

IoT based Reverse Car Parking System

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Abstract :

Nowadays,parking is a major issue that every car owner faces,due to lack of parking area the car need to be parked far away. This automated REVERSE CAR PARKING system helps to get rid of tedious parking job in PARKING AREA .This system uses obstacle detection sensors for detection of vacancy checks for the required amount of area and parks accordingly. Besides, this is INTERNET enabled system with a secured connection. The driver will get the updates of parking status.This has many advantages as there is no need of driver and can park even if the parking slot is congested which is not possible with manual parking ,as driver has to open the door to get out of the car. This even works in absolute darkness where advanced technologies like image processing fails in autonomus cars.

Introduction :

The automobile world is moving towards automation and many people toiling to do automation with less failure rate ,as error in piece of code or small unexpected malfunctioning may lead to heavy loss property and endanger life of people.Parking of car in malls and appartment is tedious ,as one need to go long distances to park thir cars.while parking in cellars back cameras fail due to low light visibility. Small dent may cost too high to repair cost.This reverse parking system helps car users to AUTONOMOUSLY PARK there car in parking area.

Expected Systems :

1.SMART PARKING SYSTEM 1: The implementation of Parking Guidance and Information System (PGIS) encompasses two major categories. The PGIS can either include the entire city area or function only within the car park facility . Setting aside the differences, both the PGIS implemented in many major cities in Europe, Japan, the United Kingdom and the United States offer similar advantages similar to those of smart parking system as discussed earlier. Both provides information which aids the decision making process of the drivers in reaching their destination location

and aids them in locating a vacant parking space within the car park facility.

2. SMART PARKING SYSTEM 2: A similar project had been carried out by Georgia Institute of Technology. The project used existing smart technology like the satellite imaging, mobile application for data acquisition and predicting the future data for parking management systems.Their parking management system is sensor-based and uses Fiber Braggs Grating sensors. These sensors are embedded in the ground, whereby as pressure is exerted on the ground where they are placed, and sensors' wavelength reflection changes to signify the presence of a vehicle.

