IOT BASED AUTOMATIC BREAKING CONTROL SYSTEM FOR EV VEHICLE AND MONITORING SYSTEM

[1]MR.S BALA NAIK, [2]MR.B VEERANNA, [3]V. ANUSRI, [4]S.SAI SAHARTH, [5]P. GANESH,

[1,2]Assistant Professor (EEE), Guru Nanak Institutions Technical Campus, Hyderabad, Telangana

[3,4,5]UG Scholar (EEE), Guru Nanak Institutions Technical Campus, Hyderabad, Telangana

Abstract:- Electric vehicles (EV) are getting more and more popular in today's society as a result of rising petrol prices. An IoT-based automated breaking Control system for EV vehicles is proposed in this paper, together with a monitoring system. An EV's battery monitoring and control system measures the battery's voltage and temperature. Sensors, a microprocessor, aWi-Fi module, and a battery make up this system. It is built using the affordable microcontroller. It has an ultrasonic sensor and works as an automated braking system. The controller receives the data sent by the ultrasonic sensor, which is used to identify obstacles, and uses them to regulate the brake mechanism. Voltage, temperature, and battery data are passed to the microcontroller, which subsequently sends them over Wi-Fi to the Thinkspeakapplication. It is suggested that the parameters of the EV be monitored immediately using a Thinkspeak app

1. INTRODUCTION

1.1 GENERAL

Electric vehicle (EVs) have gained popularity as an alternative to conventional fuel vehicles to reduce CO2 emissions and reliance on oil as global climate change is becoming more recognized as a serious environmental issue. However, because of EV charging, the powergrid's general load profile will alter and the rate at which the facilities update their power will rise [1]. Electric vehicles (EVs) have long been seen as a practical way to reduce environmental pollution, especially when used in conjunction with decarbonized energy production. In particular, Path-following autos (AVs) with active safety features which primarily depend about the

use of the brakes and guiding controls work as intended in some severely risky circumstances [2]. Eco-driving is thought of as an optimum control problem(OCP), a well studied topic, where the road and traffic conditions are completely describe dona planned route. Early studies used the assumption that human drivers would be behind the wheel and fully in charge of controlling vehicle speed and modifying their driving behaviour for improved fuel efficiency [3]. Vehicle safety has been improved and the number of fatalities from collisions between vehicles has been demonstrated to decrease because to electronic stability control (ESC). [4-5]. Direct yaw moments are produced by controlling the momentum and braking force of each wheel. Since these systems provide precisewheeltorque manipulation and frequently have superior range than electric vehicles (EVs) with individual wheel motors are easily incorporate TV controllers (TVCs). TVas well asthepotential of producing the reference yaw moment by wheel torque distributions matchin gavariety of requirements, including energy efficiency, have both been extensively evaluated[6-7]. Energy savings can be achieved through the total improvement of tire and motor energyproduction [8]. The electric vehicle is a distinctive design with several benefits. Thein-hub motor torques in each driving wheel is swiftly and independently regulated. Therefore, it goes without saying that an electric vehicle is a useful vehicle testbed to illustrate the individual orjoint dynamics of control systems. Energy savings is achieved through the total optimization of motor power output and tire energy [9-10]. In this paper, a monitoring system and an IoT-based automated breaking control system for an EV vehicle are provided.

2. LITERATURE SURVEY

2.1 EXISTING SYSTEM

The existing braking control systems in electric vehicles (EVs) generally rely on manual driver input or basic automatic features such as anti-lock braking systems (ABS) and electronic stability control (ESC). These systems do not fully leverage the capabilities of IoT for real-time data collection and advanced analytics. Monitoring is often limited toon-board diagnostics without comprehensive remote tracking and predictive maintenance capabilities..

2.2 PROPOSED SYSTEM

The proposed IoT-based automatic braking control system for EVs integrates advanced

sensors, real-time data processing, and internet connectivity to enhance vehicle safety and performance. This system autonomously adjusts braking based on real-time environmental conditions and vehicle dynamics, significantly improving response times and accuracy. Additionally, the monitoring component provides continuous, remote tracking of vehiclestatus, allowing for predictive maintenance and alerts, there by improving overall vehicle reliability and safety.

3. BLOCK DIAGRAM

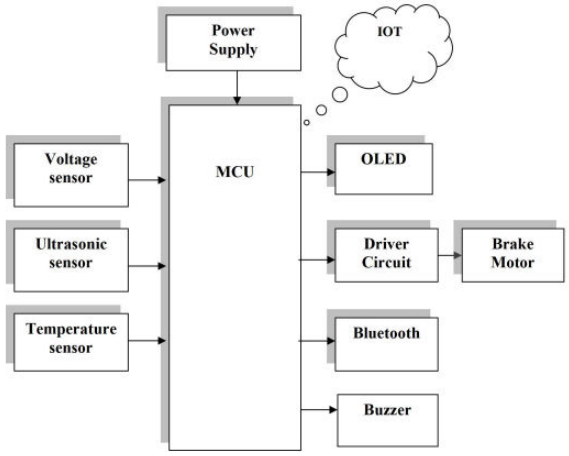

FIG: 1 Block diagram

3.1. HARDWARE COMPONENTS

- Regulated power supply.
- Micro controller.
- Voltage sensor
- US sensor
- Temperature sensor

