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MONITORING PARAMETERS OF VEHICLE USING CAN PROTOCOL

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ABSTRACT

Controller Area Network (CAN) is an alluring option in the automotive and automotive industries due to lessening in number of wires. CAN protocol reduces the wiring complexity by providing two wire communication. This paper is aimed at implementation of CAN protocol utilizing ARM for monitoring vehicle system. The main feature of the system incorporates checking and controlling of different parameters of the vehicle, the parameters are considered as per the safety of the vehicle and also safety for vehicle driver and passengers in vehicle, the parameters considered such as checking for malfunctioning or any defect in brake cable, checking the distance between the two vehicles and controlling the speed as per the distance, this parameter is considered to avoid the collision between the two vehicles for the safety of vehicle and passengers ,another features aimed at mobile popup, this feature is implemented to avoid accidents while driving the vehicle by displaying the popup and simultaneously slowing down of the vehicle due to the consideration of safety of driver and passengers travelling in the vehicle.

Keywords: *IR communication, Anti-Collision, Brake cable, mobile popup, Embedded system.*

I. INTRODUCTION

The period of time now occurring in Automobile are being implemented by highest amount of electrical parts for proficient activity. By and large number of vehicles were being worked with analog driver-vehicle interface for showing different vehicle status like speed, fuel level etc. This paper introduces the implementations of digital driving system and also advancements and usage of electronic devices for the development of digital driving system for semi-independent vehicle to enhance driver-vehicle interface. It utilizes ARM for procuring information that utilizes ADC to bring all control information or data to digital format and visualized by GLCD. The communication module used for the achievement is embedded networking CAN by which we can have effective data exchange. It additionally takes the response or feedback from vehicle conditions like vehicle speed, motor temperature and so forth, and all are controlled by fundamental controller.

With the drastic development in computers and discovering significant innovation towards the vehicle, the capabilities and vehicle-driver interface of the vehicle has become more convenient and safer. Albeit a few

vehicle have arrangement for choosing to either produces notices for the driver for awareness of the information sent by fundamental controller, or controlling the vehicle self-rulingly, they normally should settle on these choices progressively with just inadequate data. Along these lines, it is imperative that human drivers still have some control over the vehicle. Progressed in vehicle data furnishes vehicles with various kinds and level of knowledge to help driver. The presentation into the vehicle configuration has permitted a relatively symbiotic relationship between driver and vehicle by giving an advanced and keen driver-vehicle interface through a shrewd data organize.

II. LITERATURE SURVEY

Sheher Banu S and Savita Sonoli [1] proposed that Organization in India guesses that there are road incidents occurring at normal interims and the standard stake are of human goofs under which whole to 93% of all setbacks. The total yearly human misfortune due to road disasters has crossed 1.18 lakh. The work is achieved by using ARM7 controller that has in built CAN protocol which plays a major role in communication with the peripherals and controller. The system have ultrasonic sensors which is used to detect the obstacles at the front end of the vehicle, IR sensors are used to detect the changes in lanes. The GSM module is also employed to get short message service. A dynamic clever illustrative structure on the framework that alerts and helps the driver in viable driving and technical expert finding important data is the need of extraordinary significance. The system proposed so far is intended to give a safety to driver and traveler. To distinguish snags before the vehicle an ultrasonic sensor is utilized. The separation is done in three distinct levels.

Verma et. al [2] as per the request of present day vehicle, the controller area network has been implemented. All together to lessen point to point wiring harness in vehicle mechanization.CAN is recommended as a methods for information exchange in the vehicle environment or vehicle condition. The advantage of CAN protocol over conventional point to point plans will offer expanded adaptability and expandability for future innovation additions. Project depicts the AVR based plan and usage of CAN bus model for vehicle automation.

According to Krishnaveni.K and Roopa.M [3] the records obtained by world health organization, heaps of human lives are being lost consistently because of vehicular mishaps. Due to over speed vehicle movements on road, number of injuries and loss of lives have been increased day by day. CAN protocol is used with wireless monitoring system, accelerometer and GPS tracking system to overcome the situation. The system uses wireless device to send information in the form of message to phone numbers and the exact location of the vehicle is traced using GPS tracking system and Google Earth. This project can be used by vehicle transport companies, to find the vehicle location during the delay or accident.

Pradhan Suvendu kedareswar and Venkatasubramianian Krishnamoorthy [4] proposes a CAN protocol based embedded system to avoid rear –end collision of vehicles. In this paper the system not only computes the deceleration due to break but also calculates the intensity levels of the brakes and communicate with the vehicle and the array of led's are used to display the braking intensity. To avoid the collision of the vehicle it uses IR

transmitter module and the CAN protocol is used to communicate with main controller and also take the control decision according to the algorithm designed to handle the situation. The above system is implemented by using the hardware components and software components, the hardware components used to achieve here is ARM Cortex M0 microcontroller that warns the driver using a buzzer and messages the active and passive safety mechanism using CAN protocol.

