Smart Parking

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Introduction

- Smart parking is a modern approach to parking management that leverages technology and data to improve the efficiency, convenience, and overall experience of parking for both drivers and parking facility operators.

- It addresses common parking challenges in urban areas, such as finding available parking spaces, reducing traffic congestion, and optimizing parking facility usage

Need for smart parking

- Smart parking is no longer a luxury but a necessity in today's urban landscapes. As cities continue to grow, the demand for parking spaces has intensified, leading to traffic congestion, environmental concerns, and frustrated drivers.

- Smart parking is needed to alleviate these issues by optimizing parking resource allocation and enhancing the overall parking experience

What is smart parking

- Smart parking is an advanced parking management system that utilizes technology and data-driven solutions to optimize the parking experience for both drivers and parking facility operators.

- It leverages various sensors, cameras, and digital platforms to provide real-time information about parking availability, streamline the parking process, and enhance overall efficiency

BENEFIT FOR SMART PARKING

- For parking facility
- For cities and urban area
- For Environmental
- Support for Electric vehicle

MOBILE Application

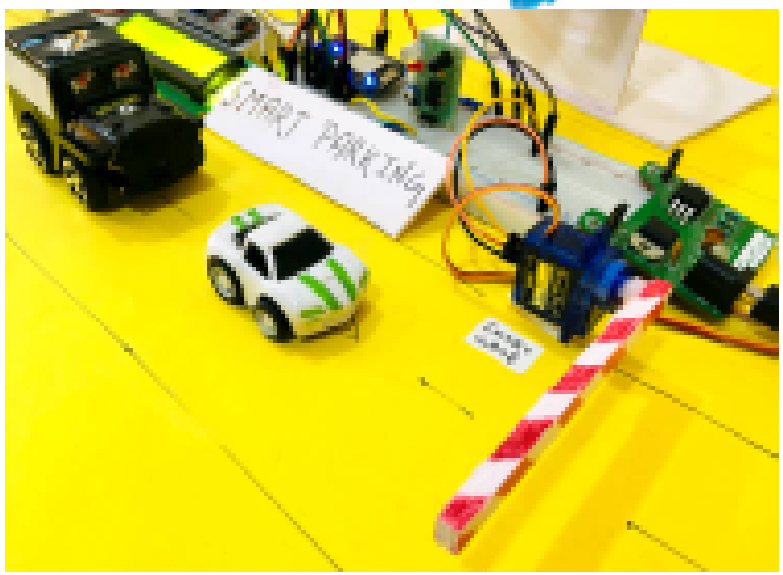
- Mobile applications for smart parking are revolutionizing the way people find, access, and pay for parking spaces in urban environments.

- These apps leverage real-time data from smart parking systems, making it easier and more convenient for drivers to navigate the challenges of urban parking.

- Users can simply open the app to access information about available parking spaces, their locations, and pricing details

Sensor Technology

- Ultrasonic Sensors
- Magnetic Sensors
- Infrared Sensors
- Camera-Based Sensors
- Lidar Sensors
- Radar Sensors
- Wireless Sensors
- Surface-Installed Sensors
- IoT (Internet of Things) Sensors

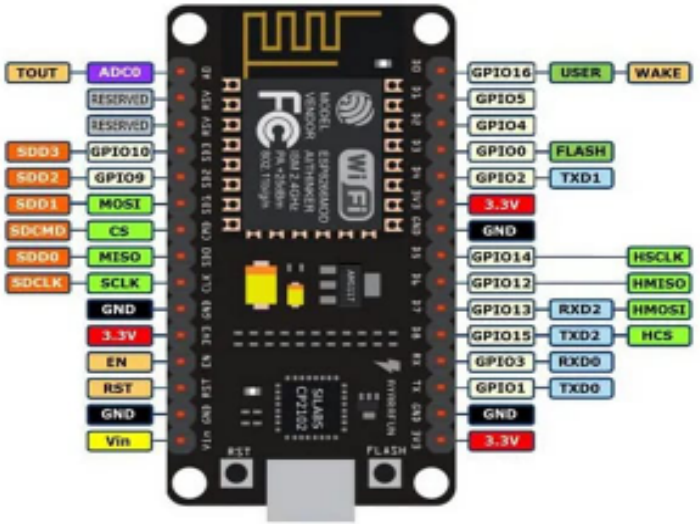


Software Requirements

1. Arduino IDE:
The Arduino IDE is a software to write and upload the program into the NodeMCU for communication between microcontroller and cloud or a system.

