ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 11, November 2015

A Review on Vehicle Control System by Using CAN Protocol

Rachana V. Vairal[1], Shaila P. Kharde[2]

PG Student[ETC], Dept. of E&TC, Shreeyash College of Engineering & Technology, Aurangabad, Maharashtra, India[1]

Assistance Professor, Dept. of E&TC, Shreeyash College of Engineering & Technology, Aurangabad, Maharashtra, India[2]

ABSTRACT: In the latest years various developments are done in the Automobiles Industries, for electrical as well as mechanical parts to provide efficient and accurate operation. CAN (Controller Area Network) is a vehicle bus a designed to communicate microcontrollers and other electronic devices with each other. To provide the accurate result to the driver different sensors are used like Temperature sensor, Gas sensor, Ultrasonic Sensors etc. This paper provides the development and implementation of various previously presented systems, which are useful to improve the driver-vehicle interface.

KEYWORDS: CAN, Temperature sensor, Gas sensor, Ultrasonic Sensors.

I.INTRODUCTION

To make driving easier, safety and reduce the human efforts various developments are done in the Automobiles Industries. Now a day's thousands of road accidents are done daily and lots of people gets injured in a world, hundreds of people die and many people are disabled for live life. Hence many researchers are interested in this field and developing various systems, which will provides the different parameter directly to the driver, which will reduce the vehicle accident.

It is observed that, in the automobile system most of the CAN (controller area network) protocol is used, because CAN have gained wide spread use, easy in use, low cost and provided reduction in wiring complexity. In advanced type vehicle systems provide with different types and levels of intelligence to the driver like active suspension, ABS(Anti-lock braking system) , gear control, , air conditioning, airbags, central locking and lighting control etc. The CAN bus was developed by BOSCH [5]. CAN is a multi-master, message broadcast system. CAN provide that specifies a maximum signalling rate of 1 megabit per second (bps). CAN is an ISO-11898: 2003 and defined serial communications bus originally developed for the automotive industry to replace the complex wiring harness with a two-wire bus. Figure 1 defines the ISO 11898 architecture of the lowest two layers of the seven layer OSI/ISO model as the data-link layer and physical layer.

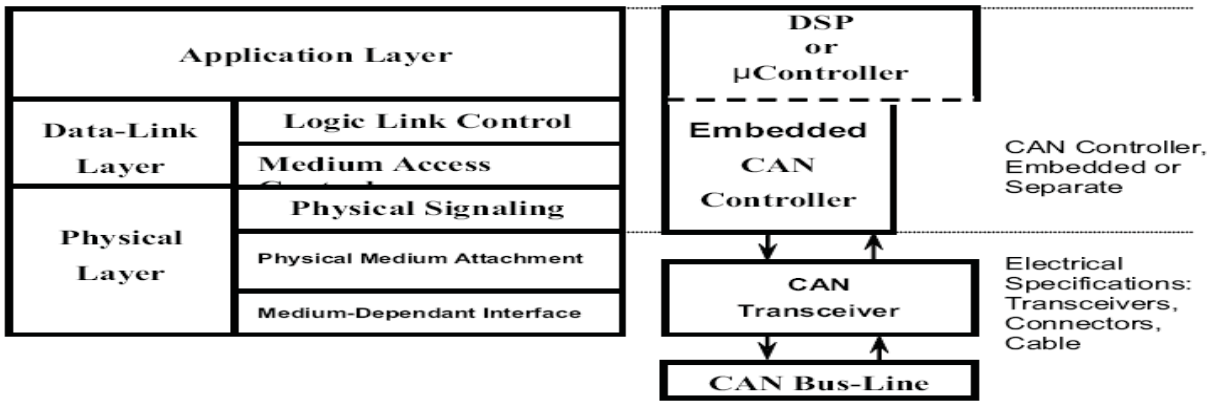

Fig. 1 Layered ISO 11898 Standard Architecture [5].

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 11, November 2015

This paper discusses the development of such a control framework for the vehicle which is called the digital-driving behaviour, which consists of a joint mechanism between the driver and vehicle for perception, decision making and control [3].

II.LITURATURE SURVEY

Presi. T. P. [1] design and development of PIC microcontroller based vehicle monitoring system. In this system controller area network (CAN) protocol is used which is ease in use, low cost and provided reduction in wiring complexity. This system provides monitoring of various vehicle parameters such as Temperature, presence of CO level in the exhaust, Battery Voltage and Light due to spark or fire. Fig. 2 shows block diagram of a system.