Nawale et. al [5] proposed that due to numerous associations of information and electrical lines to the microcontroller has become very difficult to comprehend and to investigate it. It additionally limits us long information exchange due to number of line. To limit all these issues CAN protocol is used to communicate with every one of the gadgets utilizing just two wires. Because of this, number of lines associated with microcontroller lessens extraordinarily and hardware winds up easily to comprehend and investigate. Utilizing protocol will able to have associated with different microcontrollers and different gadgets.

Chaitra et. al [6] proposes Vehicle health monitoring system using ARDUINO and IOT. The paper depicts the execution of a model structure used for successful steady data securing, engine warming and blockage of fuel pipe. System tackles ARDUINO and IOT used to separate parameters like engine warming and blocking in fuel pipe etc for ensured and careful driving. The data is sent to IOT which can be checked both by vehicle maker through distributed computing and proprietor of the vehicle by android application.

III. PROPOSED SYSTEM

The proposed system of Monitoring parameters of vehicle using CAN protocol give the answer for mishap free driving, also detects the malfunctioning or any defect in brake cable, and also due to mobile popup, necessary decision is taken, and required output is generated. Such requirement is achieved by hardware and software components. For better comprehension of the proposed system a working model is gathered. This working model is shown through block diagram, which shows the entire flow and operation of the system. The block diagram representation is shown below Fig.1. and Fig.2.

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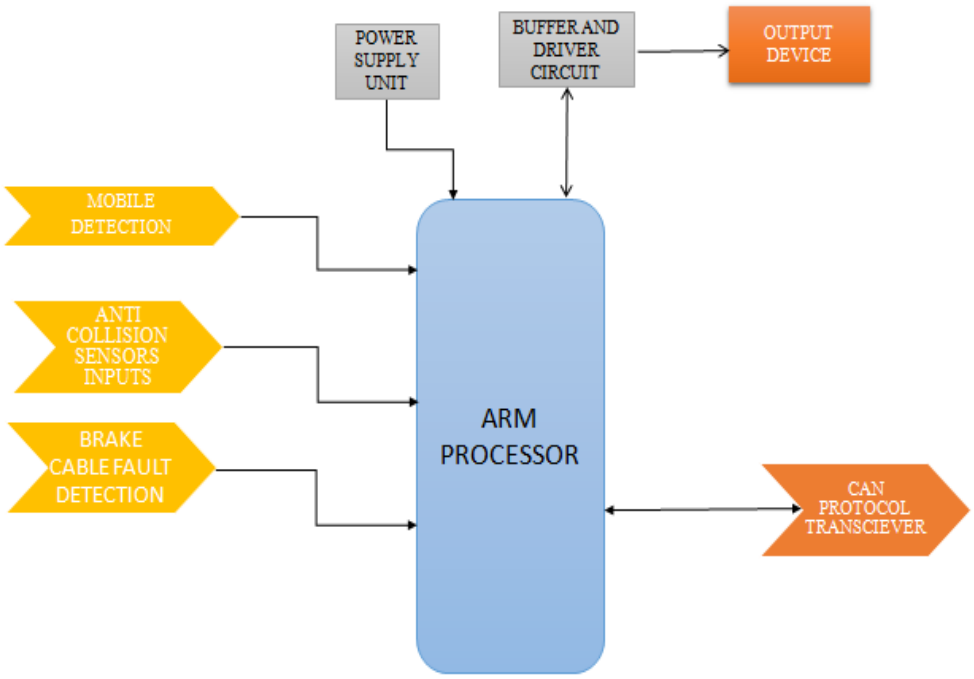

Fig. 1.Transmiter section of the proposed system.

