Intelligent Vehicle System

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Abstract - *This paper is on "INTELLIGENT VEHICLE SYSTEM", which aims at constructing an efficient, automated, user-and-environment friendly vehicle system that helps the authorities in monitoring the vehicle and the user in driving and parking of the vehicle. The project is realized by interfacing the ATMega-328 micro-controller with SIM 808 GSM-GPS Module, RFID and various sensors. This project is a prototype that aims at presenting a solution for issues faced by already existing Vehicle Systems, while not jeopardizing their current features.*

*Key Words***:** *ATMega-328, SIM 808 GSM-GPS, RFID.*

1. INTRODUCTION

'Intelligent Vehicle System' covers the growing field of intelligent technologies, from intelligent control systems to intelligent sensors. Our prototype aims to develop systems such as 'smart' parking provision, on-vehicle driver information systems, systems for accident detection. This project proposes a smart parking system for urban conditions [3]. It also provides a method to curb drunken and drowsy people by using an alcohol sensor and eye blinking sensor [2]. It uses a prompting system that helps the drivers to concentrate on the road without worrying about the sign boards or hurdles like speed- breakers [5]. Moreover GPS system tracks the current location of the vehicle and GSM system is also installed in the vehicle for sending the information [1].

2. OBJECTIVE

- In the existing system, only a few parking lots are there and no clear information is known about their availability.

- In the existing system, we have to look at the sign boards for directions and there is a chance of missing a few sign boards.

- Drivers will not be aware of speed breakers at night. This becomes tedious during rainy seasons and at nights.

- The vehicle cannot be tracked or located with the help of an SMS.

- Accident prevention by Eye Blinking Sensor and Alcohol Detector is a new feature that can be added.

Thus, all the above mentioned problems faced by user are solved in this particular project Intelligent Vehicle System.

3. LITERATURE SURVEY

The purpose of this project is to present a solution for the following issues that need addressing. They are summed up as : -

- None of the current systems have provision for providing people with information of available parking lots [7].

- The people have to look out for sign boards while driving. Many a times the warning sign on the road sides becomes difficult to watch out for and the driver may sometimes miss the warning notes.

- The location information is sent in the form of message containing latitude, longitude which can also be traced using internet through Google Maps [4].

- The number of road accidents due to alcohol or drowsy drivers can be reduced by using detectors.
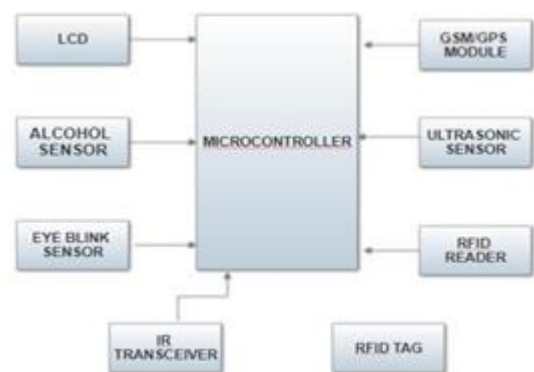
4. SYSTEM DESIGN AND IMPLEMENTATION

Fig-1: Block Diagram of Entire System

The major components of the system as seen in the block diagram are as follows :-

4.1 Micro-controller

This project uses ATMega328 IC in stand-alone mode. ATMega328 micro-controller is developed by Atmel, having

1024B EEPROM, 2KB SRAM, 23 general purpose I/O lines and 32 general purpose working registers. It also features

3 inbuilt timer/counters, two 8 bit and one 16 bit timer/counter, which were used for the timing part of the system. The stand-alone mode is executed by using a 16MHz crystal and two 22pF ceramic disc capacitors [6].
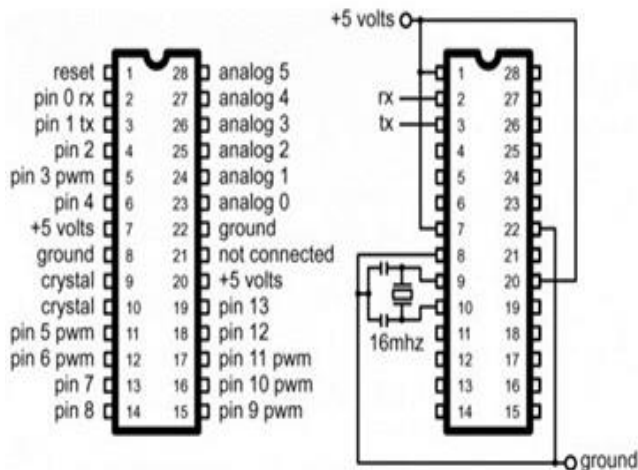

