

SMART PARKING

Introduction

Smart parking is an IoT (Internet of Things) solution that uses sensors and 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.

Project Objectives

The project aims to develop a real-time parking availability system that can help drivers find available parking spaces quickly.

The key objectives are to:

- Reduce the time and stress associated with finding parking.
- Improve traffic flow by guiding drivers to open parking spaces.
- Enhance user experience through a user-friendly mobile app.
- Utilize IoT sensors to collect and transmit real-time parking data.
- Integrate a Raspberry Pi as a central data hub and decision-making component.
- Implement a robust and efficient software system to process and display parking availability information.

Program

```
# Simulated parking space availability
```

```
parking_spaces = {
```

```
    "A1": True,
```

```
    "A2": True,
```

```
"A3": True,  
"B1": True,  
"B2": True,  
"B3": True,  
}
```

```
def check_parking_space_availability():  
    while True:  
        print("\nCurrent Parking Space Availability:")  
        for space, is_available in parking_spaces.items():  
            status = "Available" if is_available else "Occupied"  
            print(f"Space {space}: {status}")  
  
        time.sleep(5)  # Simulating real-time updates every 5 seconds  
  
def simulate_car_arrival(space):  
    if space in parking_spaces and parking_spaces[space]:  
        parking_spaces[space] = False  
        print(f"Car has arrived and parked in Space {space}.")  
    else:  
        print(f"Space {space} is already occupied.")
```

```

def simulate_car_departure(space):

    if space in parking_spaces and not parking_spaces[space]:

        parking_spaces[space] = True

        print(f"Car has departed from Space {space}.")

    else:

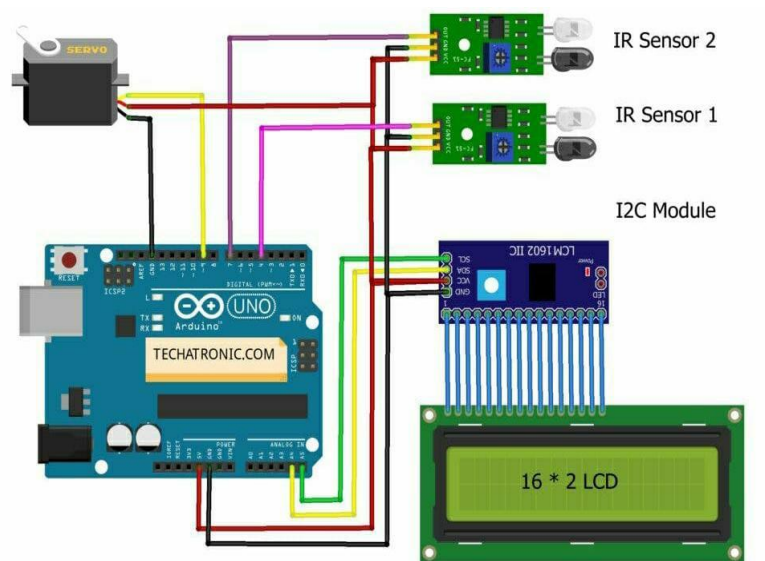
        print(f"Space {space} is already available.")

if __name__ == "__main__":

    check_parking_space_availability()

```

Schematic diagram



GLIMPSE

The Smart Parking is to improve the efficiency and user experience of smart parking systems by providing users with real-time insights into available parking spaces, reducing the time and stress associated with finding parking.

