LOGI SHARE AN OPTIMIZED LOGISTICS DELIVERY SYSTEM

CO8811 – PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

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ABSTRACT

LogiShare stands as a revolutionary force in the logistics industry, transforming the traditional approach to cargo transportation. By focusing on optimizing cargo space utilization and streamlining the shipping process, LogiShare introduces a suite of cutting-edge features that elevate it to an indispensable tool for modern logistics operations. LogiShare's intelligent algorithms ensure optimal utilization of cargo space, reducing waste and contributing to cost savings for both logistics owners and consignment senders. The platform simplifies the shipping process through real-time tracking, providing users with instant visibility into their consignments' locations and ensuring a seamless end-to-end experience. Through advanced algorithms, LogiShare facilitates efficient matching of available cargo space with consignments, promoting a more streamlined and resource-efficient logistics ecosystem. The integration of a secure and encrypted payment gateway adds a layer of trust and convenience to transactions, enhancing the overall reliability of the platform. LogiShare introduces a dynamic bidding system, fostering fair and competitive pricing. This feature empowers users to negotiate and secure transportation services at rates that align with market dynamics.

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LIST OF ABBREVIATIONS

UML	**UNIFIED MODELLING LANGUAGE**
DFD	**DATAFLOW DIAGRAM**
API	**APPLICATION PROGRAMMING INTERFACE**
JVM	**JAVA VIRTUAL MACHINE**
JDBC	**JAVA DATABASE CONNECTIVITY**
ODBC	**OPEN DATABASE CONNECTIVITY**
HTTP	**HYPER TEXT TRANSFER PROTOCOL**
IDE	**INTEGRATED DEVELOPMENT ENVIRONMENT**
GUI	**GRAPHICAL USER INTERFACE**
UI	**USER INTERFACE**
IP	**INTERNET PROTOCOL**
GeoCAM	**GEOLOGICAL CAMERA**
GPS	**GLOBAL POSITIONING SYSTEM**

CHAPTER-1

INTRODUCTION

Welcome to our innovative project dedicated to optimizing truck logistics by efficiently utilizing empty spaces. Our mission is to revolutionize the transportation industry by connecting drivers who have available capacity with businesses and individuals in need of shipping services. With our platform, we aim to streamline the process of filling empty truck spaces, reducing inefficiencies, and maximizing the utilization of resources.

In today's fast-paced world, logistics play a crucial role in the global economy. However, inefficiencies in the transportation sector, particularly empty truck spaces during transit, represent a significant challenge. Our project addresses this challenge head-on by providing a solution that benefits both drivers and customers alike.

By leveraging technology and implementing a user-friendly platform, we facilitate seamless communication and collaboration between drivers and shippers. Our goal is to create a dynamic marketplace where empty truck spaces are effectively matched with shipping demands, resulting in reduced costs, improved sustainability, and enhanced overall efficiency.

1.1 OVERVIEW

Our project is dedicated to addressing a significant inefficiency in the logistics industry: empty spaces in trucks during transit. We recognize that these empty spaces represent wasted resources and missed opportunities for

both drivers and businesses. To tackle this challenge, we have developed a platform that connects drivers with available capacity to individuals and companies in need of shipping services. Our platform utilizes advanced algorithms to match available truck space with shipping demands in real-time. This ensures efficient utilization of resources and minimizes wasted capacity. We have designed our platform with simplicity and usability in mind. Both drivers and shippers can easily navigate the system to find suitable matches for their transportation needs. We prioritize clear and transparent communication between drivers and shippers. Our platform facilitates direct communication channels, allowing parties to negotiate terms, track shipments, and address any concerns in a timely manner. By filling empty truck spaces, our platform helps reduce transportation costs for both drivers and shippers. Through efficient resource allocation, we aim to create value and savings for all parties involved. By maximizing the utilization of existing truck capacity, our project contributes to reducing carbon emissions and environmental impact associated with transportation. We believe in promoting sustainable practices that benefit both the industry and the planet.

1.2 MOTIVATION

Empty spaces represent wasted resources, including fuel, labour, and vehicle maintenance costs. By filling these spaces, companies can maximize the efficiency of their operations and minimize unnecessary expenses. Operating a partially filled truck incurs similar fixed costs as operating a fully loaded one. Therefore, reducing empty spaces allows businesses to spread their fixed costs over a larger volume of goods, ultimately decreasing the cost per unit transported. Empty trucks contribute to increased fuel consumption and carbon emissions per unit of cargo transported. By

reducing the number of empty spaces, companies can decrease their carbon footprint and promote more sustainable transportation practices. Efficient logistics operations enable companies to fulfil orders quickly and reliably, leading to higher customer satisfaction levels. By minimizing empty spaces, businesses can improve their ability to meet customer demands in a timely manner. Companies that effectively utilize their truck capacity gain a competitive edge in the market. They can offer competitive pricing, faster delivery times, and more reliable service, attracting and retaining customers in an increasingly competitive landscape. Optimizing truck capacity helps mitigate disruptions in the supply chain by ensuring that goods can be transported efficiently even during peak demand periods or unexpected events. This resilience is critical for maintaining business continuity and minimizing the impact of disruptions on operations.

1.3 OBJECTIVE

The primary objective of our project is to significantly reduce the occurrence of empty spaces in trucks during logistics operations. To achieve this goal, we aim to Optimize truck capacity utilization to maximize the utilization of available truck capacity by efficiently matching empty spaces with shipping demands. By filling these empty spaces, we aim to minimize wasted resources and increase the efficiency of logistics operations. To Minimize Transportation Costs by reducing the number of empty spaces in trucks, we aim to lower transportation costs for both carriers and shippers. Through efficient resource allocation and dynamic matching, we strive to optimize cost-effectiveness and improve the overall profitability of transportation services. Enhance Environmental Sustainability is one of our key objectives is to promote environmental sustainability within the transportation industry. By reducing the number of empty trucks on the road,

we aim to decrease fuel consumption, carbon emissions, and overall environmental impact associated with logistics operations. and to improve Customer Satisfaction that majorly aims to enhance customer satisfaction by ensuring timely and reliable delivery of goods. By optimizing truck capacity utilization, we strive to minimize delays, improve delivery times, and meet customer expectations more effectively.

1.4 SCOPE

The scope of the project aimed at reducing empty spaces in trucks during the logistics encompasses by developing a user-friendly and robust platform that connects drivers with available truck capacity to shippers in need of transportation services. This involves designing and implementing features such as dynamic matching algorithms, real-time tracking, communication tools, and secure payment systems. Conducting thorough market research to understand the needs and preferences of both carriers and shippers. Analysing market trends, competitor offerings, and industry dynamics to identify opportunities and challenges in the transportation and logistics sector. Establishing partnerships with carriers, shippers, logistics companies, and technology providers to enhance the platform's capabilities and reach. Collaborating with industry stakeholders to drive adoption, promote standards, and foster innovation in logistics operations. Implementing strategies and best practices to optimize truck capacity utilization and minimize empty spaces during transit. This may involve route optimization, load consolidation, freight pooling, and other efficiency-enhancing measures to maximize resource utilization and reduce transportation costs.

CHAPTER – 2

LITERATURE SURVEY

[1] PROCESS DISCOVERY ON GEOLOCATION DATA

Author: Joel Ribeiro, Tania Fonts, Carlos Soars, José Luis Borges
Year: 2019

An innovative methodology for inferring process events from geolocation data is proposed in this paper. Nowadays, geolocation data can be easily collected using fleet tracking systems, which are increasingly becoming present in business contexts like logistics and transportation. Apart from these tracking systems, daily-use devices such as smartphones and smartwatches are also capable of recording geolocation data. Therefore, geolocation data is one more source for getting insight into process behaviours in multiple contexts. Even though we presented this paper focusing on the public transportation context, the proposed methodology may be applied in other contexts such as logistics (e.g., delivery services), public services (e.g., ambulance services). Geospatial tracking technology is increasingly becoming one more source of information. Geolocation data can be collected in multiple contexts, in a cheap and easy manner. An innovative methodology for inferring process information from geolocation data is proposed in this paper. Process mining techniques can then be applied to get insight into the processes and operations implicitly described in the geolocation data. Transforming geolocation data into an event log, this plugin will enable the execution of a wide range of process mining techniques for process discovery, conformance checking, and enhancement.

[2] BUILDING SUCCESSFUL LOGISTICS PARTNERSHIP

Author: Douglas M. Lambert, Margaret A. Emmelhainz & John T. Gardner
Year: 2019

Various models or processes for partnership development have been identified in the literature. Gardner, Cooper, and Noor dewier developed a strategic model of partnership formation and management with five stages: choosing a partnership strategy, choosing a specific partner or partners, designing the partnership, evaluating the partnership, and evaluating the partnership strategy. Ell ram presented a different five-stage process for purchasing partnerships (preliminary phase, identify potential partners, screen and select, establish relationship, and evaluate) and also identified some specific selection criteria for potential partners.

