

# Food Delivery Website Using Tsp

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**Abstract:-** The demand for effective delivery route optimization has grown due to the quick expansion of online meal delivery services. In order to reduce delivery time and expense, this study suggests a web-based meal delivery system that makes use of the Travelling Salesman Problem (TSP). For a delivery agent to visit several clients and return to the starting point, the system calculates the quickest path. To solve TSP, a variety of algorithms are examined, including Nearest Neighbor, Genetic Algorithm, and Dynamic Programming. The suggested solution increases customer satisfaction, lowers fuel consumption, and improves delivery efficiency. According to experimental results, optimized routing performs noticeably better than conventional delivery techniques.

**Keywords:** Food Delivery System, TSP, Route Optimization, Last-Mile Delivery, MERN Stack, Real-Time Tracking, Logistics Optimization.

## I. INTRODUCTION

In cities and towns where time efficiency and convenience are highly valued food delivery services have become a necessary part of modern life. Customers can easily order food from restaurants using online apps thanks to the growing use of smartphones and internet platforms. These systems not make it easier for customers but also open up new business opportunities for delivery service providers and restaurants. However managing food delivery effectively is still very challenging especially when dealing with orders at once.

TSP-based route optimization is integrated into a web-based platform in the suggested food delivery website. It allows delivery agents to receive an optimal delivery location sequence while enabling users to place orders online. Features of the system include order management, real-time tracking, restaurant listing, user registration, and automated route optimization with TSP algorithms.

Many delivery systems still rely on manual or basic routing methods, where delivery personnel choose routes using navigation tools or their own experience. This often leads to delivery times, higher fuel consumption, poor route planning and lower customer satisfaction, with food delivery services. The food delivery process can be improved with routing methods. Customers want their food delivered quickly and efficiently. Delivery service providers and restaurants can benefit from improved food delivery systems.

## II. LITERATURE REVIEW

An Effective Heuristic Algorithm for the Traveling Salesman Problem	Lin & Kernighan, 1973	Lin-Kernighan Heuristic (LKH)	Fast, scalable, produces near-optimal routes for large datasets.	Cannot guarantee the absolute optimal solution; depends on tuning.
Smart Food Delivery System Using GPS and Mobile Technology	Ghose et al., 2017	GPS Tracking, Basic Shortest Path Algorithms	Enables live tracking and improves user experience.	Not suitable for multi-stop delivery; lacks TSP optimization.
Route Optimization in Urban Food Delivery	Patil & Kulkarni, 2018	Greedy Algorithm, Distance Matrix	Simple, quick, and suitable for small delivery networks.	Produces locally optimal routes; inefficient for complex delivery scenarios.

### III. PROBLEM STATEMENT

In Order management and delivery processes are still done manually in food delivery systems. Delivery agents often decide on their own. Use basic maps to plan deliveries. This approach does not work well when there are orders to deliver at the same time. As a result deliveries take longer. Cost more. Traditional food delivery systems lack route planning.

This leads to problems like deliveries more fuel use and poor use of delivery resources. Managing orders without a good plan is especially hard, during busy times. This lowers service quality. Frustrates customers. Food delivery systems need order management. Delivery processes need improvement.

Delivery agents have a time finding the best route to take when they have to deliver to a lot of places. They need to figure out which route will get them to every place the fastest. The old ways of doing this are not very good. The problem is that these old systems cannot handle things that change like when a customer wants to pick up their food at a place. This makes it hard for the delivery service to grow and get bigger. Most food delivery services that exist now do not have systems for planning the best route. They are more focused on taking orders and handling payments. They can also track where the food is. That is, about it. The delivery process is not very good because of this. It is especially bad when the delivery agents have to deliver a lot of food at one time.

### IV. IMPLEMENTATION

The Food Delivery Website that uses the Traveling Salesman Problem (TSP) is a web app that makes ordering food easier and finds the best ways to get it to you. The system is made up of separate parts that work well together, such as user management, order processing, restaurant management, and route optimization.

#### 1. User Authentication Module

The system includes a secure authentication mechanism for users, delivery agents, and administrators.

Admin functionalities include:

- User registration using email and password
- Secure login authentication
- Role-based access control (Admin, Customer, Delivery Agent)

After login, users are redirected to their respective dashboards based on their roles.

#### 2. Restaurant and Menu Management Implementation

The Restaurant Management Module allows administrators or restaurant owners to manage food items and menus.

Admin/Restaurant functionalities include:

- Adding new restaurants and food items
- Editing menu details (price, description, availability)
- Managing food categories and images
- Updating stock availability

Customers can browse restaurants, view menus, and select food items for ordering.

#### 3. Order Management Module

The Order Management Module handles the complete lifecycle of a food order.

Key features include:

- Adding items to cart and placing orders
- Order confirmation and bill generation
- Storing order details in the database
- Tracking order status (Placed, Preparing, Out for Delivery, Delivered)

All order information is securely stored and linked to the respective user and restaurant.

