# Automated Electric Vehicle Based On Wireless Communication

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***Abstract-*** *To automate the electrical vehicle by sensing the environment with minimal or no control of human. The car's action was controlled by multiple sensors installed in the car. Instead of OBDII CAN network, a wireless communication protocol (IOT) used to send reports. Many sensors like ultrasonic sensors, vibration sensors, speed sensor, voltage sensor are used inside the car for detection, to maintain and spontaneous action which will lead to safe driving.The improvement of hardware gadgets has furnished the technical basis for the belief of AVs. If the whole street device may be extraordinarily automated, there will be tremendous blessings in phrases of comfort and security. The record then outlines the approach of autopilot constructed on current hardware infrastructure. Several experiments have been carried out on the IAG studies centre to evaluate the feasibility of the use of electric powered alerts to pressure the car's moves and to recognize a couple of sensors mounted withinside the car. Lastly, it discusses how those initial works will be prolonged for similarly implementations.*

***Keywords***- Automatic vehicle, IoT, Sensor network

## I. INTRODUCTION

Road transportation is one of the main sources of environmental pollution. Electrification seems like the ideal solution for reducing CO2 emissions, while keeping all the advantages of modern means of transportation. The shift to electric powered cars desires to be observed via way of means of an appropriate telecommunications network, that is liable for the dependable transmission of huge volumes of information related to the intake of electricity. The application of Internet of Things (IoT) has been emerging as a new platform in wireless technologies primarily in the field of designing electric vehicles. To overcome all issues in existing vehicles and for protecting the environment, electric vehicles should be introduced by integrating an intellectual device called sensor all over the body of electric vehicle with less cost. Therefore, this article confers the need for and importance of introducing electric vehicles with IoT based technology which monitors the battery life of electric vehicles. Since the electric vehicles are implemented with internet, an online monitoring system which is called Things Speak has been used for checking all the vehicles in a continuous manner. By this application, the status of the vehicle like speed level of the vehicle and vibration of the car are viewed which are passed through the cloud by IOT technology.

## II. RELATED WORK

1. Automatic Vehicle

Manual motors have become antique fashioned; but they're nevertheless broadly utilized by many drivers. For clean using, automated transmission automobiles are being produced withinside the marketplace on a excessive scale. Initially those have been high priced and fed on greater fuel, because of this those automobiles have been now no longer call for as guide automobiles. However, automated vehicles have now come to be extra economical. The automated automobile is straightforward to deal with and manage in comparison to the guide automobile. Most of the younger human beings are going towards computerized vehicle due to the fact it's miles consumer friendly. The persevering with evolution of car era objectives to supply even more protection blessings than in advance technologies. One day, automatic riding systems, which a few talk to as automatic vehicles, can be capable of deal with the complete mission of riding whilst we don't need to or can't do it ourselves. Cars and vans that power us rather than us using them, might also additionally provide transformative protection possibilities at their maturity. At this time, even the best stage of riding automation to be had to purchasers calls for the overall engagement and undivided interest of drivers. There is large funding into secure testing, improvement and validation of computerized riding systems. These car era improvements additionally have the ability to enhance equity, air pollution, accessibility and visitors congestion.

2. Sensor Network

Sensors play the vital role in the field of automated vehicle for the detection of objects near the vehicle for smooth

running. A sensor is a tool that detects and responds to a few forms of enter from the bodily environment. Sensors can monitor various aspects of a car, such as its temperature, coolant system, engine, oil pressure, emission levels, vehicle speed, etc. Input can be light, heat, motion, moisture, pressure, or any number of other environmental phenomena. Here ultrasonic sensors, vibration sensor, speed sensor is placed for accurate detection to maintain the system safe and normal. Every sensor node is ready with a transducer, microcomputer, transceiver, and energy source. Wireless sensor networks (WSN) are gaining the floor in all sectors of life; from houses to factories, from visitors manage to environmental and habitat monitoring. Monitoring appears to be the important thing word. Wireless structures can take manage actions, too and on this manner, they compete e.g. with present system automation structures or with traditional domestic automation.

3. Internet Of Things (IoT)

The IoT can be any device with any shape of built-in-sensors with the ability to gather and transfer records over a network without manual intervention. The embedded era withinside the object allows them to engage with internal states and the out of doors environment, which in turn allows in choices making process. In a nutshell, IoT is a concept that connects all the devices to the internet and permit them to speak with each exclusive over the internet. IoT is a huge network of associated devices – all of which gather and share data about how they are used and the environments in which they are operated.

IOT (Internet of Things) is an advanced automation and analytics device which exploits networking, sensing, big facts, and artificial intelligence generation to deliver complete systems for a product or service. These systems allow greater transparency, control, and usual overall performance whilst performed to any organisation or gadget. e Internet of things (IoT) describes bodily objects (or businesses of such objects) with sensors, processing ability, software program and different technology that join and trade information with different gadgets and structures over the Internet or different communications networks.

