**Public Transport Optimization**

**Project : Development part 1**

**Introduction to public transport optimization:**

* **In general optimization in the context of public transportation is an extremely**

**Difficult task even for small transit network because of the large number**

**Of variables and constraints and the discrete nature of variables and non**

**Linearity of the objective function.**

* **Transport optimization helps shoppers,3PLs,and transportation consultants**

**shipment,rates,and constraints to produce realistic load plans that reduce**

**Overall frieght spend.**

**Public transport optimization using iot with sensors:**

**Sensor for deployment:**

* **To achieve effective public transport optimization,several types of sensors**

**Can be deployed in vehicles and at transport infrastructure locations.Here**

**Are the key sensors and their applications.**

**Gps sensors:**

**Application: used for real time vehicles tracking and route optimization.**

**Benefits:provides accurate location data,helping to monitor vehicles movement,calculate**

**ETA, and optimize routes based on traffic condition.**

**Passenger counting sensors:**

**Application: used to monitor passenger loads on vehicles.**

**Benefits: Allows for optimization of vehicle capacity ,leading to better resource allocation**

**And service planning.**

**Temperature and climate sensors:**

**Application:monitoring and maintaining comfortable climate condition inside vehicles.**

**Benefits:Ensures passengers comfort and safety by regulating heating, ventilation,and**

**Air conditioning systems.**

**Camera sensor(CCTV):**

**Application: surveillance and monitoring of passengers,drivers behaviour and security.**

**Benefits:Improve safety and security by recording video footage for analyze and**

**Incident resolution.**

**Select iot devices with sensors:**

**Research and choose iot devices that include the necessary sensors.**

**Deployment of IoT devices:**

**Install iot devices with sensor in public transport vehicle and at key infrastructure**

**Location.**

**Data collection:**

**IoT devices with sensor will collect data including gps, passenger counts, temperature**

**Proximity,and camera footage.**

**Data processing and storage:**

**Develop a data processing pipeline to clean and store the collected sensor data.**

**Python script development:**

**Create python script to analyze and process sensor data ,implementing algorithms**

**For optimization real time passenger information,and more.**

**Real-time passenger information :**

**Develop a user interface for passenger to access real-time information based on**

**Sensor data.**

**Optimization algorithms:**

**Utilize sensor data to improve route efficiency ,minimize delays,and optimize**

**Resource allocation.**

**Testing and validation:**

**Throughly test the system ,including sensor accuracy and script functionality.**

**Python program:**

**Import serial**

**Import requests**

**#configire the serial port (update the port name accordingly)**

**Ser=serial.serial(‘COMX’,9600)**

**#Think speak settings**

**Thing speak\_api\_key=’6EKT0ALDBXGG60Q1’**

**Thinkspeak\_url=f’https://thinkspeak.com/channels/2303456/private \_try**

**While True:**

**#Read passenger count data from Arduino**

**Passenger \_count=ser.readline().strip().decode(‘utf-8’)**

**#send data to thinkspeak**

**Response=request.get(f’{thinkspeak\_url}&field1={passenger\_count}’)**

**If response.status\_code==200:**

**Print(f”passenger count to send thinkspeak:{passenger \_count}”)**

**Else:**

**Print(“failed to send data to thinkspeak”)**

**Except keyboard interrupt**

**Ser.close()**

**Print (“connection closed”)**