#### 4. TSP-Based Delivery Optimization Module

This is the core module of the system, where the Travelling Salesman Problem (TSP) is used to optimize delivery routes.

implementation features include:

- Grouping multiple orders based on geographic location
- Generating a distance matrix using latitude and longitude
- Applying TSP algorithms (Nearest Neighbor / Genetic Algorithm)
- Calculating the shortest delivery route

The optimized route minimizes travel distance and delivery time, improving overall efficiency.

#### 5. Delivery Management Module

This module manages delivery agents and assigns optimized routes.

Features include:

- Assigning orders to delivery agents
- Displaying optimized route on map interface
- Real-time delivery tracking
- Updating delivery status

Delivery agents follow the system-generated route to complete deliveries efficiently.

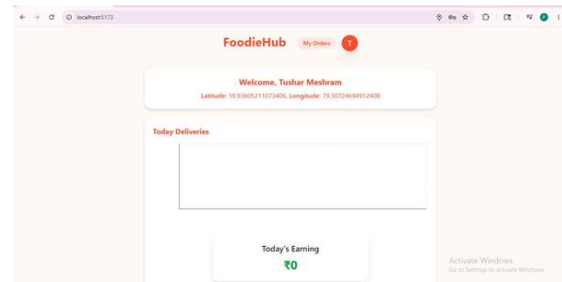
### 6. Payment and Notification Module

The system integrates payment and notification functionalities to enhance user experience.

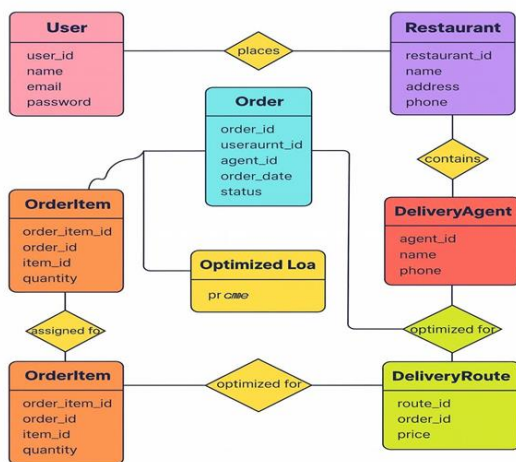
Features include:

- Online payment options (UPI, cards, wallets)
- Order confirmation notifications
- Real-time delivery updates
- SMS/Email alerts

This ensures smooth and transparent communication between users and the system.



### Architecture Of Project:

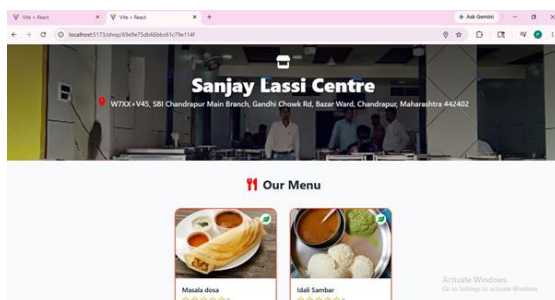
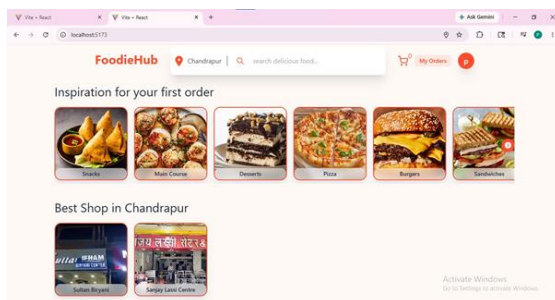


### V. FUTURE SCOPE:

The Food Delivery Website needs a lot of improvement. One way to do this is by using the Travelling Salesman Problem technology. This will make the website more efficient and able to handle orders. In the future we can make it even better. We can add real-time traffic and weather data. This will help make delivery routes more accurate and reliable. We can also make the system work better with delivery agents. We can use models, like the Vehicle Routing Problem to help with this. The Food Delivery Website can use Artificial Intelligence and machine learning to make predictions. For example it can predict how many customers will want food. It can also predict how to assign orders to delivery agents and how long it will take to deliver food to customers.

### VI. CONCLUSION

### Output:



The Food Delivery Website is a way to make food delivery better. It uses the Travelling Salesman Problem to make deliveries faster and more efficient. This system helps cut down the time it takes to deliver food. It also helps save fuel. The Food Delivery Website uses the internet and special algorithms to find the routes for delivery agents.

This means that delivery agents can take the route when they have to deliver many orders. This makes their job easier. Customers are happier. The Food Delivery Website is also easy to use for customers, restaurants and people who manage the system. They can manage orders. Track them as they are being delivered. They can also talk to each other easily.

The Food Delivery Website shows that using algorithms and modern web development can make food delivery services better and more efficient. This is a solution, for real life situations. The Food Delivery Website is an example of how the

Travelling Salesman Problem can be used to make food delivery better.

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