Fig-2: ATMega-328P in stand-alone mode

4.2 GSM-GPS Module

The SIM808 GSM GPS Module is used in this project. The GPS antenna is to be connected to DC power supply and thus the module turns on. The Global Positioning System(GPS) tracks and determines the precise location of the vehicle, or the other asset to which it is attached. The GSM uses SIM808 to send the message containing the GPS location.[4]

Fig-3: SIM808 GSM GPS Module

4.3 RFID Reader and Tag

The communication between the RFID reader and the tag takes place by using RFID (Radio-Frequency Identification) technology. It is used to transfer information from an RFID tag to RFID reader for identification purposes. The passive tags are used in this project mainly because of their smaller size. These tags do not have a battery instead they use radio-frequency to communicate with the reader.

Fig-4: RFID Reader and Tag

4.4 SENSORS

The project consists of three sensors, all of which are interfaced to the micro-controller. The three sensors are:

- Alcohol Sensor
- Eye- Blink Sensor
- Ultrasonic Sensor

4.4.1 Alcohol Sensor

The MQ3 Alcohol Sensor is basically an alcohol gas sensing element used in this project to check the presence of alcohol content. This alcohol sensor is suitable for detecting alcohol concentration on your breath, just like your common breath-analyser. This is a low-cost semiconductor Gas Sensor Module with analog and digital output. It requires no external components just Vcc and ground connections.

Fig-5: Alcohol Sensor

4.4.1 ULTRASONIC SENSOR

An ultrasonic sensor transmits ultrasonic waves into the air and detects reflected waves from an object. That is, the distance to the object can be ascertained by measuring the reflection time involved in reaching the object.

Fig-6: Ultrasonic Sensor

4.4.2 EYE-BLINK SENSOR

This Eye Blink sensor is IR based. The variation across the IR transceiver will vary as per the rate at which the eye is blinking. If the eye is closed means the output is high otherwise output is low. If the output is high for a long time, then this will indicate that the driver is drowsy. This can be used for controlling accident by detecting drowsiness through Eye blink.

Fig-7: Eyeblink Sensor

4.5 LCD Display

LCD is an abbreviation for Liquid Crystal Display. The prototype uses a 16x2 LCD to display the outputs of the RFID reader, Alcohol Sensor, Ultrasonic and Eyeblink Sensor. In 16x2 LCD, 16 means the given LCD can display 16 characters per line and 2 means there will be 2 such lines that are used to display 16 characters per line. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers that are Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a desired task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data that has to be displayed on the LCD.
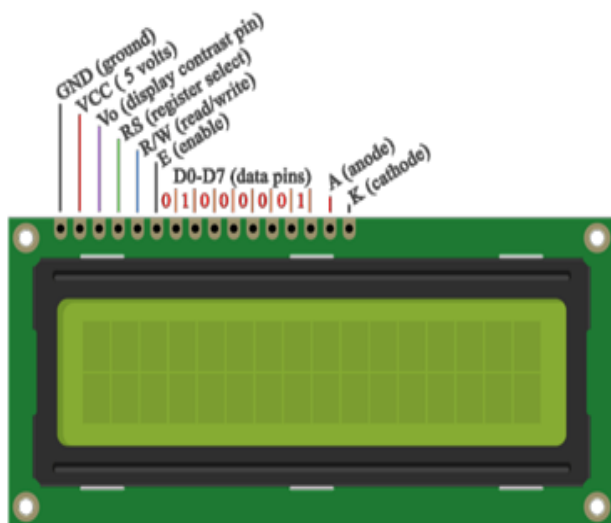
Fig-8: Liquid Crystal Display

4.6 IR Transceiver

An infrared sensor is an electronic instrument which is capable of measuring the heat being emitted by an object and detecting motion. There are two portions for motion detection - the transmitter and the receiver section. The transmitter section sends out a wave at a certain frequency depending on the receiver IR sensor, the receiver section is designed to pick the transmitted frequency. Features of the used IR sensors : -

- Low power consumption and high immunity against ambient light.

