Phase1:Problem Definition and Design thinking

Project Title:	IOT Traffic Management System
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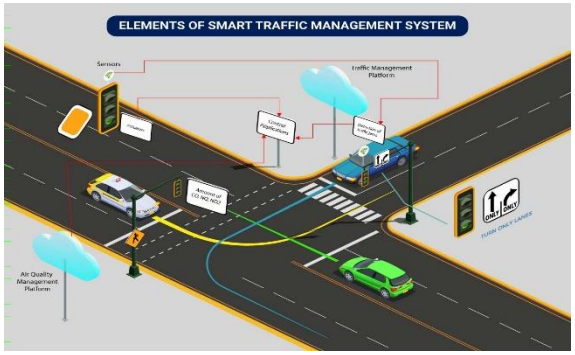
Github Respositary link	https://github.com/Supraja1508/Ibm-Naanmudhalvan-IOT.git

1.Project Definition

1.1 Project Overview:

In this project involves using IoT devices and data analytics to monitor traffic flow and congestion in real-time, providing commuters with access to this information through a public platform or mobile apps.In our Project we can reduce the traffic congestion and accident with the help of sensors and cameras communicate through computer with mobile apps.

1.2 Project Objectives:



1.Real time traffic Monitoring:

Manage traffic behaviours in real time using sensors, smart cameras, global positioning systems (GPS) and Bluetooth/Wi-Fi.

2.Congestion Detection:

IoT sensors can also monitor variations in traffic patterns and provide real-time data to drivers enabling them to choose routes that avoid traffic congestion.

3.Route Optimization:

optimizing vehicle routing can improve the reliability of the distribution process, as well as real-time tracking and monitoring of the distribution process.

2.Design Thinking

2.1 IOT Design Sensors:

Select the sensors based on monitoring the traffic flow and congestions.Consider the factors includes

accuracy,cost,power consumption and communication capability. The sen

- Doppler microwave sensor

- ultrasonic sensors
- microcontroller

- passive infrared (PIR) sensors
- Cameras

2.1.1 Uses of Sensors:

1.Doppler Microwave Sensor:

speed sensors are used in traffic management systems to monitor vehicle speed, collect traffic data, and control traffic signal**s.**

2.passive infrared sensor:

It is an electronic sensor that measures infrared light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications.

3.The ultrasonic sensor:

It is an electronic device used to measure distances. Because, measuring distance is an essential factor in many applications such as robotic control, vehicle detection etc. Sensors such as optical and sound are the most helpful. Ultrasonic sensors are used as proximity sensors.10-Sept-2022

2.1.2 Sensor Deployment :

1.Sensor Deployment:

Sensors are placed in on side of the road with low traffic volume, and are used for recall control to change the traffic light on the side road.sensors are weather resistant.

2.Communication*:*

We set up a wireless communication network *(e.g., Wi-Fi) for* sensors to transmit data to *a* center*.*

3.Power supply*:*

We use *a* reliable power source for sensors*,* either through *battery and solar* panels

4.Image Processing:

We can do Image Processing to detect the vehicles using **camera.**

2.2.Real -**Time Transit information platform**:

2.2.1. Mobile App Interface:

1. User Interface (UI):

Design an intuitive and user-friendly interface for the mobile application.Include features such as a map view in traffic occurring place

2. Real-time Updates:

We Implement a mechanism to continuously update the app with real time.

3.Reserving the Tickets:

We are Providing customers with a personalized easy-to-utilize user experience for booking and purchasing tickets through mobile apps.

2.3. Integration Approach Using Arduino and Cloud:

2.3.1 Data Collection with Aurdino:

1.Sensor Selection:

Using aurdino sensor for used to detect the presence of vehicle.

2.Data Acquisition:

Write Arduino code to read data from the sensors.

3.***Data Processing***:

We Implementing code on the Arduino to process sensor data. Calculate occupancy status based on sensor readings and thresholds.

3.2. IoT Cloud Integration:

1. Cloud Platform Selection:

We are choosing an IoT cloud platform. Popular

Options include AWS IoT, Google Cloud IoT

2. Cloud Account Setup:

We Create an account and set up your IoT project on the chosen cloud platform.

3. Device Registration:

Registering our Arduino-based device as an IoT thing on the cloud

Platform for secure Communication.

4. Data Transmission:

Configure the Arduino to use the MQTT (Message Queuing Telemetry Transport) or HTTPS protocol to send sensor data to the cloud platform securely.

3.3 Data Processing in the Cloud:

1.Cloud Functionality:

We set up the cloud functions or serverless computing services on our cloud platform to receive and process incoming sensor data.

2. Data Storage: Store processed data in a cloud-based database (e.g.,

Amazon DynamoDB, Google Cloud Firestore, or Azure Cosmos DB).

3.Real-time Processing:

3.4. Mobile App Integration:

1. Mobile App Development:

We Developing a mobile app (iOS/Android) that communicates with the cloud-based IoT platform.

2. API Communication:

Integrate APIs or SDKs provided by the cloud platform to enable

Secure communication between the mobile app and the cloud.

3. Real-time Updates:

We Implement real-time updates within the mobile app, ensuring users have access to availability information through the app.

2.3.5. User Interface

1.App Interface:

design an intuitive and user-friendly interface for the mobile app. Incorporate maps, markers, search functionality, and navigation features.

2.3.6Testing and Deployment

1.Testing:

Conduct thorough testing of the integrated system, including Arduino sensor data collection, cloud-based data processing, and mobile app functionality. Address any issues or bugs encountered during testing.

2 Deployment:

Once our testing is successful, deploy the integrated system . Ensure all our sensors are correctly placed and communicate effectively with the cloud platform.

3.User Training:

It is necessary provide user training on how to use the mobile app.