2. MIT app inventor:
MIT App inventor is an open source web application. It allows users to create an android application replacing the complex language of text-based coding into a visual drag and drops building blocks.

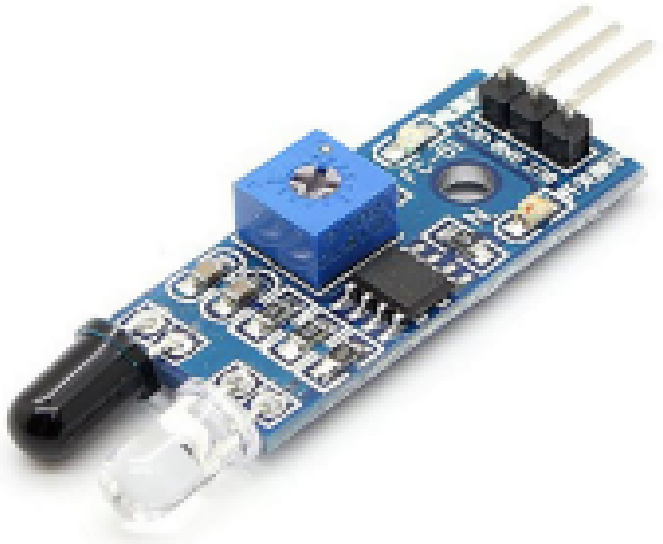
Hardware Requirements



1. NodeMCU:
NodeMCU is an open-source Lua based firmware and development board specially targeted for IoT base Applications and is built around a system-on-a-chip called ESP8266. The ESP8266 contains all crucial elements of the modern computer: CPU, RAM, networking(Wi-Fi), modern operating system and SDK.

2. IR sensor:

Infra-red sensor is used to detect an object at the parking space.to detect an object at the parking space.

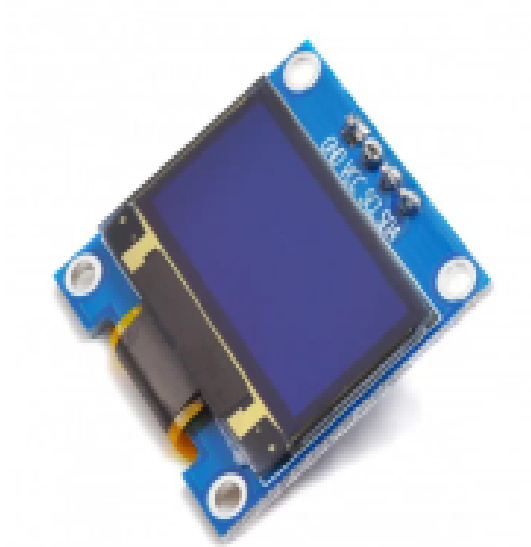


3. Servo motor:

A servo motor is a rotary actuator that allows for precise control of angular or linear position, velocity and acceleration. This is used to open the entry and exit gates in this system.

4. OLED Display:

It is used to display the information about the vacant parking spaces.



FUTURE Trends

- AI and Machine Learning
- Blockchain for Payments.
- IoT and 5G Connectivity.
- Robotic Parking Solutions
- Smart Parking for Micromobility
- Data Sharing and Open APIs
- Augmented Reality (AR) Navigation
- Sustainability Initiatives
- Dynamic Pricing Models
- Enhanced Security
- User-Centric Apps
- Smart Street Parking
- Multi-Modal Integration

Application

- Urban Parking Management
- Commercial parking
- Public Transit Hubs
- Smart cities
- Electric vehicle charging
- Employee parking Tourism

Advantages

- Efficiency
- Cost savings
- Environmental Benefits
- Data collection
- Improved user Experience
- Reduced Traffic

Disadvantage

- Cost of implementation
- Maintenance
- Privacy concerns
- Reliance on Technology
- Equity Issues

Conclusion

- In conclusion, smart parking is not just a convenience but a vital solution to the evolving challenges of urbanization, traffic congestion, and environmental sustainability. By leveraging advanced technologies such as sensors, IoT, mobile apps, and data analytics, smart parking systems transform the way we find, access, and utilize parking spaces.

- They streamline the parking process, reduce the time and stress associated with parking, and contribute to a more efficient and sustainable urban landscape

Thank you