3.2. SOFTWARE REQUIREMENTS:

- Embedded C

4. IMPLEMENTATION

An EV's battery monitoring and control system measures the battery's voltage and temperature. Sensors, a microprocessor, aWi-Fi module, and a battery make up this system. It is built using the affordable microcontroller. It has an ultrasonic sensor and works as an automated braking system. The controller receives the data sent by the ultrasonic sensor, which is used to identify obstacles, and uses them to regulate the brake mechanism. Voltage, temperature, and battery data are passed to the microcontroller, which subsequently sends them over Wi-Fi to the Thinkspeakapplication. It is suggested that the parameters of the EV be monitored immediately using a Thinkspeak app

5. CIRCUIT DIAGRAM

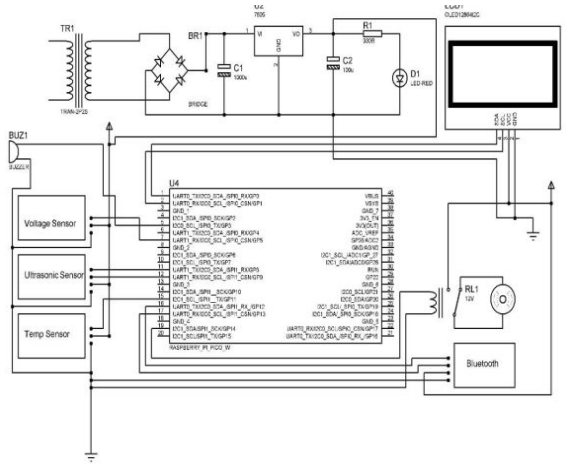

Fig circuit diagram

6. RESULT

This project is well prepared and acting accordingly as per the initia specifications and requirements of our project. Because of the creative nature and design the id of applying this project is very new, the opportunities for this project are immense. The practical representation of an experimental board is shown below:

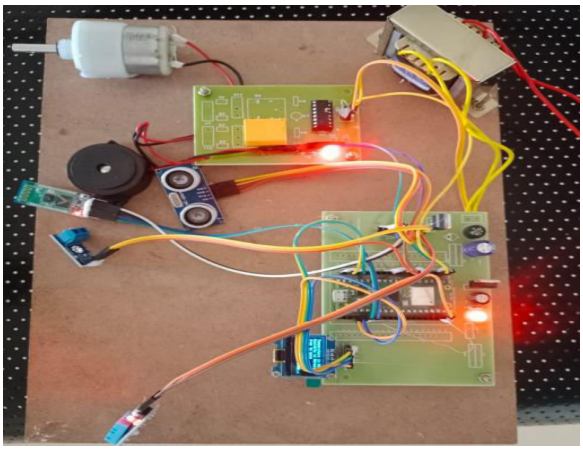

Fig:3. Project Model

6. CONCLUSION

Electric vehicles will be becoming significantly more eco-friendly by saving the globefromglobal warming by reducing the greenhouse gases released by conventional automobiles.Electric vehicle depends entirely on the energy source from the battery. This paper presentsanIoT based automatic breaking control system for an EV vehicle and a monitoring system. Thevoltage sensor is used to continuously check battery voltage. In order to measure theheat inthe battery, a temperature sensor is employed. Wi-Fi module and a microcontroller-based system are utilized to monitor these battery parameters. While configuring the time for security, the Arduino microcontroller is connected to the relay to charge the battery. Using Node Mcu, the data is transmitted to the IoT cloud where it is monitored before being sent to the blink application.

7. REFERENCES

1. Jiaming Shen; Laili Wang; Jialei Zhang, Year: 2021, “Integrated Scheduling Strategyfor Private Electric Vehicles and Electric Taxis”, in IEEE Transactions on Industrial Informatics, Vol: 17, no: 3, pp. 1637 – 1647.

2. Guodong Du; Yuan Zou; Xudong Zhang; Lingxiong Guo; Ningyuan Guo, Year: 2021,

"Heuristic Energy Management Strategy of Hybrid Electric Vehicle Based on DeepReinforcement Learning With Accelerated Gradient Optimization", in IEEETransactions on Transportation Electrification, Vol: 7, no: 4, pp. 2194 – 2208.

3. Daliang Shen; Dominik Karbowski; Aymeric Rousseau, Year: 2020, "AMinimumPrinciple-Based Algorithm for Energy-Efficient Eco-Driving of Electric Vehicles inVarious Traffic and Road Conditions", in IEEE Transactions on Intelligent Vehicles, Vol: 5, no: 4, pp. 725 – 737.

4. Lei Zhang; Yachao Wang; Zhenpo Wang, Year: 2019, "Robust Lateral MotionControl for In-WheelMotor-Drive Electric Vehicles With Network Induced Delays", inIEEE Transactions on Vehicular Technology, Vol: 68, no: 11, pp. 10585 – 10593.

5. Wenliang Zhang; Zhenpo Wang; Lars Drugge; Mikael Nybacka, Year: 2020, "Evaluating Model Predictive Path Following and Yaw Stability Controllers for Over- Actuated Autonomous ElectricVehicles", in IEEE Transactions on Vehicular Technology, Vol: 69, no: 11, pp. 12807 – 12821.

6. Christoforos Chatzikomis; Aldo Sorniotti; Patrick Gruber; Mattia Zanchetta; DanWillans; Bryn Balcombe, Year: 2018, "Comparison of Path Tracking and Torque-Vectoring Controllers for Autonomous Electric Vehicles", in IEEE Transactions onIntelligent Vehicles, Vol: 3, no: 4, pp. 559 – 570..