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# **CHAPTER 1: INTRODUCTION**

The modern world is marked by its relentless pace, and the need for efficient, reliable, and on-demand transportation solutions has never been more Discussed. As urbanization continues to surge and the global population becomes increasingly interconnected, transportation systems are under constant pressure to adapt and evolve. Traditional taxi services are being replaced by innovative technologies that offer a superior and more convenient experience.

In response to these changing dynamics, we introduce the “**Driver On-Demand Service System,**” a cutting-edge web application that goes beyond traditional transportation. Not only can you request transport services with drivers and their own vehicles, but you can also summon a personal chauffeur to drive your own car when circumstances prevent you from taking the wheel yourself.

## **1.1 Background**

World Health Organization confirms that drunk driving, driving when you feel tired or depressed increases the chance of road traffic Crashes (WHO, 2018).

According to the world Health Organization (WHO) under the SAFER Interventions, road traffic crashes are a major source of injury, disability and death throughout the world and road traffic injuries are the leading cause of death among people aged 15-29 years. Driving under the influence of alcohol, or drink driving, is a key risk factor for 27% of all road injuries . It affects not only the drunk driver, but also in many cases, innocent victims such as passengers and pedestrians[[1](https://www.who.int/initiatives/SAFER/drink-driving)].

According to the latest Rwanda National Police report published in 2023” At least 3094 road accidents were recorded across the country between April and July this year. About 40% of these accidents occurred at night, with the majority resulting from drunk and reckless drinking. Road accidents remain among the top 10 causes of deaths in Rwanda[[2](https://police.gov.rw/media/news-detail/news/gerayo-amahoro-police-hospitality-operators-discuss-measures-to-fight-drunk-driving/)].

Rwanda National Police (RNP) has been using various mechanisms to reduce accidents such as the intensive static police observation posts on the roads mainly on hotspots, Checkpoints, patrols (both saturation and routine) and education. During different operations police used breathalyzers to test BAC level, this has been used randomly or selectively.

A drunk driver is a risk not only to their lives but to other road users and property so, Drunk driving is a serious offense according to the law, a drunk driver is a risk not only to his/her life but also to other road users.

Drunk driving is punishable by a fine of 150,000 frs, imprisonment, confiscation of the driving license and impounding the vehicle[[3](https://police.gov.rw/media/news-detail/news/over-80-drivers-arrested-for-drunken-driving/?tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&cHash=c09b7d3a81f112867c940d29dfef714e)].

## **1.2 Problem Statement**

The present landscape of transportation services is characterized by an array of inefficiencies, inconveniences, and limitations that collectively block the seamless access to private transportation services. Users, in their pursuit of private transportation, confront a multitude of challenges that undermine the quality and reliability of their experiences.

**Inconsistent Availability:**

One of the foremost challenges is the unreliable availability of private drivers. This unpredictability stems from several factors, including geographic disparities and temporal variations in demand. During peak hours or in areas with limited coverage, locating a suitable driver can become an arduous task. Passengers often grapple with extended wait times, further exacerbating the issue of inconsistent availability.

**Lack of Driver Information and Compatibility with User Needs:**

A consequential issue revolves around the lack of information concerning available drivers and the compatibility of their services with users' specific needs. Users find themselves in difficulty, unable to access vital details about drivers, such as their qualifications, ratings, and suitability for trip requirements. The absence of real-time information regarding driver locations and their alignment with user-requested times compounds this challenge, leaving passengers with uncertainty about whether a driver can be engaged promptly.

**Safety Concerns:**

The paramount importance of trust and safety in the context of private transportation cannot be overstated. Users inherently require the assurance that they are entrusting their well-being to responsible, vetted drivers. The current landscape often fails to provide transparent mechanisms for users to assess the trustworthiness and credentials of drivers, leading to apprehension and anxiety about the safety of their journeys.

**The Need for Alternate Drivers in Diverse Situations:**

In addition to the previously mentioned challenges, another pressing issue in the current transportation landscape revolves around the necessity for alternative drivers in various circumstances. There are instances when individuals may find themselves unable or unfit to operate a vehicle, such as after consuming alcohol, when feeling fatigued, or due to medical conditions. In such scenarios, the absence of a reliable, readily available alternative driver poses a significant difficulty. Whether it's ensuring safe transportation home after a social event, a late-night ride back from work when exhaustion sets in, or medical incapacitation, the unavailability of a responsible and qualified driver can lead to compromised safety and convenience. This critical aspect adds to the complexity of the problem we seek to address, highlighting the need for a comprehensive solution that caters to these diverse situations.