Partnerships with third-party logistics providers are becoming more common and are likely to increase, given the competitive environment is forcing management to focus on the firm's core competencies. The partnership model presented here helps minimize the chance of failure by explicitly addressing key issues prior to the implementation of a partnership. The model provides explicit methods for dealing with problems that may lead to partnership failure. The analysis and discussion of drivers and facilitators greatly minimizes the likelihood of mismatched perceptions between the parties. An understanding of the drivers ensures that both organizations have to benefit from the partnership and that each knows what is motivating the other.

[3] GEOCAM AN IP-BASED GEOLOCATION SERVICE THROUGH FINE-GRAINED AND STABLE WEBCAM LANDMARKS

Authors: yang Li, Zhihao Wang, Dawei Tan, Jinke Song, Haining Wang
Year:2021

IP-based geolocation is essential for various location-aware Internet applications, such as online advertisement, content delivery, and online fraud prevention. Achieving accurate geolocation enormously relies on the number of high-quality (i.e., the fine-grained and stable over time) landmarks. However, the previous efforts of garnering landmarks have been impeded by the limited visible landmarks on the Internet and manual time cost. In this paper, we leverage the availability of numerous online webcams used to monitor physical surroundings as a rich source of promising high-quality landmarks for serving IP-based geolocation. In particular, we present a new framework called GeoCAM, which is designed to automatically generate qualified landmarks from online webcams, providing an IP-based geolocation service with high accuracy and wide coverage. GeoCAM periodically monitors websites hosting live webcams and uses the natural language processing technique to extract the IP addresses and latitude/longitude of webcams for generating landmarks at a large-scale. Given latency and topology constraints among webcam landmarks, GeoCAM uses the maximum likelihood estimation to approximately pinpoint the geolocation of a target host. We develop a prototype of GeoCAM and conduct real-world experiments for validating its efficacy. Our results show that GeoCAM can detect 282,902 live webcams hosted in web pages with 94.2% precision and 90.4% recall, and then generate 16,863 stable and fine-grained landmarks, which are two orders of magnitude more

than the landmarks used in prior works. To demonstrate the superiority of using large-scale webcams as landmarks, we implement four different geolocation algorithms and compare their performance between webcam landmarks and open-source landmarks.

It illustrates the CDF of the geolocation errors on the residential hosts for evaluating the performance of GeoCAM. The X-axis is the error distance (kilometre) between the ground truth and the estimated geolocation. The traffic overhead on webcams is limited to the geolocation stage. In the discovery stage, we use the web crawler to scrape the landmark information from aggregation websites. Thus, there is no traffic overhead imposed on webcams during the discovery stage. In the data collection, we crawled 100 different websites and retrieved 1.9 million webpages. However, we acknowledge that GeoCAM cannot exhaustively gather all live webcams on the Internet. Besides those 100 websites, some less popular websites (e.g., blogs or forums) might also distribute webcams to the public.

[4] DATA DRIVEN OPTIMIZATION FOR DYNAMIC SHORTEST PATH PROBLEM CONSIDERING TRAFFIC SAFETY

Author: S. Jiang, Y. Zhang, R. Liu, M. Jafari and M. Kharbeche
Year: 2022

Traffic congestion is an inescapable problem that frustrates drivers in megacities. Although there is hardly a way to eliminate the congestion, it is possible to mitigate the impact through predictive methods. This paper develops a data-driven optimization approach for the dynamic shortest path problems (DSPP), considering traffic safety for urban navigations. The dynamic risk scores and travel times at different times and locations are

estimated by the Safe Route Mapping (SRM) methodology and Long Short-Term Memory (LSTM) with Auto encoder, respectively, where possible variations in the future are considered. The DSPP is formulated as a mixed-integer linear programming problem under risk constraints to minimize the total travel cost, defined as the weighted sum of distance and travel time. To improve the efficiency of the DSPP, we design an improved tabu search with alternative initial-solution algorithms to accommodate various problem scales. Numerical experiments investigate the computational performance and the solution quality of our algorithm. The result shows satisfactory solution quality and computational efficiency with the proposed acceleration strategies compared to the CPLEX solver, a label-setting algorithm, and a state-of-the-art algorithm.

Traffic congestion is an inescapable problem that frustrates drivers in megacities. Although there is hardly a way to eliminate the congestion in its entirety, it is possible to mitigate the impact and reduce its size. Many studies have shown that adaptive traffic signal control (ATSC) improves traffic performance, such as emissions, travel time, and fuel consumption by at least 10%. The interaction between road users and the controller will train this controller to set the right traffic signal times, given any traffic patterns. Dynamic traffic signal control is a complex problem, especially when it comes to multiple intersections.

[5] ANALYSIS OF THE LOGISTICS RESEARCH IN INDIA: A CASE STUDY

Author: Mohammed M Abuteir, Alaa Mustafa El-Halees

Year:2023

An overarching purpose of this study was the identification of relevant logistics clusters in India and the exploration and initiation of new corporations, as only these can provide the prerequisite for our countries to promote and build on bilateral exchange of knowledge – at both an international and intercultural level. A common platform for exchange of experience can thus facilitate an effective mutual transfer of knowledge between partners in India and Germany. In terms of specific goals, we identify, analyse and describe the scientific and cooperative research in the field of logistics and supply chain management in India. With a bibliographical and online research, the most relevant, current and important research topics along with the relevant institutions in the field of logistics in India were identified. First, the research in the field of logistics of Indian Institutes of Management and Technology (IIMs and IITs) was analysed. The research was extended to internationally high-ranked journals and conference proceedings focused on logistics and supply chain management to gain a complete overview of the relevant research sites, authors and topics in the field of logistics in India. Research in logistics helps in understanding supply chain dynamics, identifying bottlenecks, and streamlining processes for better efficiency. By optimizing supply chain operations, businesses can reduce costs, improve delivery times, and enhance overall customer satisfaction. Companies that invest in logistics research gain a competitive advantage by staying ahead of industry trends, adopting best practices, and continually improving their operations. This allows them to respond more effectively to changing market conditions and customer preferences.

The logistics and supply chain management sector is very informal and fragmented and most of its actors are not very sophisticated. Also, safety regulations are very poor, which gets even worse when considering road and traffic conditions. The trucks of TATA for example have a capacity of 12

tons, but loads of less than 18 tons are rather exceptions, since people either do not care or simply do not know better.

[6] TRAVEL MODE CHOICE PREDICTION USING IMBALACE MACHINE LEARNING

Author: Chen, H.F.; Cheng, Y
Year:2023

Travel mode choice prediction is critical for travel demand prediction, which influences transport resource allocation and transport policies. Travel modes are often characterized by severe class imbalance and inequality, which leads to the inferior predictive performance of minority modes and bias in travel demand prediction. In existing studies, the class imbalance in travel mode prediction has not been addressed with a general approach. Basic resampling methods were adopted without much investigation, and the performance was assessed by commonly used metrics (e.g., accuracy), which is not suitable for predicting highly imbalanced modes. To this end, this paper proposes an evaluation framework to systematically investigate the combination of six over/under sampling techniques and three prediction methods. In a case study using the London Passenger Mode Choice dataset, results show that applying over/under sampling techniques on travel mode substantially improves the F1 score (i.e., the harmonic mean of precision and recall) of minority classes, without considerably downgrading the overall prediction performance or model interpretation. These findings suggest that combining over/under sampling techniques and statistical/machine-learning methods is appropriate for predicting travel mode, which effectively mitigates the influence of class imbalance while achieving high predictive accuracy and model interpretation. In addition, the

combination of over/under sampling techniques and prediction methods enriches the model options for predicting mode choice, which would better support transport planning. Class imbalance is a common and prominent problem in travel mode data, which leads to the under prediction of the minority class in travel mode prediction and causes biases in transport planning and policy-making. Although machine learning methods have obtained a high predictive accuracy in predicting travel modes, the problem of class imbalance has not been adequately discussed and addressed. This paper fills this research gap by proposing an evaluation framework for assessing the performance of travel mode prediction methods and OUS techniques. The contribution of the framework consists of at least two aspects: first, it examines not only the overall performance of prediction with both aggregate and disaggregate metrics, but also the mode-specific performance that highlights the potential under prediction of minority modes. In the LPMC dataset, each trip is labelled as one of the four modes: walking, cycling, public transport, and driving (which includes car passenger, taxi, van, and motorbike). For journeys consisting of multiple modes, the assigned mode is the one that covers the longest distance. This leads to the bias of the travel modes. The mixed mode prediction can be formulated as a multi-label classification, which predicts one or multiple labels for unseen journeys. Another approach is to create more label classes by combining the current four modes however, the combination would result in 16 classes of travel modes, which is challenging for classification

