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VEHICLE NETWORKING USINGCONTROL AREA NETWORK

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ABSTRACT

Automotive electronics is being standardizedin vehicles for improving automations. In a vehicle, organizing is a part of control circuits to build vehicle security. Poor monitoring of these critical security parameters and lack of proper communication among these security protocols are the major causes of accidents. Hence in order to improve the overall organization, Control Area network (CAN) is at present widely used in an automobile body control systems to effectively monitor and communicate.This workmajorly focuses on the control of vehicle speed based on the strategic distance and speed of the opponent vehicle.In this framework, the vehicle parameters such as the gas sensor, vehicle speed controller, temperature, humidity, metal detector etc…are continuously monitored for the detection of any critical circumstancesthat can arise.

Keyword: *-Control Area Network (CAN); gas sensor; vehicle speed controller; temperature; humidity; metal detector.*

I. INTRODUCTION

Modern automobile system uses Control Area Network (CAN) protocols to control the whole body network in order to economically achieve the reliable communication in vehicles, this paper is designed to enhance Communication Gateway based on ARM [1]. This scheme introduces the characteristics of ARM Controller and the CAN receiver, in particular, to achieve the software and hardware design of the CAN gateway. The body network control system helps in achieving the data sharing sufficiently in the communication [2]. The entire automation work can be divided into two sections, first is to study the basic critical components of the vehicle system thoroughly and then to design and implement the control circuitry [3].

In this proposed system, all safety measures are manual as well as automatically happen with aid of CAN protocol. In this paper to enhance driver vehicle interface development and implementation of electronic digital driving system for a semiautonomous vehicle is presented. The communication between two modules for efficient data transfer embedded networking by CAN is used. Using CAN protocol we are able to connect multiple microcontrollers and other devices to a standard CAN bus [4].

While providing all these features, the communication protocol must be efficient, low-cost and reliable. So Control Area Network (CAN) is this kind of communication protocol that has been employed in this work. This paper future describes the literature review in section II. The working and Proposed work are explained in section III. The resulting analysis is described in section IV. The conclusion of the paper in section V.

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II. LITERATURE REVIEW

Mr.K.Kalaiyarasu outlined a car security framework utilizing Controller Area Network. In this paper there are two modules ace and slave however both are associated with each other. Activity for the evening time driving mishaps because of glaring impact of fog light luminance, hamper line discovery, Gas spillage identification cum anticipation activity, to give clear vision to vehicle driver and checking the motor region temperature by a simple and computerized sensor is clarified in this paper. General they clarified five sensors .Master and slave both have diverse CAN transport associated through 8-bit PIC16F84 microcontroller. Ace and slave modules have CAN, USB, and Serial port correspondence. The coding will created and consume ICSP [7].

Vikash Kumar Singh created usage of 'CAN' convention in cars utilizing advance implanted framework. In this paper control framework with organize design have advantage over the customary strategy. Two sensors that is temperature sensor and IR sensor are screen through two diverse microcontroller and CAN controller yet these two can associated with the CAN transport..They likewise clarified the stream visit if transmitter segment and additionally collector segment. Defective hubs are naturally dropped from the transport that keeps any single hub from cutting a system down, and gives ensure that data transfer capacity is constantly accessible for basic message transmission [5].

Shane Tuohy looked into intra vehicle organizes in which advances, for example, Flex Ray, CAN, Local interconnect arrange (LIN) , Media situated frameworks transport (MOST), low-voltage differential flagging (LVDS), and IEEE 1394 Fire wire have been utilized as a part of vehicles and their correlation as vehicles are utilizing diverse systems administration conventions. [6].

III. PROPOSED WORK

The implementation of CAN protocol using zigbee with block diagram is described below. The networking system basically depends on microcontroller for connecting all the sensor nodes within a network and to establish communication between each nodes. Zibee helps in node to node communication with secured transmission of data.