## **1.3 Objectives**

**General Objective:**

The central goal of this project is to revolutionize the ride-hailing experience by crafting a cutting-edge web-based Driver On-Demand Service System. We're dedicated to connecting people in need, including car owners temporarily sidelined by factors like alcohol or unexpected circumstances, with skilled, dependable, trusted drivers. Our central aim is to offer a straightforward and user-friendly web platform that simplifies the process of requesting private transportation and hiring temporary drivers.

**Specific Objectives:**

1. **Facilitate On-Demand Access:** Provide users with a user-friendly interface to seamlessly request private transportation services, enhancing accessibility and convenience.
2. **Enhance Safety and Trust:** Implement rigorous driver vetting processes to ensure a safe and reliable service.
3. **Optimize Transportation Efficiency:** Employ advanced algorithms for route optimization and dispatching to reduce wait times and improve the overall efficiency of the transportation network.
4. **Improve Transparency:** Offer transparent pricing structures based on the communication between both parties involved, real-time status updates, and clear communication channels to enhance user confidence.
5. **Support Growth:** Position the "Driver On-Demand Service System" for scalability, allowing for expansion into new markets and accommodating a growing user base.
6. Develop an administration dashboard to manage driver profiles, ride requests, and user accounts.
7. Implement a registration process for drivers without cars and private car owners to join the platform.

## **1.4 Scope**

The scope of this project encompasses the design, development, and implementation of a comprehensive "Driver On-Demand Service System." This system will include:

* User-facing web application for convenient booking.
* A secure and reliable backend infrastructure for driver management, vetting and approval.
* Advanced algorithms for location filtering and efficient driver assignment.
* Robust safety and security measures to ensure the well-being of both drivers and passengers.
* Integration with third-party mapping services to enhance user experience.

## **1.5 Significance**

The "Driver On-Demand Service System" is set to make a substantial impact on the transportation industry. By addressing the pain points faced by users and offering a modern, technology-driven alternative, this project has the potential to improve transportation efficiency, enhance safety, and contribute to the broader goal of sustainable urban mobility.

By providing a readily accessible alternative to individuals who might otherwise drive under adverse circumstances, such as while intoxicated, fatigued, or distracted, the system has the potential to contribute significantly to reducing accidents and improving road safety.

In conclusion, this introduction sets the stage for a comprehensive exploration of the "Driver On-Demand Service System." The subsequent chapters will delve into the technical aspects, methodology, and implementation details of this innovative solution. As we embark on this journey, we remain committed to creating a transportation system that is not only functional but also transformative in its approach to meeting the needs of our ever-evolving society.

# **CHAPTER 2: LITERATURE REVIEW**

Albara Awajan, a computer engineers from Al-Balqa’ Applied University, has proposed a solution in the form of an automated taxi booking and scheduling system. This system, discussed in the paper, allows passengers to book taxis easily using their mobile phones, saving both time and fuel.

(1)"An Automated Taxi Booking and Scheduling System," (Awajan, 2013)the capital city of Jordan—poorly organized and inefficient public transportation, relying mainly on buses and taxis. While buses lack schedules and designated stops, taxis are in high demand, yet there is no centralized booking system. Instead, taxi drivers roam the streets randomly, and customers must often search for taxis on main roads, leading to problems such as traffic congestion, fuel wastage, and time inefficiencies. The paper presents a proposed solution: an automated taxi booking and scheduling system aimed at improving the experience for both taxi drivers and passengers.

The paper's gaps relevant to our Driver On-Demand Service System project encompass several key areas. Firstly, it lacks an emphasis on driver-centric features, potentially overlooking essential components to enhance the driver’s experience. Secondly, it doesn't address driver allocation and optimization, essential for efficient ride assignments, which is a primary concern in our project. Additionally, the paper fails to detail driver onboarding and verification processes, vital for ensuring the trustworthiness and safety of newly recruited drivers in our system. The absence of information on driver ratings and feedback mechanisms is also noticeable, a crucial element for our project to enable drivers to track their performance and receive valuable feedback. Furthermore, there's no mention of accessibility and multilingual support, which is imperative in our project to ensure that our service caters to users of varying linguistic backgrounds and those with disabilities. Lastly, the paper overlooks the critical aspects of data privacy and security, which are of paramount importance in our project to safeguard user data against potential breaches and misuse. Addressing these gaps is pivotal to the successful development of our Driver On-Demand Service System.

