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A Project Report
on

PHERIWALA: AN APP FOR STREET VENDORS

By

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C E R T I F I C A T E

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Abstract

Street vendors provide simple access to a variety of goods and services in public locations, playing a crucial role in urban economies all over the world. Even though they are thought of as being informal, street vendors play a crucial role in the development of urban economies. We use the Internet every day for practically all of our daily activities, and it plays a significant role in our lives. Retailers and local merchants are currently having a hard time competing with E-commerce market. Local retailers were able to successfully sell their products with the help of E-commerce apps. But a portion of the ordered items are taken by the third-party application. This study tries to solve the issues local retailers face and the solutions they require to manage their operations. This project promotes an android system that allows local retailers and retailers to sell products and goods directly to customers without the involvement of a third party and grow their business by showcasing quality service locally.

Keywords: Street vendors, Retailers, Local merchants, Ecommerce, Android.

List of Abbreviations

The next list describes several abbreviations that will be later used within the body of the document

API	**Application Programming Interface**
FCM	**Firebase Cloud Messaging**
IDE	**Integrated Development Environment**
SDK	**Software Development Kit**
SQL	**Structured Query Language**

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Chapter 1

INTRODUCTION

Street vending is defined as an informal type of business, which offers goods for sale to the public, without having a permanent built-up structure. Street vendors are commonly referred to as hawkers, peddlers, or street traders. Street vendors sell different types of products including fruits, drinking water, stationery, clothes, food, electrical equipment, home appliances, mobile phone vouchers, and other goods. Street vending is majorly constrained by its undeclared juridical status, and economic and educational issues related to its operational environment. However, Street vending business is important for the economy and the livelihood of the poor and less educated people in developing countries, as it provides employment, and a means for income. Its their means of survival. However, street vendors face a number of challenges, including low levels or no education. Also, Street vendors do not have a fixed place for conducting business but they move from one place to another. Street vendors do not have methodical and orderly pricing policies but instead they set the product price based on their own experience and recommendations from their fellow street vendors. For solving these problems faced by street vendors we have made an application solely for them. Its named Pheriwala and it aims to connect street vendors with their possible customers. Pheriwala mobile application is a platform where people can find the details of these local street sellers and reach out to them. The main idea is to identify promising ideas for mobile applications to be developed in order to improve street vendors' business skills, and to help vendors conduct their daily businesses more efficiently. The application helps to connect the street vendors with their customers. At the same time, it helps these street sellers increase their daily earnings and help them take their business to the next level. Also, as the street vendors do not have a fixed place to sell their goods, it will also help the possible customers to get connected with them. The purpose of making Pheriwala is also to create discipline and increase trust among street sellers. This application helps them to automate important parts of their business.

1.1 Overview

The business skills of street vendors are often low in all domains of business. Currently, very limited efforts are targeted towards empowering street vendors by training them with necessary skills and by introducing new technologies to them. Mobile technologies and educational technologies have potential for street vendors to improve their business potential anywhere and anytime, in an economical way, and through conventional and non-conventional channels. Although street vending plays a key role in the growth of the national economy, not much is done to strengthen

street vendors' resilience and entrepreneurship. Thus, there is a crucial gap in how to empower street vendors, particularly by developing mobile technology-based tools, and providing access to technologies that help to improve street vendors' business, and by providing street vendors training to improve their business success. Pheriwala targets problems faced by street vendors and aims to connect them with their possible customers and expand their business. Street vendors face challenges of eviction, limited access to capital, unstable security, unplanned policies on urban development, and low level of education. Although street vending plays a key role in the growth of the national economy, not much is done to strengthen street vendors' resilience and entrepreneurship. Thus, there is a crucial gap in how to empower street vendors, particularly by developing mobile technology-based tools that help to improve street vendors' business, and by providing street vendors training to improve their business success. Pheriwala targets problems faced by street vendors and aims to connect them with their possible customers and expand their business.

1.2 Motivation

Street vendors face many problems, the main ones being not the lack of formalisation and financial management, but rather lack of recognition in surroundings. There is a lack of information and content in their mother tongue. The vendors also observe fluctuation in rates of items sold by them. Very small customer base is covered by the local vendors.

1.3 Problem Definition and Objectives

"To create a mobile application for street vendors, displaying the items brought with them and notifying the user of their arrival."

The aim of this project is to develop a transformative mobile application catering to the needs of street vendors. Street vendors play a crucial role in the informal economy, providing affordable and accessible goods to urban communities. However, they often face challenges in reaching a wider customer base and effectively communicating their offerings. This mobile application seeks to bridge this gap by providing a platform for street vendors to showcase the items they bring along, enabling potential customers to explore and engage with their products conveniently. By developing a mobile application for street vendors, we address the need for greater visibility and accessibility for this marginalized sector. The app will serve as a digital marketplace, enabling street vendors to showcase their unique products, ranging from handcrafted goods to freshly prepared food items. By leveraging the power of mobile technology, vendors will have an opportunity to expand their customer base beyond their immediate vicinity, reaching a larger audience and potentially increasing their sales and profitability. One of the key features of this mobile application is the real-time notification system. By implementing this functionality, the app will notify users when street vendors are in close proximity to their location. This feature not only benefits potential customers by keeping them informed about the arrival of their favorite vendors but also enhances the overall user experience by creating a sense of anticipation and excitement. Additionally, the notification system allows vendors to establish a direct and efficient channel of communication with their customers, enabling them to build loyal customer relationships.

Objectives
The specific objectives of the proposed work are:

1. **To help street vendors to connect with customers and expand their businesses.**
2. **To notify users when a street vendor arrives in their surroundings.**
3. **To provide an user friendly and interactive experience.**

1.4 Project Scope and Limitations

There is a crucial gap in how to empower street vendors, particularly by developing mobile technology-based tools that help to improve street vendors' business, and by providing street vendors training to improve their business success. Pheriwala targets problems faced by street vendors and aims to connect them with their possible customers and expand their business.
Limitations:

Technical Constraints: The project may be subject to technical limitations such as compatibility issues with different mobile devices and operating systems. The application's performance and functionality may vary based on the capabilities and specifications of the user's device.