[7] THE DESIGN OF A PERSUASIVE TEACHABLE AGENT. ADVANCED LEARNING TECHNOLOGIES (ICALT)

Author: Li, C.Z , Xiao, W , Zhang, D.Y , Ji, Q

Year:2021

Dock less bike sharing, a new way of traveling to complement public transportation systems, can bring obvious benefits to the low-carbon transformation of cities. Accordingly, this paper provides a comprehensive analysis of the effects of individual-, household- and city-level characteristics on the use of bike sharing, using nationwide data from China via the China Household Finance Survey. The results showed that age, educational attainment and household income were significantly associated with the adoption of bike sharing. City characteristics are also found to be important to the likelihood of using shared bikes. Importantly, we confirmed the complementary effects between dock less bike sharing and public transportation, such as underground rail, buses and taxis, while a substitution effect exists with motorcycles and private cars. These findings have clear policy implications for the development of bike sharing and the low-carbon transformation of cities in China. Dock less bike sharing systems in China now offer environmental and social benefits over the use of private vehicles. They reduce greenhouse gas emissions (Shaheed et al., 2010), air pollution and car use (Fishman et al., 2014), mitigate traffic congestion (Wang and Zhou, 2017; Yang et al., 2017; Fan and Zheng, 2020) and promote the physical health of citizens (Caulfield, 2014; Otero et al., 2018).

CHAPTER–3

SYSTEM DESIGN

3.1 EXISTING SYSTEM

The current logistics landscape grapples with several challenges, including cargo space underutilization, limited shipping options for non-vehicle owners, and inefficiencies in route planning and pricing strategies. These challenges contribute to delays, increased costs, and environmental impact. Additionally, the lack of transparency in operational processes and insecure payment systems further exacerbate trust issues within the industry. To address these issues, a comprehensive system is needed to optimize cargo space utilization, enhance route planning efficiency, and implement transparent and secure payment mechanisms. By leveraging technology and data analytics, logistics providers can dynamically match available cargo space with shipping needs, thereby optimizing vehicle capacity and reducing unnecessary travel. Real-time monitoring and optimization tools can enable more sustainable logistics practices while also providing transparency and trust for users. Furthermore, implementing secure and transparent payment systems will foster trust and confidence in digital transactions, ultimately improving the overall efficiency and sustainability of the logistics industry. Limited Access to Efficient Shipment for Non-Vehicle Owners Inefficient Cargo Space Matching and Pricing.

3.2 PROPOSED SYSTEM

LogiShare offers a comprehensive and user-centric approach to address operational challenges in the logistics industry. It integrates advanced GPS tracking, tailored mobile and web applications, and efficient space utilization strategies. Tailored Interfaces for drivers, cargo owners, and consignees, enhancing user experience by meeting their unique requirements. Integrated GPS Tracking leveraging drivers' mobile devices or dedicated vehicle GPS devices ensures accurate and reliable location monitoring. Owner Mode Logistics Management enables logistics owners to efficiently manage fleet operations, track vehicles, update cargo space availability, and handle transit details. Driver Mode - Transit and Vehicle Management grants drivers access to route information, schedules, delivery timelines, navigation assistance, incident reporting, and communication features. Consignee Mode - Cargo Space Booking and Bidding allows consignees to efficiently search for cargo space, participate in a transparent bidding process, and secure shipping space in a cost-effective manner. Real-Time Transit Updates and Notifications ensure all parties receive ongoing updates on transit progress and key events, improving transparency and communication throughout the shipping process. Automated Route Optimization for Drivers utilizes advanced algorithms to suggest the most efficient routes, helping drivers reduce travel time and fuel consumption. Data Analytics for Owners through an analytical dashboard provides insights into fleet performance, cargo space utilization, and customer interactions, aiding informed decision-making. Tailored Interfaces for Enhanced User Experience Real-Time Transit Updates and Notifications.

3.3 SYSTEM ARCHITECTURE

The system architecture for the project involving optimizing logistics through the utilization of empty spaces is a multifaceted framework designed to address the complexities of modern supply chain management. Fig. 3.1 depicts the proposed Logishare's system's abstract architecture. The proposed framework is comprised primarily of:

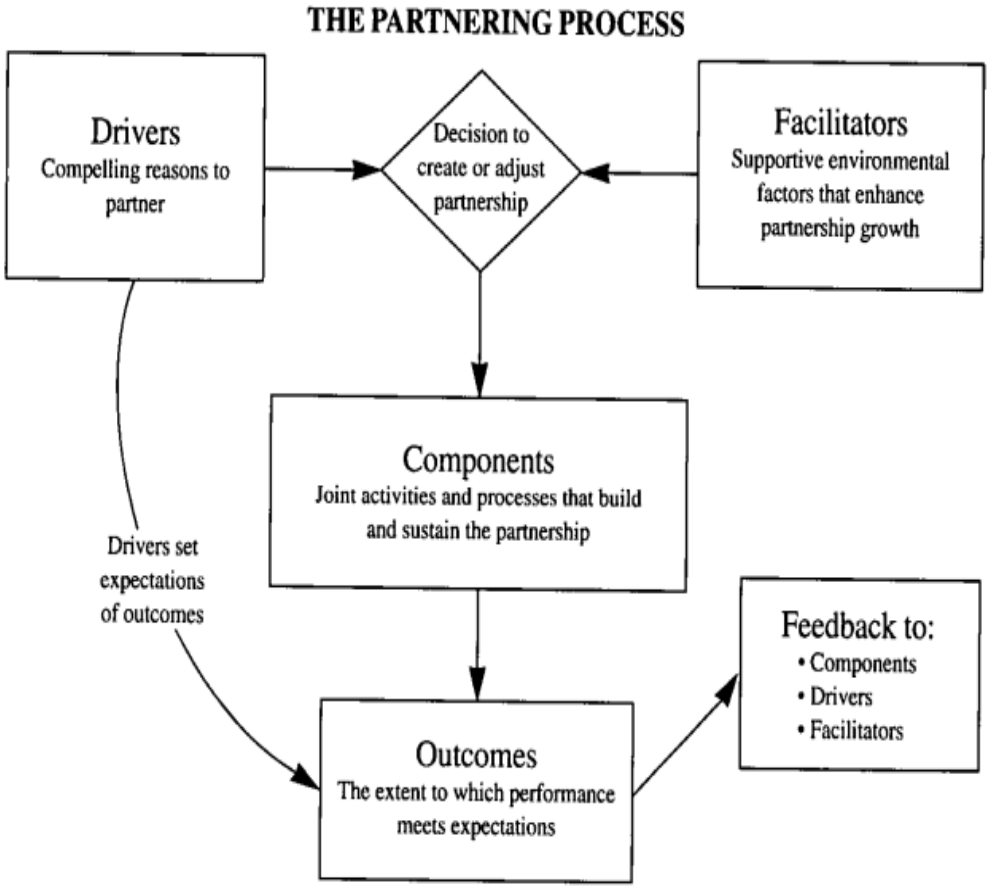

Fig 3.1 System Architecture

The system architecture for the project involving optimizing logistics through the utilization of empty spaces is a multifaceted framework designed to address the complexities of modern supply chain management. At its core, the client interface acts as the primary gateway for users to interact with the system. This interface comprises web and mobile

applications, offering intuitive user experiences, and a set of APIs facilitating seamless integration with third-party systems and services. Data ingestion and storage form the backbone of the architecture, encompassing the collection, processing, and storage of vast amounts of logistical data. This data, sourced from logistics partners, warehouses, transportation systems, and other relevant channels, undergoes rigorous processing to extract key information regarding empty spaces, available resources, and demand patterns. Empty space detection and management represent pivotal components of the system, enabling real-time monitoring and analysis of available spaces across various logistical nodes such as warehouses, trucks, and shipping containers. Utilizing a combination of sensors, IoT devices, and algorithmic analysis, the system identifies and categorizes available spaces based on factors like size, location, accessibility, and temporal availability. This information is then leveraged to facilitate space reservations and allocations, empowering users to make informed decisions regarding their logistical needs. Optimization and routing algorithms serve as the driving force behind maximizing the efficiency of space utilization and transportation logistics. These algorithms employ sophisticated optimization techniques to allocate resources effectively, considering parameters such as distance, capacity, cost, and delivery schedules. By intelligently orchestrating the movement of goods and vehicles, the system minimizes wastage, reduces transit times, and optimizes overall logistical operations. Communication and notification functionalities ensure seamless coordination and collaboration among stakeholders within the logistics ecosystem. Real-time alerts and messaging capabilities keep users informed about available spaces, reservation statuses, and any changes in logistics plans, fostering transparency and responsiveness throughout the supply chain.

