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Gesture based car control with gyroscope sensor and IoT based controlling

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ABSTRACT

With many new devices to control the daily life products, we have our smartphones, when connected to a network with suitable supporting software is capable of controlling many other objects or devices it is connected to via the network. These Devices use any one of the protocols available for Internet communication to communicate between them. A Web controlled vehicle system is presented in this project work. It highlights the idea to develop a remote-controlled car which can be driven from within the car using the Internet over a secured server. This car has Ultrasonic sensors to measure the safety distance between itself and any other vehicle or any other obstacle. The main goal here is to minimize the work done or needed to drive a car with ease of driving experience. At the same time, the car will assure comfort and convenience to the controller. A miniature car including the above features has been developed which showed optimum performance in a simulated environment.

Keywords— *Remote control, IoT, Vehicle*

1. INTRODUCTION

Electronic gadgets and Electronic products are more often used and are becoming a part of a human's daily companion. These Electronics are being evolved based on the needs of humans and are further developed to suit human needs and help them feel safe and sophisticated. The Electronic gadgets and devices help you to access information on the go when connected to any network, these devices also can control any other device connected to it. For example, we can use our Mobile phone to control other smart devices like T.V., Washing machine, Air Conditioner, Security systems, etc.

When Electronics came into existence the workload of mankind has been greatly reduced, let's look at a simple example, the remote for a Television, Television had to be tuned manually to change channels before, but now with a single button press we can change the channel and can also browse over the channel list. Such in those ways these Electronic good help us to live a more sophisticated life.

With Electronics being used more often we have developed vehicles that get support from these electronic devices and we also have made vehicles that can be operated remotely by giving them instructions. These Electronics supported vehicles assisted in driving safely, gave more control over the vehicle, while the unmanned vehicles were remotely controlled with the help of these electronic devices. It helped to develop many fields where humans were not able to enter themselves.

There are people with physical disabilities who find it hard to use most of our daily life products. They adjust to using our products, which is sometimes hard on them. When we try to adjust to their needs and create a product to suit their needs, the challenge hurdle increases. We have developed an idea to help people with physical disabilities to drive vehicle with ease.

2. LITERATURE SURVEY

In the modern world, automotive vehicles are inevitable for ease and comfortable drive. This automation is a mark of a new trend in the automobile industry. Several automation attempts have been made so far and in the near future, the manual vehicles will be replaced by autonomous vehicles.

In the developments of autonomous vehicles, driver assistance systems will be an important factor to maintain the safety of the passengers. One such system is the traffic signal and signs recognition system, which acts as a part of the driver assistance system. Real-time automatic sign detection and recognition will help in increasing driving safety significantly. The sign detection is based on the geometric shape and colour of the signboard, upon matching the needs of a signboard the sign present in the board is detected and assistance is provided.[1]

In autonomous vehicles, lane detection is the most required feature to help the car to maintain its lane and follow the traffic rules. The controller made use here is aimed at steering the

vehicle. There are robust control problems faced in this, which is solved by using different LMI formulations and optimization weights with and without Eigenvalue constraints.[2]

Obstacles always appear when travelling, to have a safe trip on the autonomous vehicle it needs a device that can detect obstacles and inform it sooner. Obstacle detection is a requirement for Advanced Driver Assistance Systems (ADAS) which are the precursors to autonomous vehicle systems. LIDAR system helps in obstacle detection with a field of vision up to 360 degrees.[3]

To help the driver assistance devices to work on a cloud network there is a need for a generic framework for developing and studying autonomous vehicles. Using Cloud-centric Architecture and simulation framework for Navigation and Traffic control of Autonomous Vehicles (CANTAV) is used for developing navigation and control system for autonomous vehicles.[4]

Based on our literature survey, no autonomous vehicle is made to serve for the purpose of helping the physically challenged people. So, in this work, we have made an attempt to bring out a smart vehicle model which suits for the physically challenged people.

3. METHODOLOGY

Real-time transmission of instruction over to the Arduino board is very important in controlling the vehicle. To implement this, we use the MQTT protocol for sending information through the internet to the Arduino. The inputs are given through a webpage or through an application. Sensors such as ultrasonic sensor and GPS sensor are kept for driving assistance. Wi-Fi module is used to connect the device to the internet for a live feed of instruction and tracking.