Internet Connectivity: The application heavily relies on internet connectivity for real-time notifications and data retrieval. Users may experience limitations in accessing vendor information and receiving notifications if they have a weak or no internet connection.

Vendor Participation: The success and effectiveness of the application depend on the active participation of street vendors. The scope of the project does not encompass strategies for vendor onboarding or guarantee vendor adoption and consistent utilization of the application.

Market Coverage: The project's scope may be limited to a specific geographic area or city, depending on the project's objectives and available resources. The application's coverage and availability to users may be restricted to a particular region, which could limit its widespread impact.

Security and Privacy: While efforts will be made to ensure data security and privacy, there may be limitations in fully protecting user information and transactions. The application may also face potential security vulnerabilities, and users should be cautious while sharing personal or financial data.

1.5 Methodologies of Problem solving

The problem-solving process begins with thorough research and analysis of the current street vending landscape, including understanding the challenges faced by vendors and the needs of potential customers. This stage involves gathering data, conducting surveys or interviews, and analyzing existing mobile applications or platforms catering to street vendors.

Requirements Gathering: Once the problem is clearly defined, the project team will engage in requirements gathering. This involves identifying and documenting the specific functionalities, features, and user experience expectations of the mobile application. Feedback from vendors and potential users can be invaluable in determining the essential requirements.

Design and Prototyping: The design phase involves creating wireframes and visual designs that align with the identified requirements. The team will focus on creating an

intuitive and user-friendly interface, ensuring smooth navigation, and incorporating the desired features. Prototypes of the application can be developed to gather feedback and refine the design.

Development and Testing: Based on the finalized design, the development phase begins. This includes programming, integrating backend systems, and database development. Throughout the development process, regular testing is essential to identify and resolve any issues or bugs. Quality assurance practices ensure that the application functions as intended and meets the defined requirements.

Iterative Approach: Problem-solving often benefits from an iterative approach. By continuously reviewing and refining the application at each stage, the project team can incorporate user feedback, make necessary improvements, and enhance the overall solution. Iterative cycles allow for flexibility, adaptability, and continuous optimization of the mobile application.

User Adoption and Feedback: After deployment, the project team focuses on user adoption and gathering user feedback. This includes promoting the application among street vendors and potential customers, providing training and support, and actively seeking feedback to identify areas for improvement.

Continuous Improvement: The problem-solving process is not static; it requires ongoing monitoring, evaluation, and improvement. Regularly assessing the application's performance, analyzing user feedback, and incorporating new features or enhancements based on changing needs and emerging technologies are critical for the long-term success of the solution.

Chapter 2

LITERATURE SURVEY

The main aim of developing the Pheriwala app is to provide street vendors with more business opportunities by notifying their customers of their arrival in their locality. This chapter gives better insights into the project through the analysis done on various research papers related to the problem faced by street vendors and android development.

2.1 Literature Survey

2.1.1 Literature Survey on what to use for Android development.

In the paper [3], authors stated the reason why the majority of developers switched from java to kotlin for android development. Kotlin is a new programing language used to write an android application which was adopted by Google for developing android apps. In [3] authors collected information from various developers who migrated code from java to kotlin and later was found that developers who migrated to access programing language features (eg. extension functions, lambdas), which are not available with Java for Android Development. one of the major reason was also to obtain safer code (ie. avoid null-pointer exceptions) and to make a shorter program for the same task. In short, it is a better option to use kotlin as a programing language for android development. As it provides high readability, simplicity, and facilitation of the app development process, has access to all Java frameworks and libraries while writing more clear and concise code, and is suited for multi-platform development.

2.1.2 Literature survey on Android activity development lifecycle and Automated testing

In the paper [8] the author discussed the android development architecture and its security system. The architecture for android development is quite the same as personal computers. Therefore, security issues can be fixed in similar ways. Safety is the main concern of android operating devices. It does not allow external applications to change or modify installed files. It allows customization of permissions which specifies applications to use the hardware and software resources of the device. Android users have the authority to accept or deny permissions for an installed application. However, android allows IPC (Inter-Process Communication) which makes the device vulnerable to security threats resulting in piracy.
Android Architecture stated by [8] consists of three layers Application Layer In which the

android application components get executed, the App Framework Layer which is designed to allow developers get access to the core application services, the Android Runtime Layer and Linux Kernel which is primarily focused on the running state of the processes. By [8] Security has always been a concern for users. Android provides numerous aspects of providing security. Malware detection systems like static and dynamic analysis, and sandboxing a system have proved to be efficient techniques. This paper [8] has briefly described some aspects of the application development process and security systems.

In [6] we learned, about Model-driven development or model-driven engineering, ie. a category of software development where the app developer/modeler uses a high-level abstract model to describe the app. The high-level model allows specifying the structure and behavior of the user interface, and the structure of the data collected from each page. The model could allow for more advanced scenarios such as backend service communication. Then, through a series of model transformations, the source code of the final app is produced. The developer can then apply final polishing to the code, compile and deploy it to the target device. The model can be either a visual or a textual model.

By [7] we learned that instead of manual testing, which is often laborious, time-consuming, and error-prone, the ever-growing complexity and the enormous number of Android apps call for scalable, robust, and trustworthy automated testing solutions. Android app testing aims at testing the functionality, usability, and compatibility of apps running on Android devices. The author has explored around 100+ papers that were published in major conferences, workshops, and journals in software engineering, programming language, and security domain, and then proposed a taxonomy of the related research exploring several dimensions including the objectives (i.e., what functional or nonfunctional concerns are addressed by the approaches) that were pursued and the techniques (i.e., what type of testing methods—mutation, concolic, etc.) that were leveraged.

