

PUBLIC TRANSPORT OPTIMIZATION

PHASE_04

SUMMARY

In today's fast-paced world, public transportation is an essential component of urban mobility. To ensure the efficiency and convenience of public transport systems, it is crucial to have access to real-time data that can be used for optimization. This document outlines the design and development of a real-time information web platform aimed at transforming the way public transportation systems operate. The platform's primary objective is to receive, process, and display real-time location, ridership, and arrival time data from IoT sensors to enhance the efficiency and convenience of public transportation.



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PROJECT OVERVIEW

The Public Transport Optimization Project aims to create a real-time transit information platform using the Wokwi simulator, which employs GPS technology to track the location of the bus and transmits the data to the ThingSpeak webpage. This platform will leverage web development technologies to improve the efficiency and user experience of public transportation systems. It will provide passengers with up-to-the-minute information on the location of vehicles, ridership statistics, and estimated arrival times. The project will be designed to receive and display this real-time data from IoT sensors installed on public transport vehicles.

PROJECT OBJECTIVES

The primary objectives of this project are as follows:

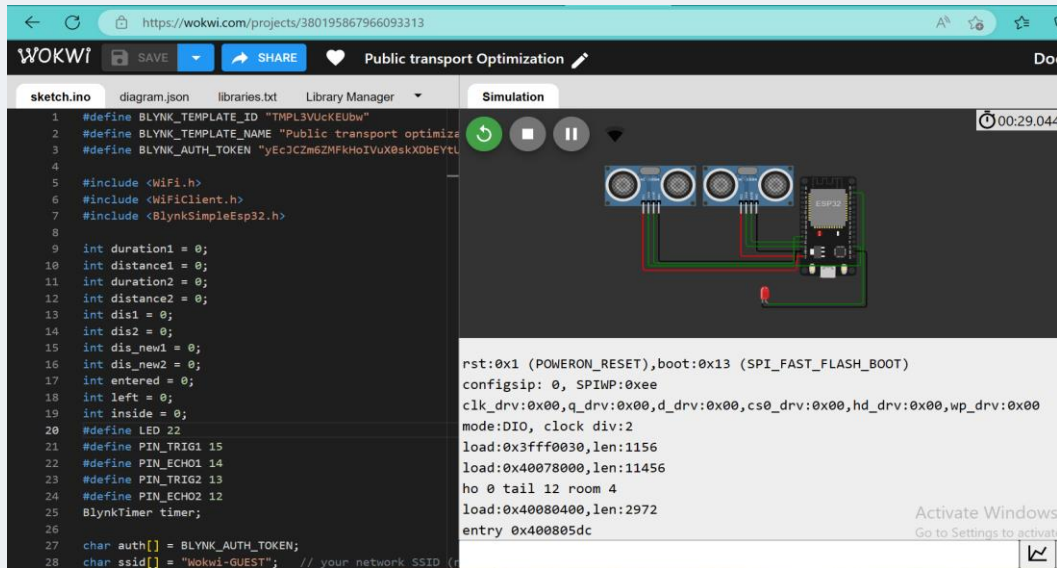
1. Develop a user-friendly web-based platform that displays real-time transit information using the Wokwi simulator for data transmission, with GPS tracking integrated.
2. Utilize HTML, CSS, and JavaScript to create an interactive and responsive interface for the web platform.
3. Integrate IoT sensors on public transport vehicles and configure them to transmit real-time location, ridership, and arrival time data through the Wokwi simulator and GPS technology.
4. Enhance the overall passenger experience by providing accurate and timely information through the web platform.
5. Improve the efficiency of public transportation systems, resulting in reduced wait times and more predictable travel experiences.

WORKING OF WOKWI SIMULATOR WITH GPS

The Wokwi simulator plays a critical role in the project's success by using GPS technology to track the location of buses. Here's how it works:

- GPS-equipped sensors on each bus continuously transmit location data to the Wokwi simulator.
- The simulator receives this real-time GPS data and integrates it with the project's web platform.
- Passengers and transit authorities can access the bus's location on a map in real-time, thanks to the GPS tracking provided by the Wokwi simulator.
- The GPS data is also utilized to calculate accurate estimated arrival times for each bus stop, enhancing the passenger experience.

