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SELF-DRIVEN VEHICLE BY USING MOTHERSHIP

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ABSTRACT

The evolution of automotive technology which aims to deliver greater safety benefits and Automated Driving Systems (ADS). This will one day can handle the whole task of driving when we don't want to or can't do it. The development of autonomous vehicles has gained a lot of interest of most of researchers and developers. The autonomous vehicle has the ability to sense the surrounding environment and navigate without any human interruption. The benefits of the autonomous self-driven vehicle are included cost reduction, increase in safety with the reduction in accidents. Internet of Things (IoT) is one of the promising of the innovations which can be utilized for interfacing, controlling and managing intelligent objects. The IoT is used for realizing self-driven vehicle automation using Raspberry Pi 3B. The wireless application is easy to use which improves efficiency decrease time consumption than wired communication to transfer the data. Automation is a conversion of a work procedure, a methodology or hardware to the programme, to reduce human activity or control. Automation does not just exchange human capacities to machines but rather includes extent re-association of work technique, during which both human machines work is redefined.

Keywords: CSS, HTML, IOT, MySQL, PHP, Raspberry pi.

I. INTRODUCTION

Comfort and safety systems from today's vehicles are powered by software, which continuously processes data from the vehicle's surroundings perceived by various sensors. However, in identifying, experimenting, and validating the various sensor configurations to find the layout, which serves the intended use cases in the best way, is a challenging, time-consuming, and error-prone task for engineers. It is an IoT based project for the purpose of shipment of products used in daily life. The small self-driven vehicle which delivers the product booked by the customer who works like a delivery boy or a girl. Nowadays the volume of orders is growing rapidly due to increases in customers' demands. However, this makes the delivery process increasingly difficult and t o meet customers' expectations.

II. RELATED WORK

Nowadays development of autonomous vehicles [1] gained a lot of interest of most of researchers. Autonomous vehicle has ability to sense surrounding environment and navigate without any human intervention. The potential benefits of autonomous vehicle include reduction in infrastructure cost, increased safety with significant reduction in traffic collisions. This paper introduces the autonomous

robot which is scaled down version of actual self-driving vehicle and designed with the help of neural network. The main focus is on building autonomous robot and train it on a designed track with the help of neural network so that it can run autonomously without a controller or driver on that specific track this motor driver will move the robot in required directions. Neural Network is used to train the model by first driving the robot on the specially designed track by labeling the images with the directions to be taken. After the model is trained it can make accurate predictions by processing the images on computer. This approach is better than conventional method which is done by extracting specific feature from images. Sensing techniques using varied configurations of infrared (IR) devices [2] are rapidly becoming a proven approach for autonomous vehicles. In this paper, present an investigation and corresponding results of embedding these sensors in a prototype robotic model and examine its performance. The results support IR sensing as a viable alternative to RADAR based system for object detection and travel in a forward path direction. Proportional Integral (PI) control is implemented due to its simplicity and effectiveness in Python programming language on the Raspberry Microcomputer. In this research, we model the operational characteristics of IR sensors in accordance with the physical principal that the measured distance is inversely proportional to the IR sensor voltage output. This provides a device independent robust sensing methodology as demonstrated in the experimental section of the undertaken research. As a result, the proposed approach is expected to enable major manufacturers and corporations to have fully autonomous passenger cars and trucks on roads. Miniature self-driving cars [3] are intended to facilitate the research and development in the domain of autonomous vehicles. Algorithms developed for the tasks of perception, navigation, and control on such platforms enable fast implementation and testing in scenarios similar to the real world, in which we use a simulated GPS to position the vehicle and to navigate on the test track. The miniature vehicle [4] is capable of successfully navigating from a start point to a destination. In today's world, road accidents are killing more people than any serious health diseases or any type of epidemic. This has created an alarming situation for every individual to drive carefully and safely. Thus, this paper mainly focuses on reducing accidents caused by collision with another vehicle or by rash driving and drunken driving. It has used the Bluetooth Technology as an indicating device. Usage of sensors, GPS, Bluetooth and all these devices will be controlled by using Raspberry-pi. This paper has also provided an equal opportunity to provide security to the car by using Biometric authentication system. Autonomous vehicles [5] are expected to reduce the number of accidents and traffic jams. However, incomplete exchange of yielding intention between human-driven vehicles and computer-controlled autonomous vehicles, which will run on same roads, may lead to accidents or traffic jams. A system that enables vehicles to accurately transmit their yielding intention to other vehicles inter-vehicle communication, irrespective of whether the vehicles concerned are driven by a human or a computer. Implemented the proposed system in Raspberry computers and mounted them on radio control cars in order to evaluate operations of the system. The computer on each car recognizes the road width, nearby vehicles and their types by analyzing images captured by the camera mounted on each car.

