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VEHICLE TO VEHICLE COMMUNICATION USING NODEMCU(ESP8266) VIA CLOUD

Prof. Suma M R[1], Ashutosh Raj[2], Shashwat Nath Verma[3], Utkarsh Nigam[4] ,Siddharth Pallav [5]

[2,3,4,5]*Students, Department of Electronics and Communication Engineering, Dayananda Sagar College of Engineering, Bengaluru, Karnataka, India*

[1]*Assistant Professor, Department of Electronics and Communication Engineering, Dayananda Sagar College of Engineering, Bengaluru, Karnataka, India*

Abstract - *The vehicular internet in today's world is totally prepared to drive future vehicular innovation and* ***Intelligent transportation systems(ITS)****. Whether it is street security, infotainment, or driverless cars, the vehicular internet is getting to lay the establishment for long-term of road travel. Governments and companies are seeking after driverless vehicles as they are considered to be more dependable than people and, so more secure. The vehicles nowadays are not fair a implies of transportation but moreover prepared with a wide run of sensors that give important information . By making the correct utilize of these information , numerous mishaps can be anticipated and prevented. On the off chance that vehicles are empowered to share information that they collect with other vehicles or specialists for decision-making and more secure driving, they in this manner shape a* ***vehicular networks****. Utilizing these networks , we are able identify the location , speed and other imperative data of the adjacent vehicles and may dodge making final minute choices .*

INTRODUCTION

Approximately 1.3 million people die every year due to road accidents, which comprises 10 percent of the cause of death on earth. In countries like India, China, USA, many developed nations and many developing nations where a large part of the population live in cities and use their own private vehicle to go to work ,it creates a crowd on the road and it becomes difficult in these countries to manage traffic. Integration of smart devices in vehicles can help in managing traffic and reducing on road accidents, which can save the precious life of human beings.

In the following project we are using ESP8266 via AWS cloud for Vehicle to Vehicle Communication.

Transport system which we are proposing will use the data from vehicle-to-vehicle communication to improve traffic management by allowing vehicles to also communicate with roadside units such as traffic lights which will be having devices for establishing connection with the cloud. The technology could become mandatory in the not-too-distant future and help put autonomous cars on highways across globe. Here we are using ESP8266 which is a cost effective device and with the help of integrated wifi module can provide uninterrupted connection with the internet.

ESP8266- is a highly-integrated solution for Wi-Fi-and-Bluetooth IoT applications, with around 20 external components.ESP8266 employments CMOS for single-chip fully-integrated radio and baseband, whereas too coordination progressed calibration circuitries that permit the arrangement to expel outside circuit flaws or alter to changes in outside conditions. In arrange to operate securely, a on board framework needs security and communications foundation to empower and guarantee the dependability of communication between vehicles. The source of each message needs to be reliable and message content needs to be protected from outside interference. In arrange to form the specified environment of believe, an onboard framework must incorporate security framework to credential each message, as well as a communications arrange to urge security accreditations and related data from vehicles to the substances giving framework security. Here we are using AWS cloud infrastructure to establish secure communication between vehicle, if we build our system from scratch for all the equipment and safety infrastructure will cost too much. Using the available technology of AWS we will establish secure communication. In the near future if large no vehicle gets integrated then we can reduce our dependency on AWS and with the help of private entities we can develop our own storage and communication system.

METHODOLOGY

We are basically providing a safe and secure drive to everyone with the help of our project. So now we will tell you, How we are doing so.

- We had made a connection of the ESP-8266 with suitable wifi. To get required connectivity for our ESP-8266. By which it can perform it"s necessary task.

- Proximity sensors detect an object without touching it, and they therefore do not cause abrasion or damage to the object. In our model the proximity sensor also detects the presence of nearby objects, And for this it does not require any physical contact.

- The further obstacle information will be sent to the AWS EC2 by our proximity sensor. For this process we have used the MQTT protocol which is an OASIS standard messaging protocol for the Internet of things. We did our coding for obstacle detection by the proximity sensor in the Arduino IDE.

- If the two vehicles are nearby, The message will be sent to the interface "Warning! Vehicle Nearby" and if there is safere distance then "Safe Distance" will be delivered. This thing is done with the help of SSH protocol.

SCOPE

We are making driving secure. In today's time expending world it is exceptionally much required. Individuals are not prepared to hold up, Which maybe can be unsafe whereas driving.

