# Paper on Hybrid Vehicle Parking System

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*Abstract*— The aim of our project is to design a hybrid vehicle parking system. The working is based on Android OS, Arduino uno, L298N motor drivers, HC-05 Bluetooth module. This is a very simple remote controlled system, with an Arduino and Bluetooth module. The idea is to first code the entire working using our previous knowledge of programming. The code will then be simulated on software and later be interfaced with the hardware. The controlling remote can be any smart device with android. All the controls of the vehicle will be on the app on that device. We chose this for our major project to overcome parking problems in everyday lifestyle and also have a wide scope in the engineering field. It plays a vital role in the development of new technology.

*Keywords:* HC-05 Bluetooth Module, Smart Phone, Arduino Uno, 150 rpm DC Motors, Vehicle Chassis, 12V Battery, Mobile Controlling Car

## I. INTRODUCTION

Smartphone has quite changed the traditional ways of human to machine interaction. Smartphone is now a vital part of a person's life. Android is a software platform for mobile devices that includes an operating system, middleware and key applications. Android is a safe and secure operating system. Now a day's various applications are developed in play store.

Our main objective of writing this paper is to develop a parking system in all automobiles by controlling the system using Bluetooth. Bluetooth is used for its various advantages over other wireless technologies. Hardware technology utilized in smart phones has also greatly improved. Hence, we can say that Android smartphones will serve a great benefit for industrial, commercial and other general purpose applications.

## II. LITERATURE SURVEY

Different types of researches have been made by different researchers in developing this type of project. However, they have a different application and have different technologies implemented. Some of those papers are mentioned below stating their technology and application.

Sudip kachhia [1], presented a 360 degree rotating vehicle to overcome the problem of parking space. This project is about design of 360 degree rotating car to move in all direction. This design provides better comfort and also saves the time of customers, that's why it is also the reliable for the customer. As it is also battery operated car thus no fuel is required. Hence it is economical to the environment. This also reduces the cost of the car, and also got idea to use battery to operate this vehicle.

Arunkumar S M, Chandan Kumar Sahu, Yubaraj G M, Jahangeer A B[2], proposed a system of consist of steering, chain sprocket, DC motor, wheel, bearing, iron pipe, battery and chain drive. In this system first the vehicle is stopped and wheels are then turned in the required direction with help of steering system and DC motor. For the forward and backward movement of this vehicle, DC motors are used in wheel and a battery is used to provide electrical energy for the DC motor. It has turning radius nearly equal to negligible of length of the vehicle itself. This system is to be useful in hospitals, small industries and also on railway platforms.

Mr. Amitesh Kumar [3], presented zero turn four wheel steering system, the various functions of the steering wheel are, to control the angular motion the wheels, direction of motion of the vehicle, to provide directional stability of the vehicle while going straight ahead, to facilitate straight ahead condition of the vehicle after completing a turn, the road irregularities must be damped to the maximum possible extent. This project the use of steering is to rotate front wheels.

Mr. Sharad P. Mali[4], presented zero turn four wheel mechanism, in this project people have used DC motor and wheel to vehicle rotate 360 degree at a same position. So in this project, the idea is to arrange of DC motor and wheel. A.A Kamble, A Dehankar[5], discusses fusion of AVM and ultrasonic sensor, used to detect the vacant parking slot in the automatic car parking system. The AVM provides a virtually 360 degree scene of the car in bird's eye view. The AVM helps the driver to maneuver into parking spots. Through the bird's eye view, a driver can check for obstacle around the vehicle. First, the parking slot marking detected in the AVM image sequence. A tree structure-based method detect the parking slot marking using individual AVM image sequence and image registration technique. Second, empty slot is detected using ultrasonic sensors. The probability of parking slot occupancy is calculated utilizing ultrasonic sensor data acquired while the vehicle is passing by parking slots, and finally the selected empty slot is tracked and the vehicle is properly parked in selected parking slots.

D.J.Bonde[6], uses the android application generates automatic parking and un parking with the help of commands of an android application. The system reduces the human intervention to the minimum by automating the process of car parking. When we visit various public spaces like shopping malls, five star/seven star hotels, multiplex cine halls many problems relating to the availability of parking spaces. Most of the times we need to traverse through multiple parking slots to find a free space for parking.

K. Lohith[7], presented a four wheel steering system for a car. In four wheel steering the rear wheels turn with the front wheels thus increasing the efficiency of the vehicle. The direction of steering the rear wheels relative to the front wheels depends on the operating conditions. At low speed wheel movement is pronounced, so that rear wheels are steered in the opposite direction to that of front wheels with the use of DC motor to turn left and right. In this presentation, the use of DC motor is to rotate the wheels 90 degree left and 90 degree right from original position.

