IOT BASED SMART PARKING SYSTEM

A project report submitted in partial fulfilment of the requirements for the degree of B.E in Computer Science and Engineering.

BY

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IOT BASED SMART PARKING SYSTEM:

PHASE 5: PROJECT DOCUMENTATION AND SUBMISSION

INTRODUCTION:

- Smart parking is a technical advancement that makes use of sensors and information technology to assist users in finding available parking spaces.
- It is a management approach for parking lots in many facilities for users to find satisfactory parking places.

SMART PARKING SYSTEM:

- Smart parking is an IoT (Internet of Things) solution that uses sensors and/or cameras in combination with a software to inform users of vacant parking spaces in a certain area.
- Most of the time, people can also directly reserve the spot and pay for it with an app.

we will divide smart parking systems into 3 main types:

- Ground sensor technology.
- Counter technology.
- Overhead sensor or camera-based technology.

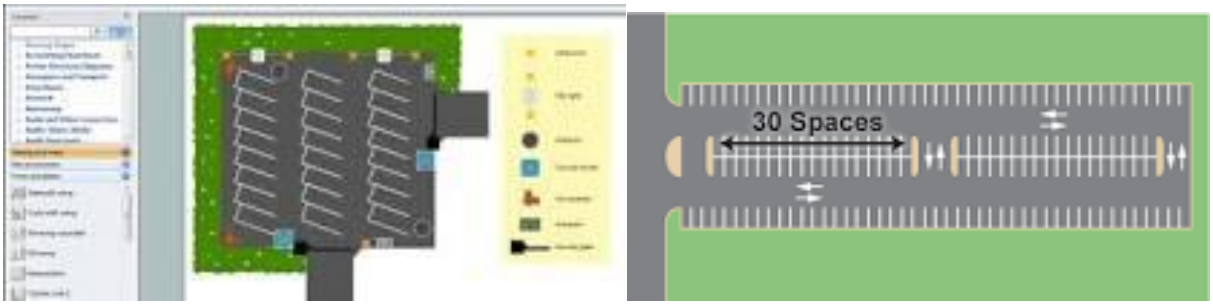
Problem Statement:

In public places where there are many visitors, a lot of time is wasted for searching parking slots: Also, a lot of manual labour is required to look after the existing parking arrangement. Moreover, there is no way of knowing whether a vacant parking space is available or not.

DESIGN THIINKING:

- The parking lot should have multiple floors where customers can park their cars.
- The parking lot should have multiple entry and exit points.

- Customers can collect a parking ticket from the entry points and can pay the parking fee at the exit points on their way out.
- The sensor periodically measures the distance and transmits this data to the microcontroller, which is connected to AWS IoT service via the MQTT protocol.
- Eliminate dead-end parking areas, so there's always a flow-through of traffic along aisles (the driving lanes facilitating access to parking spots)
- Locate aisles and rows of parking parallel to the long dimension of the site.
- Orient parking on each side of an aisle.



Best smart parking system design

BUILD THE SMART PARKING SYSTEM:

- First, you decide on the IoT hardware you'll use in the parking lot.
- Then, you connect the devices and sensors with the microcontrollers through protocols.
- Also, you need to use cloud-based services for data collection and transmission.
- Finally, you create a mobile or web app for parking management.

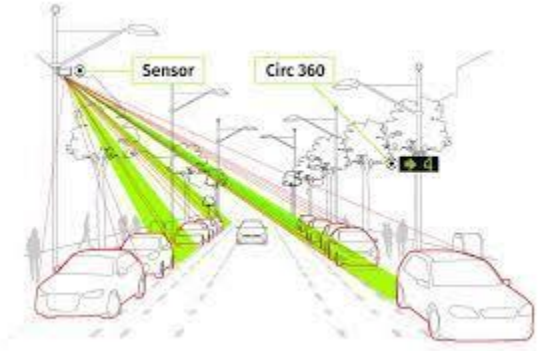
BUILD THE SMART PARKING SYSTEM USING SOME STEPS INVOLVED:

- Making three devices in Artik Cloud Platform.
- Making one application in Artik Cloud.
- Making one rule in Artik Cloud.
- Preparing & Programming Arduino.
- Connecting the Sensors to Arduino.
- Preparing Raspberry Pi.
- Preparing Intel Edison.
- Developing Web Application.

- Smart Parking System means an IoT-based system that sends data about free and residential parking areas via a web/mobile app.
- Smart car parking systems using IoT, which include sensors and microcontrollers, can be available in each parking slot.

