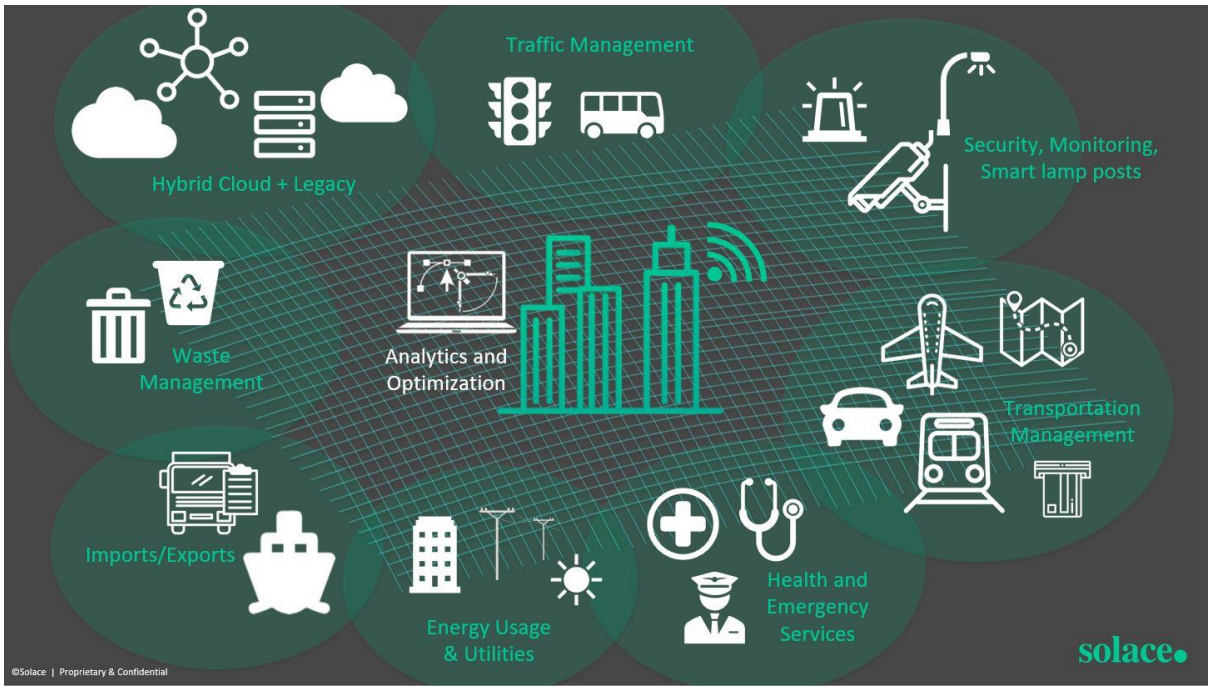
IOT PHASE 3

PUBLIC TRANSPORT OPTIMIZATION



Public transport optimization refers to the process of improving the efficiency, effectiveness, and overall quality of public transportation systems. This involves using various strategies and technologies to make public transportation more convenient, reliable, and environmentally sustainable.

IOT Projects in Public Transport

Explore a range of fascinating IOT projects that have been implemented in public transport systems, including smart

ticketing, real-time passenger information systems, and automated fleet management.

The Importance of Predicting Arrival Time

Learn why accurately predicting arrival times is crucial for passengers, operators, and city planners. Discover how IOT-powered algorithms and data analysis techniques can help optimize scheduling and reduce delays.

Data Collection and Analysis Methods

- Sensor Integration

  See how IOT sensors collect real-time data on vehicle locations, passenger counts, and traffic conditions to feed into predictive models.

- Big Data Analytics

  Explore the use of advanced analytics techniques to process and analyze massive datasets, unlocking valuable insights for optimizing public transport operations.

- Machine Learning

  Discover how machine learning algorithms can be trained on historical data to recognize patterns and predict arrival times with greater accuracy.

Development of Prediction Models

- Supervised Learning

Understand the process of training prediction models using labeled data, enabling them to make accurate forecasts based on past patterns.

- Neural Networks

Explore how artificial neural networks can leverage the power of parallel processing and hidden layers to create more sophisticated prediction models.

- Time Series Analysis

Learn how statistical techniques can analyze historical data to identify temporal patterns and seasonality, facilitating precise arrival time predictions.

Integration of Prediction Models

- Real-Time Data Sync

Discover how prediction models integrate with real-time data feeds from sensors and other sources, enabling dynamic adjustments to arrival time estimates.