2.1.3 Literature Survey on Geolocating Street Vendors

In [4] the researcher aimed to design and build applications by utilizing the functions of google maps and GPS (Global Positioning System). Where basically A* algorithm was used which find the shortest distance or nearest location between the buyer and the vendor, it accommodates data from mobile merchants or vendors where the buyer knows the nearest position of the traveling merchant. Mobile traders are traders who sell trade goods such as food, cakes, and other beverages with a mobile system using motorcycles or on foot. According to [4] it is difficult for mobile traders to find consumers because mobile traders do not have precise location and time information for prospective buyers. Literature studies were conducted in [4] through observations on objects or research objectives by the problem, and the purpose of the research is by observing directly the traveling traders in the village SialangMunggu. The author identifies the leading cause of mobile traders' problems as the absence of accurate merchant information. Data analysis is done to process mobile traders' data needed to complete the completeness of data on mobile merchant applications. The required data collected is route data, graphs, and personal data such as name, email, and mobile number. The proposed design of the application explains the overview of the system, as well as the proposed model, which will result in object-oriented software. The Program creation was completed using java android programming language because the resulting application is an android application. Trials and evaluations are conducted on the system to find out if the resulting application can run smoothly. The preparation of doing it reports after all stages have been completed and have been evaluated.

Table 2.1: Summary of Literature Survey

Author /Year of Publication	**Title**	**Outcomes**
Y. Yang, X. Dong, Y. Li and H. Zhang In July 2022	Research on Multi-scale Network Computer Modeling based on Mobile Vendor Management	Helps street vendor to connect to society and to improve the efficiency of government services
F. Mathews and A. Bhosale in November 2021	Understanding the Factors Influencing Street Vendors towards Use of Digital Payment Systems in India	An idea to connect all the street vendors to digital payment system. Having deep knowledge on problem faced by vendors relating digital payments.
M. Martinez and B. Gois Mateus in 1 Nov. 2022.	Why Did Developers Migrate Android Applications from Java to Kotlin?	Systematic description on benefits of Kotlin over Java
Istithoatun Kholishoh, Mardainis, Susandri, Khusaeri Andesa in August 2021	Geolocation Apps using A* Algorithm for Android Based Traders	Studying various algorithm and deciding A* to use.
S. S. Alrumiah and M. Hadwan in march 2021	Implementing Big Data Analytics in ECommerce: Vendor and Customer View	About how the e commerce vendor gain knowledge on customer's need by analyzing the consumer behavior and increase their income by improving customer loyalty.
T. Ghanem and S. Zein in November 2020	A Model-based approach to assist Android Activity Lifecycle Development	Understanding on android activity life cycle
P. Kong, L. Li, J. Gao, K. Liu, T. F. Bissyand´e and J. Klein in September 2018	Automated Testing of Android Apps: A Systematic Literature Review	Understanding of Android app testing.

Chapter 3

SOFTWARE REQUIREMENTS SPECIFICATION

The second chapter described the study of different papers and documents related to the proposed work. It specified the summary of each paper. In the table 2.2, the highlights and observations in each paper were specified which guided the chapter three in mentioning the requirements. The third chapter is Software requirement specification. The points included in this chapter are functional requirements, non-functional requirements, hardware and software requirements, external requirements, system requirements. This chapter also includes the software development life cycle model which is to be used.

3.1 Assumptions and Dependencies

Assumptions :

1. The application is interfaced with high speed internet connectivity.
2. The system shares live location and connects street vendors and customers.

Dependencies :

1. MySQL database is used for the storage of profile information of vendor as well as customer.
2. System is an interface provided to interact with an android application and desired action.

3.2 Functional Requirements

3.2.1 System Feature 1

The app starts by allowing vendors to easily register themselves by providing basic information such as their name, contact details, and the type of products they sell.

3.2.2 System Feature 2

The customer will get notified on their device that the vendor has arrived in their locality.

3.2.3 System Feature 3

Vendors can create a comprehensive catalog of their products, complete with names, descriptions, prices. This catalog enables customers to browse through the available products and make informed purchasing decisions.

3.3 External Interface Requirements

External Inter-vendors can create a comprehensive catalog of their products, complete with names, descriptions and prices. This catalog enables customers to browse through the available products and make informed purchasing decisions.

3.3.1 User Interfaces

The user interfaces define the visual and interactive components of the application that allow street vendors and users to interact with the system. The user interface should be intuitive, user-friendly, and responsive, enabling vendors to easily display their items and users to navigate and make purchases.

3.3.2 Software Interfaces

Software interfaces refer to the interactions and integration of the mobile application with other software systems or components. In this project, the mobile application may need to interface with various backend systems, databases, and external APIs. For example, integrating with a backend system built on Spring Boot and a MySQL database to store vendor and item information. These software interfaces should be well-documented, secure, and efficient to ensure smooth communication and data exchange between the mobile application and other systems.

3.3.3 Communication Interfaces

Communication interfaces involve the exchange of data and messages between the mobile application and external systems or devices. In this project, communication interfaces may include:

1. Firebase Cloud Messaging (FCM): The mobile application can use FCM to receive real-time notifications about vendor arrivals, order updates, or other relevant information.
2. Location Services: The application can utilize GPS or location-based services to determine the user's location and provide relevant information about nearby vendors.

3.4 Non-Functional Requirements

These requirements specify the criteria that can be used to judge operation of system, rather than specific behavior.

3.4.1 Performance Requirements

The Application should be compatible with the Android Version and UI of the device. The availability of the system should be as maximum as possible. The performance requirements are as follows.