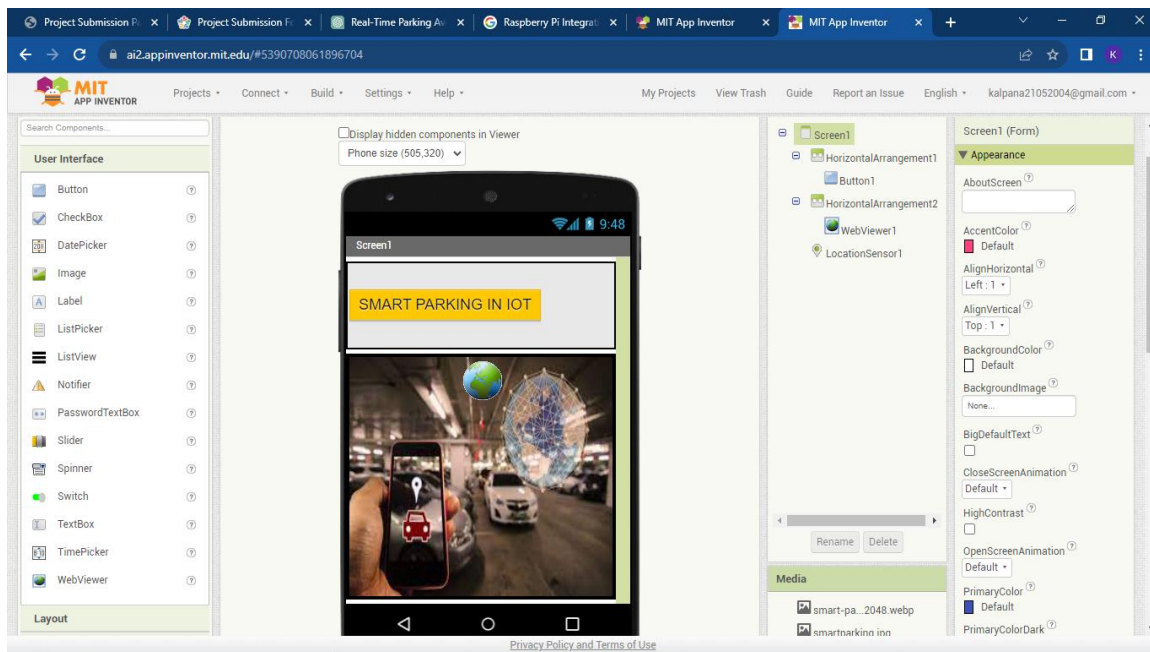
IoT Sensor Setup:

