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Design and Implementation of CANBus like Protocol for Indian Automobile

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***Abstract*—**Controller Area Network (CAN) is an attractive alternative in the automotive and automation industries due to its is ease in use, low cost and provided reduction in wiring complexity. This system describes the implementation of a prototype system used for successful real time data acquisition, fault diagnosis and display with child safety and vehicle monitoring features for vehicles. Our system is used to extract the vehicle's status or fault information, and then the results can be viewed by the driver to monitor various parameters like fuel consumption, engine temperature etc. for safe and careful driving.The system proposes that the status of vehicle will be sent to the control Unit using Android based mobile application which is connected to hardware unit using Blue tooth module. We expect this work will bring more attention to further security for Indian automobile. The main feature of the system includes monitoring of various vehicle parameters such as Temperature,Fuse wire and Alcohol detection. We expect this work will bring more attention to further security for Indian automobile. Also the proposed system is an economical easily operable.

Keywords*-ATmega328 Micro controller, LM35 Temperature Sensor,MQ3 Alcohol Sensor,Relay card, Android Device, Blue tooth, Arduino UNO.*

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I. INTRODUCTION

The Indian automobile for CAN bus like protocol is a promising security base system. In Indian automobile there is no system to detect fault in car. In India people not aware about small fault of the car in this situation car owner looking for mechanics and if mechanic is fraud then he tell small problem to big problem for money. The driving is make easier and safety and reduce the human efforts. Vehicle safety has been a major issue in today's world. People fail to give attention to their vehicles. Some people forget to service their vehicles at the right time. Servicing of vehicles is an important factor in the maintenance of vehicles. As is needless to say; a majority of accidents, which occur, are due to drunk driving. As such, there is no effective mechanism to prevent this.Here we use an alcohol sensor (MQ3) for sensing the presence of alcohol in the driver. [1]Alcohol content in the driver's body is detected by means of an infrared breath analyzer placed at the steering wheel. The fuel level in the petrol tank is measured by means of a potentiometer. The engine temperature is measured by means of a temperature sensor (LM35). Vehicle health monitoring and Driver information system is a collection of data relevant to the present and future performance of a vehicle system and its transformation into information can be used to support operational decisions. This design and operation concept includes integration of sensors, communication technologies, to provide vehicle-wide abilities to diagnose problems and alert the driver well in time. This project aims at developing an embedded system prototype for detecting the vehicle condition by monitoring the internal parameters collected from various sensors that are used in evaluating the vehicle's current health condition. 3.Proposed system Implement the Alcohol detection, Engine Temperature.

The developed system is a low-cost and flexible in operation. In this project we are designing a monitoring application within the vehicle by using CAN bus which will be used for communicating between different nodes. This is Important that human drivers control over the vehicle and check the parameters in vehicle on android device at the same time of driving, parameters like temperature, fuel. Proposed system will apply for the use of two wire system from CAN protocol to interconnect between control terminals of the system. This project aims at developing an embedded system for detecting the vehicle condition by monitoring the internal parameters that are used in evaluating the vehicle's current health condition.

II. CONTROLLER AREA NETWORK

A. Controller Area Network

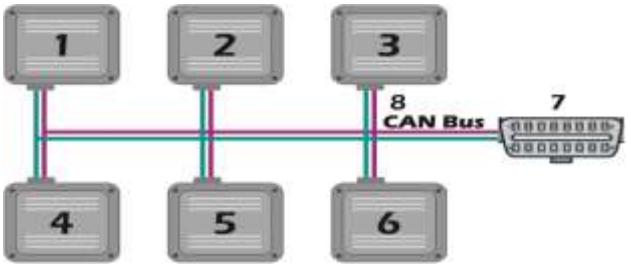

Fig1**:** CANBus System

CAN is a LAN (Local Area Network) controller CAN bus can transfer the serial data one by one. Fig 1 shows a typical architecture from an automotive system. All participants in the CAN bus subsystems are accessible via the control unit on the CAN bus interface for sending and receiving data. CAN bus is a multi-channel transmission system. When a unit fails,it does not affect others. The data transfer rate of CAN bus in a vehicle system is different. For example, the rate of engine control system and ABS is high speed of real-time control fashion of 125Kbps to 1M bps. While, the rate of movement adjustment is low-speed with transmission rate of 10 to 125K bps. This approach differentiates various channels and increases the transmission efficiency. The early CAN development was mainly supported by the vehicle industry: CAN is found in a variety of passenger cars, trucks, boats, spacecraft, and other

types of vehicles. The protocol is also widely used today in industrial automation and other areas of networked embedded control, with applications in diverse products such as production machinery,medical equipment, building automation, weaving machines, and wheelchairs.

