WIRELESS COMMUNICATION BASED A SMART V2V COMMUNICATION SYSTEM INTEGRATING RADAR TECHNOLOGY WITH MACHINE LEARNING FOR ACCIDENT DETECTION.

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ABSTRACT

Radar technology and machine learning algorithms. The goal is to create an intelligent communication system and reduce traffic congestion by analyzing the situation in real time. Use machine learning algorithms for data analysis and decision making to improve the intelligence of the system. High-resolution sensors provide a detailed 3D image of the vehicle's surroundings, while radar helps search and track, especially in bad weather conditions. Data from radar sensors is continuously processed, allowing the system to predict and identify high-risk situations. V2V communication allows vehicles to exchange important information about their positions, angles, and paths. The goal is to prevent collisions by integrating radar and machine learning into V2V communication, thus ensuring overall safety on the road and reducing the burden of collisions. The system includes monitoring the vehicle's battery to ensure continuous operation and providing quality monitoring data that can be accessed online via the IoT website. The collision detection capabilities of the V2V system are enhanced by combining network cameras for real-time video capture and ADXL sensors to monitor the vehicle's X, Y, and Z-axis acceleration. The network camera provides rear-view capability, while the tilt sensor quickly detects changes, allowing data to be recorded and stored in a database when an incident occurs.

Keywords: V2V communication, ADXL sensor, machine learning, real-time video, IoT platform**.**

I INTRODUCTION

Intelligent vehicle-to-vehicle (V2V) communication technology combines radar technology with machine learning to help prevent collisions and meet the need for safety measures in emergency situations. The future of the program is to use new radar technology and machine learning algorithms for intelligent communication between vehicles to prevent and reduce accidents. Radar sensors provide a good and accurate understanding of the vehicle's environment, real-time information in all directions, object detection and tracking. The combination of these methods provides the basis for a higher level of understanding that allows for the analysis of complex situations. V2V communication technology can improve the vehicle's performance by exchanging important information such as location and speed. Integration of technology and machine learning to create smart transportation that ensures safety, efficiency, and reduces the impact of accidents.

II OBJECTIVE

The main purpose of the program is to use tools such as radar technology to detect possible collisions between vehicles. Function. Conditions to optimize vehicle performance and reliability.

III LITERATURE SURVEY

The integration of machine learning into V2V communication is receiving more and more attention. Machine learning has been applied to many aspects of V2V communication, demonstrating its ability to solve complex problems. As mentioned in the abstract, the use of

backpropagation neural networks (BPNN) for task classification in V2V communication is equivalent to the use of neural networks in communication. Multipath component (MPC) tracking in V2V communication channels has also become an important research area. Among them, many machine learning methods have been used in large-scale research to improve MPC. [3] This research helps improve the reliability and robustness of V2V communications by providing insights into the benefits of multiple exposures. Li-Fi (Light Fidelity) technology has become a major contender in this field. Li-Fi provides high data and bandwidth efficiency by using optical signals to provide fast, reliable data transmission. The new line is welcomed as it can meet the transportation needs of smart cities. [4] These conditions not only cause great human suffering, but also cause great economic, financial and medical costs to the international community. Car accidents have a negative impact on young people ages 15-29, and the impact is huge. Machine learning algorithms analyze historical traffic data to identify patterns and trends in accidents. Through careful analysis of traffic, transportation, weather, and other conditions [5]

IV EXISTING & PROPOSED SYSTEM

1. EXISTING SYSTEM

- The integration of various technologies, including connected vehicles, telecommunications networks and modern devices, can increase the complexity of the entire process.
- Ensuring the reliability of this complex network is difficult because there is no communication or hardware that can affect the security of the network.
- Reliance on information and communication technology increases vulnerability to cybersecurity threats.
- Since CAVs are communication-based, there is a high risk of cyberattacks that can control or disrupt the traffic sector, leading to security concerns.

1.1 DISADVANTAGES

- Traffic and rail traffic are major economic problems in many major cities. These problems can be solved by supporting real driving and connected vehicles.