In this study, the author creates a digital world that imitates real-life conditions in Amman, Jordan, to assess the impact of an automated taxi booking system. They use these simulations to see how this system could reduce the fuel taxis use and make taxi services more efficient. These simulations involve generating pretend booking requests, matching taxis to customers, and monitoring their movements. While the paper doesn't go into detail on data collection, it suggests the need for real-world information to set up these simulations. Additionally, the paper discusses other research in the same area and implies that the author considered past studies before conducting their work. Lastly, although the paper doesn't delve into the nitty-gritty of the technical algorithms, it suggests that efficient taxi-customer matching algorithms would be essential for this proposed system. In essence, the primary focus of this paper is to use simulations to show how an automated taxi booking system could benefit Amman by reducing traffic congestion, fuel usage, and time wastage due to the lack of a centralized taxi scheduling system.

In conclusion, (Awajan, 2013) paper presents a promising solution to the disorganized taxi system in Amman through an automated taxi booking and scheduling system. The computer-based simulations offer insights into how this technology can significantly reduce fuel consumption and time wasted, benefiting both taxi drivers and passengers. While real-world testing remains a future step, the paper highlights the potential positive impact of such a system on urban transportation efficiency.

(Djordjevic, 2022) (2)talks about creating an application system to help taxi companies. She explains how they made this system step by step, like building a house. They used something called Google Maps to make it work better. This paper is important because it helps us understand how technology can make taxi services better. It will be very useful when we look at other research into taxis.

In the existing literature, several critical gaps become evident that need to be addressed in the context of our "Driver On-Demand Service System" project. Firstly, there is a notable lack of emphasis on driver-centric features, overlooking the importance of enhancing the driver's overall experience within the system. Secondly, the paper fails to delve into the intricacies of driver allocation and optimization, which is essential for efficient and effective passenger-to-driver assignments, a cornerstone of our project. Moreover, the absence of insights into driver onboarding and verification procedures poses a significant concern, as ensuring the trustworthiness of new drivers is paramount to passenger safety. Additionally, the paper neglects the crucial aspect of driver ratings and feedback mechanisms, vital for driver performance assessment and improvement—a key area of focus in our project. Furthermore, considerations regarding accessibility and multilingual support are conspicuously absent, despite the necessity of making our system user-friendly for a diverse range of individuals, including those with language differences or disabilities. Lastly, the paper overlooks discussions on data privacy and security, a critical aspect of our project, wherein safeguarding user information from theft or misuse is of utmost importance. Addressing these gaps is essential to the successful development and implementation of our Driver On-Demand Service System.

The paper "Designing an information system to support the business of the taxi service" by Sofija Djordjevic outlines the methodology employed to develop a web-based taxi service application. The methodology consists of several key components. First, the database-first approach is used to create the database and its tables, with Entity Framework facilitating object-relational mapping (ORM). The application follows a multi-layer architecture, including data model, repository, business logic, and controller layers, each responsible for specific aspects of the application's functionality. The front-end is built using React, employing class and functional components for user interaction. Google Maps integration assists drivers in locating destinations. Overall, this methodology emphasizes structured development, database design, and user-friendly interface design to enhance the efficiency of the taxi service.

In conclusion, Djordjevic's paper offers valuable insights into creating an application system for taxi companies, emphasizing the step-by-step development process and the utilization of Google Maps for improved functionality. This paper highlights the potential of technology to enhance taxi services, serving as a useful resource for our research on this topic.

(3)“DriveMyCar Android Application” (VINAY N. KADAM1)

In the last few years technology has been very much ahead in all fields. It plays a vital role in human commerce. For human commerce there are many applications and websites available on the internet which has made life easy. Likewise, there are many more applications that provide a driver on demand to customer wherever he needs. For example, DriveU, Drive4U, Hire4drive: Car Drivers and Cabs, Swift partners, Hopp-on demand driver.