## III. PROPOSED METHODOLOGY

The PIC controller with a battery relates to ultrasonic sensors, vibration sensor to sense the environment for smooth running of the vehicle. The speed level and vibration of the car are displayed through the LCD and these parameters are displayed through cloud by using IOT.

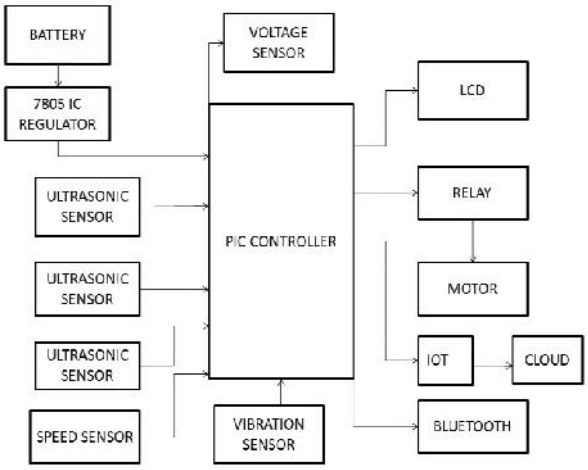


**Figure 1. Block Diagram**

## IV. SYSTEM DESIGN

This project is the development of an automatic vehicle using a combination of three ultrasonic sensors, a speed sensor, vibration sensor, voltage sensor, LCD, IOT, relay, motor, and Bluetooth module. The sensors will detect the distance and speed of the vehicle and will be used to control its direction and speed. The vibration sensor and voltage sensor will be used to ensure that the vehicle is running smoothly and to detect any malfunctions. The LCD will be used to display the vehicle's current speed and direction. The IOT, relay, and motor will be used to control the vehicle's movements. Finally, the Bluetooth module will allow the vehicle to be controlled by remotely. This project has the potential to enable the development of selfdriving cars in the future.

## V. EXPERIMENTAL SETUP

The battery produces 12 V/ 5 V power supply to the regulator that ensures a constant voltage supply through all operational conditions. It regulates voltage during power fluctuations and variations in loads. Then the constant voltage is passed to the PIC microcontroller which is the main brain of the system which is responsible for both computing and communication tasks. It regulates voltage during power fluctuations and variations in loads.

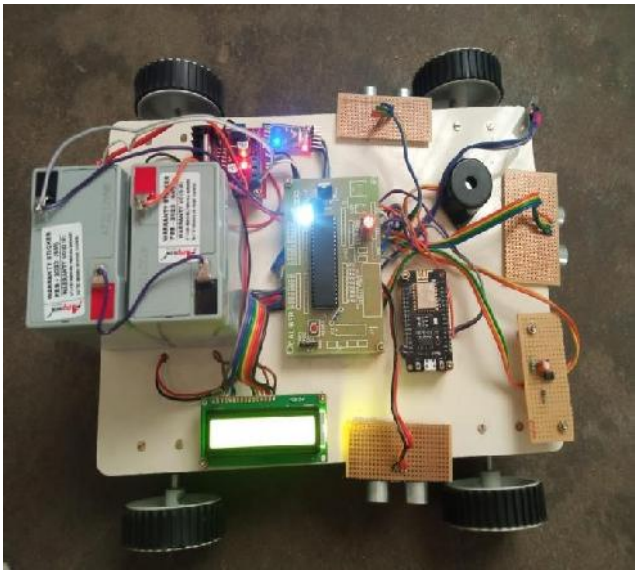

**Figure 2. Snapshot Of Proposed Hardware Kit**

Then the constant voltage is passed to the PIC microcontroller which is the main brain of the system which is responsible for both computing and communication tasks. All sensors, regulator, relay, motor, bluetooth, LCD, are connected to the microcontroller. Three ultrasonic sensors are placed in forward, right, and left direction. These sensors work by sending out high frequency sound waves to calculate the distance between the objects in close range and the vehicle. The sensor consists of advanced driver assistance systems (ADAS) that guide drivers while parking and detecting spots.
In this sensor, the transmitter uses piezoelectric crystals to generate sound travelling to the target that is then received by the receiver. It assists the user to determine the distance between the target and the sensor. Speed sensor senses the speed level of the car. The vibration sensor senses the vibration level of the car to avoid any crashes or damages. Voltage sensor senses the voltage level and maintains them. All these information's are controlled by the PIC microcontroller and inside the microcontroller some coding is written for display and for the commands given by the user in remote by using Bluetooth module. From the controller, a relay is connected with the motor to automate the power to switch electrical circuits on and off at specific times. The current status of car like speed of the vehicle and vibration level are viewed by the user at remote location through cloud by using IOT technology. To change the direction of the vehicle, the passenger can give commands to move forward, reverse, towards right and left by connecting Bluetooth module.

| S.NO | PARAMETERS | EXISTING SYSTEM | PROPOSED SYSTEM |
|---|---|---|---|
| 1. | EFFICIENCY | 85% | 90 |
| 2. | POWER SUPPLY NEEDED | 24 V | 12 V / 5 V |
| 3. | COST | HIGH | LOW |
| 4. | CONTROLLER | ARDUINO | PIC |

**Table. 1 Comparison of proposed system with existing system.**

## VI. RESULT AND DISCUSSION

As a result, vibration of car, humidity, Speed level of the vehicle are displayed through the LCD which can be viewed through other interfaced device with the help of IOT system in remote location.


