

# Vehicle Control System Implementation using CAN Protocol

Dr. S. L. Lahudkar<sup>1</sup>, Nitin V Jadhav<sup>2</sup>, Hanmant D Chat<sup>3</sup>, Sainath S Mahajan<sup>4</sup>

<sup>1, 2, 3, 4</sup> Department of Electronics and Telecommunication

<sup>1, 2, 3, 4</sup> JSPM's Imperial College of Engineering and Research, Wagholi

**Abstract-** Present Automobiles are being developed by more of electrical parts for efficient operation. Generally a vehicle was built with an analog driver-vehicle interface for indicating various vehicle status like speed, fuel level, Engine temperature etc., This paper presents the development and implementation of a digital driving system for a semi-autonomous vehicle to improve the driver-vehicle interface. It uses an ARM based data acquisition system that uses ADC to bring all control data from analog to digital format and visualize through LCD. The communication module used in this project is embedded networking by CAN which has efficient data transfer. It also takes feedback of vehicle conditions like Vehicle speed, Engine temperature etc., and controlled by main controller. Additionally this unit equipped with GSM which communicates to the owner during emergency situations.

## I. INTRODUCTION

Present Automobiles are being developed by more of electrical parts for efficient operation. Generally a vehicle was built with an analog driver-vehicle interface for indicating various vehicle status like speed, fuel level, Engine temperature etc., This project presents the development and implementation of a digital driving system for a semi-autonomous vehicle to improve the driver-vehicle interface. It uses ADC to bring all control data from analog to digital format and visualize through LCD. The communication module used in this project is embedded networking by CAN which has efficient data transfer. Additionally this unit equipped with GSM which communicates to the owner during emergency situations.

With rapidly changing computer and information technology and much of the technology finding way into vehicles. They are undergoing dramatic changes in their capabilities and how they interact with the drivers. Although some vehicles have provisions for deciding to either generate warnings for the human driver or controlling the vehicle autonomously, they usually must make these decisions in real time with only incomplete information. So, it is important that human drivers still have some control over the vehicle.

Advanced in-vehicle information systems provide vehicles with different types and levels of intelligence to assist the driver. The introduction into the vehicle design has allowed an almost symbiotic relationship between the driver and vehicle by providing a sophisticated & intelligent driver-vehicle interface through an intelligent information network. This paper discusses the development of such a control framework for the vehicle which is called the digital-driving behavior, which consists of a joint mechanism between the driver and vehicle for perception, decision making and control.

## Problem Statement

To design a real time system for automobile to monitor vehicle parameters and indicate the same on dashboard (In our case LCD).

Normally most of the protocols are Master-slave. So time delay is there in transmission and reception. Also vehicle have GPS, GSM/GPRS facilities, so of course RF noise. Vehicle motors can causes EMI noises also. So conventional protocols will not work fine in such environment.

## Solution

With considering such noise problems in conventional protocols we are going to use CAN protocol in our system which have-

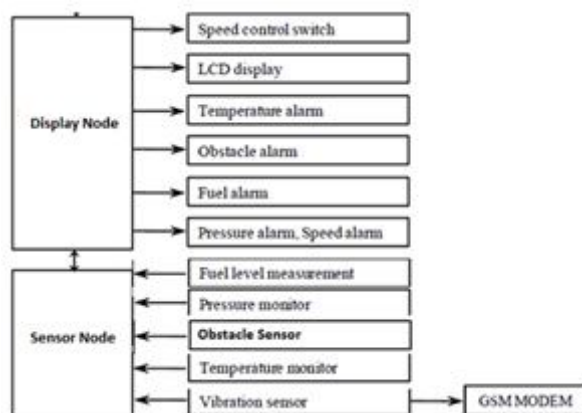
- 1) Greater noise immunity
- 2) Multi-master node communication

## II. LITERATURE SURVEY

Since the early 1940's, automakers and industries have continuously improved their industrial technologies by integrating an increasing amount of electronic components. As technology progressed, the machines became more complex and fast as electronic components replaced mechanical systems and provided additional comforts, convenience, and safety features. Up until the release of CAN Bus, machines contained enormous amounts of wiring which was necessary to interconnect all of the various electronic components.

