SMART AUTONOMOUS VEHICLE CONTROL USING IOT FOR DYNAMIC NAVIGATION

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ABSTRACT:
This piece tells you everything you need to know about a prototype of a system for self-driving cars. Driving a car that is tied to the internet is now safer than it used to be. Lane detection, object detection, and traffic light detection are the three types of detection. It is the most important part of the project. A reduction in the number of deaths and injuries is one of the main goals of the plan. The four most important parts are a Raspberry Pi, a Picamera, an Internet modem, and a web server.These are the computer vision tools that make it easier to use.Keep making improvements to the Raspberry Pi. Videos were put on the internet so that anyone could watch them. The idea is very useful and saves money at the same time.

Keywords: Raspberry Pi, Camera, Internet of Things, Open CV, Computer Vision, IR Sensor.

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1.INTRODUCTION

Life is becoming increasingly industrialized as a result of the advancement of technology. Cars that operate autonomously are the most recent advancement in society. Each individual was totally preoccupied with himself. This form of transportation is the most secure due to its highly sophisticated safety mechanisms. Currently, the most prevalent cause of motor vehicle accidents is human error. Distracted drivers may experience disequilibrium. The majority of traffic incidents are caused by drivers who are under the influence of alcohol. The vehicle was operated with the assistance of computer vision. Sensors can be employed to detect obstructions and prevent collisions. The project's primary concentration is the Internet of Things. Although the initial research on automatic vehicles was initiated in 1920, the initial test drive was not conducted until 1950. The concept for the world's first entirely autonomous vehicle was developed at Carnegie Mellon University. Upon the initial emergence of the concept, numerous organizations initiated the development and marketing of fully autonomous vehicles.

There is a growing interest in driverless automobiles among the residents of the United Kingdom, France, Italy, and Belgium. According to authorities, autonomous automobiles are currently being tested on public roadways in the Netherlands, Germany, and Spain. Stanford University scientists devised the methodology that powers Google's autonomous vehicles. Among the most renowned autonomous vehicles was developed by Google. The design process for the Google Car was primarily focused on navigation. During the autonomous vehicle's development, a variety of sensors were considered. It is anticipated that autonomous vehicles will become ubiquitous by 2020. The decision to conduct the transaction online is entirely subjective. Driving the automobile is not mandatory. This object is capable of autonomous locomotion. The information that was previously provided is intended for use exclusively in ongoing initiatives. Nevertheless, the prototype approach remains the most critical component of our endeavor. The initial figure illustrates the procedures necessary for the development of a prototype. Once a few phases have been completed, real-time work is feasible. This is a significant stride toward the development of fully autonomous vehicles. The automobile's compartment comprises six levels.

Automation is not present in Level 0. Level 3 automation is limited to the completion of the designated duties, while level 5 automation oversees

each component individually. Presently, there are no hazards associated with operating the vehicle. This particular method is expected to be highly popular in the coming years. It enhances the environment by decreasing the number of accidents. Google's automobile has arrived at the ground without incident, as it adhered to the regulations. The autonomous vehicle's camera detects obstructions that are in motion. There is a viable solution to the detection requirements through image processing.

One of the most straightforward tasks in image processing is the identification of traffic signals. The traffic light's status will be ascertained by the sensor by comparing the detected hue to a database of processed images. This prototype method enables the vehicle to independently perform all three detections after it has reached a complete halt.

Figure1.Automatic Carmodel

2. EXISTING METHOD

Automobile technology needs a lot of thought because there are so many steps involved. To find out where the car is and how fast it's going, the main idea is to get information from a lot of different places and send it to computers or phones. The arrival of the Engine Control Unit (ECU) made it easier for many car parts to work. They not only make the car run better, but they also use less fuel, which saves money.

A person can decide what to do by using information from several devices. When you combine home and car automation, you can make an ecosystem that is run by the cloud.

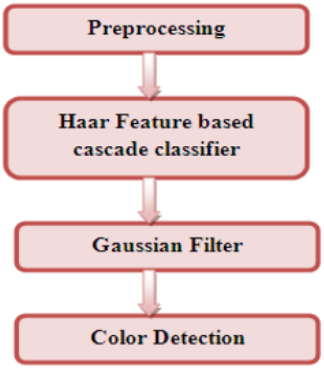

Figure 2: Process steps in Existing method

One of the main goals of current car automation systems that use the Internet of Things (IoT) is to send real-time data on different aspects of the vehicle while it is moving, as shown in Figure 2. A lot of things are constantly being watched, like the distance driven, temperature, humidity, speed, and the locking of the car.