III. OBJECTIVES

A. Improved safety

Research indicates has up to 90 % of the road traffic accidents are caused by the driver. Advocates for driverless vehicles use the statistics to argue that autonomous systems make better and faster decisions than humans. They also are claiming those self-driving vehicles will always be monitor and adapt to varying the traffic and weather conditions and will avoid the obstacles in the road, doing all these things with more diligence, speed, and safety than human drivers.

B. Higher efficiency

Traffic can be flow faster and congestion can be reduced with autonomous drives using vehicle-to-vehicle communication, autonomous systems can set high speeds and intelligently avoid busy routes. The fuel efficiency is achieved by an optimize driving and in conveying the owners of self-driven vehicles can reduce in the carbon footprint and motoring costs by approximately 15 %.

C. Lower environmental impact

The fewer cars and more efficient fuel consumption, autonomous systems are programmed to minimize environmental impact. Self-driven vehicles can achieve lower emissions. This of course benefits the environment and puts less stress on the road network.

IV. METHODOLOGY

The automatic control, architecture, use of sensors and many other technologies are integrated into the self- driving vehicle. However, few papers have surveyed the technology process of a self-driving car due to its complexity. The key technology of self-driving car according to the function implementation, which will make the description easy and clear. The software then processes those inputs, plots a path, and sends instructions to the vehicle's DC motors which control acceleration, braking, and steering. Hard-coded rules, obstacle avoidance with the use of ultrasonic sensors help the software follow traffic rules and navigate obstacles.

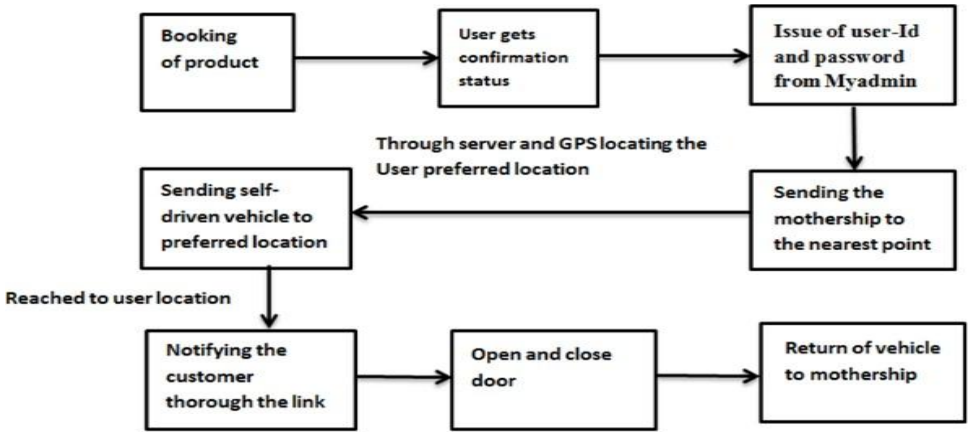

Fig 1 Block diagram

From the fig. 1, the customer/user books the products from the website. The user gets confirmation status of booking i.e. your product is booked. By using PHP Myadmin as the server used to store the data about login details and to control the self-driven vehicle through raspberry pi. A database contains a certain set of files (login details and user-id, password). Whenever customer books product the issue of user-id and password to the customer is done by the server. The product is dispatched through the mothership. Mothership is a vehicle which carries the product that to be delivered and the 4 to 5 self-driven vehicles. It moves to a particular/ nearest point. The handler in the mothership must log in to the webpage where the webpage is different for both handler and customer. The handler needs to enter the destination value of the customers' preferred location on the webpage. The satellite locates the location given by handler and it is fixed as destination point where the self-driven vehicle needs to deliver the product. The self-driven vehicle follows the path to reaches the destination.

