles for today and future development. Now a day all the IC engines is controlled by microcontroller. These controllers are preprogrammed by the manufacture in according to the engine specification, design constraints, technology constraints, Implementation constraints and price constraints. So we came up with an idea to increase the efficiency and performance of the IC engine by giving the user option to choose between economy and performance by eradicating the design and calibration constraints but being with in the engine design and emission constraints. The speed control in vehicles using the RFID is used for accident prevention by taking control of the vehicle in accident prone zones like schools, hospitals etc.

Keywords: RFID-radio frequency identification, IC Engine-Internal combustion engine, ECU-electronic control unit.

I. INTRODUCTION

This paper presents autonomous accident prevention with security enabling techniques, speed control and accident detection system. The controller based engine regulates the fuel air mixture intake to the engine by sensing the amount of accelerator input given by the user and releases that amount of pre calibrated fuel air mixture to the engine cylinder. In predecessor carburetor engine the same process is done mechanically. Here as the user pushes the accelerator the corresponding pre calibrated amount of fuel and air is released this enters into an intermediate chamber between carburetor and intake valve called resonating chamber and then moves to the cylinder whose intake valve is opened in both the cases the amount of fuel intake to the IC engine for its full range of RPM is controlled by the comprises of GPS and GSM in cell phones. As collision occurs, piezoelectric sensor will detect the signal and sends it to microcontroller. Then, the user but limited by the design and calibration of the manufacture so the user is limited by the design constraint of the manufacture for is vehicle performance and efficiency. The main objective is to design a controller to monitor the zones, which can run on an embedded system and to automatically locate the site of accident and alert concerned people. It should be done automatically as the person involved in the accident may not be in a circumstance to send the information. The proposed system is composed of two separate design units: transmitter unit and receiver unit .Just before the vehicle is in the transmitter zone, the vehicle speed is controlled by receiving the signal from the RF transmitter. For this, RF transmitter can be kept at a few meters before the zone. Security system includes Seatbelt sensor. Accident detection system

GPS available in the smart phone will start communicate with the satellite and get the latitude and longitude values and name of place of accident

will be send to the previously set phone numbers of relatives, ambulance services etc.

II. METHODS AND MATERIAL

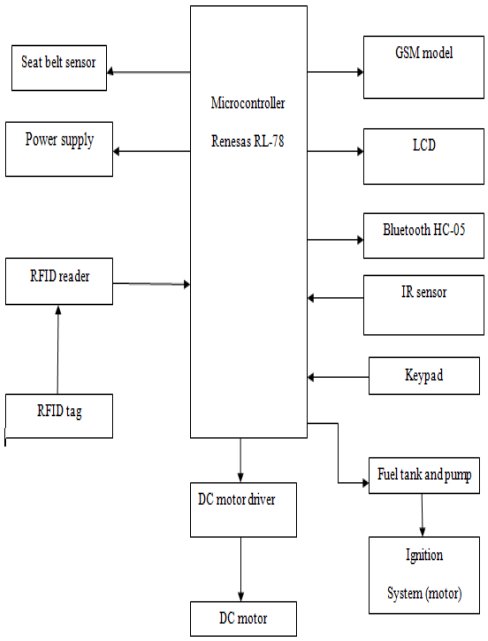

Figure 1. Block Diagram of Smart ECU

The speed and flow of fuel to the engine can be incremented / decremented manually with the help of keypad. Based on the key pressed the mode will be selected.

Button1: Economy Mode

Button2: Normal Mode

Button3: Power mode

When button1 is pressed it selects the injector1. Similarly for button2 and 3 it selects injector2 and 3 respectively.The design and model of this robot have greatly helped us understand how this system can be implemented in a vehicle. An RFID system consists of a set of tags which periodically transmit radio signals. These signals contain a unique identification code for the tag as well as some data stored in the tag's memory. This data is received using an RFID card reader which is to be fitted in the vehicle. Besides reading the tag ID, the card reader will also measure the received signal strength of the radio frequency signal. This indicates the range of the tag from the card reader. This receiver end of the transceiver is connected to controller (renesas microcontroller) of our robot. The encoded signal from the transmitter is first decoded in the microcontroller and the microcontroller then sends the decoded signals to be displayed on the LCD and to the motors to control the speed of the motor.

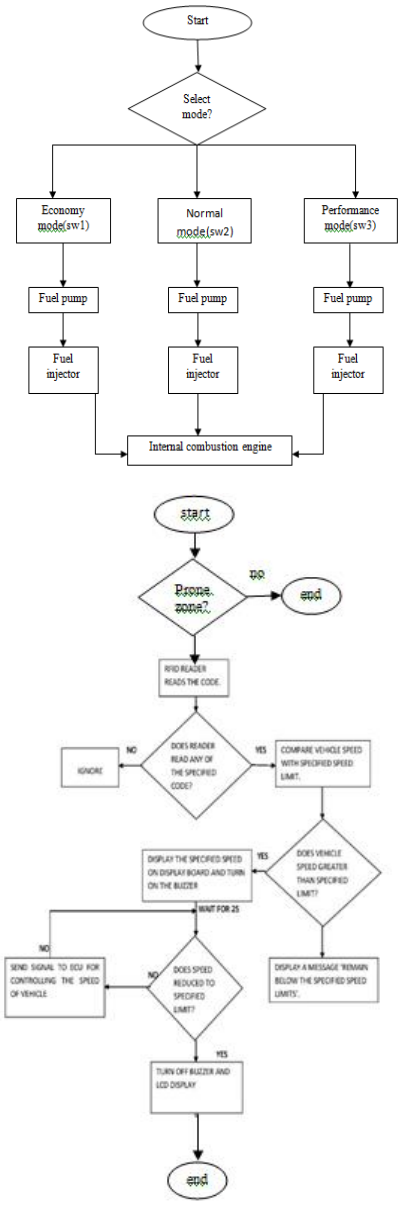

Figure 2. Flow Chart

III. RESULTS AND DISCUSSION

This section discusses the results based on the hardware and software as described. Here the RFID reader read the speed limit from the tag and then send it to the controller, hence the microcontroller initiates to control the speed of the vehicle and depending on the mode selected by the user it also controls the fuel to the engine. And the switch initiates to control the flow of fuel to IC engine.

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IV. CONCLUSION

The output of the project is tested successfully. The design of smart ECU for automobiles is carried out using Microcontroller. Where Speed and flow of fuel to the engine was controlled using push button depending upon the modes and Speed of the car at different zones was controlled using the RFID technology.

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