## III. BLOCK DIAGRAM

The Block Diagram of our system consists of a Bluetooth module, an Arduino kit and a couple of motors for driving the car.
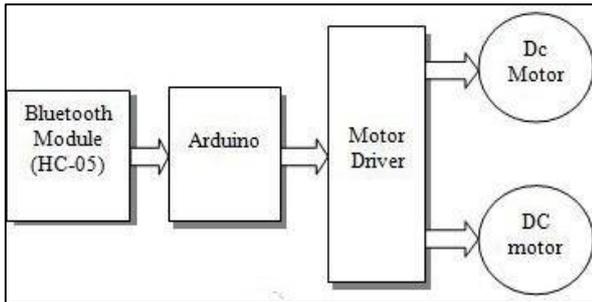


Fig. 1: Block Diagram of the Circuit

### A. Android Smartphone

Android is a very popular open source operating system (OS), based on the Linux kernel, used in mobile devices such as tablets and smartphones. Android has a very user friendly interface which relies on direct interaction between the user and the device i.e. by using touch gestures. These gestures are like real-world actions, which include swiping, tapping, scrolling and pinching, to control the on- screen objects, together with a virtual keyboard for taking input in text form. In the project, android smartphone has an installed appl which is used for controlling the robot unit. The smartphones already come with inbuilt technology to establish connection. The technology we have used is Bluetooth.

### B. User Interface

The user interface, of the overall system, is provided using the custom made android app using Graphical User Interface (GUI). The GUI provides user, the various control modes, to Control dynamically the robot unit. When the app is started, we first establish the connection between the app and RC unit using Bluetooth. The GUI of android provides a user friendly real-time experience to the user, to control the robot.

### C. Android Application

An application was developed in the software Android Studio. App can be installed on an Android smartphone to control the RC unit. The app shows buttons for movement of the car in different directions. These commands are as follows: Left, forward, backward and right.
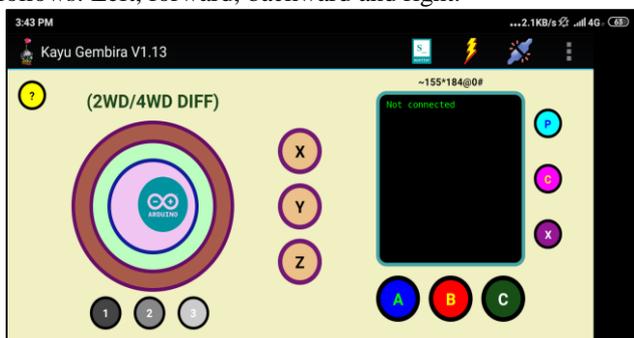


Fig. 2: Screenshot of the Application

### D. Motor Driver

Motor driver is the main working unit of this system. This unit consists of the separate motor connections jumper, the two motors are connected parallel, and connected with left & right side of terminals, Bluetooth module connected to the circuit. Motor drivers are used to control the dc motors. It is responsible for communicating with android smartphone, using the Bluetooth module and controls the motors using the motor driver. The motor driver unit is powered using 12 v battery connected to this Arduino chip. The command for controlling the module is received using Bluetooth module HC-05.

## IV. CIRCUIT DIAGRAM

Below is the circuit diagram of the hardware which shows the connections between Arduino, Bluetooth and motors. It also shows a motor driver L298N which is responsible for movement of the motors in either direction. RxD pin of the Arduino is connected to the TxD pin of Bluetooth and vice versa. Supply of 5V is provided to the motors
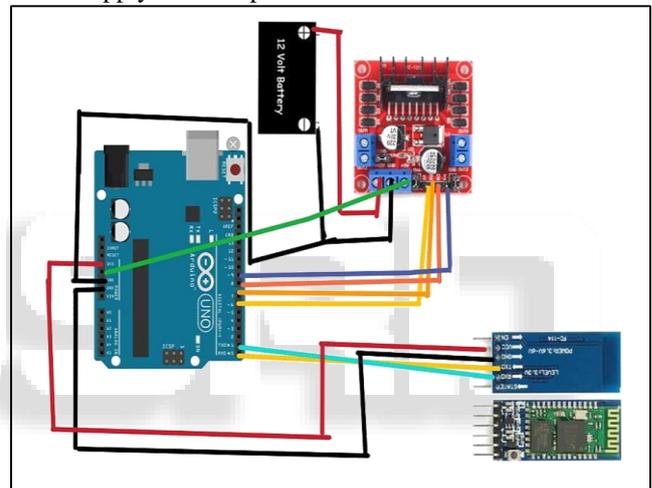


Fig. 3: Circuit Diagram of the hardware

### CONCLUSION

Thus, in this project, we designed a hybrid vehicle parking system. We have programmed Arduino and designed the parking system. It can be possible to implement in all budget cars. The system in car will receive the commands via Bluetooth and move accordingly.

## V. RESULT

This project can be useful in future generation to reduce turning space of car especially in recent days electric cars were developed it can be well suited for those car because of controlling with wireless connections by using android smart phones or any other Bluetooth controlling device.

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