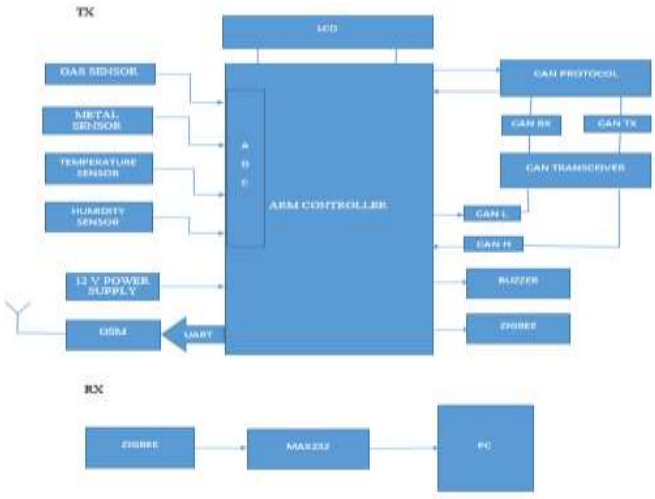

Fig.1 Block Diagram of Vehicle Networking

The above Figure.1 describes the Vehicle networking using CAN based on ARM provides multiple ways to overcome disadvantages with CAN less vehicle applications. Once all the devices are connected to the controller, it needs 5V DC power to start working with user devices. Upon power up, controller will initialize all related peripherals connected through port pins. After successful initialization, the Transmitter block keeps on reading the sensor values and sending them through CAN bus. Same time the Receiver block will be continuously receiving the data frame and comparing them with threshold values. If any of this sensor value goes out of the defined threshold Receiver block will display particular threshold on LCD and at the same time controller alerts the user through BUZZER.These stored co-ordinates will be sent to owner through SMS service by GSM modem. In this concept, if any sensor gets critical, it will be keep on indicating until the same sensor comes back to its normal operation. This infinite loop makes the user to be aware of theconditions of various devices which the user wants to monitor.

3.1 Explanation of key components used in the project:

3.1.1 Gas Sensor: It is a device which is used for detection of gas leakage at a particular area. When the gas sensor is interfaced with the controlling system the process automatically stops.

3.1.2 Metal Sensor: The device used for detection of metallic components. It is an electronic compact device with advanced sensing mechanism.

3.1.3 Temperature Sensor: The temperature sensor is also termed as a thermocouple or RTD. It is used for measuring the temperature using an electrical signal.

3.1.4 Humidity Sensor: An electronic device that is used for measuring the relative humidity, in the air by measuring moisture and temperature.

3.1.5 GSM: Abbreviation for GSM is Global System for Mobile communication. It is a Mobile networking system. Moreover it is being employed in device location tracking.

3.1.6 UART: Universal asynchronous receiver-transmitter (UART) is a serial communication based computer hardware device. It works based on relevant baudrates.

3.1.7 LCD: liquid crystal display (LCD) used to display the readings of each sensor.

3.1.8 CAN Protocol:Control Area Network (CAN) is based on CSMA-CD/ASM protocol. It is designed to allow microcontroller and other devices to communicate with each other in a system.

3.1.9 Buzzer: A buzzer is also known as beeper. It transmits audio signals.It works based on electromechanical mechanism. It is basically an output device.

3.1.10 Zigbee: A communication protocol which was designed for low power digital radio signal transmission and reception on a personal area network (PAN). Zigbee basically works on IEEE 802.15.14 specifications. The main characteristic are energy efficiency, secured networking and low data transmission rate.

3.1.11 ARM Controller: ARM processor is 32bit widely used microprocessor. 3 stage pipelining with optimization of 16/32 bit instructions are few of the additional features involved in ARM controller.

3.1.12MAX232: The device involved in conversion of signals from a serial port (RS232) to signals suitable to use in TTL compactible logic circuits and in turn varies voltage levels.

IV. RESULT ANALYSIS

This systems gives following notification on LCD**.**

1) Metal Detected
2) GAS Detected buzzer ON
3) Temperature 0024 degree
4) Humidity 0138 degree

Fig.2 Transmitter Model

Fig.3 Receiver Model

In figure 2 and figure 3 the project presentation model is provided. The project displays the following results, detection of a metal, displays the humidity, senses temperature and gas. The results are displayed on the LCD and message is being sent through GSM to mobile phones in emergency cases. The communication between two nodes is effectively finished with CAN modules.

V. CONCLUSION

In place of complex wiring proposed system we use CAN protocol which requires just two wires for communication. The parameters in an automobile are monitored and the necessary control has been created for each parameter by making use of CAN protocol. The automated parameters for the car are inexpensive so we are able to adopt it in most vehicles. So this, Vehicle networking using Controller Area Network (CAN) is a vehicle bus standard that is designed to have an ease of usage and retrieval of data with respect to the vehicle. This provides a method to assess the impact of vehicle networking.

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