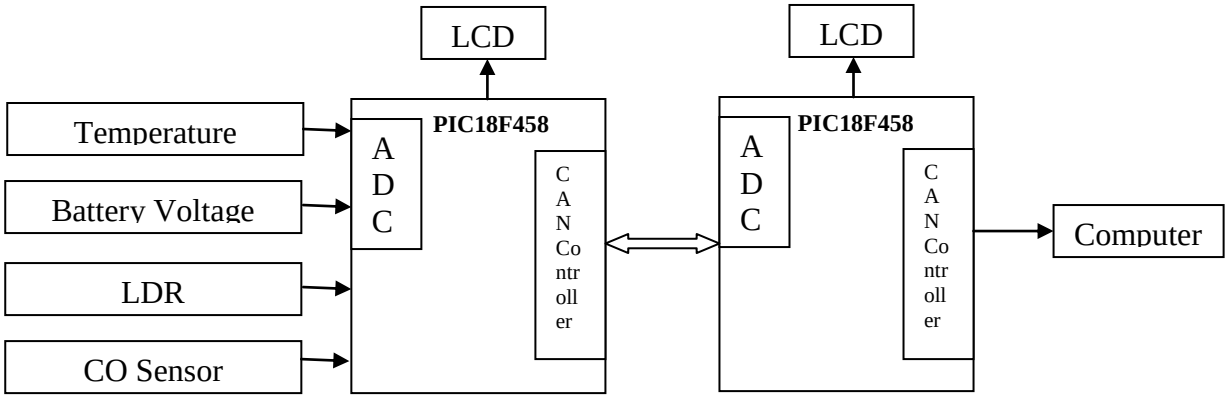

Fig. 2 Block diagram of system [1].

System monitors various vehicle parameters or provides various vehicles reading from the various sensors like Temperature sensor LM35 for the temperature, Gas sensor used here is MQ-6 for CO percentage in the exhaust, a 5.1V Zener diode is connected to get a regulated output battery voltage and LDR using CAN protocol. CAN bus contains only two wires for communication and has a multi master structure where each device on the bus can send or receive data, here only one device can send data at any time while all the others listen. The MCP2551 is used as CAN Controller, which is a high-speed CAN and fault-tolerant device that serves as the interface between a CAN protocol controller and the physical bus.

Jadhav Snehal Dnyandeo et.al [2], presents a digital driving system using CAN protocol. System contains ARM based data acquisition system that uses ADC to bring all control data from analog to digital format and communication module used in this proposed system was embedded networking by CAN which has efficient data transfer. This system keeps focusing on different parameter like temperature, speed, fuel level. For the temperature Pt100 sensor was used and if the temperature increase above the 600 c the automatically cooling system applies due to this temperature is not exceed. Speed measurement was done by using RPM sensor if revolution increases up to 70 per minute controller act and to avoid the maximum revolution and to check the fuel level continuously and display in the percentage if fuel level below 20 percent the controller gives buzzer to the driver and fuel level and temperature continuously display on the LCD. The hardware of the proposed system mainly contains CAN bus controller, ARM LPC1768 as the main control module, Speed sensor, temperature sensor, ultrasonic sensor for obstacle detecting sensor, level sensor, LCD display to provide Digital interface etc Fig. 3 shows the general block diagram of system.

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 11, November 2015

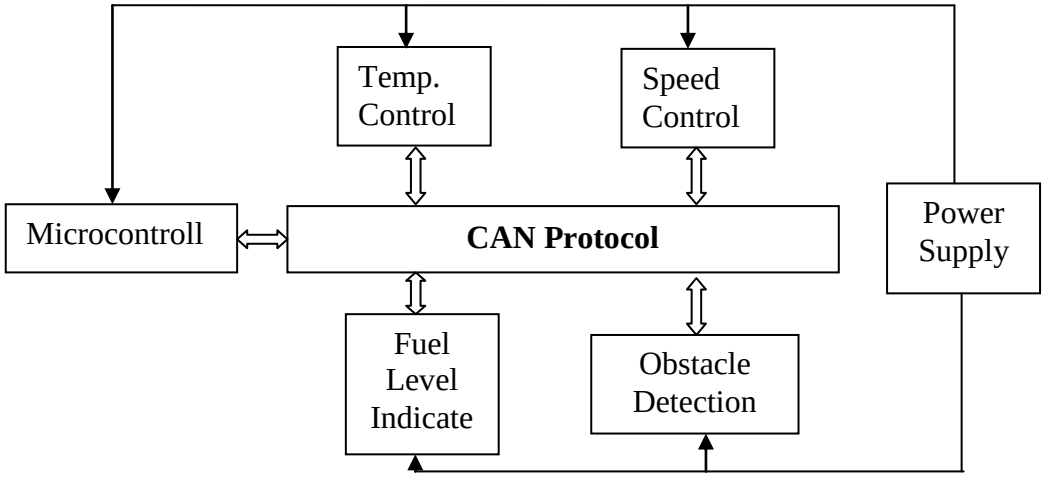

Fig. 3 General Block Diagram of System [2].

