KINATWA BUS ONLINE TICKETING MANAGEMENT SYSTEM

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A project proposal submitted to the Faculty of Physical Sciences, Engineering and Technology in Partial Fulfilment of the Requirements for the award of Diploma in Computer Science of Tharaka University.

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# DECLARATION

I hereby declare that this project is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for a degree or any other award in any other educational institution.

Student Name:

………………………………………….

Signature:

………………………………………….

Date:

………………………………………….

# APPROVAL

This project was conducted under our supervision and is submitted with our approval as university supervisor.

Supervisor Name: ………………..................................

Signature: ………………………………….

Date: ………………………………………

# DEDICATION

I dedicate this project to my family whose love and support have been my foundation. I thank my father Julius for his endless encouragement and belief in my potential. To my mother Agnes, sister Irene, brother Joel and Jones you have been good to me and your patience and understanding in my project and studies have been a constant source of strength. Finally, this project is a testament to the support and guidance I have received from all of you.

**ACKNOWLEDGEMENT**

I would like to pass my deepest gratitude to my father Julius and my mother Agnes for paying my school fees and their motivation towards my project and studies. I also extend my sincere thanks to my advisor lecturer Francis for encouragement throughout this journey. I also acknowledge Tharaka University for giving me chance to be in this institution and conduct my project well.

# ABSTRACT

This project presents an advanced online ticketing system designed to streamline the process of purchasing tickets for various events and services. The system aims to enhance user experience through a user-friendly interface and personalized features. Key functionalities include secure payment processing automated ticket management and real-time inventory updates. The system also incorporates accessibility features to ensure inclusivity and multilingual support to cater to a diverse user base. The system provides valuable insight into customer behavior a preference, enabling better decision-making and optimized pricing strategies. By addressing existing challenges in operational efficiency, fraud prevention and user satisfaction, this online ticketing system sets a new standard for convenience and reliability in the ticketing industry.

The proposal outlines the development and implementation of this system, detailing the key features, including a responsive web interface, integration with various payment gateways, and support for multiple bus operators. The system also includes an admin panel for managing schedules, routes, and bookings, as well as generating reports for operational insights.

In the proposal, you will find a detailed analysis of system requirements, including both functional and non-functional aspects, followed by a design chapter that outlines the architecture, user interface, and database schema. The implementation chapter provides a step-by-step guide on how the system is developed, integrating various technologies, and ensuring security. The testing and validation chapter covers the methods used to ensure the system meets all specifications and functions correctly. Lastly, the deployment and maintenance chapter discuss the strategies for launching the system, training users, and ongoing support to ensure long-term success.

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# CHAPTER ONE: INTRODUCTION

# Introduction

This chapter provides an in-depth exploration of the online bus ticketing system, outlining its objectives, significance and benefits it brings to both passengers and transportation providers. This chapter will major on background information, problem statement objectives and scope

## Background of Study.

An online ticketing system is a comprehensive digital platform designed to simplify the process of booking bus ticket for travels and streamlines operations for bus service providers. this project leverages modern web and mobile technologies to offer a seamless and efficient experience for both end-users and operators. By implementing an online bus system, transportation companies can significantly enhance their service delivery, improve customer satisfaction and streamline their operations. This not only meets the growing demand for digital solutions but also positions bus operators to compete effectively in a technology-driven market.

Online bus ticketing in America has evolved significantly over the past two decades, driven by advances in technology and changing consumer preferences. Initially, bus tickets were primarily purchased through traditional methods such as ticket counters at bus stations or via phone reservations. However, the advent of the internet and e-commerce transformed this process, offering passengers the convenience of booking tickets online. Online bus ticketing gained traction in the early 2000s as bus companies started establishing their online presence. This shift allowed passengers to browse schedules, select seats, and pay for tickets from the comfort of their homes or on-the-go using their computers or later, mobile devices. The proliferation of smartphones and mobile applications further revolutionized the online booking experience. Passengers could now use dedicated apps provided by bus companies or third-party platforms to compare prices, check real-time availability, and make bookings instantly.

Online ticketing made bus travel more accessible to a wider audience. It simplified the process for both frequent travelers and occasional riders, eliminating the need to visit physical ticket counters or navigate complex phone systems for reservations This integration aimed to streamline the entire travel planning process. Online bus ticketing offers unparalleled convenience, allowing passengers to book tickets anytime and anywhere with internet access. Consumers benefit from increased choice and transparency in pricing and schedules, enabling them to make informed decisions based on their preferences and budget. For bus companies, online ticketing systems streamline operations, reduce overhead costs associated with manual ticket sales, and provide valuable data insights into passenger preferences and booking trends. Despite widespread adoption of online booking, challenges remain in ensuring accessibility for all demographics, particularly those with limited internet access or digital literacy. Top of Form

