Design and Implementation Of Multiple Sensor For Data Broadcasting using 29 Bit CAN(Controller Area Network) Bus"

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Abstract—
This paper aims to Design and implementation Of multiple Sensor For Data Broadcasting using 29 Bit CAN(Controller Area Network) machine " The module utilizes two Sensor bias with separate Display in a common CAN Bus. Temperature and Gas Detector labors are display over the OLED, simultaneously the measured data is transfer to the CAN Bus with their respective CAN ID at every 1000 m Sec. The Data appears in the Data Logger window in Hex Format which is standard format for CAN Bus Protocol. CAN Frame consists of one counter also from 0x01 to 0x0F which indicated the detector transmission and dimension is live.

Keywords-
Anttiny1624with64bitinternal,Temperature Sensor, Gas Sensor,6x2Display

I. INTRODUCTION

CAN stands for Controller Area Network protocol. It is a protocol that was developed by Robert Bosch in around 1986. The CAN protocol is a standard designed to allow the microcontroller and other devices to communicate with each other without any host computer. The feature that makes the CAN protocol unique among other communication protocols is the broadcast type of bus. Here, broadcast means that the information is transmitted to all the nodes. The node can be a sensor, microcontroller, or a gateway that allows the computer to communicate over the network through the USB cable or Ethernet port. The CAN is a message- based protocol, which means that message carries the message identifier, and based on the identifier, priority is decided. There is no need for node identification in the CAN network, so it becomes very easy to insert or delete it from the network. It is a serial half-duplex and asynchronous type of communication protocol. The CAN is a two-wired communication protocol as the CAN network is connected through the two-wired bus. The wires are twisted pair having120Ω characteristics impedance connected at each end. Initially, it was mainly designed for communication within the vehicles, but it is now used in many other contexts. Like UDS, and KWP 2000, CAN also be used for the on-board diagnostics.

II. LITERATUREREVIEW

[1] Lucia Lo Bello(2019) y. In this paper the authors have suggested a new analysis fashion for recent technological challenges and HW/ SW result for on- board bedded and network automotive system.

[2] Riham Elhabyan, Wei shi, and Marc St-Hilaire (2019) TNfcaqjx9MVUKpNuKHbRR5w5FNF6WcsSy 1the performance of these protocols is substantially limited by challenges related to determining a more realistic content model for the detector bumps in the networks.

[3] Jobish Revanth(2020) In this paper authors concern to temperature monitoring, we can also maintain the temperature by connecting it with the temperature cooling system so that temperature can be maintained.

[4] Harshal Hemane.(2020), In this paper the tackle and software set up of the UWASA Node is working on the corrections grounded on the test reports ' true or false and validates it. The automatic performance test software and the automatic CiA DS401 test software can be used in the future to test other CAN open bias with little revision of the test cases. It's also suitable for colorful CAN protocols. This design is only concentrated on of the physical sub caste testing, but can also be used in data link sub caste testing, robust testing and communication testing. This test software and tackle has compass of optimization in the future, as demanded.

[5] Khalid mahmood, salman shams had, saru kumara.(2021) emphasized the impact of EFTs, generating faults on intra – vehicle communication protocol, similar as CAN and CAN- FD, leaving gaps about their impact on further robust protocol.

[6] Daniel H. Pohren, Alexandre dos Santos Roque.(2021) In this paper authors used an integrated approach in combining spatially unequivocal resource implicit analysis is with The performance of these protocols is substantially limited by challenges related to determining a more realistic content model.

[7] Geoffrey Spencer, Francesco Mercaldo,(2021)TNfcaqjx9MVUKpNuKHbRR5w5FNF6W csSy1 of expanding the integration of the development of new CAN machine electronic control units designed to enable remote communication between detectors and selectors, and the main regulator of timber machines.

[8] Geoffrey Spencer,(2021) This paper presents the original developments of new tackle bias targeted for CAN(Controller Area Network) machine dispatches in timber machines. CAN machine is a extensively used protocol for dispatches in the machine area. It's also applied in artificial vehicles and machines due to its robustness, simplicity, and operating inflexibility. It's ideal for forestry ministry directors who need to couple their outfit to a machine that allows the transportation assiduity to fete the significance of homogenizing dispatches between tools and machines.

[9] Frutuoso Mateus(2021) This paper presents the original developments of new tackle bias targeted for CAN Controller Area Network) machine dispatches in timber machines. CAN machine is a extensively used protocol for communications in the automobile area. It is also applied in industrial vehicles and machines due to its robustness, simplicity, and operating flexibility.