2. PROPOSED SYSTEM

- In the example shown here, using v2v communication in an emergency means that a vehicle wants to communicate with another vehicle using IoT technology.
- Information about this can be stored in the cloud, if there is any doubt, this means that the message should be sent with the API key and the notification will be accepted from another vehicle. The product can find the car remotely and quickly.
- A connectivity platform that provides an online website to monitor the vehicle's battery power, facilitate remote access and provide real-time notifications for maintenance and improvement of battery health.
- Get instant experience. ADXL sensors can also monitor changes in vehicle speed such as collisions, which is important in detecting accidents.

2.1 ADVANTAGES

- v2v communication enables instant communication between vehicles, enabling rapid response in the event of an emergency.

V BLOCK DIAGRAM

1.TRANSMITTER BLOCK DIAGRAM

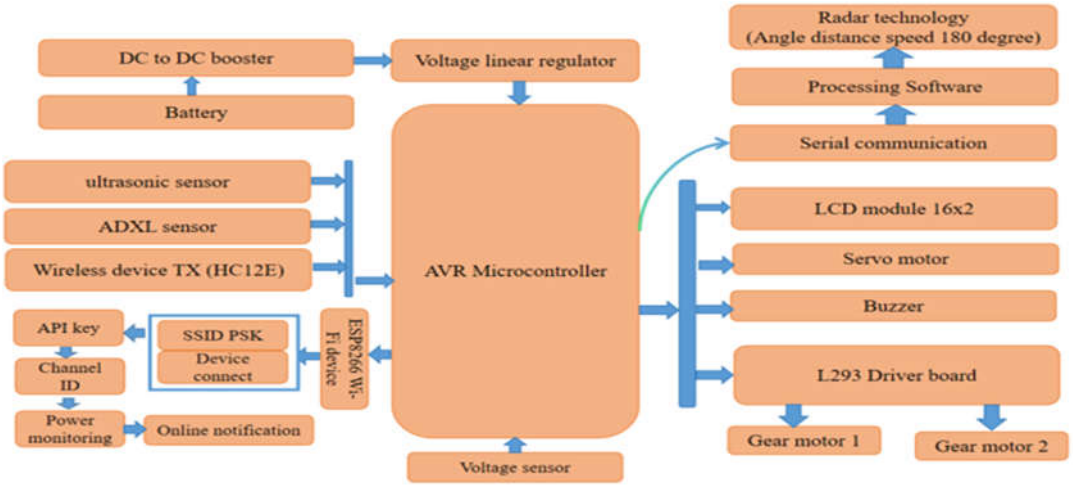

Fig No:1 Transmitter Block Diagram

2.RECEIVER BLOCK DIAGRAM

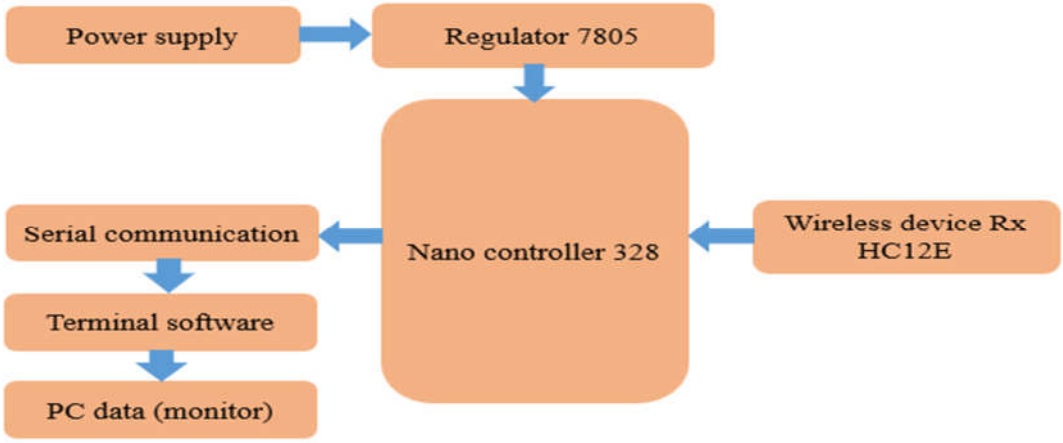

Fig No:2 Receiver Block Diagram

VI HARDWARE REQUIREMENTS

1. TTP223 Touch sensor

The radio frequency is 433.4~473.0MHz, and the audio can be switched to all 100 channels in 400kHz steps. The maximum transmitting power of the module is 100mW (20dBm), the baud rate is 5000bps, the output receiving accuracy is -116dBm, and the communication distance is about 500 meters. The module adopts stamping hollow packaging method and can be welded. The module size is 27.4mm*13.2mm*4mm (including the antenna base without the antenna spring installed), which is easy for users to install in the product.

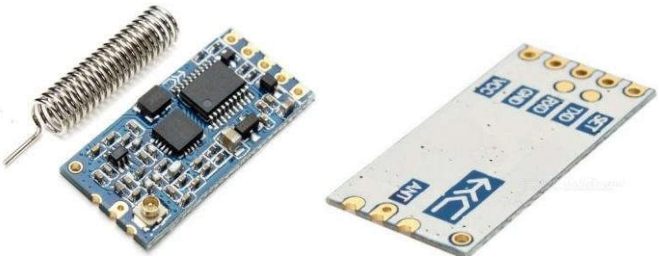