- **The mobile application will be user friendly.**
- **It will be available 24/7.**

3.4.2 Security Requirements

Data Transfer :

- **The system shall use secure sockets in all transactions that include any confidential customer information.**
- **The system shall automatically log out all customers after a period of inactivity.**
- **The system shall not leave any cookies on the user's computer containing the user's password.**
- **The system shall not leave any cookies on the user's computer containing any of the user's confidential information.**

Data Storage :

- **The user's web browser shall never display a user's password. It shall always be echoed with special characters representing typed characters.**
- **The system's back-end servers shall never display a user's password. The user's password may be reset but never shown.**
- **The system's back end shall only be accessible to authenticated administrators.**

3.4.3 Software Quality Attributes

- **Reliability: Software performs accurately and consistently.**
- **Performance: Software operates efficiently and delivers results quickly.**
- **Scalability: Software can handle increasing workload and user base.**
- **Usability: Software is user-friendly and intuitive.**
- **Maintainability: Software is easily modified, enhanced, and maintained.**
- **Security: Software is protected against unauthorized access and malicious activities.**
- **Testability: Software is easily testable for correctness and reliability.**
- **Portability: Software can be transferred or adapted to different platforms.**

3.5 System Requirements

3.5.1 Database Requirements

- **MySQL**
- **Firebase Realtime Database**

3.5.2 Software Requirements

- **Operating Systems: Windows 7 or later, macOS, and Linux.**
- **Android Studio 2022.2**
- **Android Version: 6.0 Marshmallow and Above**
- **Android SDK**
- **Spring Tool Suite 4**
- **Java Development Kit (JDK)**
- **Visual Studio Code 1.78.2**
- **Flutter**
- **MySQL Workbench 8.0.33**

3.5.3 Hardware Requirements

- **Processor: Intel Core i5 or higher, or an equivalent AMD processor**
- **Hard Disk: 64GB**
- **RAM: 4GB**

3.6 Analysis Models: Agile SDLC Model to be applied

We are using the Agile SDLC model for the mobile application project because it allows for user involvement, iterative development, and adaptability. We value user feedback and will actively engage street vendors and customers throughout the development process. The iterative approach enables us to deliver functional increments quickly and gather early feedback. We can adapt to changing requirements and market dynamics by adjusting priorities and incorporating new features in each iteration. Overall, Agile ensures a collaborative and user-centric development approach that delivers value incrementally.

The Agile software development methodology is one of the simplest and effective processes to turn a vision for a business need into software solutions. Agile is a term used to describe software development approaches that employ continual planning, learning, improvement, team collaboration, evolutionary development, and early delivery. It encourages flexible responses to change.

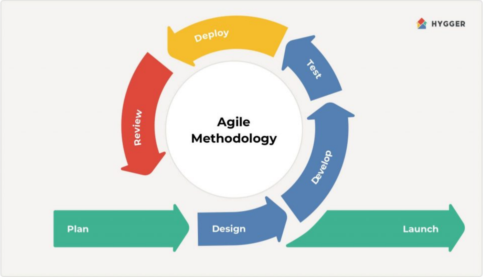


Figure 3.1: Agile Model

The agile software development emphasizes on four core values.

1. **Individual and team interactions over processes and tools**
2. **Working software over comprehensive documentation**
3. **Customer collaboration over contract negotiation**
4. **Responding to change over following a plan**

Chapter 4

SYSTEM DESIGN

In previous chapter, an idea about how the project is started after studying various previous works and the techniques that will be used to implement the project are discussed. The review gives a brief idea about the papers considered and analyzed & the summary gives the brief description and the observations regarding the same. This chapter includes the software requirements specifications in detail including the functional & non-functional requirements along with the system requirements.

4.1 System Architecture

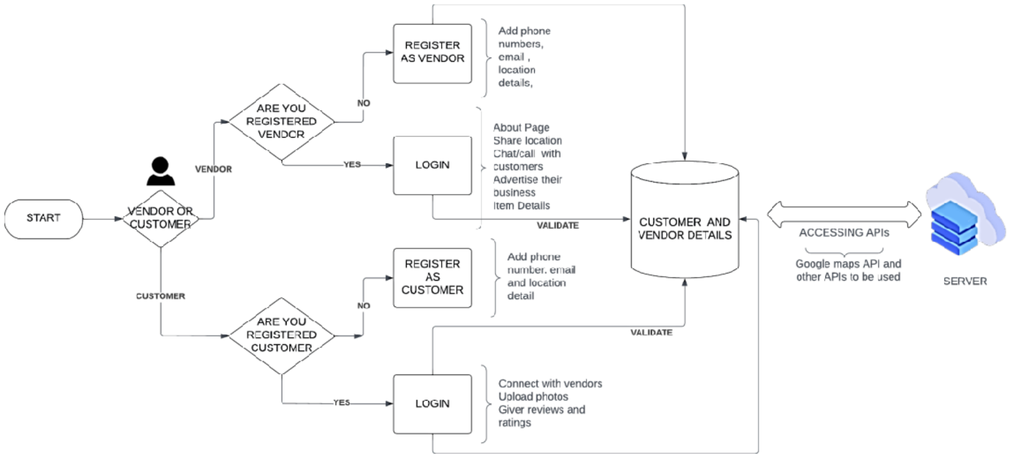


Figure 4.1: Architecture for the Street Vendor APP

The block diagram in Fig. 4.1 gives an overview of the approach towards building an application of the intended features for the street vendors.
The workflow of the application is in following manner –

1. **Vendor- login or registration and sets the locality which he will visit.**
2. **User- login or registration and receives notification of the arrival of street vendor.**
3. **Vendor or User can contact each other through the app.**

4.2 Mathematical Model

Input
Process
Output

Figure 4.2: Mathematical Model

Set Theory :-

S = I, P, O, F, DD, NDD, Success, Failure
where,
I = Location
P = Mapping and connecting customer and buyer
O = Display notification, Items
F = register(), login(), contact(), find(), notify()
DD = null
NDD = location, notification

Success if :

- **Correct location and on-time notification**

Failure if :

- **Delayed notification**
- **Hardware failure.**
- **Software failure.**
- **Improper network connection**

4.3 Data Flow Diagrams

A data-flow diagram (DFD) is a way of representing a flow of a data of a process or a system (usually an information system). The DFD also provides information about the outputs and inputs of each entity and the process itself.

