

# Self-Parking Car with Voice Information

Dr. Manish Kumar Mukhija  
(Associate Professor)

Mr. Satish Alaria  
(Assistant Professor)

Narayan Sharma, Mohit Kumar Sharma, Pratap Singh  
Students

*Department of CSE*  
*Arya Institute of Engineering*  
*&*  
*Technology*  
Jaipur, Rajasthan

[sharmanarayan388@gmail.com](mailto:sharmanarayan388@gmail.com), [mohitksharma820@gmail.com](mailto:mohitksharma820@gmail.com), [pratapsinghshekhawat9000@gmail.com](mailto:pratapsinghshekhawat9000@gmail.com)

**Abstract-** In Today's time IoT is developing day by day and due to this there is less human interaction in daily activities. Like Example there is home automation, Industry automation and many more So here we introduce one more that is Self-Parking Car with Voice Information using IoT. The purposed of Self-Parking Car is that will automatically sense the parking slot using Ultrasonic Sensor with the help of Arduino and senses the distance between obstacles and car and check for the distance that is required for car to park. Car accidents are getting higher with nearly ninety percent of traffic issues which are usually caused by human errors, we all know that reversing and adjusting a vehicle when parked is a complicated process. So, it will reduce time as well human interaction for driving and park the car with efficiently in complex areas.

We achieved this by programming the sensors and Arduino.

## Keywords

Self-Car Parking, Voice Information, IOT, Arduino Uno, Servo Motors, Ultrasonic Sensor.

## 1. INTRODUCTION

In today's scenario, use of IoT is increasing and the world getting less human interaction by the use of sensors and actuators and computing devices. For Example, keen networks, Industry Automation, Home Automation, and many more. To Study Integration of Electrical Sciences and Electronics by their applications in daily life. (Like Self Car Parking). Car parking is a major problem in urban areas in both developed and developing countries. Following the rapid increase of car ownership, many cities are lacking car parking areas.

A self-car parking can design with Arduino can be described as a machine that perform the action of a driver without any human interaction in order to maneuver a vehicle into any available parking opening which has been proved to be very efficient

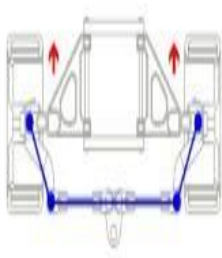
in large urban cities where vehicle is usually not parked correctly, so this model automatically senses the spots in between the obstacles using the Ultrasonic Sensors and using Arduino Uno the car model will park to the spot or area that finded by the Ultrasonic Sensor.

With that there is one special feature that will give voice information by the model while taking turns in the car as well display on LCD. When the car is parked successful than also displayed with the voice information through speakers. This will help the driver to know about the turns that model is taking so that driver will make eye on the car while parking.

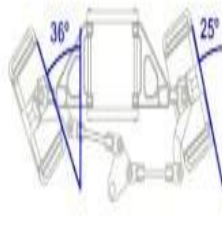
As we know Car accidents are getting higher with nearly ninety percent of traffic issues which are usually caused by human errors, we all know that reversing and adjusting a vehicle when parked is a complicated process. Parallel parking is usually tending to be horrible for more car owners because it doesn't only require your driving skills to be top match but it also requires you to avoid bumping unto vehicle parked already. So, this model or self-car will help driver who don't have that expertise parking skills that will help out by using this model. As all have mostly that parking skills but some driver didn't have those skills so that this diver feel scare to be bump unto parked vehicle and others vehicle while parking.

In this every step the model will give voice information about the turns and also distance from the obstacles and other car which are parked using Ultrasonic sensors. So that for driver who have less skills in parking that can use this function to park the car and it help to mark car with more efficient with less time without any headache of accident or damaging the car. In this the theory used is the Ackermann Steering theory through which the servo motors or front wheels are rotate.

**Ackermnn Steering:** This can be defined as a principle used in order find the specific geometry of the automobile when turning through a particular angle of the steering wheel during the determination of an incoming curve, in which the wheel at the front will go through different radii at the curve as displayed in Figure a below which will then lead to steering not to be foreseen due to fact that slipping of one of the wheels as occurred. So, in order to avoid this from happening or to make the steering better we place the steering wheel inwards so that the steering wheels can turn at different rate rates as show in figure 1.1 b.