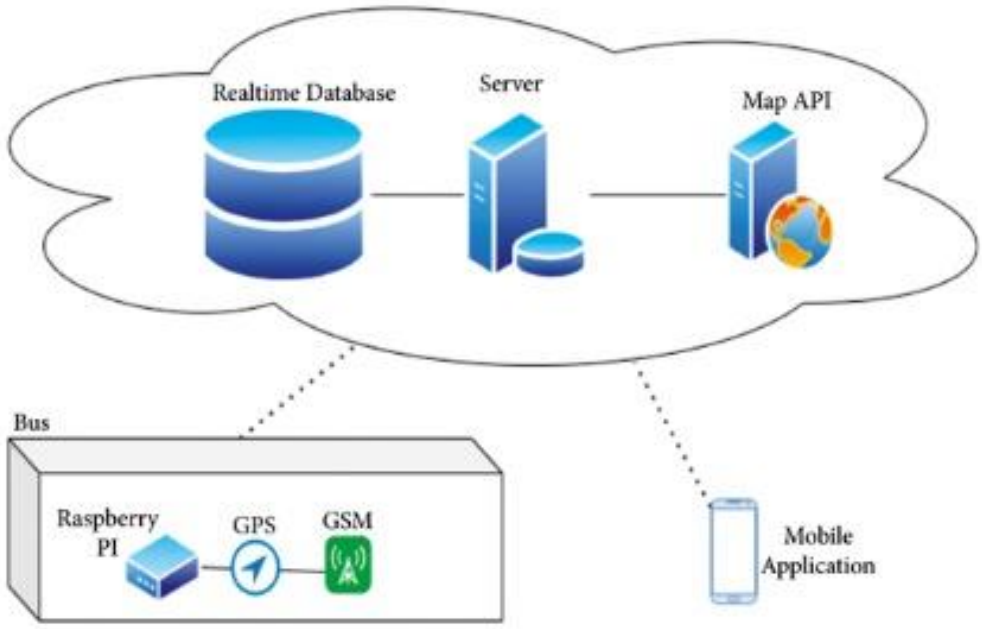
- **Passenger Information Systems**

See how arrival time predictions are seamlessly communicated to passengers through digital displays, mobile apps, and public announcements.

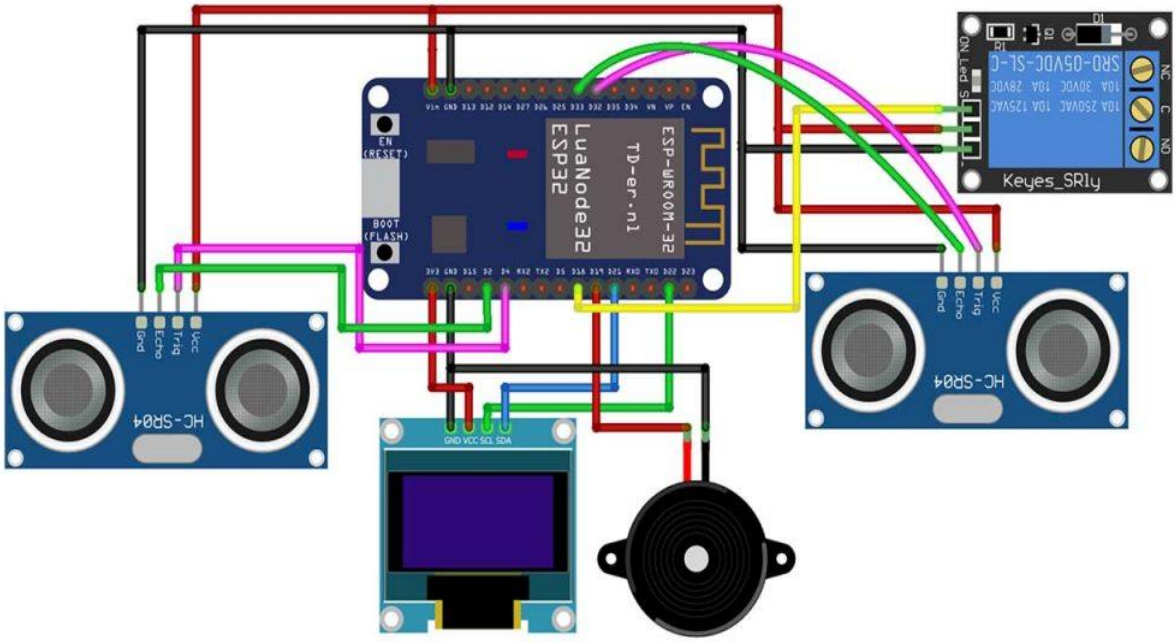
- **Operational Decision Support**

Explore how transport operators use prediction models to optimize driver schedules, minimize waiting times, and improve the overall efficiency of their services.