4. WORK PLAN

The smart vehicle is built on top of a robot chase. Wheels are attached to the D.C. motor which is controlled by L293D motor driver IC. The ultrasonic sensor is attached at the front of the vehicle, which is used to measure the distance between the vehicle and any object. The safe distance is calculated as 20 cm for this model and if any object is within 20 cm it informs the same via the LCD display. The Wi-Fi module (ESP8266) is used to connect the vehicle to the internet. The instructions are given via a webpage to the module. The module sends the information to the Arduino microcontroller for processing. After processing the Arduino executes the corresponding action. The work plan is given as a block diagram in figure 1.

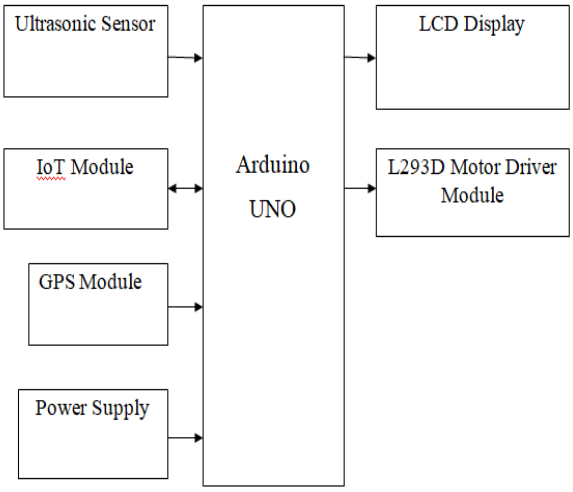

Fig. 1: Block diagram

The input interface for the smart vehicle

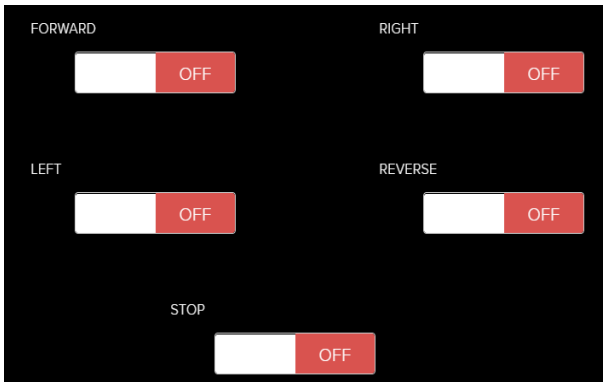

Fig. 2: Input Interface

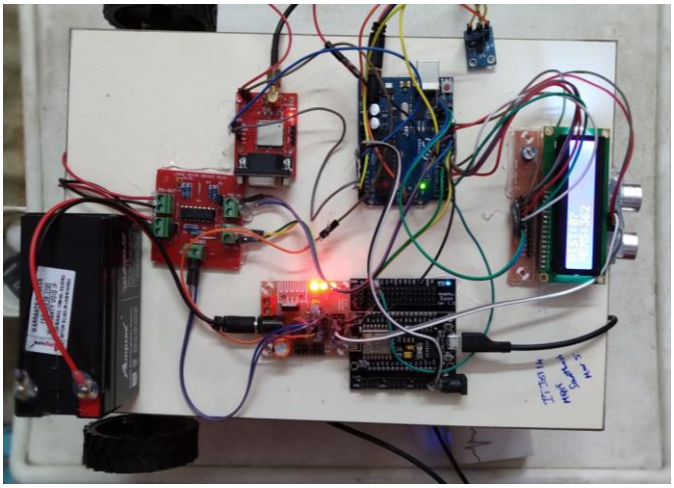

Fig. 3: Model

5. OUTPUT

Fig. 4: Output

Fig. 5: Output when Forward command is given

Fig. 6: Output on detection of an obstacle

6. CONCLUSION

We have started the present project with the aim of helping people to access the vehicle with ease and thus have achieved in doing that through this project model. This project will have a great reach upon implementation which will improve the lifestyle and help even physically challenged people.

7. ACKNOWLEDGEMENT

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