In summary, the system architecture for the project involving optimizing logistics through the utilization of empty spaces is a comprehensive framework designed to address the myriad challenges of modern supply chain management. By leveraging advanced technologies, algorithms, and integration capabilities, the architecture empowers organizations to maximize efficiency, minimize costs, and unlock the full potential of their logistical operations.

UML DIAGRAM

3.4 USE CASE DIAGRAM

A use case diagram is a graphic depiction of the interactions among the elements of a system. The use case is a methodology used in system analysis to identify, clarify and organize system requirements.

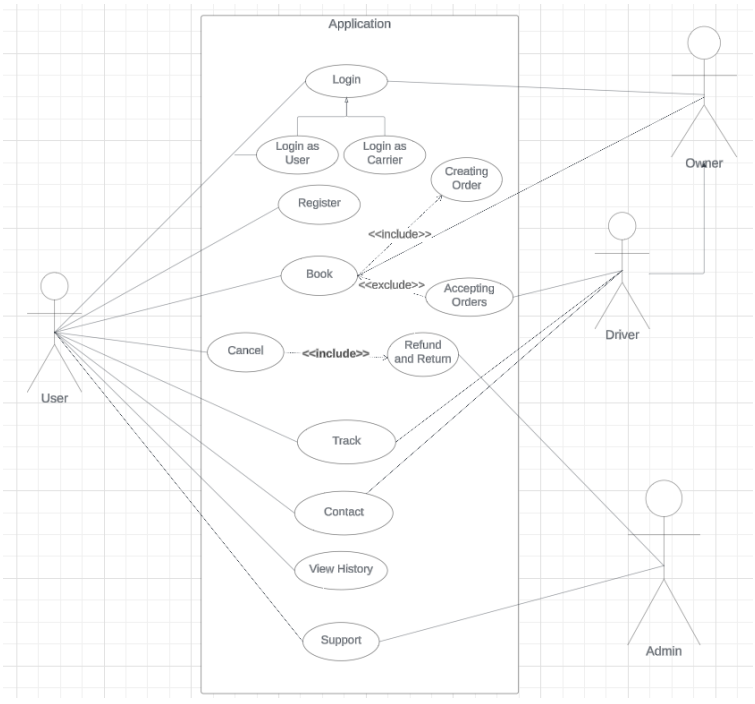

Fig 3.2 Use case diagram

3.5 ACTIVITY DIAGRAM

Activity diagram captures the dynamic behaviour of the system. Other four diagrams are used to show the message flow from one object to another but the activity diagram is used to show the message flow from one activity to another. Activity is a particular operation of the system. Activity diagrams are not only used for visualizing the dynamic nature of a system, but they are also used to construct the executable system by using forward and reverse engineering techniques. The only missing thing in the activity diagram is the message part. It does not show any message flow from one activity to another. Activity diagram is sometimes considered as the flowchart. Although the diagrams look like a flowchart, they are not. It shows different flows such as parallel, branched, concurrent, and single.

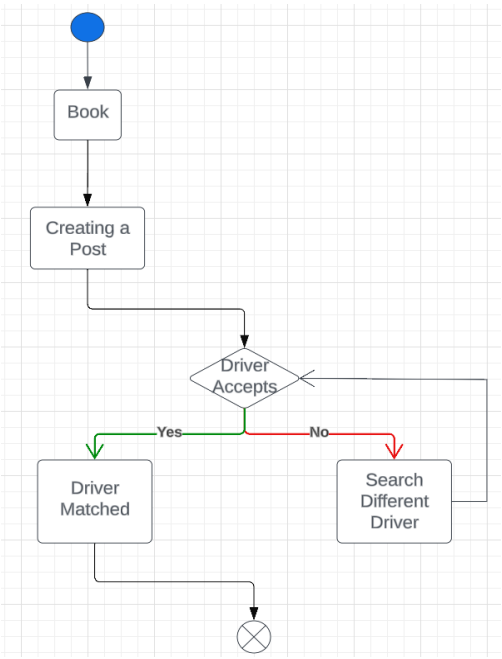

Fig 3.3 Activity diagram

3.6 CLASS DIAGRAM

Class diagram is a static diagram. It represents the static view of an application. Class diagram is not only used for visualizing, describing, and documenting different aspects of a system but also for constructing executable code of the software application. Class diagram describes the attributes and operations of a class and also the constraints imposed on the system. The class diagrams are widely used in the modelling of object oriented systems because they are the only UML diagrams, which can be mapped directly with object-oriented languages. Class diagram shows a collection of classes, interfaces, associations, collaborations, and constraints. It is also known as a structural diagram.

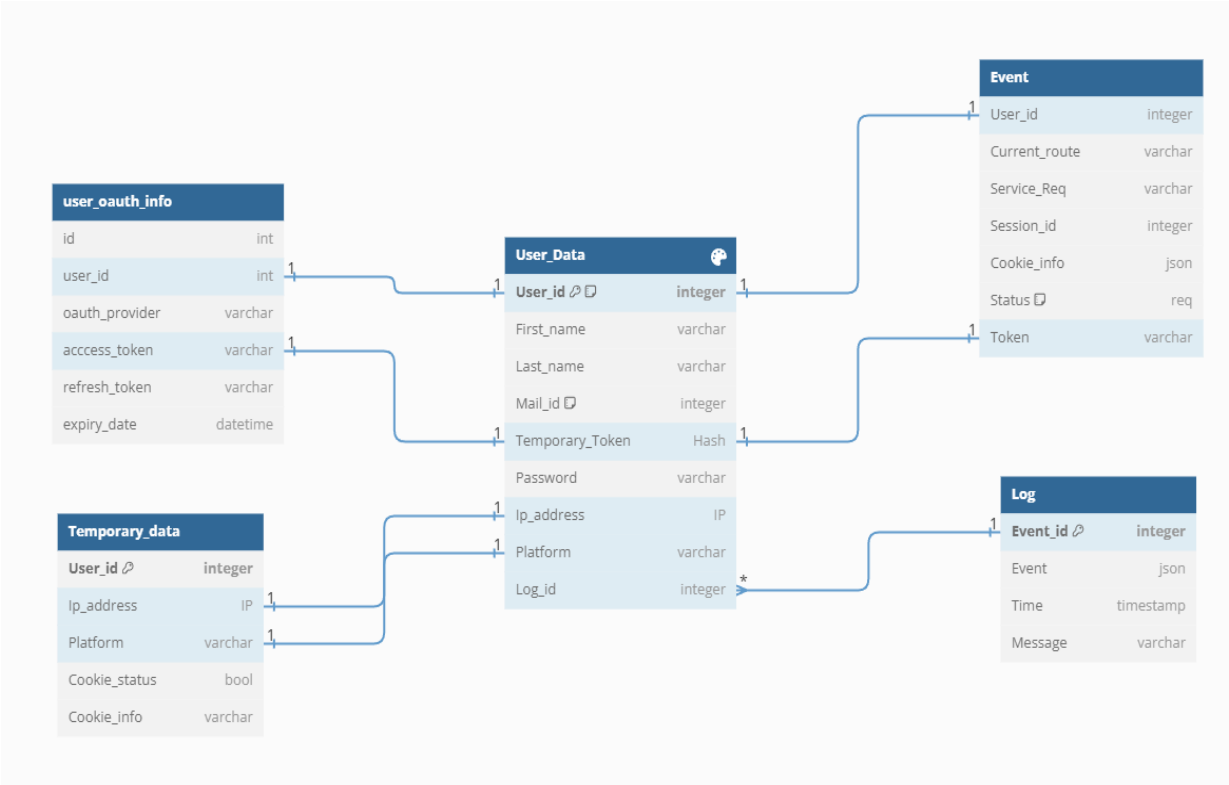

Fig 3.4 Class diagram

3.7 SEQUENCE DIAGRAM

A Sequence diagram is a kind of interaction diagram that shows how processes operate with one another and in what order. Message Sequence diagrams are sometimes called event diagrams, event sceneries and timing diagrams.

