PUBLIC TRANSPORT OPTMIZATION

Project Report

Project Objectives:

The Public Transport Optimization project aims to enhance the efficiency and convenience of public transportation services by utilizing IoT technology. Key objectives include:

- Real-time tracking of public transport vehicles.
- Predictive maintenance to reduce downtime.
- Improved passenger experience with a mobile app.
- Data-driven route optimization.
- Reduced emissions and fuel consumption.

IoT Sensor Setup

Hardware Components:

- GPS modules for vehicle tracking.
- Environmental sensors (temperature, humidity) for data collection.
- Raspberry Pi for data processing and communication.

Sensor Deployment

Sensors are strategically placed on public transport vehicles for data collection and transmission.

Data Collection

Sensors continuously collect data and transmit it to a central server for analysis.

Mobile App Development

A user-friendly mobile app is developed to provide passengers with real-time information on vehicle locations, estimated arrival times, and route updates.

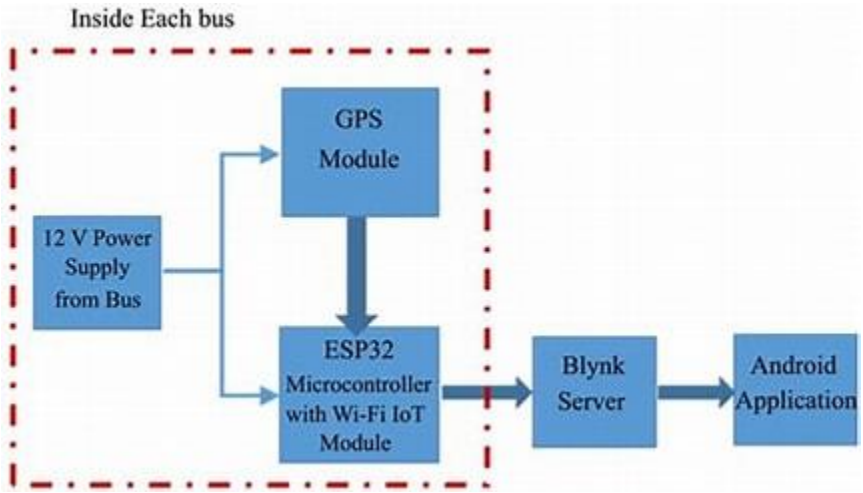
Raspberry Pi Integration:

Raspberry Pi acts as a gateway, collecting data from sensors and sending it to the cloud server for processing.

Code Implementation:

- Python scripts on Raspberry Pi for data handling.
- Cloud-based server for data analysis and storage.
- Mobile app development using relevant languages (e.g., Java or Swift).

System Architecture:



Improving Public Transportation Services

Real-Time Transit Information

- Passengers can track vehicle locations and plan their journeys.
- Reduced waiting times and improved punctuality.

Passenger Experience:

- Mobile app offers route recommendations and schedule updates.
- In-app payment options for seamless travel.
- Notifications and alerts for service disruptions.

Program:

HTML:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>IoT Transport Optimization</title>
```

```
    <link rel="stylesheet" href="styles.css"> <!-- Assuming you have a separate CSS file -->
</head>
<body>
    <header>
        <h1>IoT Transport Optimization System</h1>
    </header>

    <nav>
        <ul>
            <li><a href="#">Home</a></li>
            <li><a href="#">Routes</a></li>
            <li><a href="#">Schedules</a></li>
            <li><a href="#">Contact</a></li>
        </ul>
    </nav>

    <div class="main-content">
        <h2>Optimize Your Public Transport</h2>

        <form>
            <label for="origin">Origin:</label>
            <input type="text" id="origin" name="origin"><br>

            <label for="destination">Destination:</label>
            <input type="text" id="destination" name="destination"><br>

            <button type="submit">Find Route</button>
        </form>

        <h2>Optimized Routes</h2>

        <table>
            <tr>
                <th>Route</th>
                <th>Departure Time</th>
                <th>Arrival Time</th>
                <th>Duration</th>
            </tr>
            <tr>
                <td>Route 1</td>
```

```
            <td>08:00 AM</td>
            <td>08:45 AM</td>
            <td>45 minutes</td>
          </tr>
          <!-- Add more rows as needed -->
        </table>
    </div>
   <footer>
        <p>&copy; 2023 IoT Transport Optimization</p>
    </footer>
</body>
</html>
```

CSS:

```
/* styles.css */

/* Resetting default margin and padding */
body, h1, h2, h3, p {
    margin: 0;
    padding: 0;
}

/* Setting a background color and font */
body {
    background-color: #f8f8f8;
    font-family: Arial, sans-serif;
}

/* Header styles */
header {
    background-color: #333;
    color: #fff;
    text-align: center;
    padding: 1rem;
}

header h1 {
    font-size: 2rem;
}
```

```
/* Main content styles */
main {
    max-width: 1200px;
    margin: 0 auto;
    padding: 2rem;
}

/* Section styles */
section {
    margin-bottom: 2rem;
}

/* Map section styles (assuming you're using a map library) */
#map {
    width: 100%;
    height: 500px;
    border: 1px solid #ccc;
}

/* Schedule section styles */
#schedule {
    background-color: #fff;
    padding: 1rem;
    border-radius: 8px;
    box-shadow: 0 2px 4px rgba(0, 0, 0, 0.1);
}

/* Statistics section styles */
#stats {
    background-color: #fff;
    padding: 1rem;
    border-radius: 8px;
    box-shadow: 0 2px 4px rgba(0, 0, 0, 0.1);
}

/* Footer styles */
footer {
    background-color: #333;
    color: #fff;
    text-align: center;
```

```
    padding: 1rem;
    position: fixed;
    bottom: 0;
    width: 100%;
}
```

JAVA SCRIPT:

```
document.addEventListener('DOMContentLoaded', function() {
    const form = document.querySelector('form');
    const originInput = document.getElementById('origin');
    const destinationInput = document.getElementById('destination');
    const optimizedRoutesTable = document.getElementById('optimized-routes');

    form.addEventListener('submit', function(event) {
        event.preventDefault();

        const origin = originInput.value;
        const destination = destinationInput.value;

        // Simulate data retrieval and optimization process
        const optimizedRoutes = getOptimizedRoutes(origin, destination);

        // Clear previous results
        optimizedRoutesTable.innerHTML = '';

        // Populate table with optimized routes
        optimizedRoutes.forEach(route => {
            const row = document.createElement('tr');
            row.innerHTML = `
                <td>${route.name}</td>
                <td>${route.departure}</td>
                <td>${route.arrival}</td>
                <td>${route.duration}</td>
            `;
            optimizedRoutesTable.appendChild(row);
        });
    });

    function getOptimizedRoutes(origin, destination) {
        // Simulated data, in a real-world scenario, this would come from IoT devices and backend
```

```
    processing
      const routes = [
        { name: 'Route 1', departure: '08:00 AM', arrival: '08:45 AM', duration: '45 minutes' },
        { name: 'Route 2', departure: '08:15 AM', arrival: '09:00 AM', duration: '45 minutes' },
        // Add more routes as needed
      ];

      return routes;
    }
});
```

Conclusion:

The Public Transport Optimization project leverages IoT technology to create a smarter, more efficient, and passenger-centric public transportation system. Real-time data collection and analysis empower transit agencies to optimize routes, reduce operational costs, and enhance the overall travel experience for passengers.