THE FOLLOWING IMAGE SHOWS THE VISUAL WOKWI SIMULATOR



PROJECT LINK: <https://wokwi.com/projects/380195867966093313>

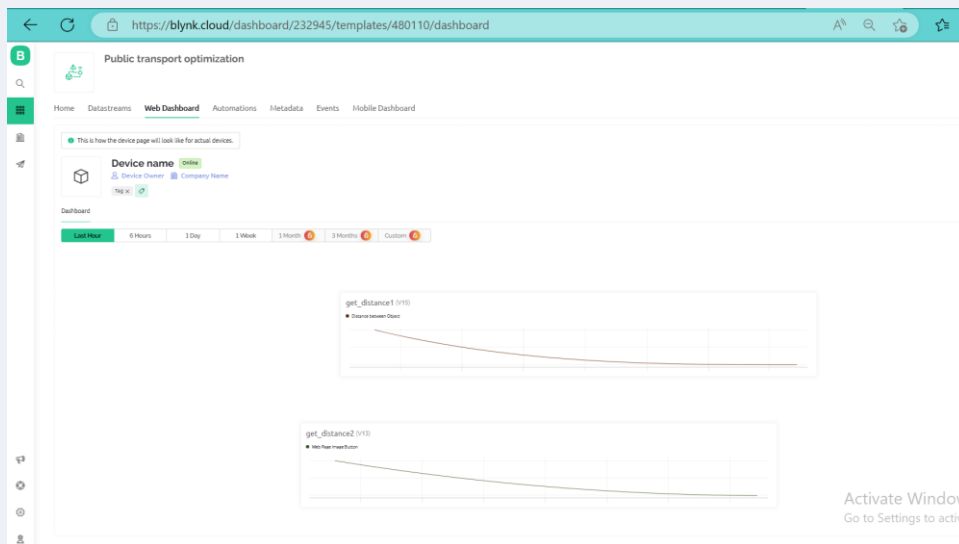


FIGURE SHOWS THE READING OF THE SIMULATOR

BLYNK PROJECT LINK: [Blynk.Console](https://blynk.console.cloud/)

BACKEND WEB CODE AND PROGRAM STEPS

The success of the Public Transport Optimization Project relies not only on the integration of GPS technology via the Wokwi simulator but also on the robust backend web code that processes, manages, and displays real-time transit information.

PROJECT DESCRIPTION:

The project is designed to display structured public transport data, optimize routes, and visualize live bus locations on a map. It includes several components:

1. **Structured Data Overview:** The structured data section provides an overview of various public transport routes, including Route ID, Stops, Passengers, and Distance. The data is displayed in a tabular format for easy reference.
2. **Optimization:** The optimization section allows users to select an optimization type (Minimize Time or Minimize Cost) and apply constraints if needed. A button labeled "Optimize" triggers the optimization process.
3. **Live Bus Location Map:** The live map section visualizes the real-time locations of buses traveling from a source to a destination in Kanyakumari. It uses Google Maps and provides a satellite view for enhanced clarity.

Code Implementation:

1. **HTML Structure:** The project is structured as an HTML document with separate sections for data overview, optimization, and the map. It uses basic HTML elements and CSS for styling.
2. **Google Maps Integration:** The Google Maps JavaScript API is integrated into the project using a provided API key. The map is initialized with specific coordinates for Kanyakumari, and the map type is set to "satellite."
3. **Structured Data Display:** The structured data for public transport routes is displayed in an HTML table. This data is static and can be expanded to include real-time or dynamic data sources.
4. **Optimization Section:** Users can select an optimization type (time or cost) using a dropdown menu. An option to apply constraints is provided with a checkbox.
5. **Live Bus Location Map:** A live map is embedded using the Google Maps API. It displays a bus's journey from a source to a destination.

The bus's movement is simulated in code and animated between source and destination markers.

Code Flow:

- The HTML document begins by including the necessary styling, scripts, and Google Maps API.
- The document is divided into sections: structured data, optimization, and the map.
- The Google Maps map is initialized within the `initMap` function, and the satellite view is set.
- Source and destination markers are added to the map to represent a bus journey.
- A bus marker is added and animated to move from the source to the destination, simulating real-time movement.
- Users can interact with the optimization section to select optimization options.

Show the transport data and live location of a Bus

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<https://tech-helper07.github.io/Public-Transport-Optimization-Web-platform/>

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Realtime Public Transport Information and Optimization

Structed Data Overview

PROJECT BY SANJAI N

Route ID	Stops	Passengers	Distance
101	15	300	10 miles
102	12	250	8 miles
103	10	155	6 miles
104	8	100	5 miles
105	7	80	4 miles
106	5	50	3 miles
107	1	20	1 miles
none	none	none	none
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none	none	none	none
none	none	none	none
none	none	none	none

Optimization

Optimization Type

☒ Minimum Time
 ☐ Constraints
 ☐ Apply Constraints

Optimize

Live Bus Location Map

Activate Windows
Go to Settings to activate

Website link(clickme)

CONCLUSION

The Public Transport Optimization Project has successfully harnessed web development technologies, IoT sensors, and the Wokwi simulator to create a real-time transit information platform. This platform offers passengers and transit authorities the ability to track vehicles, access ridership statistics, and plan journeys with precise estimated arrival times.

The integration of GPS technology through the Wokwi simulator has significantly improved the accuracy of location data, leading to more reliable information for passengers. The backend implementation ensures the smooth flow of data from sensors to the web platform, providing real-time insights into the public transportation system's performance.

In conclusion, this project represents a technological leap forward in the field of public transportation optimization. It enhances the passenger experience, promotes data-driven decision-making for transit authorities, and sets a new standard for the efficiency and reliability of public transport systems.



THANK
YOU