**Figure 3. speed level**

The information's like speed of the vehicle and vibration of the car are seen by means of passing this information to cloud. By installing "Thing Speak" application in any android phone and login with the mail id of suganyaksusi@gmail.com with the password of Project@1. The information which is passed through the cloud can be viewed through the above login in any remote location as in Fig.3 and Fig.4.

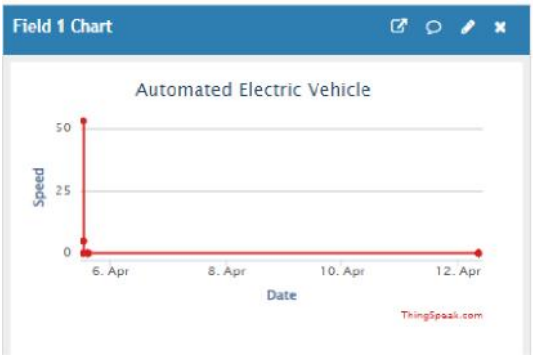


**Figure 4. speed level chart through IOT**

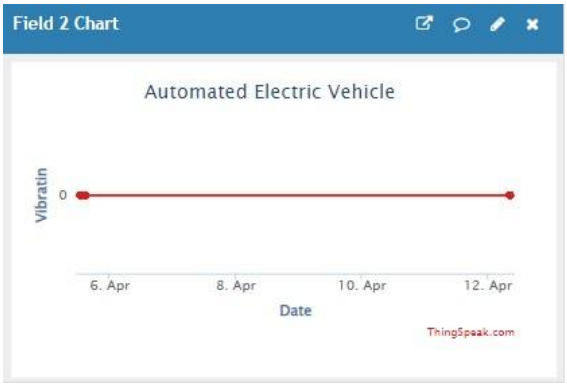


**Figure 5. vibration level chart through IOT**

Now if the passenger loves to extrude the course of the automobile way set up a Bluetooth terminal software and switch on the Bluetooth and pair with the Bluetooth located in the car. After connecting the Bluetooth device, the passenger can give the following commands given in Table.2

| Directions | Commands |
|---|---|
| Forward | #1 |
| Reverse | #2 |
| Right | #3 |
| Left | #4 |
| Stop | #5 |

**Table.2 Bluetooth commands**

When the vibration level of the vehicle increases, the vibration sensor senses that maintains them in constant level. But when the vibration level exceeds than the normal state, the car stops and displays through the LCD as Fig

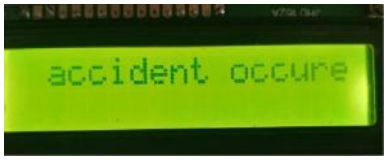


**Figure 6. when vibration level increases**

The most important benefit right here is multiple sensors set up within the automobile senses the surroundings and the automobile movement stops while any disturbances or items discovered to keep away from crashes and accidents.

| S.NO | PARAMETERS | EXISTING SYSTEM | PROPOSED SYSTEM |
|---|---|---|---|
| 1. | EFFICIENCY | 85% | 90 |
| 2. | POWER SUPPLY NEEDED | 24 V | 12 V / 5 V |
| 3. | COST | HIGH | LOW |
| 4. | CONTROLLER | ARDUINO | PIC |

**Table. 3 Comparison of proposed system with existing system.**

## VII. FUTURE SCOPE

The future scope of automated electric vehicles based on wireless communication is very promising. Soon, wireless communication could make it possible for automated electric vehicles to interact with each other and with the environment, allowing for improved safety and efficiency. Automated electric vehicles could be used in a variety of applications, from transportation to delivery services. Additionally, wireless communication could be used to enable autonomous driving capabilities, allowing vehicles to drive themselves based on predetermined routes and locations. Furthermore, wireless communication could provide access to real-time traffic information, allowing for better route planning, and could also be used for vehicle diagnostics, allowing for more efficient maintenance and repair. In the longer term, wireless communication could be used to enable vehicles to communicate with other vehicles and with the surrounding infrastructure, creating a “smart” transportation network. This could lead to more efficient and reliable transportation services, and could also enable innovative new applications, such as carpooling and ridesharing.

## VIII. CONCLUSION

The automated electric vehicle based on wireless communication is an incredibly advanced and revolutionary technology that has the potential to revolutionize the transportation industry. It is a clean, efficient, and costeffective mode of transportation that can be used to reduce traffic congestion and environmental pollution, while providing an alternative to traditional combustion-based vehicles. This technology has the potential to revolutionize the way people move from place to place, and it is likely to have a huge impact on the way we live in the future.

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