Automatic Speed Control of Vehicles Using RFID

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Abstract: Road traffic crashes are one of the world's largest problems. Poor road infrastructures, failure to comply with speed limits, growing drinking and driving habits are the main factors contributing to deaths. According to the World Health Organization (WHO), more than million people are killed in road accidents, each year all over the world. According to the statistics of accidents in India, the National Crime Records Bureau reveals that every hour at least 13 people die in road accidents. In 2015, 1.25 million people in India lost their lives in road mishaps.

Keywords: Alcohol sensor, Mems sensor, RFID Reader, PIC Microcontroller, GPS.

I. INTRODUCTION

The main objective is to prevent the road accident by controlling the speed of vehicles near speed limiting area. Reduce the horn control at horn prohibited areas. And also send the location of the vehicle when accidents happen. In this project, we propose an intelligent system for vehicle speed control using RFID technology. This system is not only refers to reduce road accident but also time saving then embedded system will control the vehicle as per the requirement.

It presents the design and implementation of automation system that can control vehicles via RFID based application. Many accidents occurs due to drunk & drive and over speed, so in our project we prevent the road accident by using RFID Technology along with simple sensors like MEMS, Alcohol sensors to save the human life. The RFID Technology is used to control the vehicle speed in speed limiting zones and also control unwanted disturbances in horn prohibited zones such as hospitals, schools.

Alcohol sensor is used to detect the person drunk and drive, if the person had drunk, it would stop the vehicle and sent the message to the control room or any particular number loaded in the program by GSM.If whether a person is met with an accident, the MEMS sensor automatically sends the information along with location to hospital or any particular number. Then the person can be immediately taken to the hospital or the first aid can be given to save the human life.

This project is mainly developed to avoid accidents due to high speed vehicles and also to enable the public to cross the road without any danger from high speed vehicles. Usually the drivers drive the vehicles at high speed without considering the public in speed limited areas too. Even though the traffic police control them we cannot achieve full response from them. Also it is not possible to monitor those areas at all time to regulate their speed. Thus this project paves way for controlling the speed of the vehicles within certain limit in those restricted zones without the interruption of the drivers. Here we use RF communication method for controlling purpose. In order to implement this in public then we want to attach the RF receiver along with the vehicle and the Transmitter with these Zones.

II. BLOCK DIAGRAM

1.VehicleUnit
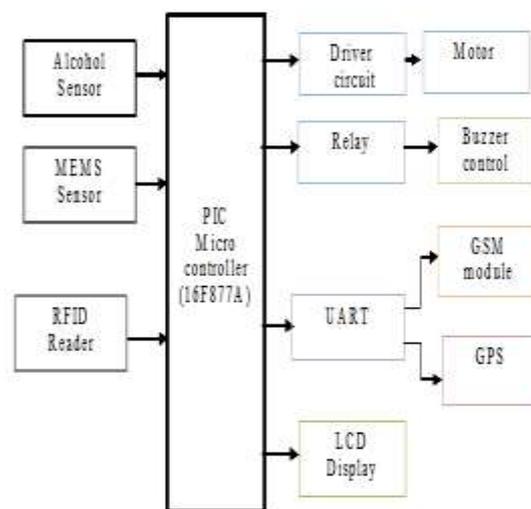
procedure for the next author. Do not create a table or text box and place the "Author and Affiliation" information horizontally.

2.Transmitter Unit

Block Diagram consists for Alcohol sensor, MEMS sensor, RFID Reader, PIC Microcontroller(16F877A), Driver circuit, Motor, Relay, Buzzer, UART, GSM module, GPS, LCD Display, RFID Tag.

MEMS sensor and ALCOHOL sensor output was connected to PIC microcontroller in port A, the output of the sensors were analog, the PIC microcontroller converts analog output into digital.
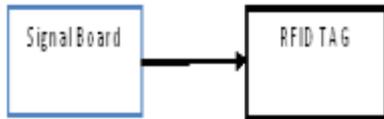
Figure 1 Block Diagram

III.   DESCRIPTION

ALCOHOL sensor-It senses whether the person is drink and driving. In this we set a certain limit in microcontroller, if the sensor senses and it reaches above the limit, the sensor produces corresponding analog output, the output was given PIC microcontroller of port A and it converts analog to digital, and it automatically stops the vehicle if it reaches above the limit and give alert to certain number through GSM module and then stop the vehicle.

MEMS sensor-If whether an accident has been happen, MEMS sensor senses that acceleration or vibration, it was also act as a transducer, it convert one form of energy into another form, the output of MEMS sensor was analog, it given to PIC microcontroller of port A it converts analog into digital, they gives information to hospitals or any number that we program in the PIC microcontroller through GSM module, the location of the accident zone was found by GPS settings.

Horn Control of Vehicle in No Honking Zone-Control unwanted disturbances in horn prohibited zones such as hospitals, public libraries, courts, schools etc.

RFID-The RFID tag has been placed in different zones like hospital areas and school zones, the tag has placed in zones with unique codes at different frequencies. The RFID reader has placed in vehicle, it reads the frequencies comes from RFID tag, RFID tag sends the frequencies as electromagnetic waves, the reader reads and sends the signal to the receiver pin of PIC microcontroller, the receiver pin is connected to the driver circuit, it controls speed of the motor and also sound of vehicle based on RFID reader reads the RFID tag frequencies.

