**SMART PARKING USING INTERNET OF THING (ÍOT)**

**INTRODUCTION:**

**\***The proposed IoT-based Smart Parking System leverages a network of sensors and communication devices to monitor and manage parking spaces in real-time. These sensors are strategically deployed in parking areas, and they continuously collect data related to parking space occupancy and availability. This data is then transmitted to a central cloud-based platform for analysis and dissemination.

**IDEAS :**

• A sensor that can detect the presence of the vehicle.

• A micro control that can help you processing the data.

• A cloud platform will restore the data.

• A mobile application enables you to control the smart parking process.

**SENSORS USED IN SMART PARKING SYSTEM:**

**ESP32**

\*ESP32 is a series of low-cost, low-power system on a chip microcontrollers with integrated Wi-Fi and dual-mode Bluetooth. The ESP32 series employs either a Tensilica Xtensa LX6 microprocessor in both dual-core and single-core variations, Xtensa LX7 dual-core microprocessor or a single-core RISC-V microprocessor and includes built-in antenna switches, RF balun, power amplifier, low-noise receive amplifier, filters, and power-management modules.

**Ultrasonic Sensors**

\*The integration of ultrasonic sensors, which measure the distance between objects using ultrasonic waves, allows for precise parking. However, such devices have one drawback — the sensor might get blocked with dirt.

**Electromagnetic Field Sensors**

\*An electromagnetic field sensor detects and measures changes in the magnetic field. This way, it reacts to the approach of metal objects.

**Infrared Sensors**

\*Infrared (IR) sensors emit an infrared signal and catch the reflection of this signal from the environment. Integrating such a device enables measuring the temperature

**SEGMENT INVOLVED:**

\*Decentralized server (Raspberry Pi) for image processing, computation and network management.

\*ESP32-CAM hardware setup for wireless image transmission and reception by server.

\*Object detection and updation of database

\*Cloud Deployed and completely scalable Website and Cloud Database management.

**IMPLEMENTATION OF SMART PARKING SYSTEM USING IOT:**

\*Esp32 Cam sends data from sensors to firebase so that data can be viewed in real-time. Implementation on smart parking using Esp32 Cam will provide information as well as detect cars provided for parking users.

\*A Smart Parking System makes use of sensors or other technologies to determine the availability of parking lots in cities. This information can be shared with drivers, reducing the time spent looking for parking and thus reducing traffic congestion.

**TECHNICAL STACK:**

**ESP32-CAM setup**

\*Arduino IDE

\*ESP32 board

\*Socket library

\* Protocol

**Object detection and updation**

\*Python

\*OpenCV library

\*OS module

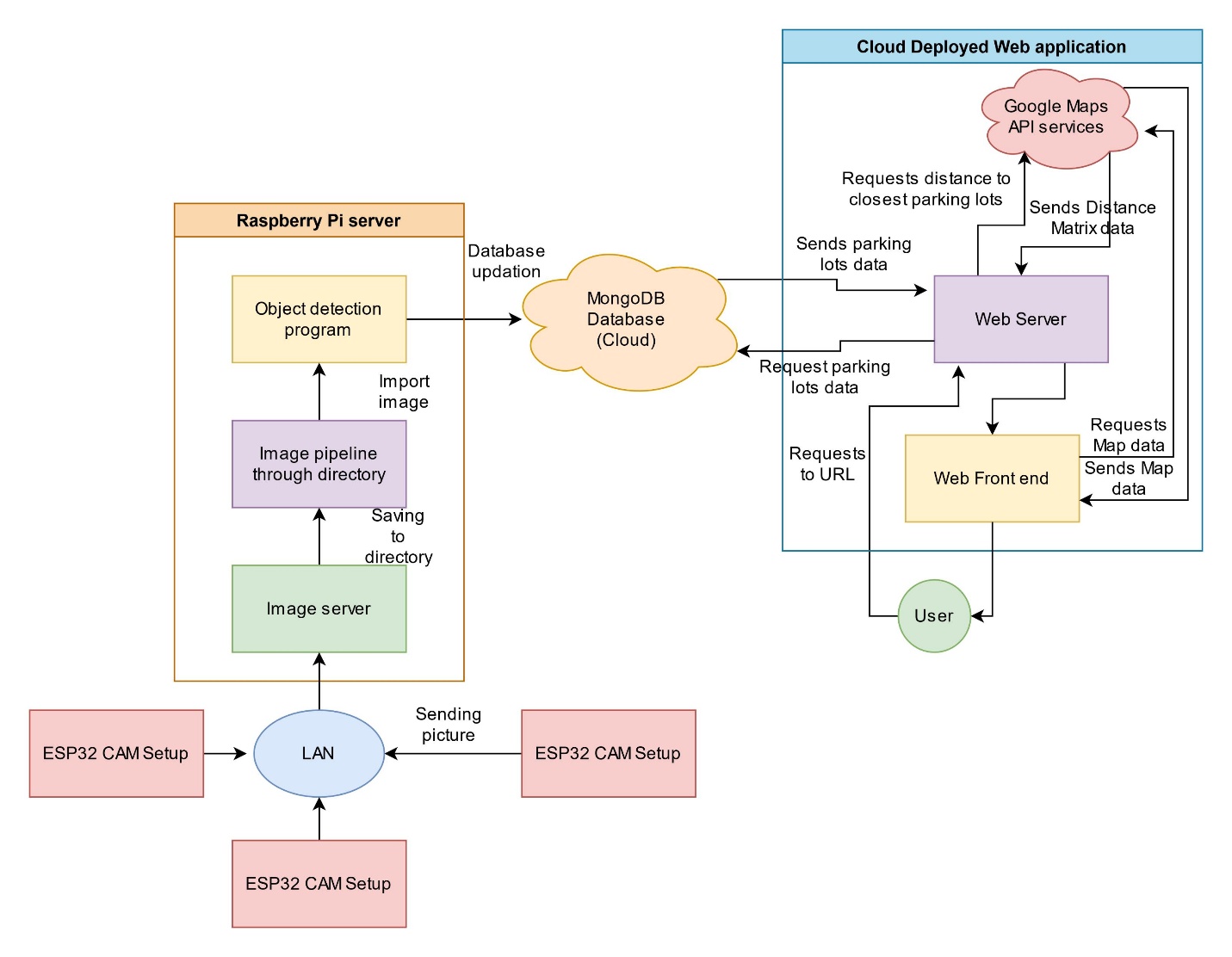
**APPLICATION OF SMART PARKING SYSTEM USING IOT:**

\*An IoT-based smart parking system is a decent solution for businesses and consumers,

\* providing real-time data on parking space availability, pricing, payments, and more. It can positively impact the environment and traffic.

\*Moreover, IoT solutions ensure efficient parking reservation and management.

**BLOCK DIAGRAM:**

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