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SELF DRIVING ELECTRIC VEHICLE

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Abstract: **The objective of this project consisted of creating an autonomous electric vehicle. Autonomous electric vehicle technologies can decrease transportation costs and increase accessibility to low-income households and persons with mobility issues. It reduces traffic and parking congestion, increases safety, improves energy conservation, and reduces air pollution. The system has sensors and cameras to detect the obstacles and to be able to respond according to their position.**

Keywords: **AVC, buzzer, Camera, EVS, Motor, raspberry pi, sensors.**

I. INTRODUCTION

Over the years and centuries, the Automobile industry has gone through enormous. Development, as the first vehicle was only powered by the steam engine, then the petrol and diesel came to the public mind and currently it seems that the electric. Propulsion will be the future. In most cases, accidents are the fault of the driver; therefore it could be theoretically replaceable with the help of self-propelled cars. These vehicles are driven by digital technologies without any human intervention. They are capable of driving and navigating themselves on the roads by sensing the environmental impacts.

All around the world excitedly sitting tight for self-sufficient vehicles and specialists thought this vehicle fulfills clients' requirements, particularly the individuals who feel bore on driving. Yet, in certain spots previously hit the road and utilizing additionally based on land conditions, completely accessible route framework, and so on, it is valuable for all matured people and no requirement for a driving license. The advantages of a self-driving vehicle are protected to travel (typical people like face challenges implies rash driving however self-sufficient vehicle submit to rules and control speed of the vehicle and ready to rest in evening time), Time-saving, keeping away from traffic frameworks, vehicle Parking space, increment the lifetime of the vehicle, save fuel or electric power

II. LITERATURE SURVEY

[1]. "Line Follower with Obstacle Information System using Zig Bee" ,by Snehal kokkare,

Here Firebird robot follows white line on a black surface. On Firebird V three white line sensors (Left, Centre, Right) for detecting white line. When obstacle comes in robot path then robot stops and buzzer get on for alertness and sends message wirelessly to PC via ZigBee i.e. “Obstacle is present”. Here Sharp IR range sensor is used for obstacle avoidance and motion of robot is handled by DC (Direct Current) Motors. PWM (Pulse Width Modulation) is used to control the speed of motor.

[2]. "Infrared Line Following and Ultrasonic Navigating Robot with ATMEGA328 Pro",by Yuhang Tian

Here paper presents a low-cost scheme for developing an Arduino robotic car with varying functions, including line following, ultrasonic navigation, and automatic parking. In terms of line following, an array of IR reflective sensors, distinguishing the binary colors, can be used for tracking the lines, in addition, the speed of the car can be adjusted by a closed-loop PID controller.

[3]. "AUTOMATIC DETECTION AND CLASSIFICATION OF TRAFFIC SIGNS",by Carlos Filipe Paulo

Here proposes algorithms for the automatic detection of traffic signs from photo or video images and their classification to provide a driver alert system. Several examples taken from Portuguese roads are used to demonstrate the effectiveness of the proposed system. Traffic signs are detected by analyzing color information, notably red and blue, contained on the images.

III. METHODOLOGY

Here the concept of line following technology is used. A line will be placed on the road, the vehicle will move by sensing this line. The white line is used in roads for getting maximum detection by using an IR sensor. When the vehicle identifies the path, it starts moving which is controlled by the motor. The main component that controls the entire vehicle is Raspberry pi. It acts like a mini-computer. It has serial USB ports, HDMI port and for data transfer it has Bluetooth. The operating system used by raspberry is raspbian buster. The camera automatically detects obstacles and traffic signals. The vehicle always keeps a minimum distance with moving objects ahead by using an ultrasonic sensor.

SYSTEM ARCHITECTURE

The heart of the vehicle is Raspberry Pi, it act as a mini computer. Here Raspberry pi 4 is used. It has 40 Control pins, in which 28 GPIO (General purpose Input Output) pins, 8 Ground pins, Two 5v pins and two 3.3v pins which is used to connect Hardware components(like LEDs, motors,etc.) . The Operating system used is Raspbian buster. In this System using various Sensors, Camera and Buzzer etc.