3. Automatic Car Parking System Using

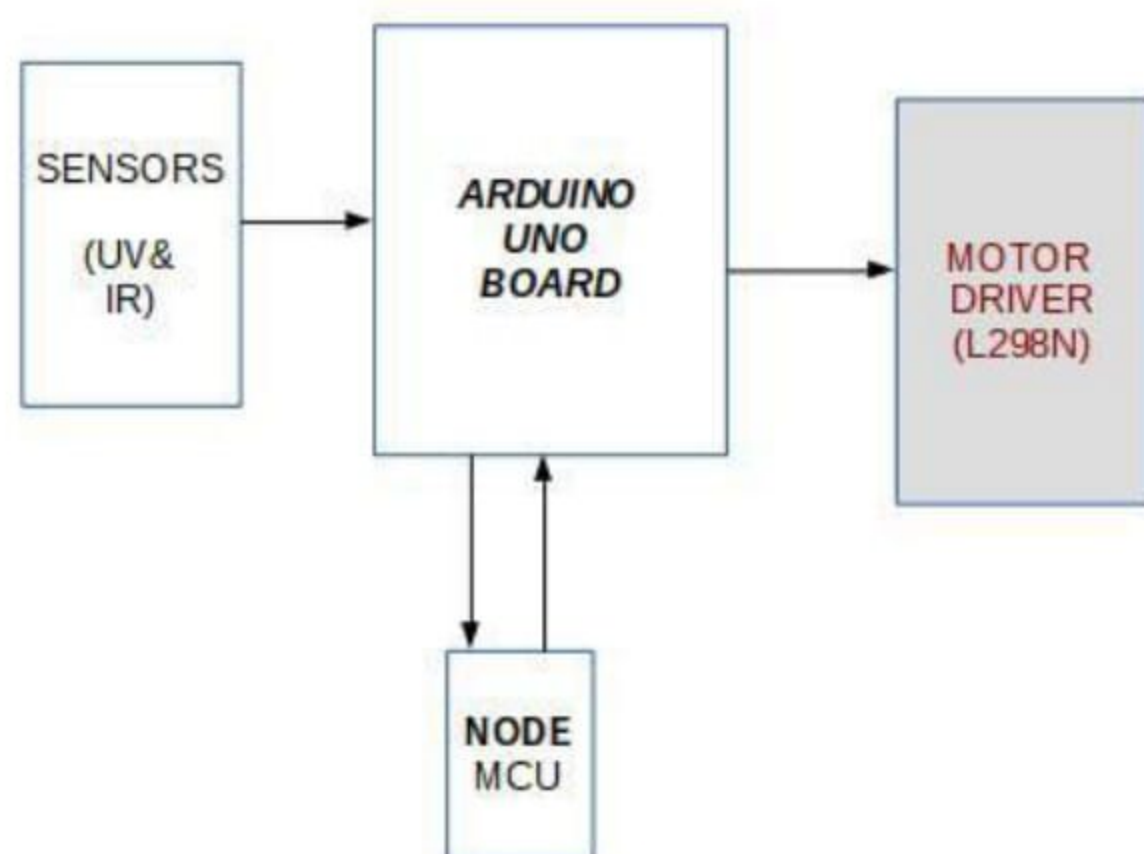
Microcontroller : Past days a person needs to guide drivers to park the car but nowadays we are trying to automate this process. Which means without any guide of person the driver himself knows where the empty slot is there for parking. We are facing many problems for car parking system. As we need to park our car manually and there is no discipline in this process it creates a huge hurdle. People can park their cars anywhere they want to, which creates a mess as people don't follow a particular cue most of the time. As a result of this a huge traffic jam takes place in that place. While parking in and retrieving car due mismanagement cars can get dent by bumping with each other as there is lack of sufficient space. This 23 leads to arguments, fights among people which sometimes create traffic jam. This is also an economical lose as we need to repair our damaged car. This chaos also leads to cars consuming extra fuel.

Proposed Systems :

Our Automatic Reverse Car Parking System works with help of IR and UV obstacle detection sensor. An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion.These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive

IR sensor. The light that the human eye can see lies in the range of 380 to 760 nm and is called visible light. In the case of UV sensors, the flame's ultraviolet light is used instead, which is detected by a UV diode. In the sensors, the sensor signal is converted by an amplifier circuit into a signal that the control can use. The additional feature of uv over ir sensor is, from the time taken to activate uv diode after emission of uv rays, we can calculate distance of obstacle, which not possible in case of ir sensor. The sensors provide signal to the arduino uno board and uno controls the motor driver module which results in motion of car. In our system Node mcu acts as interface between uno and user's device through secure internet connection.

System Architecture :



Components used :

- | | |
|---------------------------|-----|
| 1. Arduino uno | - 1 |
| 2. NodeMCU | - 1 |
| 3. IR sensors | - 3 |
| 4. UV sensors | - 1 |
| 5. 9V battery | - 2 |
| 6. Switch | - 2 |
| 7. DC motors | - 2 |
| 8. Car chasis with wheels | - 1 |
| 9. L298N motor driver | - 1 |

Coding Part :