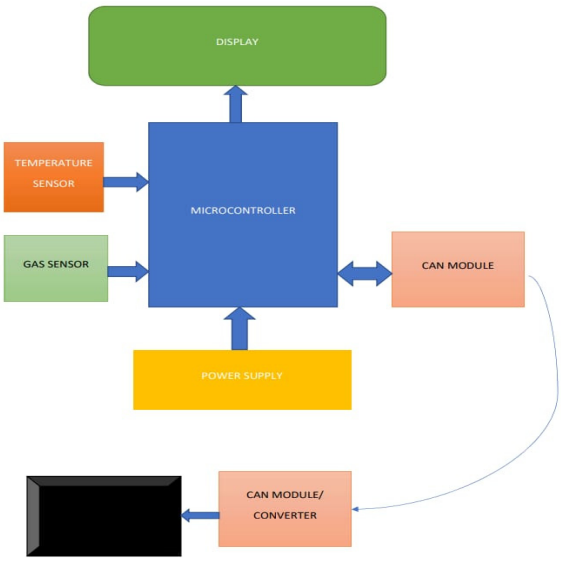
[10] Rosangela Casolare (2022)In this paper the authors have aim to discriminate between malicious and legitimate CAN packets with supervised machine learning. As evidenced by the experimental analysis results, the approach suggested in this paper achieved good results. For future works, as a first aim, we would like to introduce new types of attack, for example, we could conduct detailed experimentation on the replay attack. This attack permits the attacker to record CAN traffic related to the driver's actions and make the vehicle reproduce the same actions. Furthermore, the replay attack turns out to be very difficult to identify, as it is based on sequences of legitimate CAN packets reproduced from a previous transmission. turns out to be very difficult to identify, as it is based on sequences of legitimate CAN packets reproduced from a previous transmission.

IV.METHODOLOGY

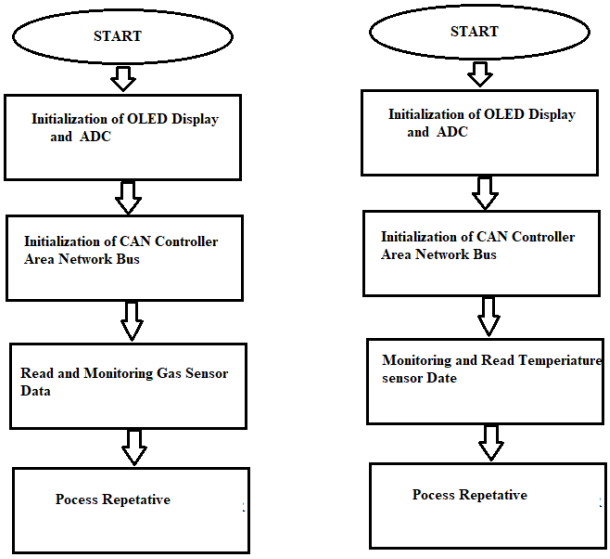
Monitoring of colorful parameter like Temperature, moisture, Carbon Emission etc. are veritably pivotal now a day in diligence. motorcars region generally used CAN protocol for the detector data transmission and assemblage to take necessary action when ever needed. CAN provides multiple transducer uniting on a single machine, this makes it more popular for artificial operations. Transmission speed and distance plays a vital part in any data broadcasting, and CAN is able of befitting it. Number of sensors are ensconced in the industries to scamper it efficiently without an interrupt. Environmental parameters monitoring alike a piece of it. CAN provides the inflexibility to make number of addresses on a single machine, so that it will be easy for anyone to cover the records on a single platform and take necessary action. In our proposed design we are going to affiliate Temperature and Gas detector and the gauged parameter get broadcasted through a CAN machine. Then we will use 29- bit

long- drawn- out Frame ID which is advanced interpretation of CAN protocol. These sensors are immediate interfaced with internal ADC of Microcontroller. autochthonous display unit also acquirable to answer the scaled data. Aim is to fabricate cost effective solution for assiduousness with elaborated technology.

Block Diagram



FLOWCHART



IV.WORKING

The paper title is Design and Implementation Of Multiple Sensors for Data Broadcasting using 29 Bit CAN(Controller Area Network) Bus " The goal is to Propose a project consisting of a Temperature and Gas Sensor. The output of sensors is connected to the internal ADC of ATTINY1624. ATTINY1624 is a new series of microcontrollers with RISC Architecture and 12- bit internal ADC along with USART Port and SPI communication. CAN Module rested on Microchip connected to the microcontroller through a SPI protocol(SS, MISO, MOSI, CLK) lines .One Graphical LCD also interfaced with it. Microcontroller continuously measures the sensor output and display it on TV. At every 5 second it transfers the reported data to CAN bus through a CAN module. AT Receiver end one more CAN converter is accessible, which receives the data and display it on computer. One can transmit data at 1 Mbps rate, but we will use standard 250kbps baud caliber for data back-and-forth.

III. SYSTEMREQUIREMENT

HARDWAREREQUIREMENT

[1] OLEDD is play
[2] Gas Sensor
[3] Temperature Sensor
[4]Controller Module
[5]ATTINY 1624 with 64 bit internal ADC along with CAN Transmitter Module.

SOFTWAREREQUIREMENT

ATMEL Studio for code compilation, VB Application for Remote Terminal Unit.