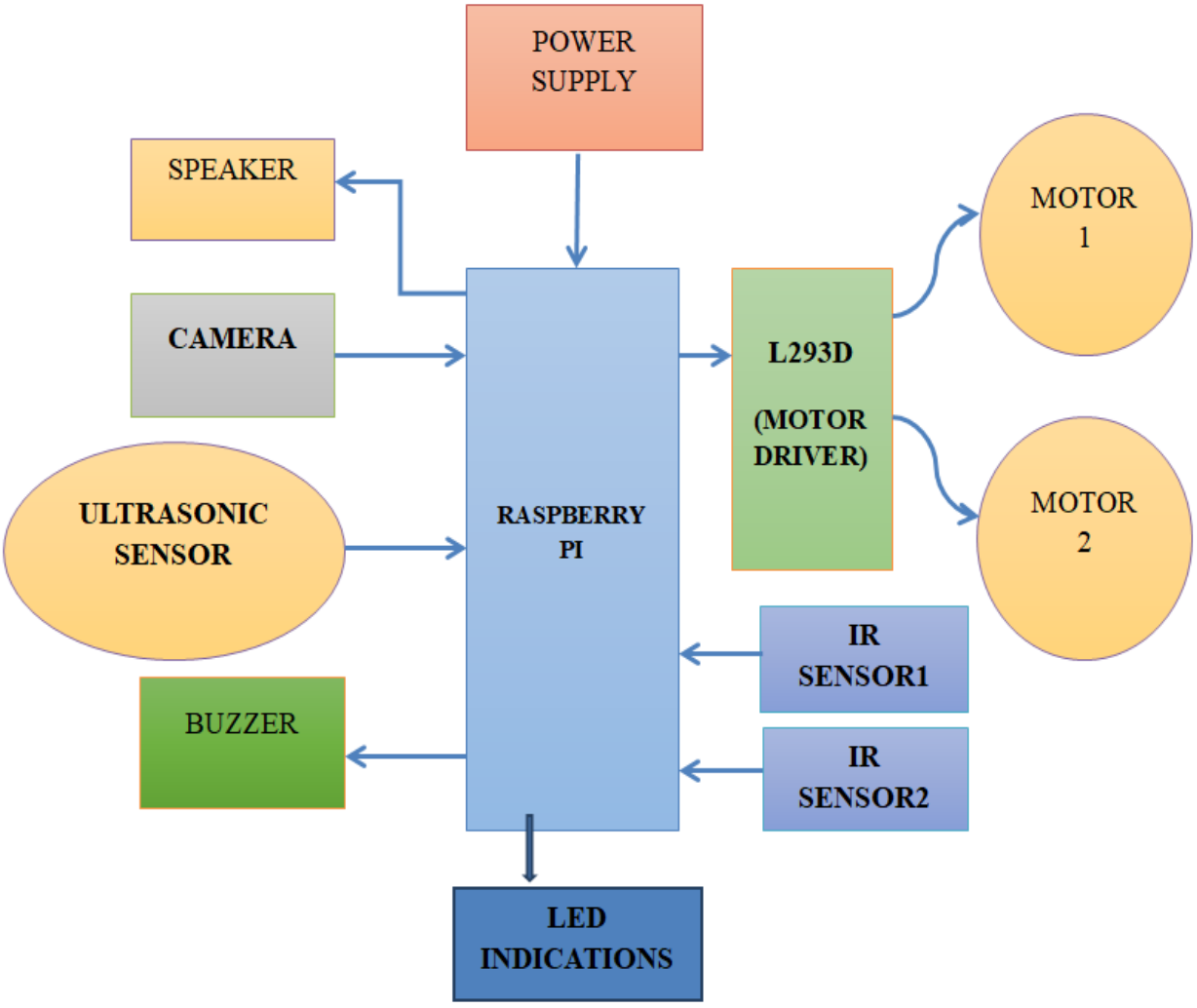

Fig1: Block Diagram of Self driving Electric Vehicle

The Vehicle monitors the surrounding environment using different sensors and camera at every moment. The Signals detected by the sensors are analyzed by the Raspberry pi. These signals are compiled along with the program build in the raspberry pi and sudden action will be taken. This device working on the principle of line following, Human detection, obstacle avoiding, traffic sign detection, and android application. The android application will act like steering controlled by a human.