1. **DFD (Level 0)**

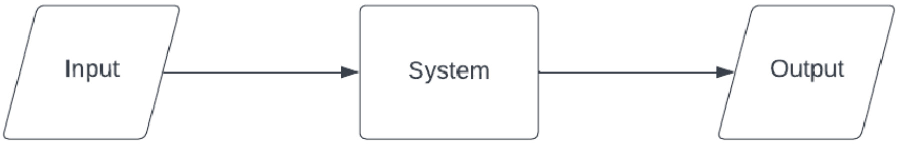


Figure 4.3: Level 0 Data Flow Diagram for Street Vendor App

The figure 4.3 shows the abstract level of data flow in this project.

It is also known as context diagram.It's designed to be an abstraction view, showing the system as a single process with its relationship to external entities. It represent the entire system as single bubble with input and output data indicated by incoming/outgoing arrows.

In figure 4.2 locality of vendor is fed as input to the system and notification is sent to users in that locality as output.

2. **DFD (Level 1)**

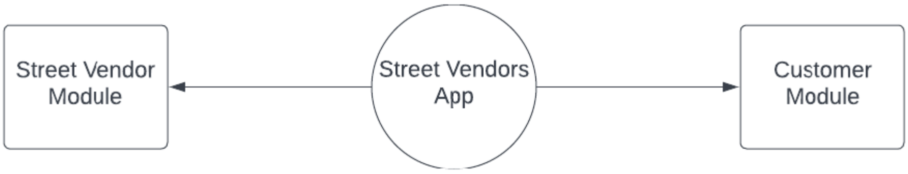


Figure 4.4: Level 1 Data Flow Diagram for Street Vendor App

3. **DFD (Level-2)**

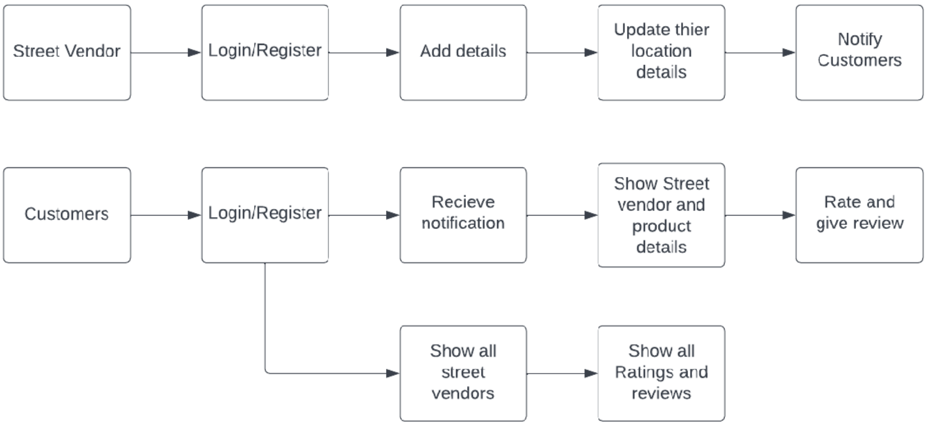


Figure 4.5: Level 2 Data Flow Diagram for Street Vendor App

4.4 UML Diagrams

4.4.1 Use Case Diagram

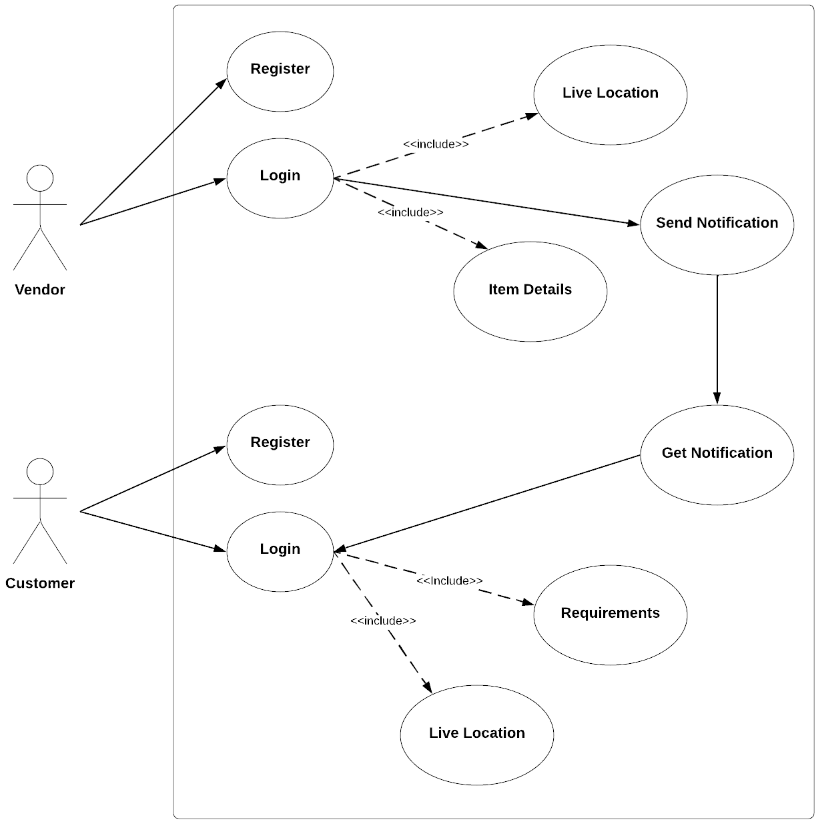


Figure 4.6: UML Use Case Diagram

Figure 4.6 depicts the use case diagram which shows the interaction between the actors and the system. Actor in the use case diagram is