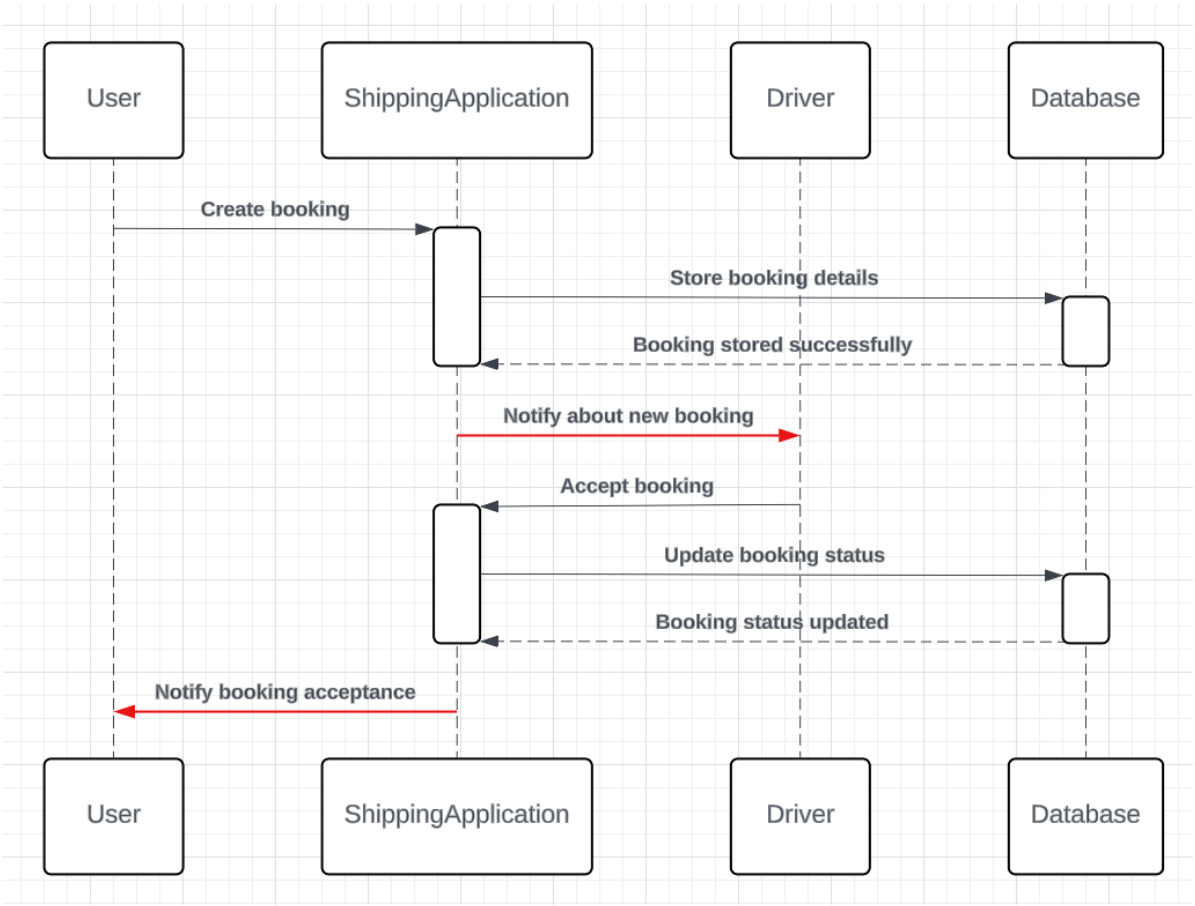

Fig 3.5 Sequence diagram

3.8 DATA FLOW DIAGRAM

A Data Flow Diagram (DFD) is a graphical representation of the "flow" of data through an information system, modelling its aspects. It is a preliminary step used to create an overview of the system which can later be elaborated DFDs can also be used for visualization of data processing.

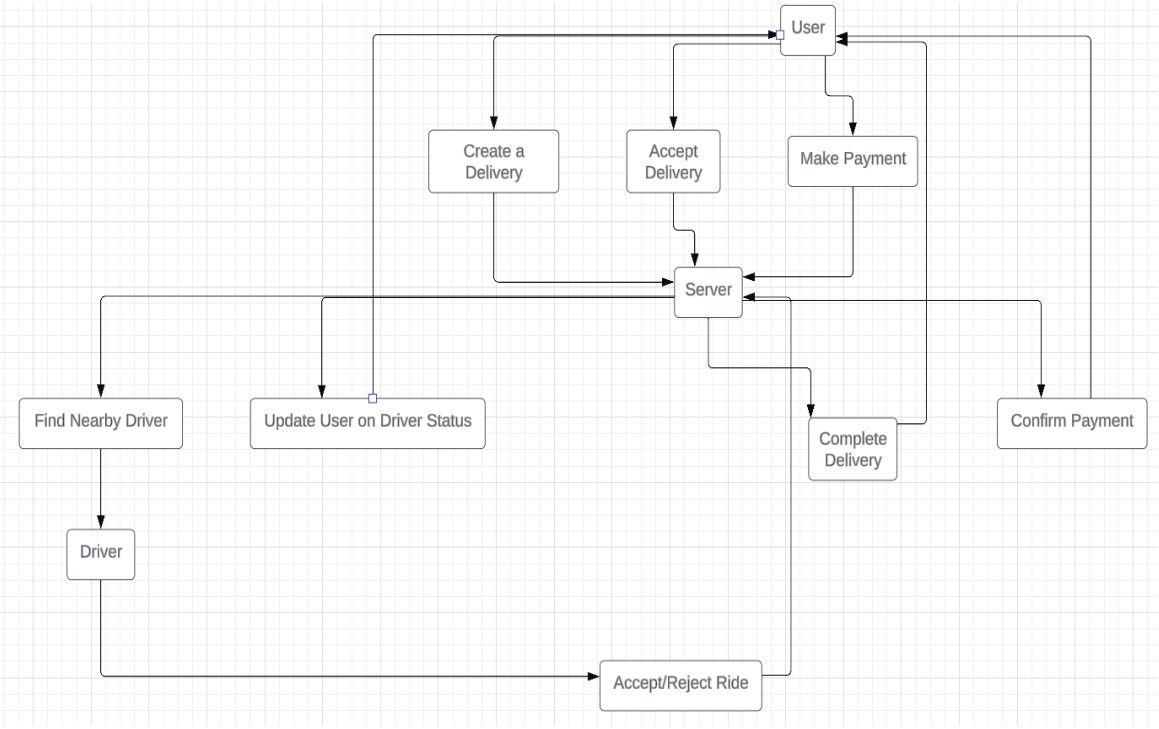

Fig 3.6 Data Flow diagram

CHAPTER-4

REQUIREMENT SPECIFICATION

4.1 List of Applications

4.1.1 LogiShare Backend (Cloud Server)

The cloud-based backend forms the logistical backbone, handling data processing and storage. It ensures scalability, integrates a database for information storage, utilizes backend logic for core functionalities, employs APIs for seamless communication, and is designed for accommodating growing user demands.

4.1.2 LogiShare Web Application (User Access)

The web application provides a user- friendly interface accessible through browsers. It facilitates secure user registration, consignment posting, bidding, and payment processes. The real-time tracking feature, responsive design, and transparent notification system enhance user experience and accessibility.

4.1.3 LogiShare Mobile App (User Access, Notifications & Reports)

The mobile app allows users to register, log in, and access accounts. It offers push notifications for bid and transit updates, and users can access transaction history and consignment details conveniently through the mobile platform.

4.1.4 LogiShare Mobile App (Notifications & Track)

The tracking-focused mobile app allows real-time monitoring of consignments with features such as live tracking on maps, GPS integration, offline functionality, alerts for transit events, and a user-friendly interface, providing users with comprehensive control and visibility over their shipments.

4.2 HARDWARE REQUIREMENTS

- Processor : Intel Core i3 Processor
- Speed : 2.5 GHz
- RAM : 2GB(min)
- Hard Disk : 500MB
- Key Board : Standard Windows Keyboard
- Mouse : Two or Three Button Mouse
- Monitor : LCD

4.3 SOFTWARE REQUIREMENTS

- Operating System : Windows 11
- Application Server : Tomcat6.0/7/8.X.
- Front End : Java , HTML, CSS, React
- Scripts : JavaScript.
- Server side Script : Java Server Pages.
- IDE : Net beans 8.2
- Back End : MYSQL 5.0
- Database Connectivity : JDBC

4.3.1 FEATURES OF WINDOWS 11

Windows 11 is the latest version of Microsoft's operating system, and it was announced in 2021. It introduces several new features and improvements over Windows 10, including a new Start menu and taskbar design that is cantered and simplified. This makes it easier for users to find what they're looking for and navigate the operating system more efficiently. The improved Snap Layouts and virtual desktops are also noteworthy features that allow users to quickly organize and manage their windows and desktops. Another significant improvement in Windows 11 is the integration of Microsoft Teams directly into the operating system. This means that users can easily collaborate and communicate with colleagues and friends without needing to install a separate app. In addition, the redesigned Microsoft Store makes it easier to discover and install apps, including support for Android apps via the Amazon Appstore. Windows 11 also includes several improvements for gamers, such as Auto HDR and Direct Storage, which enhance game performance and make games look and load better. The operating system also includes several new accessibility features, such as improved text-to-speech and speech-to-text capabilities, as well as the ability to customize the appearance of the operating system to better suit users' needs.