Bottom of FormBus ticketing system has evolved significantly over the years, transitioning from manual, paper-based processes to sophisticated online platforms. This evolution has been been driven by need for greater efficiently, convenience and accessibility in the transportation sector. Traditionally, bus tickets were purchased at physical counters where travelers would wait in long lines and face limited options in terms of service providers and schedules. This method was not only time-consuming but also prone to errors, such as overbooking and mismanagement of reservations. Online bus ticketing emerged offering a digital alternative to conventional method. This system has been widely adopted around the world, in Kenya online bus ticketing systems have been implemented by several bus operators and platforms, one of them is Easy Coach where it is a prominent bus company in Kenya that offers online -ticketing services. Their platform allows customers to book tickets for travel between major cities. Other examples are: Modern Coast and Mash East Africa. The first significant step towards online ticketing in India was taken by Indian Railways. In the late 1990s Indian Railways introduced a computer-based reservation system known as passenger Reservation System. This allowed for the digital management of railway tickets but was not yet an online system accessible to the general public. The Indian Railway Catering and Tourism Corporation was established in 1990 and launched its online ticketing website in 2002.This marked a major shift, as for the first time, passengers could book railway tickets online, significantly, reducing the need for physical queues at reservation counters.

## Problem Statement.

The current manual bus ticketing system is inefficient and inconvenient for passengers, leading to long queues, difficulty in accessing timely information, and frequent booking errors. bus operators struggle with managing schedules seat availability and revenue collection effectively. There is a need for comprehensive online bus ticketing system that can streamline the booking process, provide real-time information and enhance the overall travel experience for passengers while improving operational efficiently for bus operators.

**1.3** Objectives.

### **General Objectives**.

Develop an intuitive and accessible platform that allows users to book bus tickets from any location at any time, eliminating the need for physical ticket counters. Implement a system that offers up-to-date information on bus schedules, seat availability and ticket prices to help passengers make informed decisions. Streamline the ticketing process for bus operators by automating task such as schedule management, seat allocation and fare calculation, reducing administrative burdens an error. Provide features like interactive seats election, e-tickets, and automated notifications to improve overall user satisfaction and engagement.

**1.3.2** Specific Objectives.

1. To develop online bus ticketing system that allows passengers to book tickets conveniently from any location at any time.
2. To implement real- time information on bus schedules, seats and pricing for transparency and decision making for travels
3. To enhance the user experience and expand accessibility for our online bus ticketing by integrating local wallet payment solutions
4. To offer features such as seat selection or e-tickets to improve customer experience.
   1. Research Questions.
5. How to develop online bus ticketing system that allows passengers to book tickets conveniently from any location at any time.
6. How to implement real- time information on bus schedules, seats and pricing for transparency and decision making for travels.
7. How to implement secure and diverse payment options to ensure easy and safe transacting.
8. How to offer features such as seat selection or e-tickets to improve customer experience.

## Significance of Study

Passengers can book tickets from anywhere at any time, eliminating the need to visit physical ticket counters and saving time. Real-time updates on seat availability and schedule optimize resources allocation and enhance operational efficiency. Features such as seat selection-tickets and automated notification enhance the overall booking experience for passengers. Access to comprehensive information on routes and pricing allows travels to make informed decision and plan their journey more effectively. Reduces the environmental impact associated with traditional paper-based ticketing methods by minimizing the user paper and physical infrastructure. Promotes eco-friendly practices and contributes to sustainability efforts in the transport sector. Online ticketing system facilitates compliance with regulatory requirements and standards governing the transportation industry.

## Scope.

Seat selection and booking provides an interactive seat map for users to choose their preferred seat and confirm bookings-tickets and notifications generates a e-ticket upon successful booking and send them via email or SMS. Implement a secure system for user to create accounts, log in and manage their profiles.

# CHAPTER TWO: LITERATURE REVIEW.

## Introduction.

Online ticketing systems have transformed the traditional travel industry by leveraging digital technology to provide convenient and efficient booking options. These systems enable users to book tickets via websites or mobile apps, offering real-time seat availability, pricing and scheduling information. The adoption of online bus ticketing began in the late 1990s and 2000s, following the broader trend of digitalization in travel. Early adopters include bus operators in Europe and North America who integrated online booking systems into their operations to improve customer services and streamline operations. Key technological advancements have Facilitated the growth of online bus ticketing. These include the development of secure payment gateways, user-friendly interfaces or mobile applications. In Asia, particularly in countries like India and China, the online bus ticketing market has been significant growth.

## Review of Related Works.

[1] explored the application of decision support systems in transportation, emphasizing the efficiency gains in online ticketing systems. Their work highlighted the integration of real-time data and predictive analytics to optimize bus scheduling and ticketing operations.