These applications provide convenient and the best service to customers but still some issues are there like the existing system is not transparent with customer. In the existing system some problems occur like finding the location of customer, customer cannot trace the time and location of driver therefore customer must face many problems. So, we are going to upgrade or add some point to the existing system which will help the customer to find driver in his own area. It will reduce time and minimize the location finding issues.

(4)Enhancement of Mobile-Based Application for Vehicle Rental Author: Falah Y H Ahmed; Eizwan Bin Hazlan; Muhammad Irsyad Abdulla EZGO is a website that allows consumers to look for vehicles such as cars, bikes and rental vans that can have the most satisfactory outcome and avoid the rejection of unavailable car rental by providing substitute vehicles that are close to the needs of the customer The project implemented an agile approach for the design and development of mobile apps, developed UML diagrams for the car rental system, and performed a survey of prospective customers using questionnaires. option for Malaysian drivers and drivers to provide personal transportation without the need to purchase and own for themselves.

As we have seen in the current existing systems people face difficulty in hiring driver for their own cars and the lack of private individuals providing transport services can result in limited choices and potential price surges during peak periods.

So, to overcome this problem we are developing our App "Driver on demand service" in which we will provide temporary drivers on hire to customers who have their own car but are not able to drive under different circumstances. In which they can easily search for drivers or jobs near them and hire them on duty as well as private individuals providing transport services.

In Conclusion Proposed web-based application will be easy to customer for hire a driver. Customer can book the driver as per their requirement and get the driver details with acknowledgement to/from the driver online thereby saving time and money.

# **CHAPTER 3: METHODOLOGY**

Our project Driver On-Demand Service System will follow the Waterfall methodology in Development. This approach consists of distinct phases:

## **Requirement Analysis:**

In this initial phase, we will thoroughly gather and document all the project requirements. This includes understanding what users need, defining the features we want, and specifying how the web application should work. For our project, this means detailing processes like user registration, driver vetting, ride request management, and the administration dashboard features.

## **System Design:**

After understanding the requirements, we'll move on to designing the entire system. This step involves creating a detailed plan for the web application and specifying how different parts will work together. For our project, this phase includes designing the user interface (how it looks and feels), planning the database structure (how information is stored), and deciding on the overall system architecture (how everything fits together).

## **Implementation:**

With the system design ready, we'll start building the web application. This means writing the actual code to create each piece, feature, or module based on the plans from the design phase. For our project, this includes coding the user registration and login system, the driver vetting process, and all the other features we've outlined.

## **Testing:**

After developing everything, we'll perform thorough testing. This is to make sure that every part of the web application works correctly, without any problems. Testing is crucial to confirm that the application does what it's supposed to. For our project, this phase includes checking that the user registration process runs smoothly, ensuring our driver vetting is strong and secure, and confirming that the administration dashboard works without issues.

## **Deployment:**

Once the testing phase is successfully completed, we'll make the web application available for everyone to use. This marks the shift from development to real-world use. For our project, this means making the platform accessible to drivers, passengers, and administrators.

## **Maintenance:**

In the Waterfall methodology, maintenance is typically a separate phase. It involves continuous support, updates, and handling any issues or improvements that come up after the web application is up and running. For our project, this phase involves providing support to users, regularly updating the system, and addressing any unexpected challenges that may arise.

## **Data Collection Techniques**

The research moved around in the city (Kigali) to generate data through interviewing, observations, and documentation review.

### **Interview**

This method allows the researcher to get information by asking for some information face to face, and it is very nice because it helps to get all information needed and there is no limitation in asking questions. Again, in this method of interview we’ve conducted an interview with different Drivers and transportation companies.

### **Documentation Review**

The project developer gathered information from the jobless driver’s testimonies and people own cars, libraries, internet, journals, and Textbooks, reviewed other relevant published literature on the development of an effective score processing system.

### **Observation**

 This method of observation is used when a researcher wants to know what exactly happens in the activity processes practically, he takes a note of everything that is done which means that observe what people do and take a note about what he or she observes.

## **ARCHTECTURE DESIGN**

**Customer**

Login

Register

Search By Drivers Location

Pick A Driver

UI

Start

Owns Car

**Driver**

Start

Get Requests Notifications

Login

Register

Done

Accept

Contacting

**Admin**

Delete

Decline

Approve

Users Management

Perform (checking)/Vetting Processes

Get Users Requested

Login