B. Need Of CAN

1. CAN is mature standard.
2. Excellent error handling.
3. Fault confinement
4. High speed, real time communication.
5. Provide noise immunity in an electrically noisy environment.
6. Hardware implementation of the protocol.

III. LITERATURE SURVEY

Esha Naryal[1] proposed "Real Time Vehicle Health Monitoring and Driver Information" Display System Based On Android al.design The packets received will be tabulated in the server, and then will be used by the maintenance department which holds the server.Vehicle health monitoring and Driver information system is a collection of data relevant to the present and future performance of a vehicle system and its transformation into information can be used to support operational decisions[1].

Lestin Jills[2],et al "Arduino based real time driver drowsiness detection and mobile alert system using Bluetooth"In The goal of this design is to detect drowsiness in drivers to prevent accidents and to improve safety on the highways. A method for detecting driver drowsiess/sleepiness is developed on Arduino microcontroller board based on Atmega328 for real-time monitoring.

T.Narendra Kumar[3],et al,"Android-Based Vehicle Monitoring and Tracking System Using ARM7" This system aims to provide a low-cost means of monitoring a vehicles performance and tracking by communicating the obtained data to a mobile device via Bluetooth. Then the results can be viewed by the user to monitor Temperature and Fuel consumption. The mobile application software will interact with the hardware interface unit wirelessly via Bluetooth.

M.Jyothi kiran[4] et al," Vehicle Health Monitoring System".This system deals with developing an embedded system for detecting the vehicle condition by monitoring the internal parameters that are
used in evaluating the vehicles current health condition. In this project, an in-vehicle embedded system is being developed to generate a vehicle health report (VHR) whenever needed by the user.

Saurav V. Malpani[5].et al, "Android Dashboard and Smart Vehicle Management "This system designs to provide a cheap cost means of monitoring vehicle parameters and displaying them on the android mobile smart phone. An intelligence system needs to be devel- oped to overcome these mistakes. So these system is proposed where mistakes done by the driver are eliminated.

IV. GOALS AND OBJECTIVE

The goals and objectives of this system detects the faults parameters and makes the vehicle intelligent by maintaining the parameters it also detect the alcohol within specied safety conditions and avoiding road accidents caused by drowsiness and drinks. This System provides the efficient and user friendly GUI by which driver or owner easily understand fault arise in the vehicle and remedy for such faults.

- To Detect the Alcohol of the driver and Detect the faults of the car.
- To Avoid road accidents.

To Fast Diagnosis.

- Most common use is in the automobile industry
- To Increase efficiency.
- To Excellent Error Handling.
- To High speed, real time communication
- To Provides exile, reliable technology base for the future.

V. PROPOSED SYSTEM

In this section, we introduce the design and implementation of our smart phone and sensor based drunken driving detection ,fuel level and engine temperature system. Intention of proposed system is to provide inexpensive, easy, flexible vehicle diagnostic system that is well-suited with all vehicles. The graphical user-interface is provided by using android phones and utilizes the standard Blue tooth to make possible taking out and relaying of readings, diagnostic trouble codes (DTC), and commands. With the growing Automation industry, modern vehicles are becoming more and more complex, and the need for integrating subsystems together is becoming more important than ever before. To accommodate different systems needs and requirements, manufacturers have developed new vehicle networking protocols, such as CAN, which are currently being used jointly in vehicles. To demonstrate the ability of integrating different control systems together in a vehicle, the CAN (Controller Area Network) control system is implemented to control and monitoring the vehicle parameter.