4.2.2 FEATURES OF JAVA PROGRAMMING LANGUAGE

Java is a widely used programming language that has been around for more than two decades. It was initially released in 1995 and has since become one of the most popular programming languages in the world. Java is known for its portability, security, and reliability, making it a favourite

among developers for a wide variety of applications, including web development, mobile development, enterprise software development, and more. One of the main reasons for Java's popularity is its platform independence. Java code can run on any platform that has a Java Virtual Machine (JVM) installed, which makes it an ideal choice for developing cross-platform applications. This portability feature has helped Java become the language of choice for developing large-scale enterprise applications. Spring Boot is a popular open-source framework built on top of the Java programming language. It is designed to simplify the development of web applications and micro services by providing a set of pre-configured and opinionated tools and features. Spring Boot provides a wide range of benefits for developers, including faster development time, improved productivity, and easier maintenance of applications. One of the key advantages of Spring Boot is its opinionated approach. Spring Boot provides developers with a set of defaults and best practices for building web applications and micro services. This approach allows developers to focus on business logic instead of worrying about the underlying infrastructure. Another advantage of Spring Boot is its ease of use. Spring Boot provides a simple and intuitive interface for developers to configure their applications. This interface makes it easy for developers to quickly set up and run their applications, without having to spend a lot of time on configuration. Spring Boot also provides a robust set of features for building scalable and highly available applications. It includes support for cloud-based architectures and micro services, which are critical for building modern web applications. Spring Boot provides a number of tools for building micro services, including a lightweight HTTP server, a service discovery mechanism, and a configuration server. Together, Java and Spring Boot provide developers with a powerful set of tools for building reliable, secure, and high-performing web applications and services. By leveraging the benefits of both

Java and Spring Boot, developers can build complex applications quickly and easily, without sacrificing performance or reliability. With its wide range of features and benefits, Spring Boot has become a popular choice among developers for building modern web applications and micro services.

JDBC

In an effort to set an independent database standard API for Java, Sun Microsystems developed Java Database Connectivity, or JDBC. JDBC offers a generic SQL database access mechanism that provides a consistent interface to a variety of RDBMS. This consistent interface is achieved through the use of "plug-in" database connectivity modules, or *drivers*. If a database vendor wishes to have JDBC support, he or she must provide the driver for each platform that the database and Java run on.

To gain a wider acceptance of JDBC, Sun based JDBC's framework on ODBC. As you discovered earlier in this chapter, ODBC has widespread support on a variety of platforms. Basing JDBC on ODBC will allow vendors to bring JDBC drivers to market much faster than developing a completely new connectivity solution.

JDBC was announced in March of 1996. It was released for a 90-day public review that ended June 8, 1996. Because of user input, the final JDBC v1.0 specification was released soon after.

The remainder of this section will cover enough information about JDBC for you to know what it is about and how to use it effectively. This is by no means a complete overview of JDBC. That would fill an entire book.

JDBC Goals

Few software packages are designed without goals in mind. JDBC is one that, because of its many goals, drove the development of the API. These goals, in conjunction with early reviewer feedback, have finalized the JDBC

class library into a solid framework for building database applications in Java.

4.2.3 FEATURES OF NETBEANS IDE

NetBeans is a popular integrated development environment (IDE) that is widely used by software developers to create applications in a variety of programming languages, including Java, JavaScript, HTML5, PHP, and more. As an open-source IDE, it is freely available to all developers, making it a popular choice for both beginners and experienced programmers. NetBeans provides a range of features that make it easier for developers to write, test, and debug their code. These include code highlighting, code completion, and code formatting, which help to improve code quality and ensure that code is consistent and easy to read. Additionally, NetBeans provides integrated support for version control, making it easy for developers to manage changes to their code over time. One of the key strengths of NetBeans is its support for the creation of graphical user interfaces (GUIs). The IDE provides a built-in drag-and-drop interface that makes it easy to design and test GUIs, allowing developers to quickly create applications with rich and responsive user interfaces. NetBeans also supports the development of web applications, with integrated support for popular web frameworks such as AngularJS, Node.js, and HTML5. The IDE includes a range of plugins that extend its functionality, allowing it to be used for a wide range of software development projects. Overall, NetBeans is a powerful IDE that provides developers with a range of tools and features to improve their productivity and streamline their development workflows. Its support for a wide range of programming languages and web frameworks, combined with its intuitive interface and extensive plugin library, make it a popular choice among developers around the world.

CHAPTER-5

RESULTS AND DISCUSSION

The implementation of a logistics delivery solution utilizing empty spaces in trucks presents a significant opportunity for optimization and efficiency within the transportation industry. By leveraging advanced technology and strategic planning, this project aims to address the challenge of underutilized capacity in truck shipments while simultaneously reducing costs and environmental impact.

5.1 Input UI

The LogiShare’s input dashboard's UI is designed for simplicity and efficiency, offering an intuitive, user-friendly experience across web, desktop, and mobile platforms. It features a clean layout, responsive navigation, and interactive data visualizations, enabling easy access to project reports, productivity metrics, and real-time insights for informed decision-making.

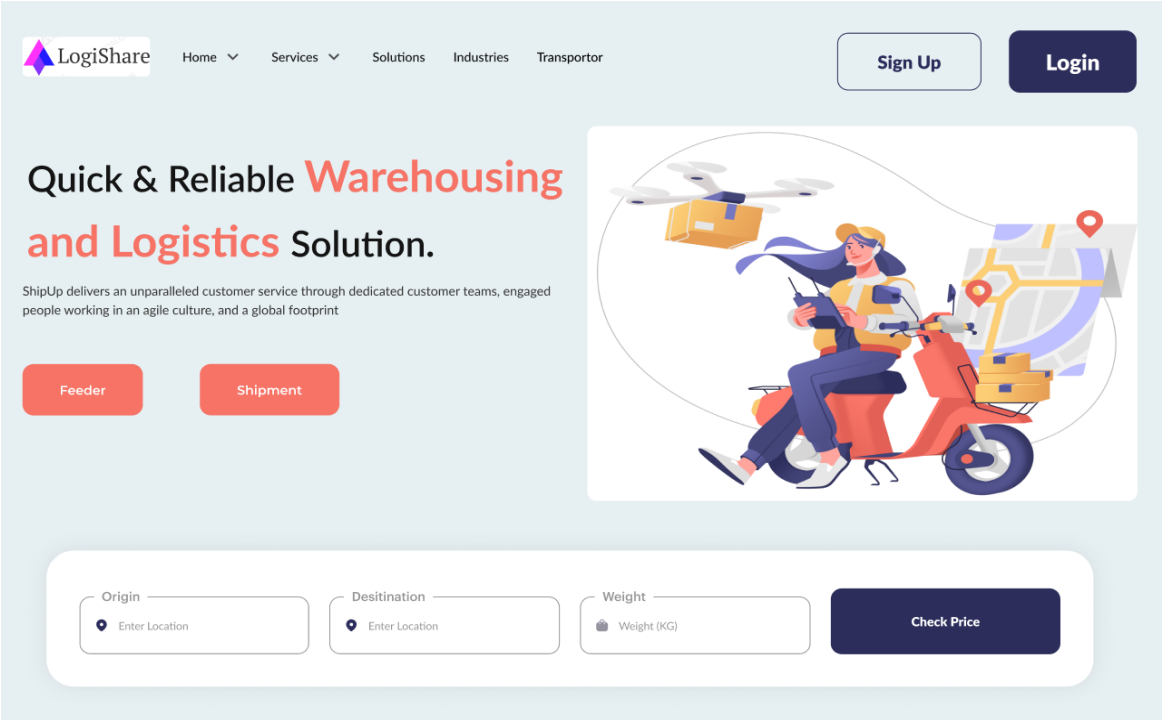

Fig:5.1 LogiShare's Landing Page

The fig 5.1 is meticulously designed to captivate visitors and effectively convey the company's services and value proposition. At the top, the header proudly displays the company logo and provides easy navigation through essential pages like Services, About Us, and Contact. Immediately below, the hero section commands attention with a compelling headline showcasing the primary benefit of the logistics solutions offered, accompanied by a striking image or video illustrating logistics operations in action. Following this, a clear call to action prompts visitors to take the next step, whether it's obtaining a quote, learning more, or requesting a demo. As visitors scroll down, they encounter an overview of the services provided, each accompanied by a brief description highlighting its advantages. Delving deeper, an About Us section introduces the company's mission, values, and distinguishing features, fostering trust and credibility. Testimonials from

satisfied clients further bolster confidence in the company's capabilities. Conveniently located contact information encourages visitors to reach out, while a responsive design ensures seamless viewing across all devices. Consistent visual elements throughout the page reinforce brand identity and enhance user experience, culminating in an engaging and informative journey that encourages visitors to explore further and ultimately become valued clients.