SOME DEVICES USING IN THE SMART PARKING SYSTEM:

- Ultrasonic sensors. Ultrasonic sensors measure distance by using ultrasonic waves in time between the emission and reception. ...
- Electromagnetic field sensors. ...
- Infrared sensors (IR sensor)

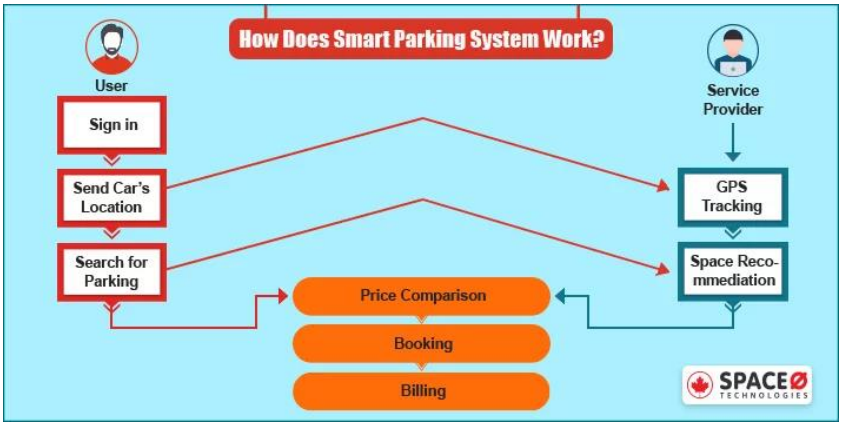


Salient Features of Smart and Automated Car Parking System:

- ✓ Real-time monitoring: One of the main features of smart and automated car parking systems is real-time monitoring

- ✓ Parking guidance systems
- ✓ Automated vehicle retrieval
- ✓ Integration with other systems
- ✓ Environmental sustainability

HOW TO SMART PARKING SYSYTEM WORKS:



IMPORTANT OF INNOVATION TO SMART PARKING SYSTEM:

- Smart parking solutions enable the municipalities to manage and reduce parking search traffic on the streets.
- This technology also ensures parking safety, but its major contribution to traffic congestion are the factors of making the parking experience faster, more convenient and hassle-free.

BEST INNOVATIVE IDEA:

Automated Parking Systems

- They employ techniques such as vertical stacking, horizontal sliding, or robotic valet parking to optimise space efficiency.
- These solutions are particularly beneficial in high-density urban areas with limited space, offering an innovative and reliable approach to parking.

INNOVATION STEPS OF SMART PARKING SYSTEM:

- Automated valet parking robots
- Car Parking lifts
- Robot car parks
- Smart Parking sensors
- Pay by Plate payment method for parking
- 3D parking design and signaling
- Pollution based parking fees
- Length based parking fees
- Resident rates for parking fees
- Wireless charging on parking spots

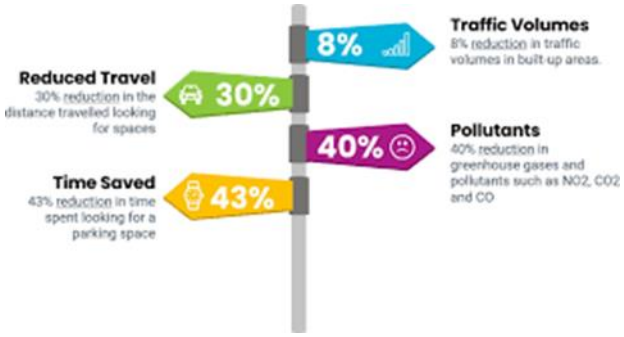
SMART PARKING SYSTEM USING THE ARDUINO DEVICES:

- 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 system utilizes an Arduino Uno board along with an ultrasonic sensor, IR sensor, servo motor, and object counter to efficiently park vehicles.
- This prototype aims to optimize parking space utilization, reduce human error, and enhance overall parking efficiency.

ADVANTAGE OF SMART PARKING SYSTEM:

- Use Smart Parking Protection Easily.
- Monitor Your Parking Lots.
- Manage Parking Lot Using Real-time Data.
- Minimize Carbon Footprint.
- Maximize Revenue.
- Save Time, Gas, And Money.
- Integrate Them Into Any Smart City System.



Benefits of smart parking:

- Reduces unnecessary vehicle emissions caused by parking search traffic

- Saves time and hassle for drivers to find (and pay) for their ideal parking space quickly and easily
- Generates data that can be leveraged to connect other modes of transportation - hints the concept of a mobility hub. Such as ride-sharing, bike hire, scooters or public transportation.

FUTURE SCOPE:

- A smart parking solution represents the future of parking, providing real-time information to drivers and offering numerous benefits for city planners.
- By reducing congestion, increasing efficiency, and improving sustainability, smart parking is set to revolutionize the way we park our cars in cities around the world.

CONCLUSION:

- As a conclusion, this project will help in reducing the amount of time a driver has to spend around the parking just to find an available spot, reducing the amount of traffic around the parking and also reducing the bad parking around the parking space.
- Using IOT devices maintain and build the smart parking system easily.