Location Provider Module



Passenger Count

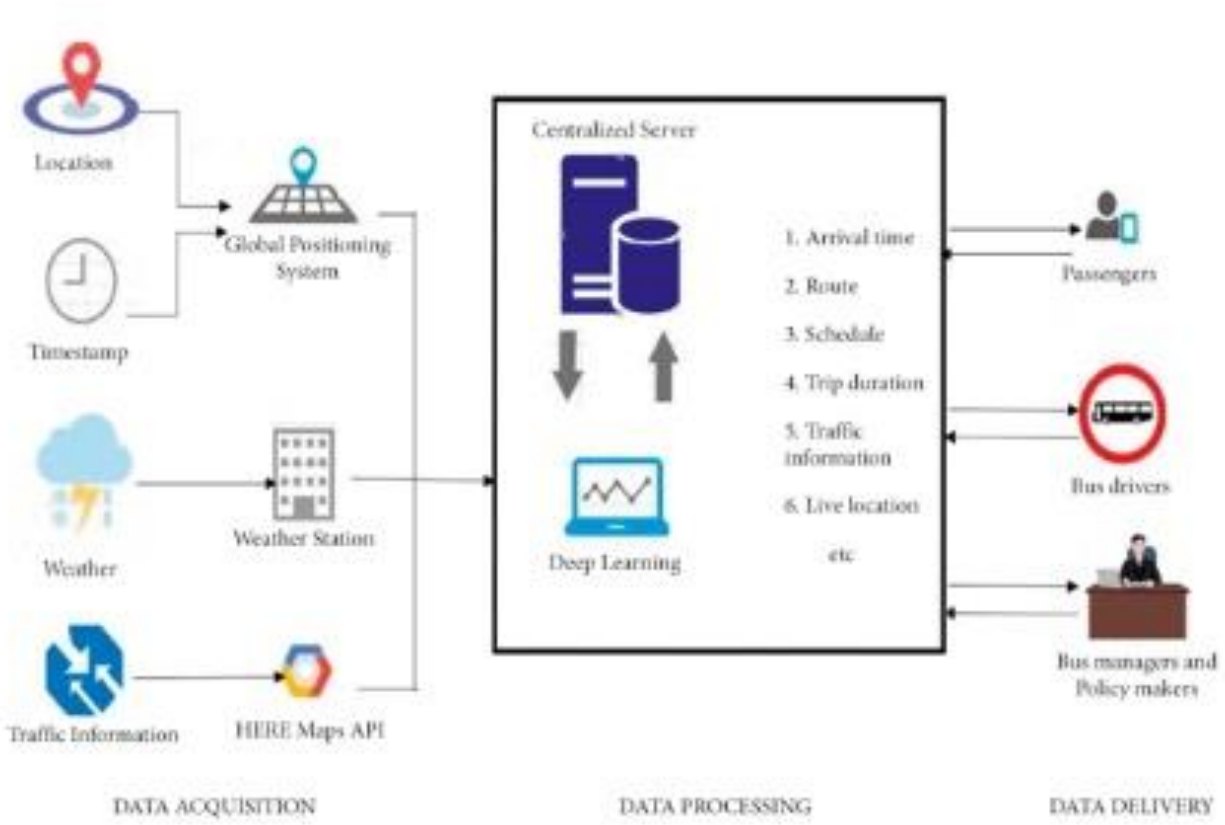


Program for Passenger Count

```
import time
import random


class Bus:


    def __init__(self, bus_id):
        self.bus_id = bus_id
        self.location = 0


    def move(self):
        self.location += random.randint(1, 5)
```

```
    def get_location(self):
        return self.location

class Passenger:

    def __init__(self, passenger_id, destination):
        self.passenger_id = passenger_id
        self.destination = destination

    def request_bus_info(self):
        # Simulate requesting bus information
        print(f"Passenger {self.passenger_id}
        is looking for a bus to {self.destination}.")

class BusStop:

    def __init__(self, name, location):
        self.name = name
        self.location = location

    def is_near(self, bus):
        return abs(bus.get_location() - self.location) <= 2
```

```
def main():
    # Create buses and bus stops
    buses = [Bus(1), Bus(2)]
    bus_stops = [BusStop("Stop A", 10), BusStop("Stop
    B", 20)]

    passengers = [Passenger(1, "Stop B"), Passenger(2,
   "Stop A")]
   while True:
      for bus in buses:
        bus.move() for passenger in passengers:
          if passenger.request_bus_info():
            for stop in bus_stops:
              if stop.name == passenger.destination:
                if stop.is_near(bus):
                  print(f"Bus {bus.bus_id} is approaching
                 {stop.name} for Passenger
                 {passenger.passenger_id}.")
                  time.sleep(1)
                 # Simulate time passing

if __name__ == "__main":
   main()
```


Location
Timestamp
Global Positioning System
Weather
Weather Station
Traffic Information
HERE Maps API
Centralized Server
Deep Learning
1. Arrival time
2. Route
3. Schedule
4. Trip duration
5. Traffic information
6. Live location
etc
Passengers
Bus drivers
Bus managers and Policy makers
DATA ACQUISITION
DATA PROCESSING
DATA DELIVERY