IMPLEMENTATION

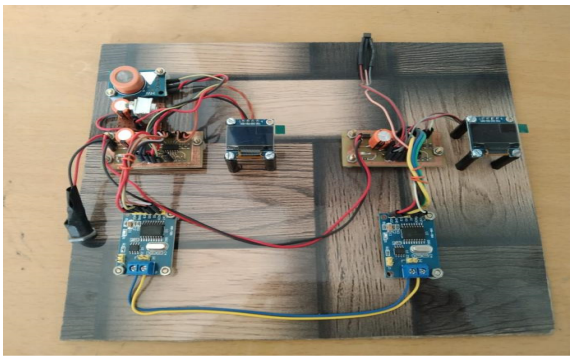
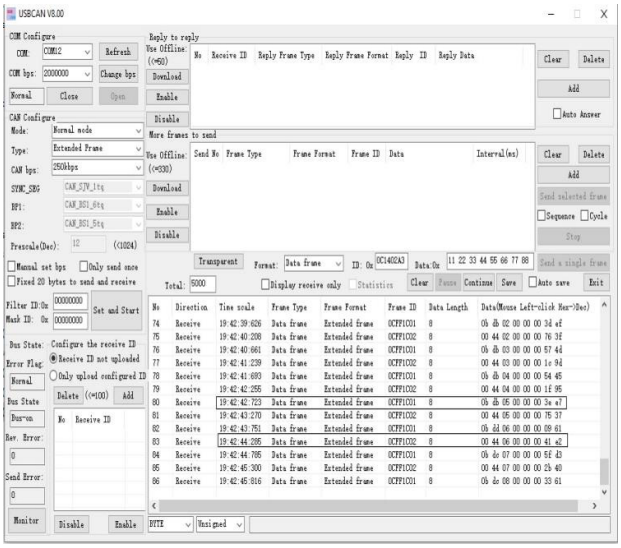


Fig shows the experimental setup of the system

RESULT

The results of the paper demonstrated significant improvements Can protocol really solve the multiple point data collection problem which is serious concern for industries. Extended 29 bit frame provides extra facility to increase the nodes. Transmission speed also is very high up to 2Mbps which plays very vital role in scientific laboratory and automotive industries.



IV.CONCLUSION

There's no data conflicts as we've assigned individual CAN Frame ID to sensors. Each sensor transmitting the hex data without any interruptions. The delay between the two frames are also within the limits. The main advantages is that we can assign any CAN ID to the Sensors. CAN frame has provision of counter through which we get idea about the current situation and sensors are working properly? The Data analyzer having a feature of data logging so that we can save the CAN frame Data for further analysis and applications

V. REFERENCE

[1] Lucia Lo Bello, Recent advances and trends in on- board embedded and network automotive system. IEEE TRANSACTIONS ON INDUSTRIAL INFORMATICS Vol. 15,No. 2, February 2019.

[2] Riham Elhabyan, Wei shi, and Marc St-Hilaire. Coverage Protocol for wireless sensor network review and future directions. JOURNAL OF COMMUNICATIONS AND NETWORKS, Vol. 21,No. 1 February 2019.

[3] Khalid mahmood, salman shamshad, sarukumara. Comment on " Lightweight secure message broadcasting protocol for Vehicle- to- Vehicle communication ". IEEE SYSTEMSJOURNAL.vol.15,No. 2, March2021.

[4] DanielH. Pohren, Alexandre dos Santos Roque, Impact Analysis of Electrical fast transients on flex ray In- Vehicle Networks .IEEE sale ON ELECTROMAGNETICCOMPATIBILITY.vol.63,No. 1, February 2021.

[5] Geoffrey Spencer, Design of CAN Bus Communication Interfaces for Forestry Machines Computers 2021, 10, 144.

[6] Mehmet Bozdal, A Survey on CAN Bus Protocol Attacks, Challenges, and Potential Solutions, 2018 International Conference on Computing, Electronics & Communications Engineering(iCCECE), 16- 17 August 2018, South end, Essex, UK. DOI10.1109/ iCCECOME.2018.8658720.

[7] Harshal Hemane, Testing and Validation of a CAN Protocol Network Nodes, Vol. 9, Issue 2, February 2020.

[8] Geoffrey Spencer, Design of CAN Bus Communication Interfaces for Forestry Machines, Computers 2021,10, 144. https//doi.org/10.3390/computers10110144 https//www.mdpi.com/journal/computers.

[9] Jobish Revanth, Temperature Logging System using Can Protocol, Volume 8, Issue 17, Published by,www.ijert.org 2020.

[10]Francesco Mercaldo, A Real- time Method for CAN Bus Intrusion Detection by Means of Supervised Machine Learning Amato, F., Coppolino ,L., Mercaldo, F., Moscato, F., Nardone, R., and Santone, A.(2022). Can-bus attack detection with deep learning. IEEE Transactions on Intelligent Transportation Systems.3 https//orangedatamining.com.