R. Manoj Prasanth, S. Raja and L. Saranya [3], presents Vehicle Control for implementing the intelligent braking system (IBS) Using CAN Protocol. System presents the digital driving system for a semi-autonomous vehicle to improve the driver-vehicle interface. Proposed system contains a PIC based data acquisition system that uses ADC to bring all control data from analogue to digital format and visualize through LCD. This paper is based on distance measurement using Ultrasonic sensors which denotes that vehicle's position from obstacles like speed breaker& some critical zones. The vehicle detects the obstacles before the certain limitation by tags using RFID module for introducing the new technology of priority based Intelligent Braking System (IBS).

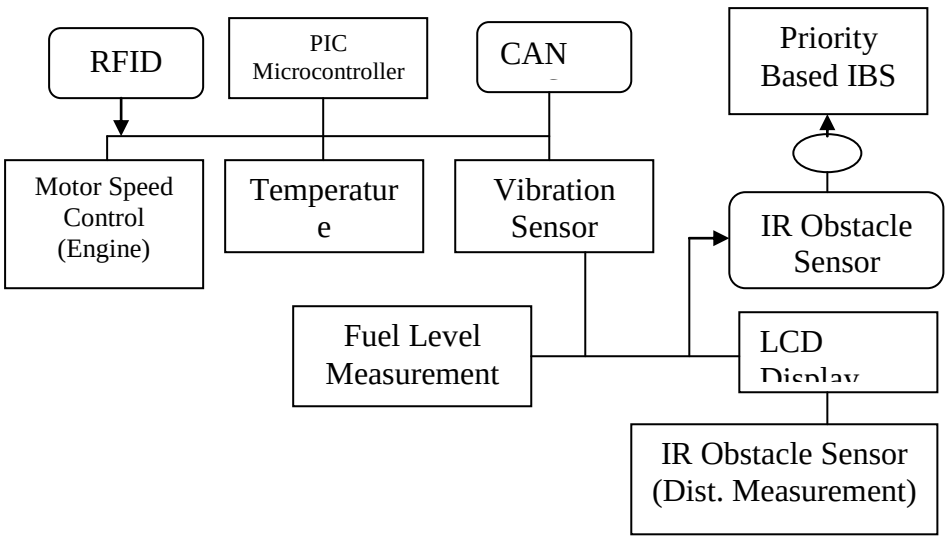

Fig. 4 Proposed System Block Diagram [3].

Proposed system contains CAN Bus (it is a Local Area Network controller CAN bus and it can transfer the serial data one by one), Peripheral interface controller (PIC is a microcontrollers made by microchip technology of control peripheral devices through system or CPU), Liquid Crystal Display (LCD), Ultrasonic Sensors (used for obstacle

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 11, November 2015

Distance Measurement), Temperature Sensors(LM-35 was used which can calibrated directly in ° Celsius), and RFID module (used for braking process in automatic enabled vehicles).

Sathya Narayanan and Ms. Monica P. Suresh [4], developed a Vehicle Monitoring and Controlling System Using Controller Area Network (CAN) Protocol based on ARM Microcontroller. This system monitors various parameters such as presence of CO level, load balancing, pressure level and humidity. System sensed parameter are prioritized and gives the appropriate output to do the specified task to the user. KEIL µvision3 using Embedded C software was used to for compilation and decision. Hardware of the system mainly contains LPC2129; which is based on a 16/32 bit ARM7TDMIS CPU with real-time emulation and embedded trace support, CAN Transceiver; TJA1040 is the interface between the CAN protocol controller and the physical bus, Gas sensor; for monitoring of gases produced by vehicle, PIR sensor (Passive InfraRed sensor); which infrared (IR) light radiating from objects in its field of view, Load cell; it is a transducer that is used to convert a force into electrical signal, Pressure sensor, Humidity sensor etc.

Venkatesh H. and Rajashri Y Manakwad [6] developed an driver alerting system using CAN protocol. The vehicle itself known the danger parameter and this intelligent vehicle warn the driver regarding the danger ahead which will cause damage to vehicle as well as his life also. Fig. 5 shows the Block diagram of alerting system.