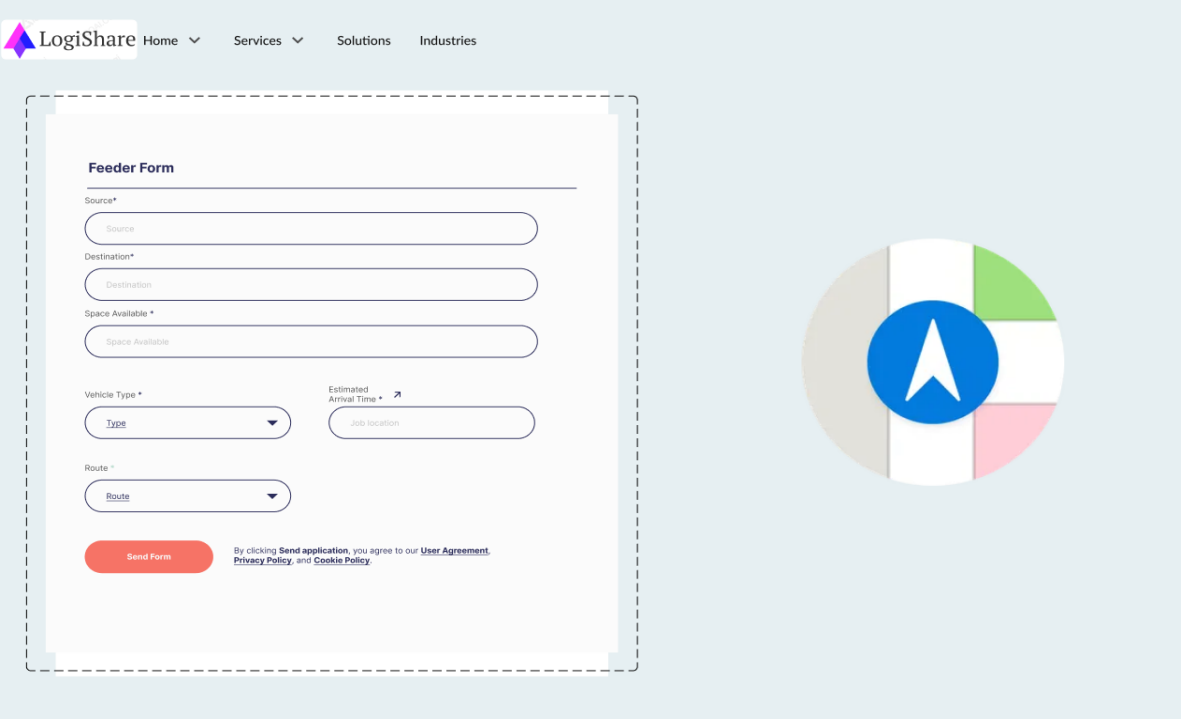

Fig 5.2: Feeder Form Input page

The fig 5.2 of a logistics website plays a crucial role in guiding visitors towards their desired destinations within the site. Designed with a strategic layout, it serves as a gateway to various sections, ensuring efficient navigation and maximizing user engagement. At the top, a concise header prominently features the company logo and provides intuitive menu options,

directing visitors to key areas such as Services, About Us, and Contact. Below, the hero section serves as a focal point, featuring a captivating headline and visually appealing imagery that encapsulates the essence of the logistics services offered. A clear call to action prompts visitors to explore further or take specific actions, such as requesting a quote or signing up for updates. As visitors scroll down, they encounter informative sections highlighting the company's services, expertise, and client testimonials, fostering trust and credibility. Contact information is readily accessible, facilitating seamless communication. With a responsive design ensuring compatibility across devices, the feeder page delivers a cohesive and user-friendly experience, guiding visitors smoothly towards their desired destinations within the logistics website.

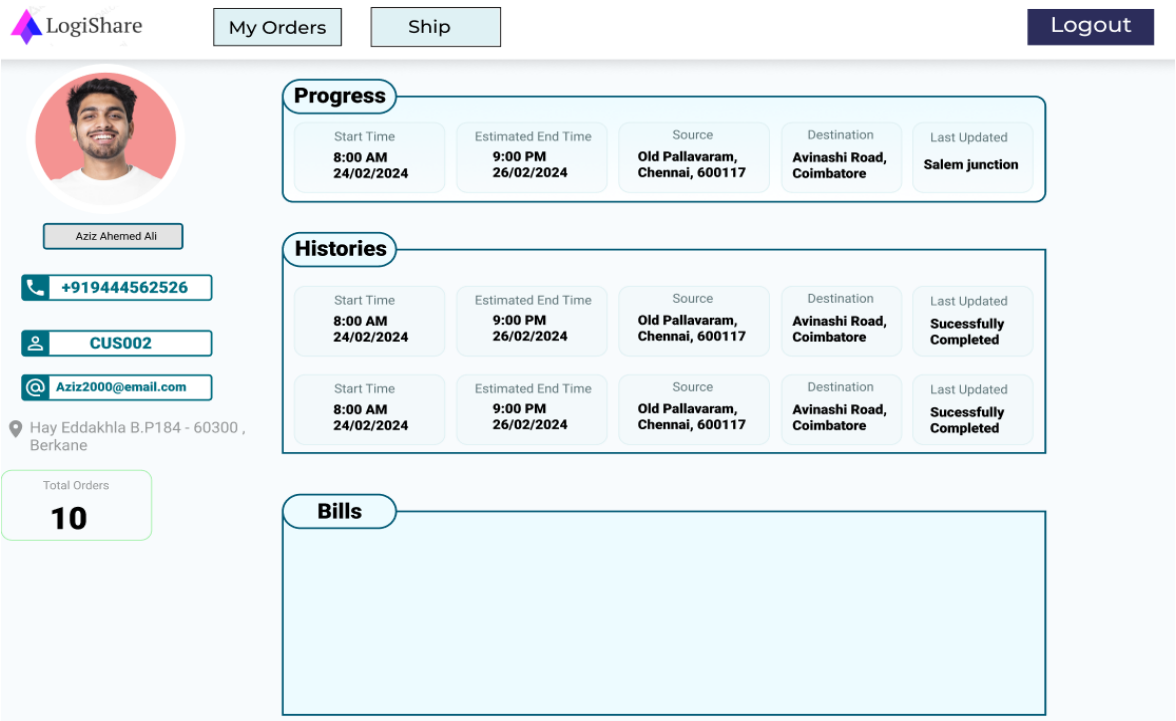

Fig 5.3: Transporter Admin Page

The fig 5.3 depicts within a logistics website serves as a centralized hub for managing and overseeing various aspects of transportation operations. Designed with functionality and efficiency in mind, this landing page prioritizes user-friendly navigation and comprehensive tools for administrators. At the top, a streamlined header displays essential navigation options, allowing administrators to access key features such as managing shipments, tracking vehicles, and coordinating schedules. The hero section of the page may highlight critical performance metrics or alerts, providing administrators with immediate insights into the status of transportation operations. Below, intuitive dashboard elements provide at-a-glance summaries of key metrics, allowing administrators to quickly assess performance and identify areas for optimization. Interactive maps and visualizations may be incorporated to provide real-time tracking of vehicles and shipments, enhancing transparency and coordination. Additionally, customizable filters and search functionalities enable administrators to efficiently locate specific information or transactions within the system. With a focus on functionality and usability, the transporter admin landing page empowers administrators to effectively manage transportation operations and ensure seamless logistics processes.