(a) Steering angle wheel

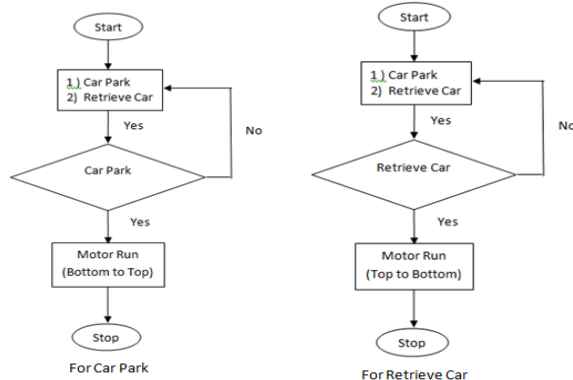


(b) Different angle wheel

## 2. WORKING AND FUNCTIONALITY

As we know that Tesla is providing the auto drive car with less human interaction the system will automatically drive the car when it shifts to the auto. The Working of the car is to reduce the work and time drive the car with relax so this model will provide less interaction with human and park the car with some functionality. So, the Model provide two function: -

- first is park the car it means when the ultrasonic sensor will find the distance and check whether the distance is sufficient for the car to park or not after that it will take left right turn and park to the find slot.
- Second is when the car is parked than many find difficulties to unpark the car because when the car is park than there are too many cars parked with that so those who don't have proper parking skills than they will find difficulties to unpark the car it will automatically unpark the car by following same as they parked the car.



The working flowchart system for Automated Car Parking System

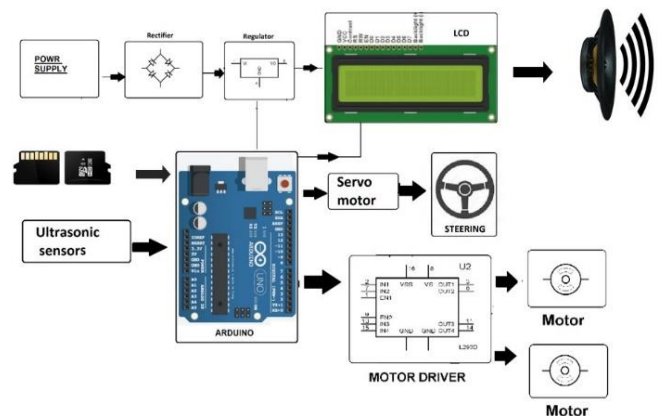
After Executing these 2 functions servo motors are started and do their functionality of car parking and unparking.

Now coming to the working that how the car model is work and park the car automatically. Firstly, it starts from the power supply which is then connected to the rectifier that convert about 240V Ac in to 9v of direct current for efficient usage as show in Figure 3, it is transmitted to the voltage regulator in order to maintain a constant voltage level throughout the whole process.

After the car detects free parking space it uses the motor present in the car to control the movement of the vehicle upwards and backwards. The servo motor is attached with the steering lever which helps in better understanding of the self-parking vehicle. After the car is aligned it moved accordingly and is parked successfully.

As that is taking place, The Arduino uno is been powered and is working simultaneously with the ultrasonic sensors in order to detect proximity of obstacles around the vicinity, which then transmits data to the LCD screen for monitoring with servo motor rotating the steering wheel equivalent to the data expressed on the LCD screen as the motor drivers work while displaying the data on LCD with the voice information while turning the wheels like example if the wheel taking left than there is voice information that the car is "taking left turn" and for same "taking left turn" and if the car is parked successful than with the LCD display same voice information is their "Car is successfully Parked" and "Successfully unparked" through this the car is efficiently hitherto to control the motor of the vehicle.

All the information that are used for voice that will store into the SD Card of 16 GB.



The Arduino Uno will get the instruction from the ultrasonic sensor in the form of an image and then after that, the image is examined by Arduino Uno and detects the obstacles.

- If obstacles are not detected then it will turn left by default.
- If obstacles are detected then checks for the sides where are the obstacles present like on left, right, or both sides.
- If obstacles are present on the left side, then turn Right.
- If obstacles are present on the right side, then turn Left.
- If obstacles are present on both sides, then don't turn go forward.