Fig no:3 HC-12 Transmitter and receiver module

2. ADXL345 SENSOR

Accelerometers and gyroscopes are commonly used to measure velocity. Accelerometers measure acceleration, while gyroscopes help determine rotational speed. Gyroscopes are used to measure angular velocity, which uses the Earth's gravity to determine the direction an object is moving. Sensors like the MPU6050 have an accelerometer, a gyroscope, and an inertial measurement unit (IMU) to determine position, location, and velocity. Here we're talking about the ADXL345 accelerometer, which measures acceleration or change in velocity in the x, y, and z axes. These children are used to understanding the situations where phones are made in cars and bikes, and the measurements and patches for the phone can be used for many things such as replacement location.

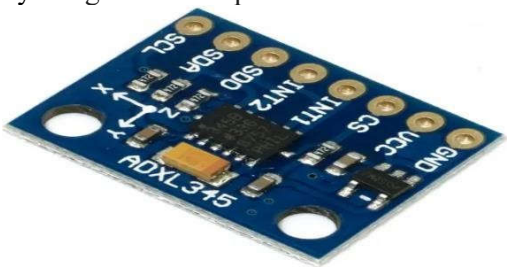

Fig no: 4 ADXL345 sensor

3. DC-DC Booster

The boost converter is the simplest of the many converters. As the name suggests it takes power and steps it up or down. It consists of an inductor, a switching semiconductor (now a MOSFET as you can buy good switches these days), a diode and a capacitor. This can be a simple 555 timer or a dedicated SMPS IC like the famous MC34063A IC. This happens thousands of times per second (depending on the frequency of the oscillator) so energy builds up with each cycle so you get a nice and useful result like 10 joules divided into two parts which equals 10 watts. Of course it helps but not as much as we think! If we increase the inductance, the maximum current is reached during the time when the current increase decreases or reaches (remember the equation V / L = dI / dt), so the entire output voltage increases. It will not increase! and the peak current balance.

