

# SMART CAR PARKING SYSTEM USING ARDUINO UNO

## *A PROJECT REPORT*

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**Dr. ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**

*By*

**AMBREEN QAMAR**

**ARMAN KHAN**

**SHIVAM SHARMA**

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## INTRODUCTION

In smart cities, there is a greater need for new and effective technology to tackle many of the problems that are visible on the surface, as well as to make cities less crowded. Finding a parking spot is one of the most aggravating issues for drivers. Particularly in public venues such as shopping malls, 5-star hotels, and multiplex cinema halls. Even within the park, drivers waste time and fuel hunting for a spot to park their cars. This will damage the driver's emotions as well as pollute the environment while searching for a parking spot. In this project, we create and design a smart parking system that effectively addresses these issues. Many research has been conducted in recent years with the goal of reducing car parking issues and making it more convenient and humane. It has recommended a smart parking system survey. They concentrate on practical smart parking technologies developed to address existing issues through the use of a wireless sensor network and real-time data processing from the sensors. The system appears to be unfixable and employs a complicated access technology; additionally, there is no guidance mechanism for parking places. The Arduino Uno is used to create a smart car parking system. The device uses IR sensors mounted in the parking slots to detect empty slots and assists the driver in finding parking in a new city. The system lacks a payment mechanism as well as guide technology that can automatically find available parking spaces. The goal of the smart auto parking initiative is to make parking simple and straightforward. This project assists car drivers in parking their vehicles with the least amount of wasted time by providing reliable information on the availability of parking spaces. The servo motors, LCD display, and IR sensor are all connected to an Arduino Uno microcontroller unit. The LCD shows how much space is available, and the IR sensors keep track of how many automobiles enter and exit the parking place. The IR sensors identify whether or not a parking place is available. The

development of this project prototype can operate as a way-finder, directing automobile drivers inside the car park to available parking slots and directing them there. It's a project that uses an Arduino microcontroller. It employs an infrared sensor to detect the vacancy of each parking space at a car park level, then sends a wireless signal to a microprocessor, which processes and shows the total number of available parking slots on 16x2 LCD displays.

## **OBJECTIVE**

The basic objective of a smart parking solution is to identify a vehicle's presence or absence in a particular parking space with a high degree of accuracy, and to pass on this data into a system for visualization and analysis – to be available for parking asset. Smart Parking is an IoT based solution, equipped with sensors that send data to applications about the vacant parking spots. The drivers use this application to direct themselves to the available parking spaces instead of wasting their time and fuel in search of one. When a driver knows exactly where they need to go; it reduces idling and unnecessary driving – therefore optimizes traffic flows in built-up areas. Smart Parking creates the possibility of new business models that are only made possible using technology. Reward programs, app-based payments and dynamic parking tariffs are just some examples. Being able to accurately direct a driver to an available space has many environmental benefits; it reduces CO2 emissions, noise and other pollutants. Smart Parking can be combined with Smart Environment, measuring air quality and parking space availability.

## FEASIBLE STUDY

- I.To identify road stretches for survey purpose by reconnaissance.
- II.To determine the parking anatomy & pen down existing problems.
- III.To suggest suitable solution on existing parking system.

### Characteristics of Parking –

There are two types of parking systems: On-street parking method and off-street parking method. On-street parking method is explained.

**On - Street parking:** - On street parking means the vehicles are parked on the sides of the street itself. This will be usually controlled by government agencies itself. Common types of on-street parking are as listed below. As per IRC the standard dimensions of a car are taken as 5m x 2.5 m and that for a truck is 3.75m x 7m.



**Fig.1 On-street parking in PCMC**

### Types of On-Street Parking

There are three types of parking which are as follows:

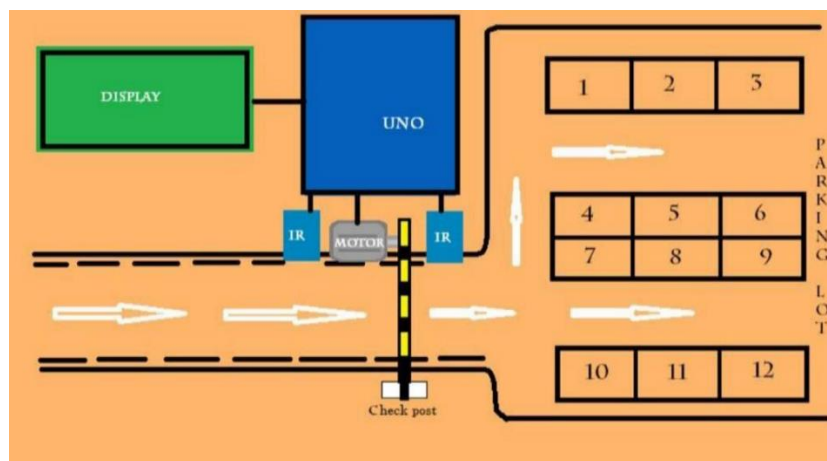
- I.Right angle
- II.Angle parking
- III.Parallel Parking

## **CONCLUSION**

In the present study based on various surveys and analysis carried out for each road stretch, suitable parking system which can be adopted for these roads is verified. In this work, the vehicular count is taken into consideration along with time, area required for parking and cost revenue for that particular road. The present study highlights a methodology to estimate mode-wise parking demanding a typical commercial area in Indian cities. Various Methods to estimate the demand disaggregated by user groups, their trip purposes, and socio-economic characteristics are also discussed.