A. System Block Diagram

Fig:2 gives detail description of the project as to how we are going to design the further modules. The intention of our Android-based user interface vehicle diagnostic system implemented in this effort is the execution of diagnoses on a remote server. Here we are using three types of sensor Temperature sensor, fuel level sensor and Alcohol sensor

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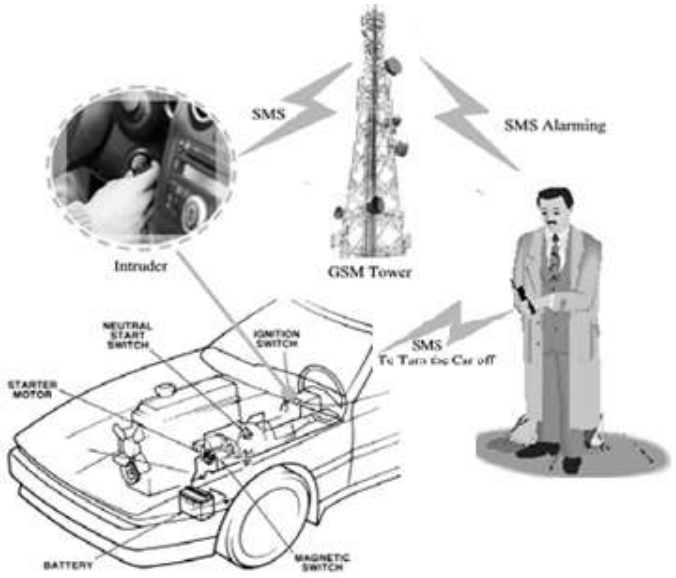

Fig 2: General Block Diagram

1) Temperature sensor-

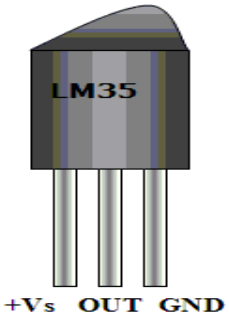

Fig:Temprature Sensor

LM35 is a precision IC Temperature sensor with its output proportional to the temperature.LM35 temperature can be measured more accurately than with themistor. LM-35 is Suitable for Remote.Applications. It is Low Cost Due to Wafer-Level Trimming. It Operates from 4 to 30 V and Less than 60-µA Current Drain.The temperature sensor is used to calculate the coolant temperature of internal combustion engine. If temperature of engine or cabin exceeds desire value then system alerts to driver.

2) Fuel Sensor-

The fuel level sensor makes sure that the fuel level is maintained and the level is not under a particular level this sensor makes sure the driver fills in amount of fuel as said by owner and there is transparency.Fuel sensor is used to provide remote real time control and monitoring of fuel level.

3) Alcohol Sensor-

Fig: Alcohol Sensor

The alcohol sensor we will use is the MQ-3 sensor. Just as we exhale carbon dioxide when we breathe out, we also will breathe out some alcohol if we have alcohol in our blood.This alcohol content gives a good indication for if a person is drunk and how drunk they are. Micro controller first reads the value of alcohol sensor if any alcohol is detected in the driver's cabin, the ignition is turned off.

4) Arduino Microcontroller-

Fig: Arduino Microcontroller

Arduino is common term for a software company, project, and user community that designs and manufactures computer open-source hardware, open-source software, and micro controller-based kits for building digital devices and interactive objects that can sense and control physical devices. In our project, Arduino micro controller is used to take the sensor values from the different sensors in this project like Temperature sensor, Alcohol sensor and the potentiometer. The values obtained are ADC values which needs to be converted into the proper units which is done by the Arduino microcontroller. After conversion, these values are sent to the Android application via Bluetooth.

B Algorithm Of The System

1.Start
2.Initialize the sensors.
3.Sensor sense the environment and give information to microcontroller.
4.Microcontroller take input from sensor and diagnose it take related action.
5.If Fault occur then It gives alarm.
6.Give current situation of car component on mobile.
7.Stop.

VI. CONCLUSION

This study proposes fault diagnose system for indian automobile, which are not exist in current automobiles industry. The main goal of this paper is to show environment of car system. Parameters of car like Fuel level indication, Temperature of engine and speed of car are displayed on Android device digitally and also controlled. The proposed high-speed CAN bus system solves the problem of automotive system applications. The result of our system successfully implemented an integrated prototype system consisting of low cost hardware unit and user friendly Android - based mobile application software utilized to create an on-board vehicle diagnostic system for a vehicle data Acquisition, Fault Diagnosis and display System using CAN protocol, and Bluetooth technology. We continuously scan for various parameters of car, such as engine temperature, Fuel level and alcohol sensors. If the driver is found to have alcohol in the breath, it warns and then turns the buzzer is operated and hence possibility of accident is avoided. The project work with put up for study and the implementation on Arduino board with the Atmega328P microcontroller was done. The hardware and programming was prepared in care for successful operation. The aim of this project was to detect the fault and alert the driver when he is drunk. The main idea behind this project Is to engineer all embedded related technology to make a drive a smart just drive.

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