- Drivers can get the traffic reports from the vehicular cloud AWS EC2. In which occasion is made for each person vehicle.

- We are able share road condition such as overwhelmed street within the vehicular cloud.

- In certain driving conditions such as haze, serious storms, snow and etc. drivers can utilize this benefit in the event that they need to be cautioned about potential accidental causes.

- Applications related to basic scenarios in life like collision evasion require strong security assurance.

- Vehicles utilizing vehicular cloud systems will be able to reserve parking slots.

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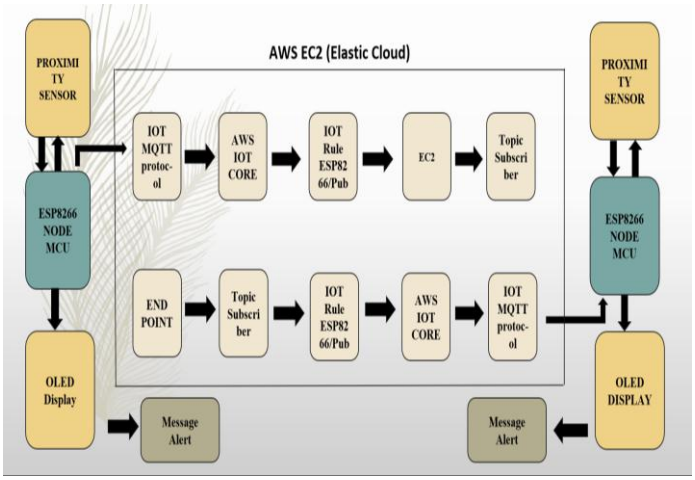

Fig -1: Detailed Block Diagram of the Project

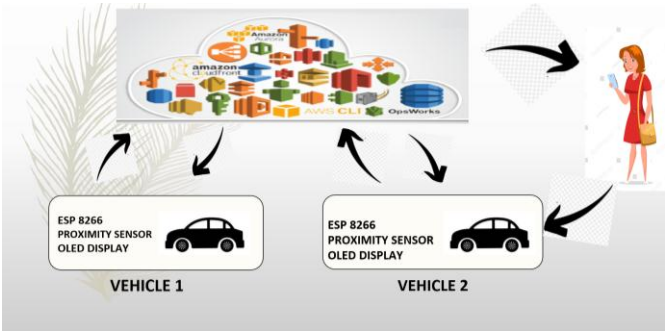

Fig -2: Overview Block Diagram of the Project

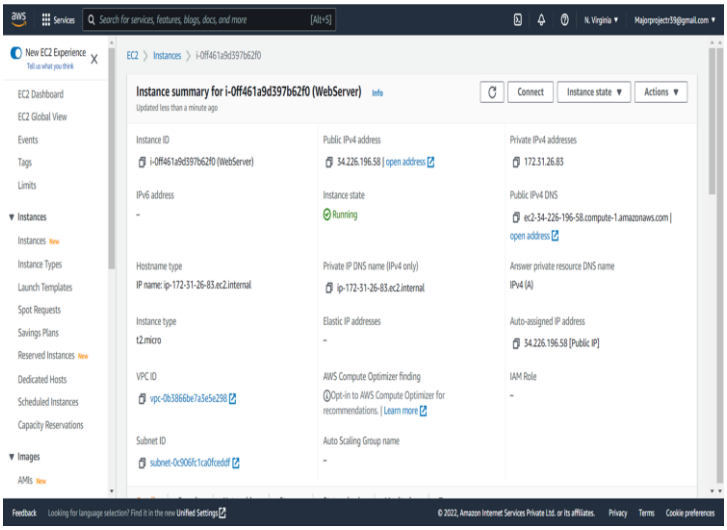

Fig: Instance of single vehicle in AWS cloud

TOOLS USED

HARDWARE COMPONENTS

ESP8266 Node MCU : The Node MCU is a well known development board based on the ESP8266. It highlights not as it were the ESP12 Module, which contains the ESP8266. But it too comes with a USB connector and breadboard-friendly pins, to create it easy for you to test and create projects for the ESP8266. Node MCU is a low-cost open source IoT stage. It at first included firmware which runs on the ESP82 . The ESP8266 Wi-Fi Module could be a self contained SOC with coordinates TCP/IP convention stack that can grant any microcontroller get to to your Wi-Fi organize. The ESP8266 is competent of either facilitating an application or offloading all Wi-Fi organizing capacities from another application processor.