CONNECTION DIAGRAM

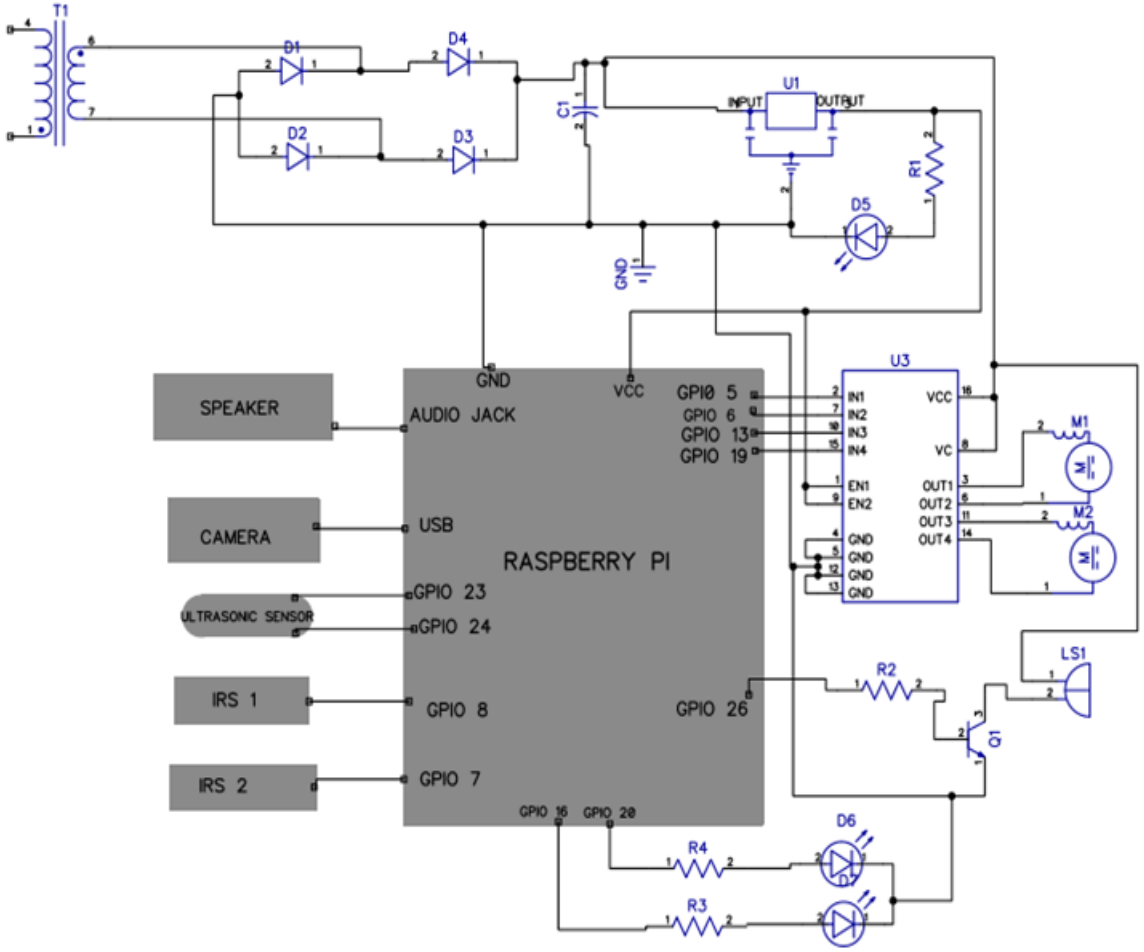

Fig 2: Connection Diagram of Self driving Electric Vehicle.

IV. RESULT

The prototype here holds up a variety of sensors to detect obstacles, traffic signal and speed control, After testing we obtained the following results.

1) IR sensor analyses the road and follows the line.
2) Ultrasonic sensor sense the surroundings and keep a minimum distance with the object.
3) Pi Camera detects the moving objects and traffic signals.
4) Android application for controlling the vehicle.
5) According to the speed limit the vehicle regulates its speed.

V. ADVANTAGES

Advantages of the proposed works are

- Continuous monitoring of surroundings using sensors impart in reduced accidents.
- The vehicle is capable of taking quick decisions.
- The vehicle emits no pollution as it is powered by batteries.
- Greater convenience and reliability.
- Reduced running cost and maintenance requirements.

VI. CONCLUSION & FUTURE SCOPE

Self-driving electric vehicles have been an active area of research for some decades but particularly in the past five years. These are believed to considerably lower transportation costs. In one estimate, social AV impacts in terms of crash savings, travel time reduction, fuel efficiency, and parking benefits. The AV is still in the infancy stage. There is a considerable road to travel before maturity, implementation, and mass-market release are achieved.

This vehicle works by using artificial intelligence so accidents can also be reduced. Considering a country like India, where there is a high dependency on oil imports and pollution remains a challenge, autonomous vehicles and EVS offer a one-way solution for these two major problems.

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