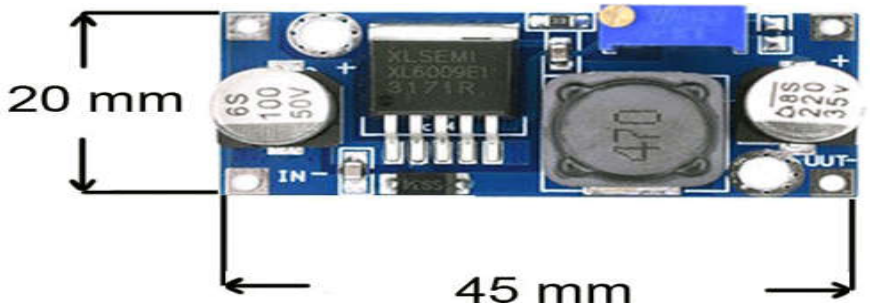

Fig No: 5 2D Models Of Booster

4. Nano Controller

The board is designed for breadboarding and the connection is very easy to use. Let's start by supporting the board. The charger or computer gets the power the board needs: the Vin pin provides a variable 6-12V voltage to the board. In addition to serving its purpose, they can also be used for special purposes as described below: Serial Pins 0 (Rx) and 1 (Tx): The Rx and Tx pins are used to send and receive TTL data. They are responsible for connecting the USB and TTL serial port chips. External Interrupt Pins 2 and 3: These pins can be configured to trigger an interrupt on a low value, rising or falling edge, or to change value. The board is designed for breadboarding and the connection is very easy to use. Let's start by supporting the board. The charger or computer gets the power needed to power the board.

VII RESULT

The project used intelligent vehicle-to-vehicle (V2V) communication with radar and ADXL sensors. The system increases road safety by detecting potential collisions in real time. Radar technology reduces the risk of accidents by providing accurate information about the environment. Network cameras help create a visual environment with situational awareness, while ADXL sensors monitor vehicle vulnerability and record critical events. These general rules aim to prevent accidents and reduce serious accidents.

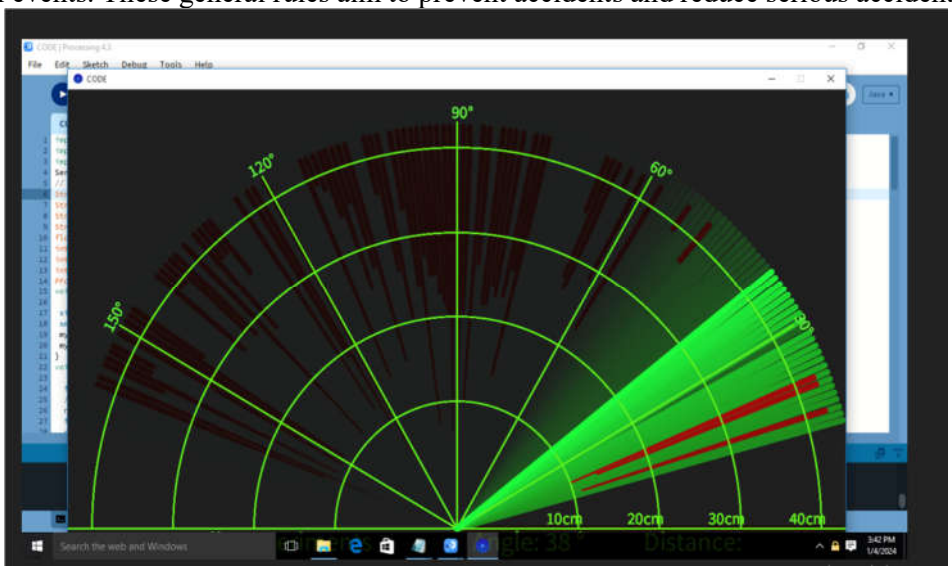

Fig no: 6 Radar signal

VIII CONCLUSION

The integration of radar technology with machine learning to increase visibility is an important step in the development of road safety. The combination of advanced technologies, including radar, creates a sense that allows the car to recognize its surroundings. The system is also supported by machine learning algorithms that allow it to analyze data sets and identify patterns associated with the risk of injury. The creation of a vehicle-to-vehicle communication network improves the operation of the system and supports the exchange of information and collisions between vehicles on the road. This work demonstrates its passion for accident prevention by focusing on the detection of potential threats and automatic responses such as self-control and evacuation. Together, these advances point to a future where cars can communicate effectively, anticipate hazards, and work together to avoid collisions while you pull the steering wheel. Stupidity is the key to redefining automotive safety standards.

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