## METHODOLOGY

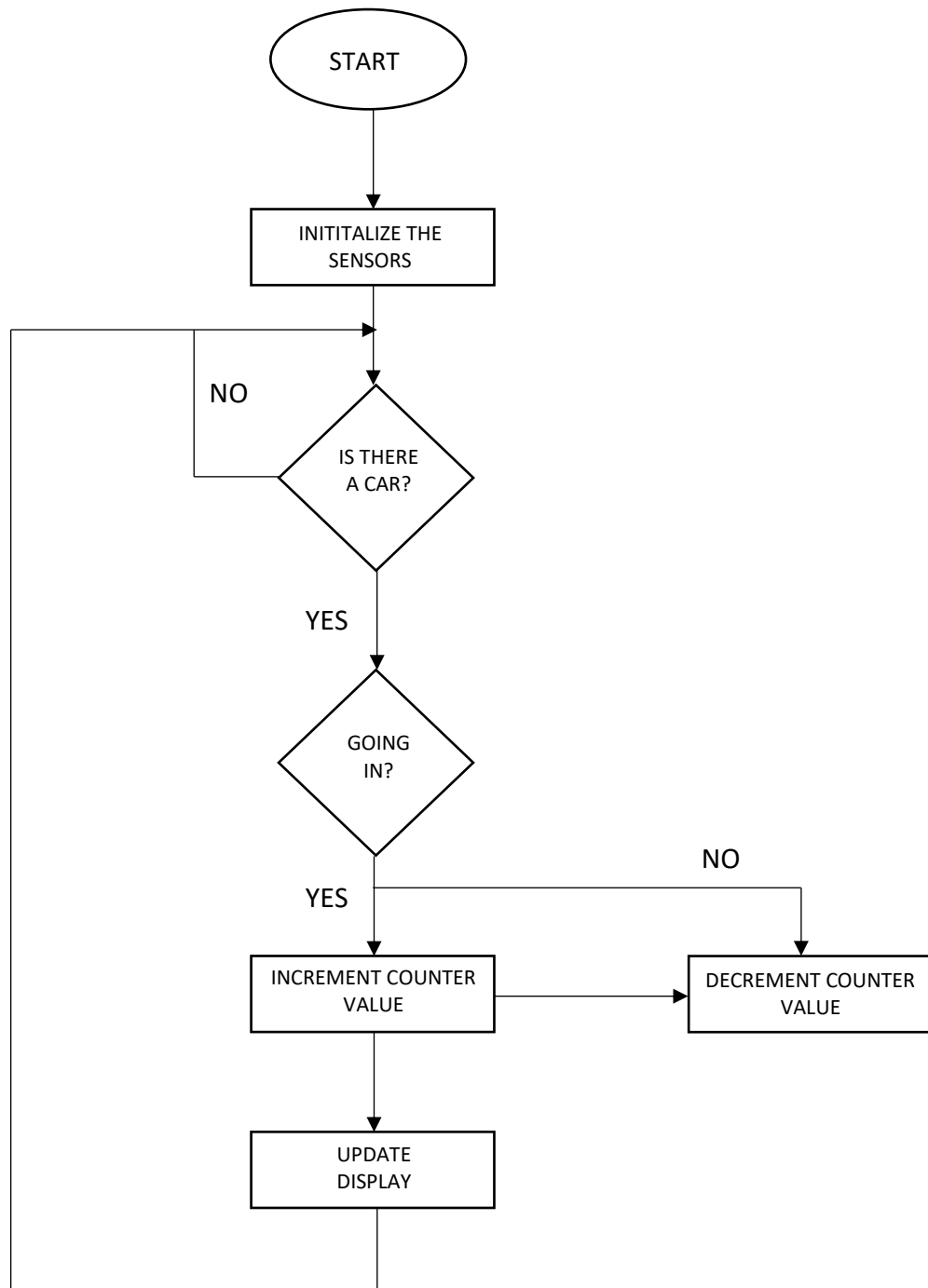
The microcontroller Arduino UNO is utilized. The Arduino digital pins are connected to the infrared sensors. The entry IR sensor delivers a signal to Arduino, which sends a command to operate the motor when a vehicle approaches the entry gate. The motor functions as a checkpoint/gate, allowing or disallowing actions based on the presence of a car detected. The total number of parking spaces available has already been determined. The vehicle is detected by both IR sensors when it enters the parking area.



If the IR sensor-1 (outside the check post) detects the vehicle first, it means the vehicle is entering the parking area, and the number of total parking slots available will be reduced by one unit.

If the IR sensor-2 (inside the check post) detects the vehicle first, the number of total parking slots available will be increased by one unit. The motor continuously opening and shutting the check post based on the vehicle detection. To keep track of available parking slots, we need to make sure that all of the parking lots are filled in a specific order, rather than parking randomly.

## FLOWCHART:





## **FACILITIES REQUIRED FOR PROPOSE WORK**

- 1. Arduino:** The Arduino Uno is an open-source microcontroller board designed by Arduino.cc and based on the Microchip ATmega328P microprocessor. The board includes digital and analogue input/output (I/O) pins that can be used to connect to expansion boards (shields) and other circuits.
- 2. IR Sensor:** An infrared (IR) sensor is a type of electrical gadget that detects and measures infrared radiation in its surroundings. In the year 1800, an astronomer named William Herchel made an unintentional discovery of infrared light. He found that the temperature just beyond the red light was the highest while measuring the temperature of each hue of light (separated by a prism).
- 3. Servo motor:** A servomotor is a linear or rotatory actuator that permits exact control of angular or linear position, velocity, and acceleration. It is made comprised of an appropriate motor and a position feedback sensor. It also necessitates a complex controller, which is frequently a separate module created exclusively for servomotors.
- 4. Breadboard:** The breadboard is a white rectangular board with small embedded holes to insert electronic components.
- 5. LCD Display:** A liquid crystal display, or LCD, gets its name from its definition. It is made up of two different states of matter: solid and liquid. A liquid crystal is used to create a visible image on an LCD.

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