Proximity Sensor : A proximity sensor is a non-contact sensor that identifies the nearness of an protest (frequently alluded to as the "target") when the target enters the sensor's field. Proximity sensors are utilized in phones, recycling plants, self-driving cars, anti-aircraft frameworks, and get together lines. There are numerous sorts of proximity sensors, and they each sense targets in particular ways.

OLED Display : 0.96 inch OLED module for showing graphical and literary data specifically on your micro-controller Bolster voltage: 3.3V-5V DC; Power consumption: 0.04W amid typical operation, full screen lit 0.08W, no embedded fonts inside the OLED controller, client can make the fonts through the text style era software .

SOFTWARE DESCRIPTION

Arduino IDE : The Arduino Integrated Development Environment could be a cross-platform application that's composed in capacities from C and C++. It is utilized to type in and upload programs to Arduino consistent sheets, but moreover, with the assistance of third-party cores, other seller development boards.

Amazon EC2 : Amazon Elastic Compute cloud (Amazon EC2) provides scalable computing capacity in the Amazon Web Services (AWS) Cloud. Using Amazon EC2 eliminates your need to invest in hardware up front, so you can develop and deploy applications faster.

MQTT Protocol :

MQTT may be a lightweight, publish-subscribe network protocol that transports messages between devices. The protocol ordinarily runs over TCP/IP, in any case, any arrange protocol that gives requested, lossless, bi-directional associations can bolster MQTT.

MQTT stands for Message Lining Telemetry Transport. It could be a machine to machine web of things network convention. It provides quicker data transmission, like how WhatsApp/messenger gives a faster delivery.

It is a real-time informing protocol. It could be a publish and subscribe framework where we are able to publish and receive the messages as a client. It makes it simple for communication between different devices.

It could be a straightforward informing protocol outlined for the obliged devices and with low transfer speed, so it's a idealize arrangement for the internet of things.

BitWise SSH:

Bitvise is a proprietary secure remote access software developed for Windows and available as a client and server.

Bitvise SSH client supports all desktop and server versions of Windows, 32-bit and 64-bit, from Windows XP SP3 and Windows Server 2003, up to the most recent – Windows 11 and Windows Server 2022.

SSH(Secure Shell) is access credential that is used in the SSH Protocol. In other words, it is a cryptographic network protocol that is used for transferring encrypted data over network . It allows you to connect to a server, or multiple servers, without having you to remember or enter your password for each system that is to login remotely from one system into another.

Bitvise SSH Server is ideal for remote administration of Windows servers; for secure file transfer by organizations using SFTP and SCP; for advanced users who wish to access their home machine from work, or their work machine from home; and for a wide spectrum of advanced tasks, such as securing other applications using SSH TCP/IP tunneling.

BENEFITS OF THE PROJECT

➢***Vehicle maintenance****:* Vehicles can get their software updates from the cloud whenever the developer releases a new version.

➢***Traffic management****:* Drivers can get the traffic reports from the vehicular cloud.

➢***Sharing road condition***: You can share road condition such as floods, rough roads in the vehicular cloud.

➢***Accident warnings at intersections****:* In certain driving conditions such as fog, severe storms, snow and etc. drivers can use this service if they want to be alerted about potential accidents.

➢***Intelligent parking management:*** Vehicles using vehicular cloud networks will be able to reserve parking slots.

CONCLUSION

We endeavored to create a Portal utilizing ESP8266 that can be utilized with Electric Vehicles in Industry 4.0 This portal would work as communication gadget between the point of collecting the information and sending the information.

The role of gateway in Industry 4.0 is to gather the information from source to a gadget which can handle it and after that transmit it to goal. Communication has advertised numerous unused openings for the automotive industry. This venture proposes a innovation to move forward traffic clog and road security. Moreover we have analyzed circumstances like collision, delay and repetition etc. which can be progressed or overcome with straightforward caution message transmission.

Proximity sensor is utilized so that V2V framework processor can recognize the remove of the other vehicle. More sensors can be included for superior working and accuracy. Future cars will be more shrewdly which can make its claim choice for the security reason. Quick offer assistance will be given by knowing the location in the event that the advance system.

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