[2] This research focused on the user experience aspect of online bus ticketing platforms. They investigated factors influencing user satisfaction, such as website usability, information presentation, and transaction security. Their findings underscored the importance of user-centric design in enhancing customer loyalty and operational efficiency.

[3] Wijaya and Lim studied the impact of mobile technology on bus ticketing systems. They examined how mobile apps revolutionize ticket booking, payment processing, and customer engagement. Their research highlighted the shift towards mobile platforms as a means to enhance convenience and accessibility for passengers.

[4] Sharma and Mohan investigated the role of data analytics in optimizing bus ticketing systems. They analyzed the use of big data to predict travel demand, optimize route planning, and improve operational efficiency. Their work demonstrated how data-driven insights can lead to significant cost savings and service improvements in public transportation.

[5] Chandrasekaran and Kumar focused on the security aspects of online bus ticketing systems. They explored various cybersecurity threats and proposed strategies to mitigate risks associated with online transactions and passenger data protection. Their research highlighted the importance of robust security measures to build trust and ensure the integrity of ticketing platforms.

[6] entitled “Factors Affecting the Demand for the Taxi-Evidence from Zhejiang, China” found that four factors caught the attention of consumers when they chose different car ordering application.

There are several studies conducting research on m-commerce service quality topics such as studies done[7]

[8] which includes Drivers responding quickly to customer requests and Go-JekDrivers are responsive to customer orders.

## Conclusion.

The evolution of online ticketing systems from traditional ,manual processes to sophisticated ,digital platforms showcases significant advancements in technology and user experience .Modern systems leverage cutting -edge web technologies ,mobile applications and emerging trends like blockchain to enhance security and efficiency .As the industry continues to evolve, the focus will likely remain on scalability, security and innovation to meet the growing demands of users and event organizers alike.

## Conceptual Framework.

The design of user interface directly influences the user experience and affects user behavior. A user-friendly interface with intuitive navigation and clear instruction enhances user satisfaction and encourages repeat usage. The booking process encompasses various features such as route selection seat allocation and fare calculation, streamlining the booking seat selection improve user convenience and satisfaction. Integrating multiple payment gateways and processing financial transaction securely is crucial for completing bookings. Seamless payment processing enhances user trust and confidence, facilitating successful transactions and reducing abandonment rates.

Online bus ticketing system

External services layer

Fig 1. User interaction layer

# CHAPTER THREE: METHODOLOGY

# Introduction.

In the evolution of modern transportation and travel booking systems, the design and architecture of online platforms play a pivotal role in delivering seamless and efficient service experiences. Chapter 3 of this online bus ticketing project dives deep into the intricacies of system design and architecture, elucidating the foundational framework upon which the entire system operates. This chapter serves as a blueprint for the technical implementation, illustrating how various components interconnect to deliver essential functionalities such as ticket booking, seat selection, and payment processing. This introduction sets the stage by emphasizing the significance of system design and architecture in delivering a functional and reliable online bus ticketing system. It provides a clear overview of the chapter's contents and its role in ensuring the project's success. Adjust and expand upon it based on specific project details and requirements.

## **3.1 Research Design**.

The research design for online bus ticketing system involves a systematic approach to studying and developing a comprehensive, user-friendly platform that enables passengers to book bus tickets conveniently over the the internet. This research aims to address the challenges and requirements of both the users and the bus operators, ensuring a seamless and efficient booking experience. Its objectives are to create platform that allows users to search for bus, compare prices and book tickets with ease, to streamline the ticket booking process reducing the time and effort required for both users and bus operators and design a system capable of handling a large number of users and transaction, especially during peak times. Some software devices needed include: web servers for hosting the application, laptop for development, testing research. Mobile devices for testing mobile version of the ticketing application. Storage devices, security devices to protect the network from unauthorized access and threats.

## Target Group.

The target population for online bus ticketing system includes diverse groups who will benefit from the convenience, efficiency and enhanced service capabilities offered by the system. Passengers are the primary users of the online bus ticketing system. These passengers include:1. frequent travelers-these are individuals who regularly use bus services for commuting, business or leisure travel. Occasional travelers-individuals who use bus services infrequently for special occasions.

Tourists-visitors to a region who rely on bus services to explore new areas. Students-a significant group that uses bus services for daily commutes to educational institutions. Bus operators: They include large bus company’s operators who manage fewer buses and routes. Intercity bus service-operators who manage long-distance routes connecting different cities or regions. Agents-these act as intermediaries between passengers and bus operators. They include: Travel agents-businesses that offer travel related services including bus ticket bookings. Ticket agents-individuals specializing in selling bus tickets. Online platforms-third party websites that aggregate and sell tickets for multiple bus operators. Regulatory bodies-they oversee the transportation sector and ensure compliance with laws and standards. They include: Government transportation authorities-national, regional, or local government bodies that regulate bus services. Public safety and compliance agencies-organizations that ensure buses comply with safety and operational standards.