3. PROPOSED METHOD

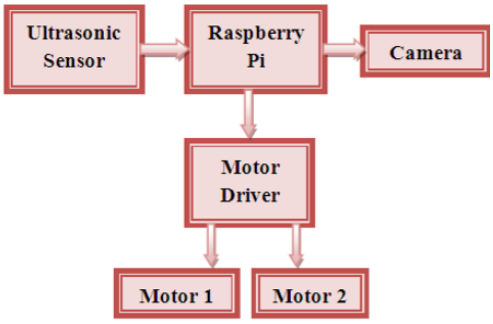

Figure 3 Block diagram of proposed model

As a solution, we propose combining fully autonomous vehicles with new computer systems that can determine which routes require constant internet access. The vehicle's interface can be controlled using a web browser. Figure 3 shows a system that includes a Raspberry Pi, camera module, driver circuit, and actuators. Video transmission over the internet is accomplished with a Raspberry Pi. With its fast CPU and serial camera interface, this single-board computer is ready to go. When filming a moving vehicle, it is standard practice to attach this gadget to the camera.

After setting up a dependable web server application like Apache on the Raspberry Pi, a programming language can be used to visit various web pages. An extra sensor, usually an ultrasonic or infrared one, has been added to the prototype because of its near proximity application. The information gathered by the wireless obstacle detector is sent to the Raspberry Pi module. The vehicle's trajectory is controlled by the Raspberry Pi, which receives, processes, and uses data. For the best wheel control, a DC motor running at 100 RPM is usually recommended.

Figure 4: Raspberry Pi module

Figure 4 depicts the model of the third-generation Raspberry Pi. A great deal of flexibility is built into the Raspberry Pi platform. Uploading digital parameters

saved on the cloud is made easier using this module. The data that has been saved can be examined and kept tabs on.

Figure 5: Automated car

4. CONCLUSION

The fast growth of urban areas is making the shortage of skilled drivers even worse. In the years to come, the self-driving cars shown in Figure 5 may cause a major shakeup in the car business. In densely populated places, internet-enabled vehicle controls provide better user connectivity and more rapid compatibility. Ensuring the security and reliability of computer-to-computer communication does, however, always come with tolerable risks.

REFERENCES

1. Levinson J, Askeland J, Becker J, Dolson J, Held D, Kammel S, Kolter J.Z, Langer.D, Pink.O, Pratt et al V., 2011 Towards fully autonomous driving: Systems and algorithms Intelligent Vehicles Symposium (IV) IEEE, pp. 163-168.
2. Gurjashan Singh Pannu,Thapar University, Patiala Mohammad Dawud Ansari Jamia Millia Islamia, New Delhi, Pritha Gupta, Netaji Subhas Institute of Technology, New Delhi March 2015 Design and Implementation of Autonomous Car using Raspberry Pi International Journal of Computer Applications (0975-8887) Volume 113 – No. 9
3. Hordur K, Heidarsson and Gaurav S, Skhatme 2011 Obstacle Detection and Avoidance for an Autonomous Surface Vehicle using a Profiling Sonar IEEE May 9-13.
4. Bhuvaneshwari C, Manjunathan A 2019 Advanced gesture recognition system using long-term recurrent convolution network Proc. ICONEEEA, pp. 1-8.
5. Johann Bornstein& Yoram Koren, 1988, “Obstacle Avoidance with Ultrasonic Sensors”, IEEE Journal on Robotics and Automation, vol. 4, no. 2, pp. 213- 218.
6. Manjunathan A, Bhuvaneshwari C 2020 Designing of smart shoe Materials Today: Proceedings 21, 500-503.
7. Yue Wanga, Eam KhwangaTeoha&DinggangShenb 2004 Lane detection and tracking using BSnake Image and Vision Computing 22.
8. Joel C. McCall & Mohan M.Trivedi 2006 Video-Based Lane Estimation and Tracking for Driver Assistance: Survey, System, and Evaluation, IEEE Transactions on Intelligent Transportation Systems vol. 7, no. 1, pp.20-37.
9. Bruce Moulton, Gauri Pradhan, Zenon Chaczko Voice Operated Guidance Systems for Vision Impaired People: Investigating a User-Centered Open Source Model”.
10. Martin P, Rouchon P, and Rudolph J 2004 Invariant tracking ESAIM: Control, Optimisation and Calculus of Variations, vol. 10, no. 1, pp. 1–13.