- Continuous data transmission possible.

- Suitable burst length.

Fig-9: IR Transceiver

5. WORKING

The system is controlled by a micro controller to achieve the purpose. It uses the At Mega 328P micro-controller to interface the various components used and to integrate them to the vehicle system. An RFID reader along with a micro controller receives the information and displays the information using the LCD display. The information about the road signs and various other information can be provided using RFID tags along the sides of the roads. The RFID tags contain code numbers that indicate various signs like for example Speed Breaker. The code information is already pre-programmed in to the micro-controller. For the implementation of the parking feature of the project IR Sensors are provided at the back of individual parking slots, where a car is to be parked. All the sensors are interfaced to the micro-controller. It transmits the parking availability details to the central coordination system using RFID. A GPS and GSM system is placed along with the micro-controller. The GPS system gives the exact position of the vehicle by giving out its latitude and longitude in case of accident. The GSM is used to send out information to another GSM terminal device. The heart of the system is a micro-controller that is connected to both the GPS and GSM system, RFID and also different sensors for detecting alcohol consumption or drowsiness of the driver. As a result the system ends up fully automated and thus minimizes the driver's efforts required in carrying on the tasks.
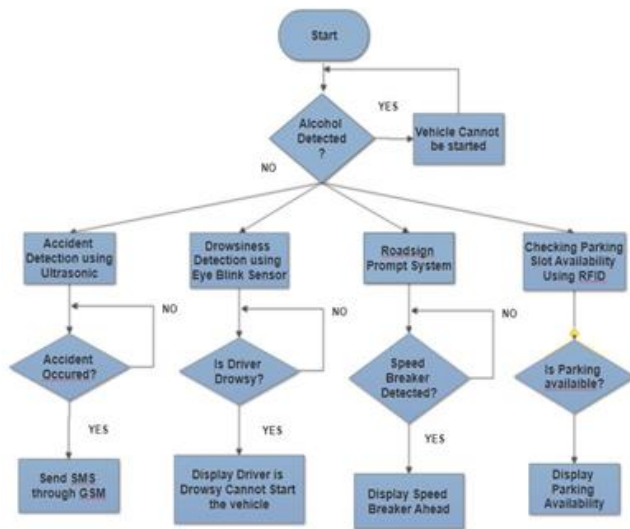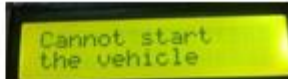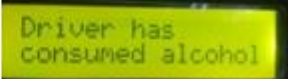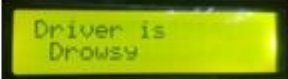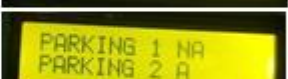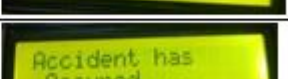
Fig-10: Flowchart of the proposed system

6. RESULTS AND ANALYSIS

Table-1: Displayed Results

7. CONCLUSION

With the economy growing and cars becoming more affordable to people, new problems have come up in the recent times of finding a parking place for all the cars and controlling the number of accidents. This is particularly true in metropolitan areas, where the population density is very high and naturally the concentration of cars is also high. This project proposes a parking system for urban conditions. It also monitors drunken and drowsy people by using an alcohol sensor and eye blinking sensor embedded in the vehicles. It uses a notifying system that helps the drivers to concentrate on the road without worrying about the sign boards or hurdles like speed- breakers. Moreover GPS system tracks the current location of the vehicle and GSM system is also installed in the vehicle for sending the information to the owner.

Thus the 'Intelligent Vehicle System' aims at resolving issues faced by the user while driving and thereby providing a smooth and uninterrupted driving experience.

8. REFERENCES

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