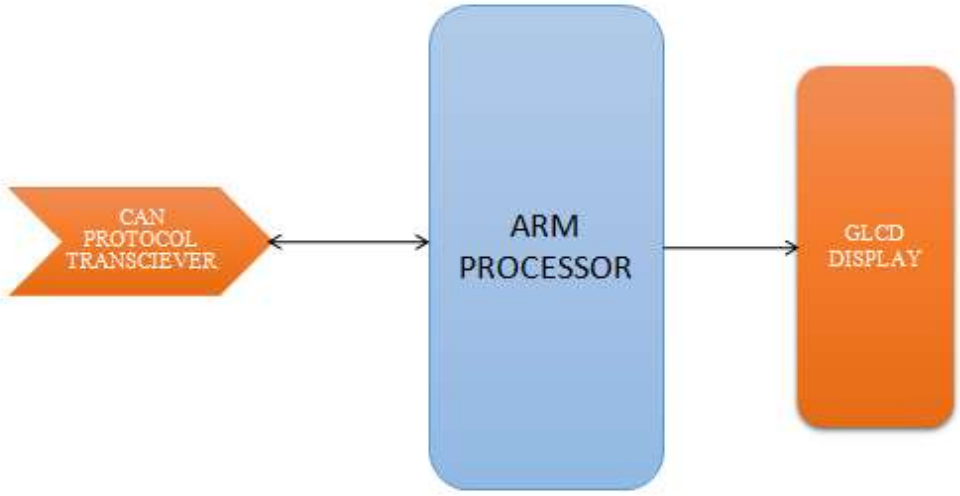

Fig.2. Receiver section of the proposed system.

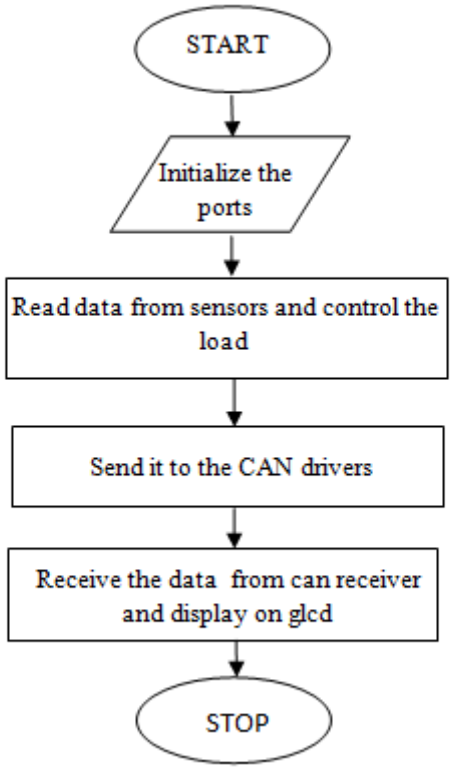

Fig.3. System flowchart

From the block diagram, the anti-collision system is implemented by using two IR receivers fitted at the two sides of single IR transmitter. The first IR receivers is ordinary recipient where as second IR receivers is marginally less proficiency beneficiary. So when IR rays transmitted by IR transmitter hits to an long distance impediment and return and are received by first IR receiver.

The switching stage relay is energized as its output goes high. The relay's normally connected pin provides normal voltage to motor by using variable power supply unit thus making motor to run at normal speed. When the obstacle is found in safe distance, relay is energized and the normally open contact becomes normally close contact and provides a low voltage by using variable power supply, and the speed of the vehicle is reduced.

When impediment is found very nearer, IR rays transmitted by IR transmitter are received by second IR receiver, the switching stage relay is energized as its output goes high. The relay's normally connected pin are in series with power supply unit thus motor is run at normal speed. When the obstacle is found in safe distance, relay is energized and the contacts gets changed. This change in contact breaks the voltage to the motor and the vehicle is stopped.

For the detection of brake cable defect or malfunctioning of brake, continuity is used. If the continuity is broken then brake failure alert is provided using buzzer via buffer, driver and relay stage.

For the detection of the mobile popup in the vehicle, the mobile detection module will be used to detect the mobile rings. This mobile sniffer circuits are used detect mobile rings. As mobile sniffer circuits detect mobile rings the vehicle speed is reduced via buffer, driver and relay stages. Here buffer acts as a temporary storage, driver is used to drive the relay and relay is used for switching purpose, and the mobile popup is displayed in GLCD. Figure 3 represents the system flowchart.

IV. APPLICATIONS

The CAN protocol as per the safety purposes provides wide range of applications. The examples for safety purpose applications provided by CAN protocol includes:

- Aerocraft control system, to achieve highly reliable communication of micro-computer based system in Aerocraft control system.
- Anti-collision, Vehicle can be avoided for mishap.
- CAN is used in monitoring various parameters of vehicles.
- In train communication, CAN is used for train control and fault detection system in train.

V. CONCLUSION

From the above methodology and exchanges, we presume that motor speed of the vehicle is controlled as per the parameters being monitored, communicated and controlled by CAN protocol. This method can be utilized in real time vehicles and the parameters can be monitored and processed, if required a restorative actions are initiated if the events isn't under typical task according to fundamental point that is composed and built up for vehicle using CAN protocol. The design here is principally expected to accomplish communication between master and slave modules for observing different parameters of the vehicle.

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