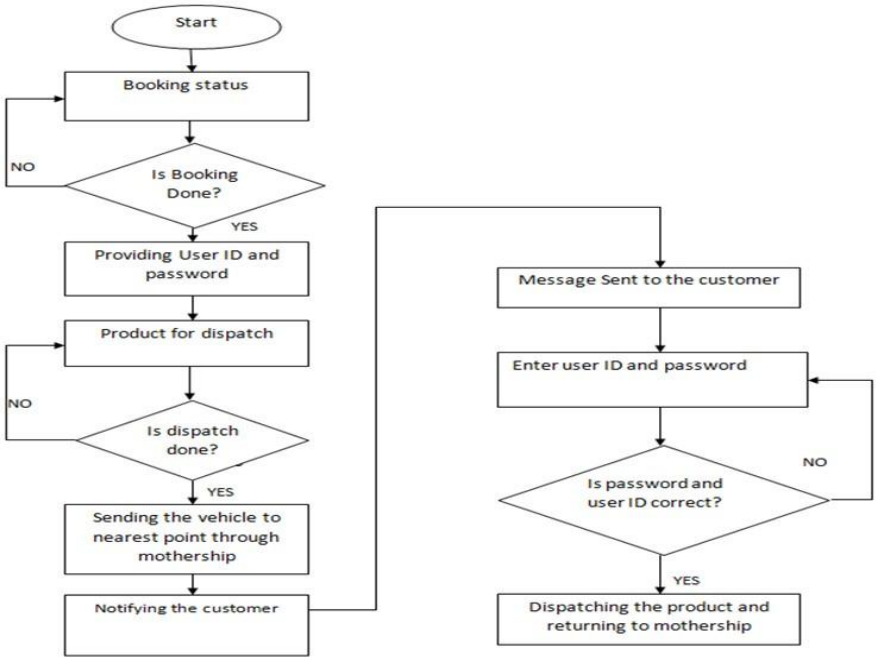

Fig 2 Flow chart

From fig.2, the process will start after the product has been booked. When the booking is done the status will be checked from the handlers and issuing the login credentials (user id and password) which can help in tracking of the delivery vehicle. After that the product will be dispatched from the office. It means should again check the dispatch for one more time. After dispatching, the mothership will be sent to the nearest point which is nearer to the customer and notify the customer regarding the delivery through a message. When the vehicle is reached to the preferred location message will send and they have to enter the given login credentials in the given URL (which contains login page) if any miss-match occurs then they have to re-enter the credentials or should contact the handler. The product can collect by submitting the given button (open and close) and after collecting the product, the self-driven vehicle

will return to the mothership.

V. IMPLEMENTATION AND RESULT

The server used in the project is PHP My admin which is an invisible source of self-driven vehicle. The database is created through coding language PHP. Server is used for shipment, locating the customer's location and tracking of the vehicle. Files are added to Myadmin through newly created database which contains login details and user-id and password details. Whenever the customer books the product immediately confirmation status with the one set of user-id and password is given to him. Self-driven vehicle is controlled through two modes (manual, automated) by server through raspberry pi. Server is linked to raspberry pi through PHP which acts as medium b/w pi and server. Every time data (login details) is read through URL. Whenever customer or handler login the page through user id and password given to them the data is update in database with time and date.