For coding we have used the embedded C

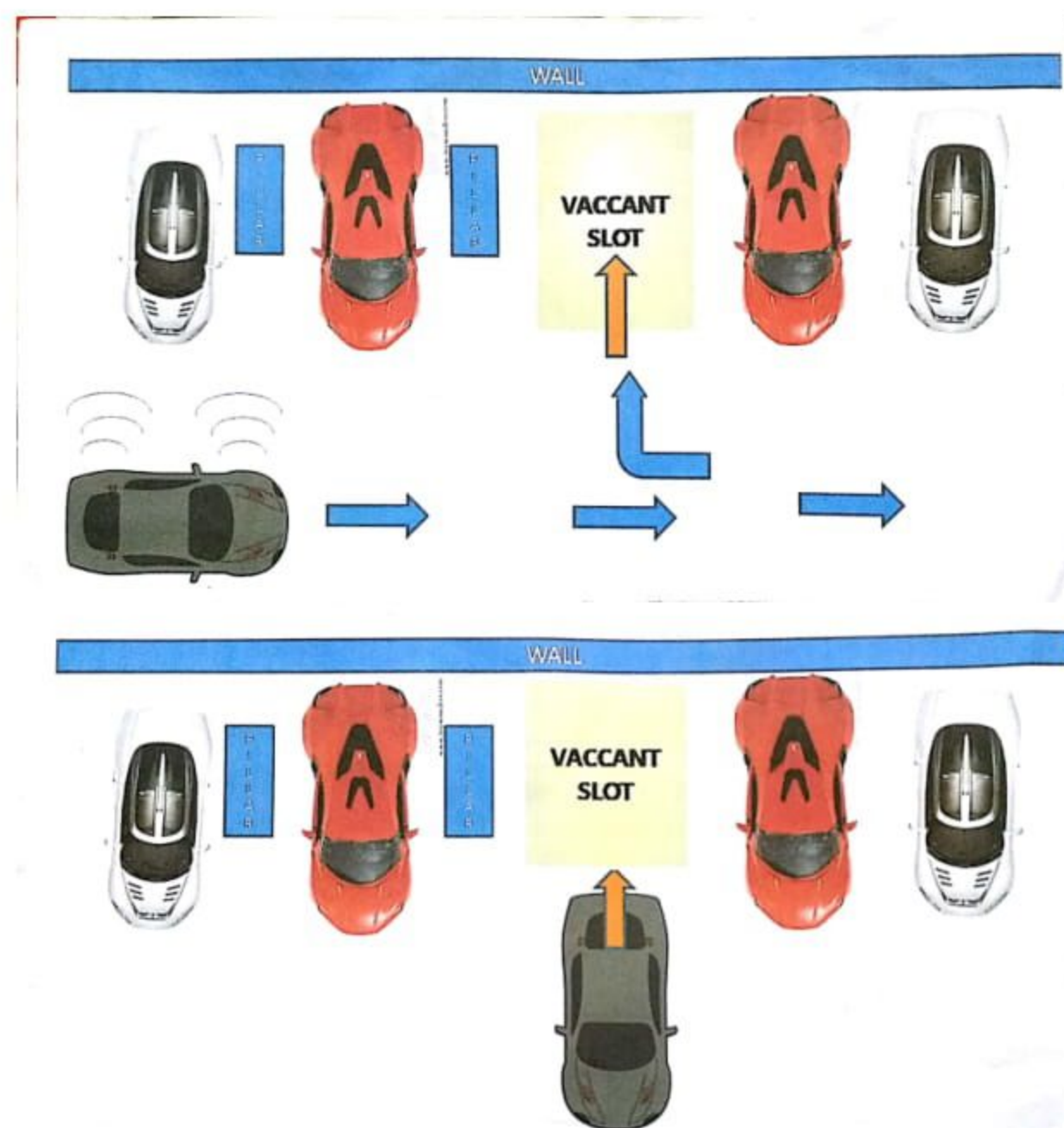
language with the help of an Arduino IDE. The reason we used embedded C as our coding language is, since we are needed to control the hardware components, the hardware components can be controlled more easily with embedded language rather than more high level language.

The libraries we used are :

<ESP8266WiFi.h> ,
<BlynkSimpleEsp8266_SSL.h>.

Test cases :

1. Parallel park slot checked.
2. Checked while the side of car contains any obstacle.
3. Checked when the slot is present but the size of the slot is less than the size of the car.



Conclusion :

As our project can be built only for a cost of around Rs.1000/- any one can buy it and place it to their car externally and we are gradually improving its working performance.

Future Plans :

- Updating this system and getting the car back from parking slot
- Use of image processing with night vision cameras
- Do this at practical high level by controlling mechanical petrol and diesel engines.
- Reduce the failure rate by using multiple sensors.