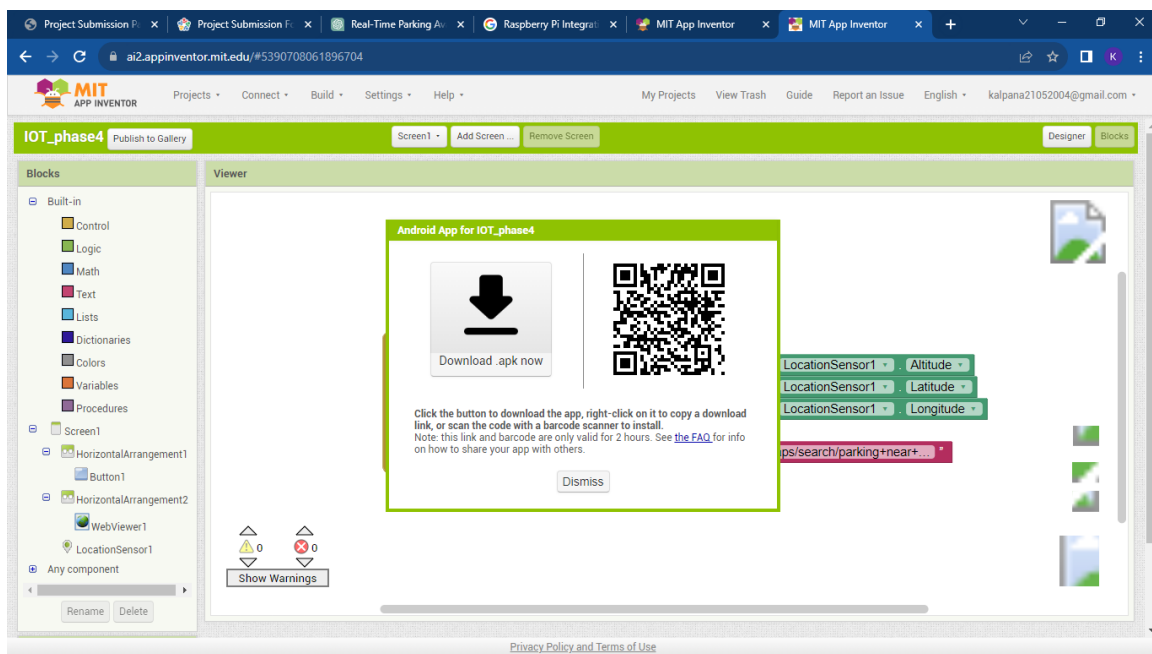
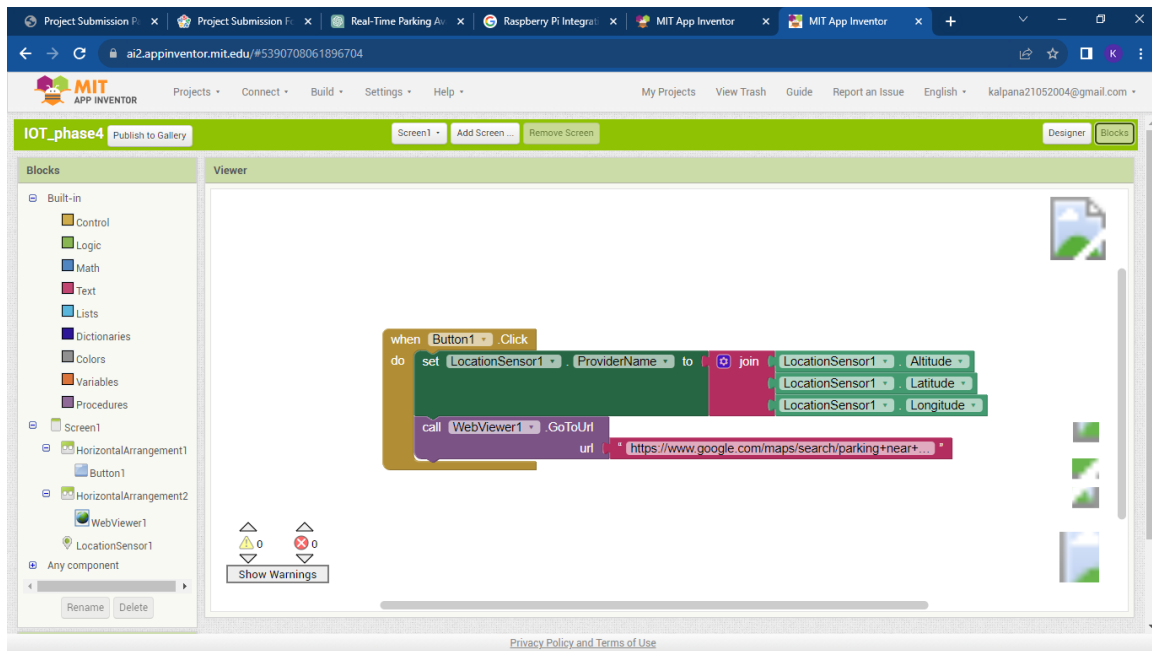
For this system, we'll use ultrasonic sensors placed in parking spaces to detect the presence of a vehicle. Each sensor will be connected to a microcontroller that sends data to a central Raspberry Pi.

Mobile App Development:

The mobile app is a critical component that provides real-time parking information to users. Users can view available parking spaces and get directions to the nearest open spot. The app should have a user-friendly interface with features like user registration, GPS integration, and real-time updates. The Raspberry Pi serves as the central hub for data collection, processing, and distribution. It receives data from the IoT sensors, processes it, and makes it available to the mobile app. Additionally, the Raspberry Pi can control LED displays in the parking lot to indicate available spaces.

Raspberry Pi Integration







Reference

Juhi Seth, Pola Ashritha, R Namith, "Smart Parking System using IoT ElakyaR", International Journal of Engineering and Advanced Technology (IJEAT), ISSN: 2249 – 8958, Volume-9 Issue-1, October 2019.

Conclusion

Smart Parking solution is an outcome of human innovations and advanced technology which not only provides easy access to the parking spots but also help in saving valuable resources such as fuel, time and space.