CAN Protocol was designed specifically for automotive applications but is now also used in other industrial areas. The main reason for Bosch to come up with CAN is to reduce the harness in various machines. Before CAN bus all the controllers and sensors were connected peer to peer. Also CAN is known for its faster communication so used for emergency applications. Controller-area network (CAN or CAN-bus) is a computer network protocol and bus standard designed to allow microcontrollers and devices to communicate with each other without a host computer. CAN is a serial communication protocol. The CAN bus may be used to connect engine control unit and transmission, or different distant units of an industrial plant.

### III. BLOCK DIAGRAM



#### Description:-

In this project there would be two sections. One slave part and one master part. The one of slave would be connected to sensors. The master part contains the LCD which will display and control peripherals. When the sensor values violets set value, vehicle will react accordingly. The master and slave communication would be through CAN two wire communication.

#### TRANS-RECEIVER (MCP2551):

- It acts as an interface between CAN BUS and CAN NODE.
- It converts voltage levels: From TTL to CAN compatible (-13v to 13v).
- Suitable for 12V and 24V systems.
- High Noise Immunity due to differential voltage levels.

#### NODE 1:

- Contains PIC18F458: Main Microcontroller
- Contains Inbuilt CAN module.

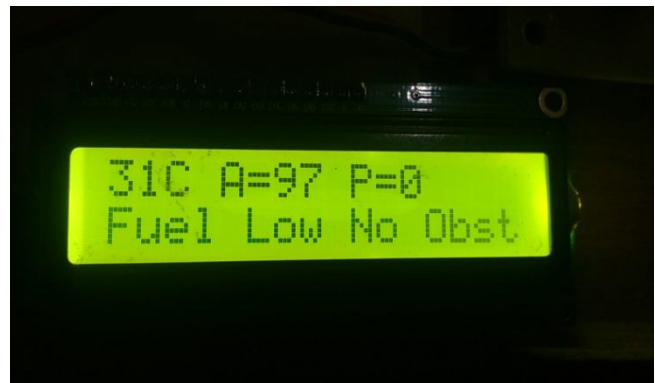
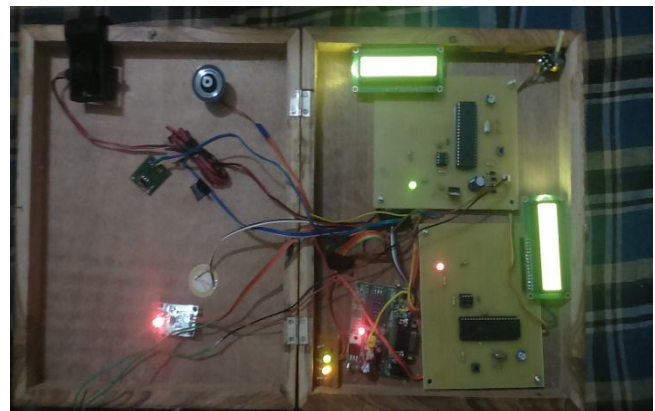
- Contains LCD display 16X2
- Speed control will be done by potentiometer which will interface to 10 bit built in ADC.
- Alarms and respective signals will be connected to this master node.

#### NODE 2:

- Contains PIC18F458: Main Microcontroller
- Contains Inbuilt CAN module.
- Has 8 channels 10 bit ADC.
- Temp Sensor: LM35
- Pressure Sensor: Flexy Force Sensor
- Obstacle Sensor: IR sensor
- Vibration Sensor: ADXL 335
- LCD Display: 16X2

### IV. RESULT

The LCD provided at the driver's panel displays the various indicator generated with different sensors. indicator during the various cases like high pressure in tyres, Fuel level low, Obstacles around the vehicles, Over speed etc, Vibration sensor receives detects with external impact like accidents, sends the signal to GSM. GSM sends the message to vehicle owner.



## V. CONCLUSION

- Thus This project introduces an embedded system with a combination of CAN bus systems. Digital control of the vehicle is an important criterion of modern technology.
- The proposed high-speed CAN bus system solves the problem of automotive system applications, also has a certain practical value and significance.
- This system features efficient data transfer among different nodes in the practical applications.

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