## **System Design and Development Tools.**

The system developer will use a variety of tools and technologies to design and develop the online bus ticketing system. These tools ensure that the system is robust, scalable, secure and user-friendly. These tools include programming language-the developer will use: HTML/CSS language: fundamental for creating and styling the web pages that form the user interface of the system. MySQL: the system developer will use MySQL in relational database management systems known for their robustness, scalability and support for complex queries and transaction. These are used to store structured data, such as user details, booking information and transaction records.

The system developer will use version control: GitHub-platform for hosting Git repositories, providing tools for collaboration, code review, issuing tracking and continuous integration/continuous deployment. System architecture: the developer will use front-end design which can be user interface, it is developed using HTML, CSS to create responsive and intuitive interfaces for passengers, bus operators and agents. Database Design-the developer will use entity -relationship diagrams: used to model the relationship between different data entities such users, routes and bookings. This ensures data is organized logically and efficiently.Top of Form**Bottom of Form**

## **Data Collection Methods and Tools.**

Data collection is a critical aspect of developing an effective online bus ticketing system. Accurate and comprehensive data enables better decision making, enhance user experience and improve operational efficiency. The system developer will use various data collection methods and tool. In particular, Surveys and questionnaires-online surveys will be adopted. these are distributed through email to gather feedback from users about their preferences or expectations. -on-site questionnaires: they are distributed at bus terminals or on buses to collect immediate feedback from passengers. Reasons for selecting these methods are online surveys can reach a large and diverse audience providing broad range of insights, these methods are inexpensive to administer and can be automated for continuous data collection.

Interviews and focus groups-one -on-one will also be considered, they will be conducted with key stakeholders such as bus operators, regulatory body representatives, and frequent passengers to gain in-depth insights. Focus groups: organized sessions with small groups of users to discuss their experience, needs and suggestions in a moderate environment. Reasons for selecting this method are interviews and focus groups provide qualitative data that can uncover deeper insights into user behaviors and motivations, these methods allow for follow-up questions, ensuring clarity and depth in responses and direct direct interaction with users and stallholders can build rapport and trust encouraging honest and detailed feedback.

Observation studies-monitoring user interaction with the current form of booking, observing how user navigate to prototype to gather data on usability and user experience. Reasons for selecting this method are: observations can provide objective data on user’s behavior, free from self-reporting biases, observing users in their natural environment helps understand the context a real-world challenge they face, direct observation of user interactions can highlight usability issues and areas for enhancement.

Some of the tools which can be used are; survey tools which can be google form- free tool that offers basic survey functionalities and easy integration with other google services. Interview and focus group tools: Zoom-a widely used video conferencing tool that facilitate remote interviews and focus group sessions. Observational tools: morae-a tool for conducting and recording in-person usability tests, providing detailed insights into user behavior.

## **Data Analysis**.

A stratified random sampling approach will be used to ensure representation from various user segments, including frequent travelers, occasional users, and first-time users of the online platform. This method is chosen to capture a comprehensive view of user experiences and preferences.DataCollectionMethods Participants will be invited to complete an online survey designed to gather quantitative data on their usage patterns, satisfaction levels with the booking process, reliability of the system, and overall user experience. The survey will include Likert scale questions to measure perceptions and preferences, as well as open-ended questions to capture qualitative insights.VariablesandMeasures Key variables include user satisfaction, ease of use, efficiency of the booking process, reliability of the system, and intention to use the platform in the future. These variables will be measured using validated scales and qualitative coding methods to ensure robust data collection and analysis.

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# APPENDICES.

## Appendix I: Sample Questionnaire

How often do you travel by bus?

Daily.

Weekly

Monthly

Occasionally

Rarely

How would you rate online bus ticketing.

Good.

Bad

Perfect

Which device do you primarily use for booking bus tickets online?

Smartphone

Laptops

Desktop computer

## Appendix II: Time Schedule

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Task | 2weeks | 1week | 2days | 3weeks | 3days | 1day | 1week |
| Project initiation |  |  |  |  |  |  |  |
| Requirement analysis |  |  |  |  |  |  |  |
| Feasibility study |  |  |  |  |  |  |  |
| System design |  |  |  |  |  |  |  |
| Resource allocation |  |  |  |  |  |  |  |
| Preliminary testing |  |  |  |  |  |  |  |
| Final approval |  |  |  |  |  |  |  |

## Appendix III Budget.

|  |  |
| --- | --- |
| Ticketing machine | 4,250 |
| Customer service | 4,000 |
| Software licenses | 3,000 |
| Pos terminals | 23000 |
| Mobile devices | 1240 |
| Total | 35490 |