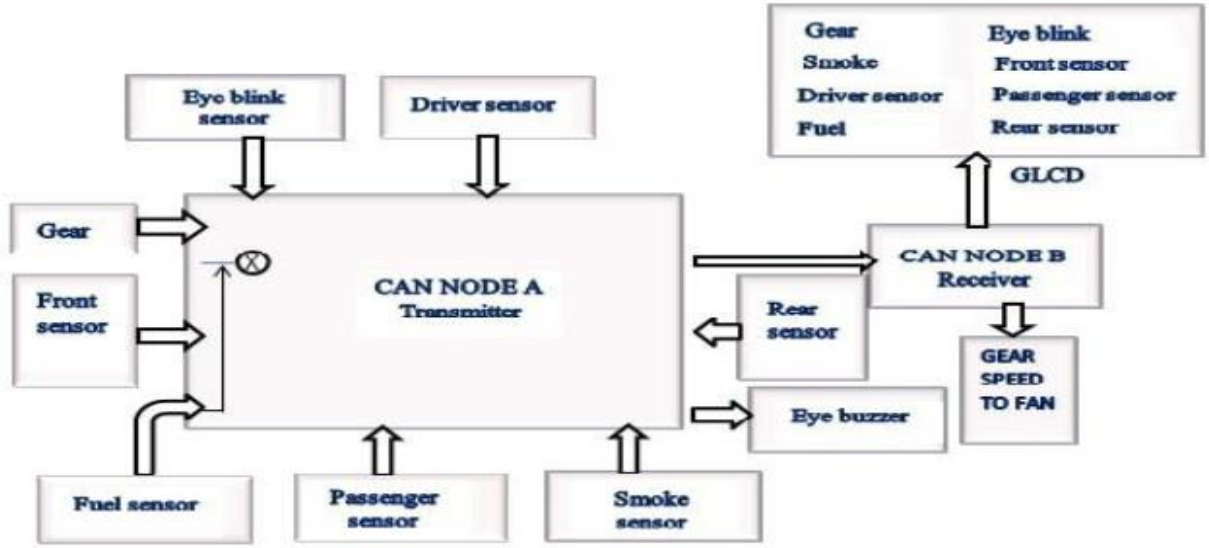

Fig. 5 Block diagram of alerting system [6].

The architecture of the proposed system contains different hardware like GLCD; it is a Graphical LCD has a format for displaying of 128x64 dots, Joystick; which is used to control the gear system, ARM Processor; The ARM7 (LPC2129) is a general purpose 32-bit microprocessor which will provides performance and low power consumption, Eye blink sensor; to monitor driver whether he felt asleep while driving the vehicle, Fuel indication sensor, Smoke Sensor; to detects the presence of smoke at engine, Basic IR sensor, Relay, Buzzer, and CAN bus to implement the system to alert the driver.

III.CONCLUSION

The main goal of this paper is to provide details of development of existing car system. Different author of the particular system works on various parameters of car like Fuel level indication, Temperature of engine, speed, ABS (Anti-lock braking system), central locking and lighting control system etc. in each system most of the CAN (controller area network) protocol was used.

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 11, November 2015

REFERENCES

[1] Presi. T. P., "Design and Development of PIC Microcontroller Based Vehicle Monitoring System Using Controller Area Network (CAN) Protocol", Information Communication and Embedded Systems (ICICES), IEEE, pp. 1070 – 1076, 2013.
[2] Jadhav Snehal Dnyandeo,Taware Tejashree Brahmadeo and Jadhav Shamal Popatrao, "Vehicle Control System Using CAN Protocol", International Journal of Engineering Research and General Science, Volume 3, Issue 3, pp.33-40, 2015.
[3] R. Manoj Prasanth, S. Raja and L. Saranya, "Vehicle Control Using CAN Protocol For Implementing the Intelligent Braking System (IBS)", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 3, Issue 3, pp. 7597-7605, March 2014.
[4] Sathya Narayanan and Ms. Monica P. Suresh, "Design and Implementation of ARM Microcontroller Based Vehicle Monitoring and Controlling System Using Controller Area Network (CAN) Protocol", International Journal of Innovative Research in Science, Engineering and Technology ,Volume 3, Special Issue 3, pp. 712-718, March 2014.
[5] "Introduction to the Controller Area Network (CAN)", SLOA101A–August 2002–Revised July 2008.
[6] Venkatesh H. and Rajashri Y Manakwad, "Driver Alerting System Using CAN Protocol", International Journal of Electrical and Electronics Research, Vol. 3, Issue 1, pp. 218-223, 2015.