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Analysis of Real -Time Operating System for Autonomous Vehicles

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ABSTRACT: *Autonomous vehicle technology is improving rapidly. Currently, autonomous vehicle technology is starting to be commercialized. Until now, many companies have put a lot of effort into developing technologies related to autonomous vehicles. The commercialization of selfdriving cars is accelerating. This project look into the technological trends of autonomous vehicle operating systems. We look at the development trend of Real-Time Operating System (RTOS) technology, which is a core technology in autonomous vehicles at the time of entering the commercialization stage. Automotive embedded systems have become very complex, are strongly integrated, and the safety-criticality and real- time constraints of these systems raise new challenges. Distributed system development, short time-to-market intervals, and automotive safety standards require efficient and consistent product development along the entire development lifecycle. The automotive OSEK/VDX standard provides architecture for distributed real-time units in vehicles and a language aiming in specifying the configuration of real-time OSEK operating systems. The aim of this project is to enhance a model-driven system-engineering framework with the capability of generating OS configurations from existing high level control system information.*

Keywords: *ADAS,RTOS,ICV,ITC,IOT.*

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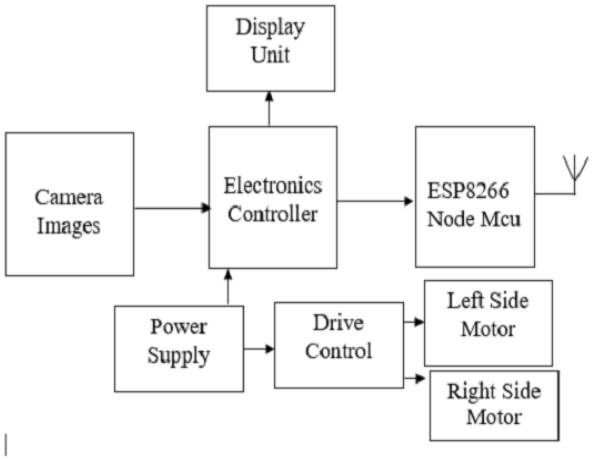
I. INTRODUCTION:

The designed method allows for vehicle-to-vehicle communication by developing sensors on the vehicle for smart interaction. The automobile industry is the primary application space where IoT may be used to make vehicles intelligent. Our primary emphasis for automotive safety. As a result, they are developing the following main challenges using microcontrollers and IoT. 1.Automatic lighting feature 2. Adaptive FrontLighting SysteM 3. The rain-light sensor 4. Smoke and alcohol detector 5. Nearby sensor for detecting black spots 6. Automatic upper dipper light control. This auto gearbox system is being used in both authentic and low-cost sedans. With IoT technology, this system automates the maintenance of real autos. Along with the rapid growth in urban population density, the demand for more offices and assets is increasing step by step. To address city development difficulties, the usage of Web of Things (IoT) devices and smart frameworks is a quick and profitable source. The interconnection and communication of millions of IoT devices across the internet results in the generation of a massive amount of data known as Large Information [1]. This study offers a computer vision-based system drowsiness system for motorized vehicles that uses Web Push Notifications to alert the driver before an accident happens. A real-time camera system captures the driver's face, and a pre-trained machine learning algorithm recognizes the driver's eye borders from that real-time video stream [2]. The suggested approach proposes a framework capable of continually transmitting the vehicle count and generating an alarm in the event of a big vehicle gathering to the controlling station in Chandigarh or similar major Indian towns. Image processing techniques can be used to predict the number of vehicles traveling through a site far before the required traffic junction [3]. Our proposed system makes use of an Arduino microcontroller, as well as a MQ-3 sensor, an infrared sensor, an accelerometer, and a webcam. To control all of these sensors, Arduino is used [4]. In this research, we propose a unique IoT access architecture based on field programmable gate array (FPGA) and system on chip (SoC) that may provide unified access to the IoT for a wide range of low- and high-speed devices, as well as associated extendibility and configurability [5]. The project use the Node MCU ESP 8266 12 E as both the controller and the wireless communication module. Various sensors, including as MQ6, MQ 135, DHT 11, and others, have been utilized to monitor the environment around the house [6]. The Internet of Things project focuses on developing a smart wireless home automation system that can be controlled remotely by the user via the Internet. Furthermore, trespassers can be detected using a system of sensors. This method outperforms similar current systems in that the status sent to the connected microcontroller managed system can be notified to the specific user on his phone from any remote place, regardless of whether his phone is connected to the internet or not [7]. This study proposes a smart energy efficient home automation

system that can access and control home equipment from anywhere in the world [8].