Fig 3 Login page

From the fig.3, the office page contains, A textbox to enter the destination value, it completely depends on the customer's preferred geographical location. Handler has to check whether the longitude or latitude value is changing with respect to location and customers' preferred location. If the GPS is connected to satellite and receiving the location data then this method is followed. The owner mode is used when the GPS is not connected which manual mode of operation is done by handler. The owner mode box consists of direction command in from of buttons that is forward, backward, right, left and stop. Box command which contains buttons for open and close door of the compartment of vehicle. Google map which shows the current position of the vehicle.

Using Raspberry pi 3B and Motor Driver (LM293D) and 12V dc motor the vehicle movement is controlled through server. The four wheels are fixed to four dc motors and it is fixed to the metal plate and this body is called Robotic chassis. All the motors are shorted connected to a single drive. There are four enables of motor drive used controls forward, right, left and backward direction by making any two of the enable input must be high for backward and forward and any one for right and left and to stop all the inputs must be low.

Fig 4 Obstacle detection

From the fig.4, for obstacle detection ultrasonic sensor is used. The ultrasonic sensor emits the wave if obstacle is present the waves are reflected. If obstacle is present in a distance less than self-driven vehicle takes right, turns left and move forward or else it follows the path. When obstacles are continuously detected vehicle moves backward and stop it calibrate the destination location and follows another path.

When customer or handler clicks on the open button in the webpage. The servomotor attached to the door of the compartment of self-driven vehicle is rotated to 90 degree. After few minutes (1-2) if close button is selected then servomotor is rotated from 90 degree to 0 degree. Then vehicle is returned back to mothership.

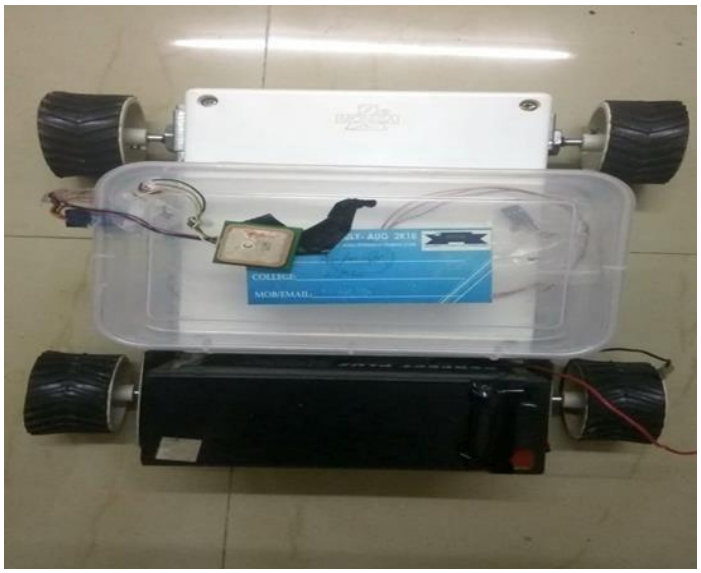

Fig 5 Prototype model

From the fig.5, the system is first rigged up as per the previously designed individual block circuits. The pin details are checked again to assure proper working. Before turning on the power, continuity of the power lines to all the peripheral modules is checked. Then the power supply is checked if it is giving the ideal voltage of 12V. The power converter module (Voltage circuit) is used to supply 5V to the system, and this voltage is checked. The system is connected to an active Wi-Fi network to enable server functioning. The system is allowed to settle for a while and then three terminal windows are opened since we have three python programs which will b e running simultaneously.

VI. CONCLUSION AND FUTURE SCOPE

Self-driven vehicle is a battery driven vehicle which is a new means of transportation which is rapidly developing on the behalf of conservation of non -renewable resources and environment preservation. This is an advanced step for self- driving vehicles for shipment purposes. Vehicles can be set to automatically navigate to the destination location (customers' preferred location) by continuously receiving the direction from GPS module or it can be controlled manually.

In future the door delivery system, usage of solar panels, camera modules and finger print sensors can be implemented.

VII. ACKNOWLEDGMENT

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