- **Vendor**
- **Customer**

4.4.2 Activity Diagram

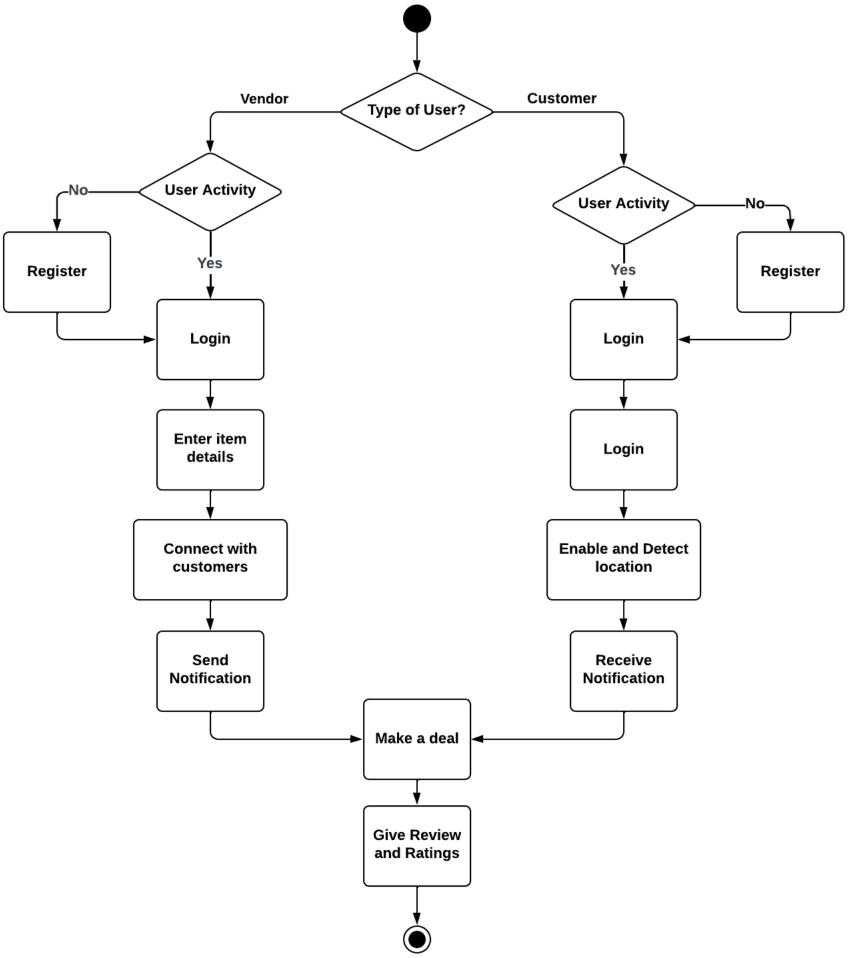


Figure 4.7: UML Activity Diagram

Figure 4.7 illustrate the flow of control in the system and shows the steps involved in the execution of a use case. User Activity decides the flow of the control. Activities has predefined flow and execute as per the conditions. Process of the app is shown in the activity diagram.

4.4.3 Sequence Diagram

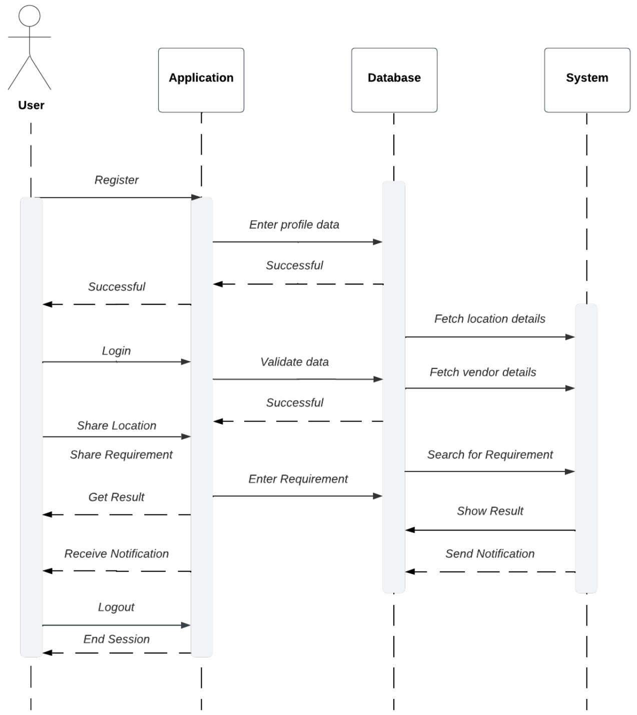


Figure 4.8: UML Sequence Diagram

High-level interaction between active objects in a system is visualized using sequence diagram. In figure 4.8 the sequential flow of system and the exchange of messages between the object is shown. Active Objects/Actors in the sequence diagram are User, Database & System.

4.4.4 Class Diagram

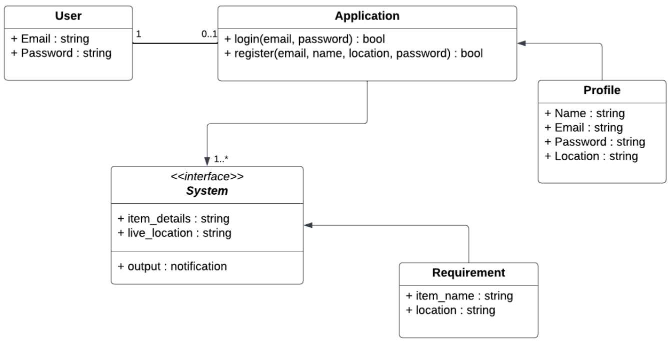


Figure 4.9: UML Class Diagram

In figure 4.9 the class diagram is shown which represents the relationship between classes. Each class contains some attributes and functions. System is the interface in the class diagram to be used with the android application user interface.

Chapter 5

PROJECT PLAN

The previous chapter described the system design of the project, this chapter contains the project plan to implement the system design and contains project estimate, risk management, schedule, and team organization details.

5.1 Project Plan

A project plan is a formal document designed to guide the control and execution of a project. A project plan is the key to a successful project and is the most important document that needs to be created when starting any business project. The following chapter contains necessary points to be considered for the project plan.