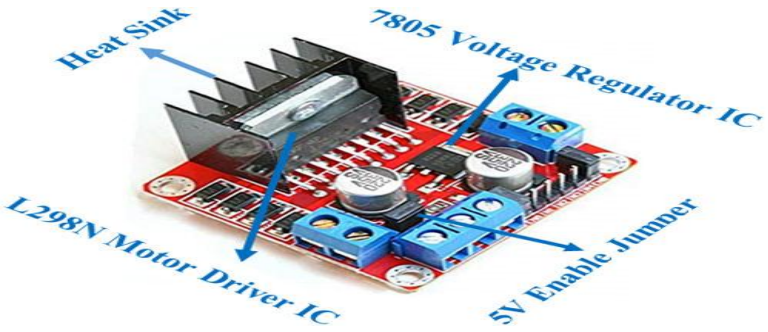
II. CAR DRIVING SYSTEM

On the surface, electric vehicles appear to be quite easy. Each has a location to store power, which is usually in the form of a battery, and a device to provide drive to the wheels, which is usually in the form of an electric motor. Electricity is either drawn from the grid or generated on-board, such as via a gasoline engine. A front-wheel-drive vehicle will have a motor in the front, whereas a rear-wheel-drive vehicle will have the motor in the rear. The presence of two motors, one at each axle, effectively transforms the vehicle into an all-wheel drive vehicle. In the future, certain vehicles with exceptional performance will even have a motor dedicated to each wheel.



- **L298 CONTROLLER:**

This L298N Motor Driver Module is a high-power motor driver module that can power both DC and stepper motors. An L298 motor driver IC and a 78M05 5V regulator are used in this module. The L298N Module is capable of controlling up to four DC motors or two DC motors with directional and speed control.



- **Principle of IoT Devices:**

The Internet of Things refers to the collective network of linked devices as well as the technology that enables communication between devices and the cloud as well as amongst devices.

- **IOT Devices IN Arduino:**

They could also be sensors that gather and store data from the environment digitally. With its extensive accessory set, Arduino can connect to such networks, access or contribute to data, and control the aforementioned devices and sensors. As a result, Arduino is essential in any IOT network.

III. GOOGLE ASSISTANT CONNECTIVITY WITH NODEMCU

- **Google Assistant Through IFTTT:**

Many of the smart elements in your house can be controlled by your Google Assistant. Using IFTTT, you may extend the reach and capabilities of your voice assistant. Use it to sync your to-do lists across services or to keep your calendars constant throughout the week.

- **Setting Up Adafruit IO:**

Since you are making an Adafruit account for the first time, you can click the "Sign up" button underneath "Need an Adafruit account?" This will take you to the sign up page. The only information required to set up an

Adafruit account is your first and last name, email address, username, and password. **CONCLUSION**
This experiment exhibits the effectiveness of neural networking in the operation of an autonomous vehicle. On this stage, a street sign acknowledgment calculation was performed with promising results. When compared to the current framework, the framework execution is greatly improved. The framework can effectively identify all indications in test images, with only a few extreme positive outcomes. The proposed framework can efficiently break down the sign in both daylight and night illuminations. Make a quick move indicated by the sign. The car can then avoid collisions with the help of sensors. This system is being improved by enhancing the computation by having a calculator figure out how to accomplish it. To control the system, an IoT-based Google Assistant system is enabled. The RTOS manages data traffic. The current calculation completes the jobs on all of the edges. It is accurate, but its proficiency could be improved if it began learning on its own and avoided useless miniatures of regions that are already known or commonplace. Once the car is on the road, it decides on the obstacles (mainly static) along the way and notes their distinguishing features.

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