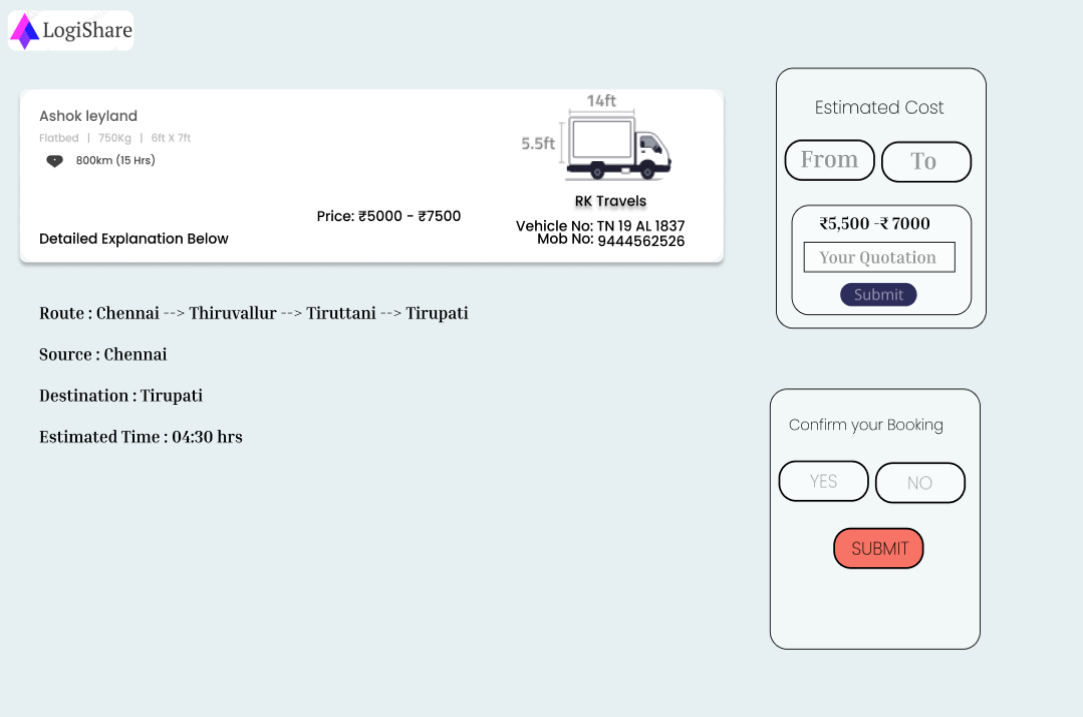

Fig 5.4: Explore Page

The Fig 5.4 of a logistics website serves as a gateway to a wealth of information, offering visitors an opportunity to delve deeper into the various facets of the logistics industry. Designed to facilitate discovery and education, this landing page features a dynamic layout that showcases a diverse range of topics, services, and resources related to logistics. At the top, a user-friendly navigation menu provides easy access to different sections, allowing visitors to explore topics such as supply chain management, freight forwarding, warehousing, and more. The hero section may feature compelling visuals or introductory text that invites visitors to embark on a journey of exploration. Below, visitors encounter a curated selection of articles, guides, case studies, and multimedia content that offer insights into industry trends, best practices, and success stories. Interactive elements such as videos, infographics, and interactive maps may be incorporated to enhance engagement and comprehension. Additionally,

user-friendly search and filtering options enable visitors to find relevant information quickly and efficiently. Whether they are industry professionals seeking in-depth knowledge or newcomers looking to learn about the logistics field, the explore landing page provides a rich and informative experience that satisfies curiosity and fosters learning.

CHAPTER-6

TESTING AND MAINTENANCE

6.1 SYSTEM TESTING

Testing is vital to the success of the system. System testing makes a logical assumption that if all parts of the system are correct, the goal will be successfully achieved. In the testing process we test the actual system in an organization and gather errors from the new system operating in full efficiency as stated. System testing is the stage of implementation, which is aimed at ensuring that the system works accurately and efficiently.

In the testing process we test the actual system in an organization and gather errors from the new system and take initiatives to correct the same. All the front-end and back-end connectivity are tested to be sure that the new system operates in full efficiency as stated. System testing is the stage of implementation, which is aimed at ensuring that the system works accurately and efficiently. The main objective of testing is to uncover errors from the system. For the uncovering process we have to give proper input data to the system. So we should be more conscious of giving input data. It is important to give correct inputs to efficient testing. Testing is done for each module. After testing all the modules, the modules are integrated and testing of the final system is done with the test data, specially designed to show that the system will operate successfully in all its aspects conditions. Thus the system testing is a confirmation that all is correct and an opportunity to show the user that the system works. Inadequate testing or non-testing leads to errors that may appear a few months later. This will create two problems:

Time delay between the cause and appearance of the problem. The effect of the system errors on files and records within the system. The purpose of the system testing is to consider all the likely variations to which it will be suggested and push the system to its limits. The testing process focuses on logical intervals of the software ensuring that all the statements have been tested and on the function intervals (i.e.,) conducting tests to uncover errors and ensure that defined inputs will produce actual results that agree with the required results. Testing has to be done using the two common steps Unit testing and Integration testing. In the project system testing is made as follows: The procedure level testing is made first. By giving improper inputs, the errors occurred are noted and eliminated. This is the final step in the system life cycle. Here we implement the tested error-free system into a real-life environment and make necessary changes, which runs in an online fashion. Here system maintenance is done every month or year based on company policies, and is checked for errors like runtime errors, long run errors and other maintenance like table verification and reports.

Integration Testing is a level of software testing where individual units are combined and tested as a group.

The purpose of this level is to expose faults in the interaction between integrated units. Test drivers and test stubs are used to assist in Integration testing.

METHOD

Any of Black Box Testing, White Box Testing, and Grey Box Testing methods can be used. Normally, the method depends on your definition of ‘unit’.

TASKS

Integration Test Plan

- Prepare
- Review
- Rework
- Baseline

Integration Test Cases/Scripts

- Prepare
- Review
- Rework
- Baseline

Integration Test

- Perform

6.2 UNIT TESTING

Unit testing verification efforts on the smallest unit of software design, module. This is known as “Module Testing”. The modules are tested separately. This testing is carried out during the programming stage itself. In these testing steps, each module is found to be working satisfactorily as regard to the expected output from the module.

6.3 BLACK BOX TESTING

Black box testing, also known as Behavioural Testing, is a software testing method in which the internal structure/ design/ implementation of the

item being tested is not known to the tester. These tests can be functional or non-functional, though usually functional.

6.4 WHITE-BOX TESTING

White-box testing (also known as clear box testing, glass box testing, transparent box testing, and structural testing) is a method of testing software that tests internal structures or workings of an application, as opposed to its functionality (i.e. black-box testing).

6.5 GREY BOX TESTING

Grey box testing is a technique to test the application with having a limited knowledge of the internal workings of an application. To test the Web Services application usually the Grey box testing is used. Grey box testing is performed by end-users and also by testers and developers.

6.6 INTEGRATION TESTING

Integration testing is a systematic technique for constructing tests to uncover errors associated within the interface. In the project, all the modules are combined and then the entire programmer is tested as a whole. In the integration-testing step, all the errors uncovered are corrected for the next testing steps.

Software integration testing is the incremental integration testing of two or more integrated software components on a single platform to produce failures caused by interface defects.

The task of the integration test is to check that components or software applications, e.g. components in a software system or – one step up – software applications at the company level – interact without error.

6.7 ACCEPTANCE TESTING

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

Acceptance testing for Data Synchronization

The Acknowledgements will be received by the Sender Node after the Packets are received by the Destination Node. The Route add operation is done only when there is a Route request in need The Status of Nodes information is done automatically in the Cache Updating process

BUILD THE TEST PLAN

Any project can be divided into units that can be further performed for detailed processing. Then a testing strategy for each of this unit is carried out. Unit testing helps to identify the possible bugs in the individual component, so the component that has bugs can be identified and can be rectified from errors.

CHAPTER-7

CONCLUSION AND FUTURE ENHANCEMENTS

CONCLUSION

In conclusion, the implementation of a logistics delivery solution utilizing empty spaces in trucks presents a significant opportunity for optimization and efficiency within the transportation industry. By leveraging advanced technology and strategic planning, this project aims to address the challenge of underutilized capacity in truck shipments while simultaneously reducing costs and environmental impact.

Through the utilization of innovative software algorithms, real-time tracking systems, and collaborative partnerships with logistics stakeholders, this solution can effectively match available cargo with empty spaces in trucks, maximizing the efficiency of each delivery route. This not only optimizes resource utilization but also reduces the number of vehicles on the road, minimizing congestion and emissions.

Furthermore, the adoption of this delivery solution fosters a more sustainable approach to transportation, aligning with the growing emphasis on eco-friendly practices and reducing the carbon footprint associated with logistics operations.

Overall, the implementation of this logistics delivery solution represents a win-win scenario for businesses, consumers, and the environment alike. By harnessing the potential of empty spaces in trucks, we can drive greater efficiency, reduce costs, and contribute to a more sustainable future for the transportation industry.

FUTURE ENHANCEMENT

The future scope of this project involves further research and development to enhance the performance and scalability of the proposed e-coupon service. This includes exploring different block chain platforms and consensus algorithms, extending the service to include other types of digital coupons, integrating it with existing e-commerce platforms, and adding additional security features such as privacy-enhancing technologies. The future scope of this project involves extending the service to include other types of digital coupons, such as loyalty points, gift cards, and promotional codes. This will require the development of new features and capabilities that can handle different types of coupons and ensure their secure exchange and redemption. To integrate the e-coupon service with existing e-commerce platforms to provide a seamless and convenient experience for both businesses and customers. This will require close collaboration with e-commerce providers and the development of custom APIs and plugins that can integrate with different platforms.

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