5.1.1 Project Estimate

Project Resources

Personal computer with the software and hardware requirements as mentioned in the chapter 3.

5.1.2 Reconciled Estimates

The budget of a project is calculation or estimation of all the efforts and costs required to implement the project. For this project, the budget has been calculated by using CoCoMo model. The basic CoCoMo model was used in Organic mode as the project is small and doesn't have too many complex budgeting factors. The basic CoCoMo equations are:-

$$E = a_b(KLOC)^{(b_b)} \tag{5.1}$$

$$D = c_b(E)^{(d_b)} \tag{5.2}$$

$$SS = \frac{E}{D} \tag{5.3}$$

Estimated size of the project = 5 KLOC

So, using equations 5.1 & 5.2, we get

$E = 2.4(5)^{1.05} = 13.01PM$

$D = 2.5(13.01)^{0.38} = 6.63M$

$SS = 13.01/6.63 = 1.96P$

Here, E is Effort (measured in Person Months),
D is Deployment Time (measured in Months)
SS is Staff Size (units is Persons)
Hence, Total Effort required is 13 person months(approx.) yielding a Development Time of 6.63 months and a Staff Size of 2 persons.
As, the team size is 4 persons, the development time of 6.63 months can be speeded up and calculated as follows:

Person	D
2	1/6.63
4	1/x

So, x = 2 6.63/4 = 3.3
Hence, the project will require 3 month (approx.) to complete (theoretically).

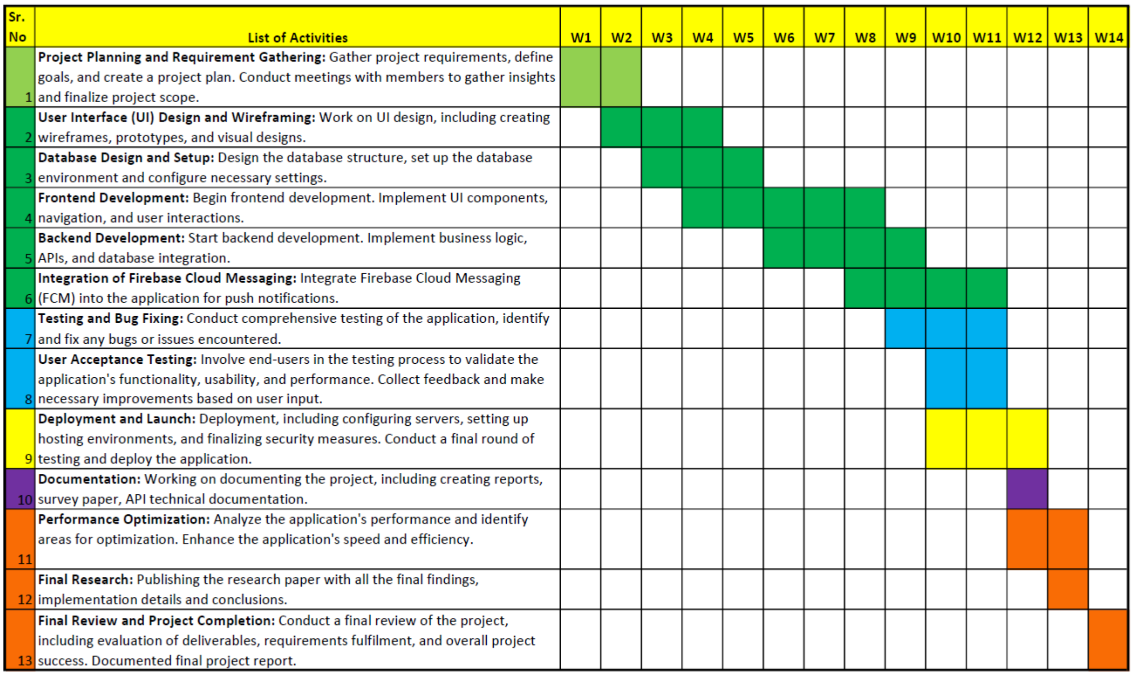
5.1.3 Risk Management

Risk management is defined as the process of identifying, assessing and controlling threats to a project. Risk management is a process that seeks to reduce the uncertainties of an action taken through planning, organizing and controlling of both human and financial capital.It is the responsibility of project manager to go through potential threats. The project manager can identify the risks and accordingly control them with the help of other stake holders
Risk Identification :
The risks identified in the project are very few because of high cohesiveness and low coupling involved. Also, open-source technologies are used throughout and no external APIs are used which makes the project self-dependent and hence the probability of error is less.
Risk Analysis :
Risk analysis is handling the system response in the risk conditions which are identified. If the system response is incorrect then the developers work on it and try fixing out the identified risks. Risk analysis can affect on project objectives which can work incorrectly in the risk cases. The risk analysis assigns the severity to the risks and developers start working accordingly

1. High severity: Catastrophic
2. Medium severity: Critical
3. Low severity: Marginal

5.1.4 Project Schedule

The project schedule is a set of activities which covers the development of all functionalities in the project. It comes with the start and end date of each and every activity. The project schedule includes every single detail of the project, such as who will be completing each task, the deliverable that will be produced, the goals and objectives the project will achieve and the amount of time it will take to complete the project