The project tackles some major causes of road accidents such as breaking traffic signals and drunken driving. It also has a major objective of exercising road discipline such as speed control in different areas and horn control in horn prohibited zones. The features added in this work are:

Vehicle Speed Control in Variable Zone- in this feature, speed of the vehicle is controlled in different areas such as flyovers, bridges, highways, schools, cities and internal areas.

Horn Control of Vehicle in No Honking Zone-Control unwanted disturbances in horn prohibited zones such as hospitals, public libraries, courts, schools etc.

Automatic Collision Notification- In this feature when vehicle meet with an accident, the system of this project sends messages (SMS) via GSM Modem to control room and the nearest relative of the victim.

Alcohol Control- The alcohol sensor prevents the ignition key from working if the driver breathes into it and a significant quantity of alcohol is detected. Consequently message is sent to the RTO.

IV.   HARDWARE DESCRIPTION

A.RFID TAG AND READER
1. RFID TAG

RFID involves detecting and identifying a tagged object through the data it transmits. This requires a tag (transponder), a reader (interrogator) and antenna (coupling devices) located at each end of the system.One key element of operation in RFID is data transfer.

A passive tag is an RFID tag that does not contain a battery; the power is supplied by the reader. When radio waves from the reader are encountered by a passive RFID tag, the coiled antenna within the tag forms a magnetic field. The tag draws power from it, energizing the circuits in the tag. The tag then sends the information encoded in the tag's memory.

2.RFID READER

The coupling in most RFID systems is either electromagnetic (backscatter) or magnetic (inductive). The reader is typically connected to a host computer or other device that has the necessary intelligence to further process the tag data and take action.The method used in a particular implementation depends on the application requirements, such as the cost, size, speed, and read range and accuracy.
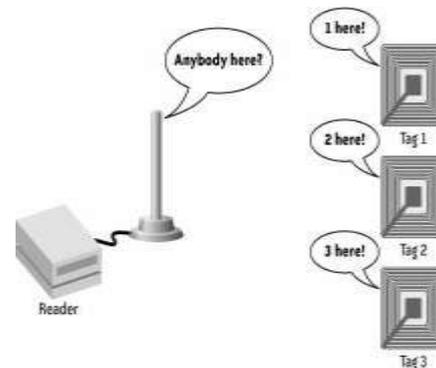
Figure1. Block Diagram of RFID Tag and Reader

ALCOHOL SENSOR

Alcohol Sensor for use in Breathalyzer's or in an alarm unit, to detect the presence of alcohol vapors. This sensor unit offers very high sensitivity, combined with a fast response time. The unit will work with a simple drive circuit and offers excellent stability with long life. When all the acetic acid is cleared out of the FUEL CELL, the instrument is ready to analyze another sample.

FEATURES
> 5V DC or AC circuit
> Requires heater voltage

- Operation Temperature: -10 to 70 degrees C
- Heater consumption: less than 750mW

MEMS Sensor

Micro-electromechanical systems (MEMS) are free scale's enabling technology for acceleration and pressure sensors. MEMS based sensor products provide an interface that can sense, process and/or control the surrounding environment.

Micro-Electro-Mechanical Systems, or MEMS, is a technology that in its most general form can be defined as miniaturized mechanical and electro-mechanical elements (i.e., devices and structures) that are made using the techniques of micro fabrication.

The functional elements of MEMS are miniaturized structures, sensors, actuators, and microelectronics, the most notable (and perhaps most interesting) elements are the micro sensors and micro actuators. Micro sensors and micro actuators are appropriately categorized as "transducers", which are defined as devices that convert energy from one form to another.

GPS

The Global Positioning System (GPS) is a U.S. space-based global navigation satellite system. It provides reliable positioning, navigation, and timing services to worldwide users on a continuous basis in all weather, day and night, anywhere on or near the Earth.

The **Global Positioning System** (GPS) is actually a **constellation** of 27 Earth-orbiting satellites (24 in operation and three extras in case one fails).The orbits are arranged so that at anytime, anywhere on Earth, there are at least four satellites "visible" in the sky.

GPS is made up of three parts: between 24 and 32 satellites orbiting the Earth, four control and monitoring stations on Earth, and the GPS receivers owned by users. GPS satellites broadcast signals from space that are used by GPS receivers to provide three-dimensional location (latitude, longitude, and altitude) plus the time.

GSM

The GSM/GPRS modem comes with a serial interface through which the modem can be controlled using AT command interface. Here a SIMCOM made (SIM 900A) modem interfaced with the microcontroller operates in 900 MHz frequency.

The GSM modem specific commands are used adapted by a GSM modem. The coverage area of each cell varies according to the implementation environment. Macro cells can be regarded as cells where the base station antenna is installed on a mast or a building above average roof top level.Microcells are cells whose antenna height is under average roof top level; they are typically used in urban areas.

HARDWARE OUTPUT

CONCLUSION

This project has proposed a cost effective and flexible vehicle control using RFID Technology. RFID is a viable technology with many applications that are well suited to its functionality. In this project the vehicle speed is controlled automatically and detects the person is drunk and drive and also detect whether the accident is happen.

Controlling the vehicle speed automatically in real time is very difficult. So in order to avoid those difficulties, instead of controlling the vehicle speed automatically, our project altering the driver about the speed limits using RFID Technology and detects the accident by using GSM and GPS Techniques. In this paper we detects the person is drunk and driving by using alcohol sensor, it sense and stop the vehicle. If Reader reads the tag the speed as well as the horn sound can be reduced in school zones and in hospital areas.

The major aim of the project is to avoid accidents and also prevent the humans while the accident has been occurred.

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