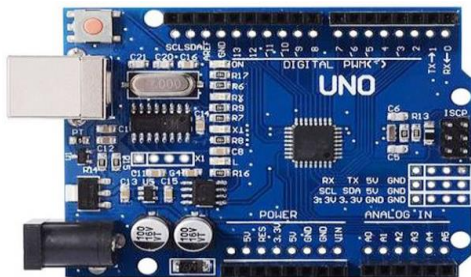
### 3. HARDWARE FEASIBILITY

#### 1. ARDUINO UNO:

It is an open-source microcontroller board based on the Microchip Atmega328P microcontroller. The board is equipped with sets of digital and analog inputs/output pins that may be interfaced to various expansion boards and other circuits.

Some features of Arduino Uno are as follows:

- Microcontroller: ATmega328
- Operating Voltage: 5V
- Input Voltage (recommended): 7-12V
- Input Voltage (limits): 6-20V
- Digital I/O Pins: 14 (of which 6 provide PWM output)
- Analog Input Pins: 6
- Flash Memory: 32 KB
- Clock Speed: 16 MHz



#### 2. Ultrasonic Sensor:

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves.

We will use this to Measure proximity of our device to obstacle through the use of soundwaves.



#### 3. Servo Motors:

A servomotor is a rotary actuator that allows for precise control of angular position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback.



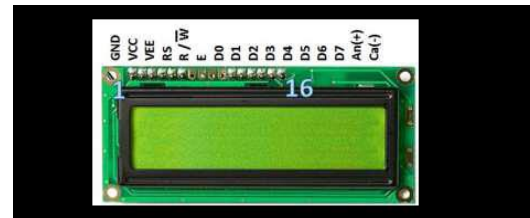
#### 4. Speakers:

Speakers are used to give voice information or play music etc. in the model we used for voice information at every step.



#### 5. LCD Display:

A 16x2 LCD Display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines.



#### 6. Robotic Chassis:

- A Chassis of a robot that will carry the DC motors, batteries, electronics, mounting supports, and more.
- A Robotic Chassis will help in installation of hardware and as well easy for expansion.



#### 7. DC Motors:

A DC motor is any of a class of rotary electric motors that convert direct current (DC) electrical energy into mechanical energy.



## 4. RESULT

The successful implementation and connection of hardware's given us the best result possible i.e., a fine working model of the Self Car that can align itself accordingly to the users wish and park parallel on command with that gives voice information on Successfully parking and as well while taking the turns. The implementation of the code on Arduino Uno has been successful and has been added with the results of the project. Basically, the result or the output of our project is a working model of a self-parking car. We have made use of c programming in the Arduino IDE and various trial & error runs have given the best result with minimum error.

## 5. FUTURE ENHANCEMENT

In Future this framework can be used on the different application. Like the driver can book their parking slot before going to the mall, market etc. Just one application away for the parking slot are visible on an online application through which the driver can book their slot for parking and when they go there, they find a parking slot. The Driver just give timing for the booking area for parking. After that particular time, they have to remove the car from the parking area and if they spend more time due to some reason the driver is not frethenan they can extend their parking time.

An App linked to a Wi-Fi Module will help bring the entire system to our mobiles. This project helps making a beginning in the broader projects of Smart Cities and Artificially Intelligent Systems. Integrating the same with IoT helps make a much more automated and controllable system.

## 6. CONCLUSION

This project mainly depicts the free parking slot using the Ultrasonic Sensors that will send images to the Arduino that there is an available free parking slot. After that the Arduino will command the servo motors and the wheels will start rotating and it will park the car automatically within the slot. Moving the model gives the voice information like taking "left", "right", and "Car is Successfully Parked", "Successfully Unparked".

Our Self Car parking project is planned to be integrated with another software application to help drivers to find the empty spot in the parking lot more easily with less time. As we know there are many drivers who are quite fewer skills in parking the car in reverse and so this model will help those drivers who are not skilled perfectly. The Car is automatically parked and unparked itself.

This model will park the car in any complex area as well so there is no problem that the car will damage if it parked wrong. The car also indicates the driver with the voice information through speakers or using the TV panel in the car.

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