Sr. No	List of Activities	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
1	**Project Planning and Requirement Gathering:** Gather project requirements, define goals, and create a project plan. Conduct meetings with members to gather insights and finalize project scope.	🟩	🟩												
2	**User Interface (UI) Design and Wireframing:** Work on UI design, including creating wireframes, prototypes, and visual designs.		🟩	🟩	🟩										
3	**Database Design and Setup:** Design the database structure, set up the database environment and configure necessary settings.			🟩	🟩	🟩									
4	**Frontend Development:** Begin frontend development. Implement UI components, navigation, and user interactions.				🟩	🟩	🟩	🟩	🟩						
5	**Backend Development:** Start backend development. Implement business logic, APIs, and database integration.						🟩	🟩	🟩	🟩					
6	**Integration of Firebase Cloud Messaging:** Integrate Firebase Cloud Messaging (FCM) into the application for push notifications.								🟩	🟩	🟩	🟩			
7	**Testing and Bug Fixing:** Conduct comprehensive testing of the application, identify and fix any bugs or issues encountered.									🟦	🟦	🟦			
8	**User Acceptance Testing:** Involve end-users in the testing process to validate the application's functionality, usability, and performance. Collect feedback and make necessary improvements based on user input.										🟦	🟦			
9	**Deployment and Launch:** Deployment, including configuring servers, setting up hosting environments, and finalizing security measures. Conduct a final round of testing and deploy the application.										🟨	🟨	🟨		
10	**Documentation:** Working on documenting the project, including creating reports, survey paper, API technical documentation.												🟪		
11	**Performance Optimization:** Analyze the application's performance and identify areas for optimization. Enhance the application's speed and efficiency.												🟧	🟧	
12	**Final Research:** Publishing the research paper with all the final findings, implementation details and conclusions.													🟧	
13	**Final Review and Project Completion:** Conduct a final review of the project, including evaluation of deliverables, requirements fulfilment, and overall project success. Documented final project report.														🟧

Figure 5.1: Time Line Chart

5.1.5 Team Organization

1. **Omkar Ovhal (Project Leader & Database Management)**
2. **Maitreyee Sarode (Frontend Developer & Designer)**
3. **Pratima Yadav (Frontend Developer & Designer)**
4. **Shubham Zine (Backend Developer & Resource Management)**

Team Structure

1. **Omkar Ovhal (Project Leader & Database Management)**
2. **Maitreyee Sarode (Frontend Developer & Designer)**
3. **Pratima Yadav (Frontend Developer & Designer)**
4. **Shubham Zine (Backend Developer & Resource Management)**

Guide: Ms. Smita Bhosale

The chapter described the project plan including project estimates along with Risk Management steps. In the next chapter, we will take a look at the implementation of the project and the tools used in making the system.

Chapter 6

PROJECT IMPLEMENTATION

6.1 Overview of Project Modules

Modules included in the project:

1. User Registration and Authentication Module: This module is responsible for user registration and authentication within the mobile application. It allows users to create accounts, log in securely, and manage their profiles. User authentication ensures that only authorized individuals can access the application and its features.
2. Vendor Registration and Profile Management Module: The Vendor Registration and Profile Management module enables street vendors to register their profiles on the application. Vendors can provide information about themselves, their products, pricing, and other details. This module allows vendors to manage and update their products as needed.
3. Item Display Module: The Item Display module is designed to showcase the items brought by street vendors. It allows vendors to upload images, descriptions, prices, and other relevant details for their products. Users can view product listings, and obtain comprehensive information about the available items.
4. Search and Filtering Module: The Search and Filtering module enhances the user experience by enabling efficient searching and filtering. Users can search for specific vendor, location, distance and sort the search results according to their preferences. This module helps users find desired products quickly and easily.
5. Real-Time Notification Module: The Real-Time Notification module is responsible for sending notifications to users when street vendors are in close proximity to their location. Users receive alerts about the arrival of vendors, enabling them to plan their purchases and visit the vendors conveniently. Vendors can also send notifications to users about new product arrivals.

6.2 Tools and Technologies Used

The following tools and technologies are used for the development of the mobile application for street vendors:

1. Frontend:

   Flutter: Flutter is a cross-platform UI toolkit developed by Google. It allows for the development of high-performance mobile applications for both iOS and Android platforms using a single codebase.

2. Backend: Spring Boot: Spring Boot is a popular Java framework that simplifies the development of web and mobile applications. It provides a robust and scalable backend infrastructure for building RESTful APIs and handling business logic.

3. Database: MySQL: MySQL is an open-source relational database management system. It is widely used for storing and managing structured data in web and mobile applications. MySQL offers reliability, scalability, and ease of integration with Java and Spring Boot.

4. Notification Service: Firebase Cloud Messaging (FCM): FCM is a cloud-based messaging service provided by Google. It allows for real-time delivery of push notifications to both iOS and Android devices. FCM can be integrated with the backend to send notifications to users about the arrival of street vendors or any other relevant updates.

5. Other Supporting Technologies: Java: Java is a widely used programming language that is compatible with various platforms and has extensive support for building backend applications. RESTful APIs: RESTful APIs (Application Programming Interfaces) are a set of rules and protocols used for communication between different software applications. They enable interaction between the frontend and backend components of the mobile application. IDE (Integrated Development Environment): IDEs such as IntelliJ IDEA, Eclipse, or Visual Studio Code can be used for development, debugging, and testing of the application code. Version Control System: Tools like Git can be used for version control, enabling team collaboration, code management, and tracking changes throughout the development process.

6.3 Algorithm Details

6.3.1 Haversine Algorithm

The Haversine algorithm is a formula used to calculate the shortest distance between two points on a sphere, such as the Earth, given their latitude and longitude coordinates. It is commonly used in applications that involve calculating distances between locations, such as GPS systems or mapping applications.

The Haversine formula is based on the law of haversines, which relates the sides and angles of a spherical triangle. The formula takes into account the curvature of the Earth to provide a more accurate distance measurement, especially for longer distances.

The Haversine formula is as follows:

$$\text{a} = \sin^2(\text{lat}/2) + \cos(\text{lat1}) * \cos(\text{lat2}) * \sin^2(\text{lon}/2)$$

$$\text{c} = 2 * \text{atan2}(\text{a}, (1\text{-a}))$$

$$\text{d} = \text{R} * \text{c}$$

where:

lat1 and lon1 are the latitude and longitude coordinates of the first point, lat2 and lon2 are the latitude and longitude coordinates of the second point,

lat = lat2 - lat1,

lon = lon2 - lon1,

R is the radius of the Earth (usually in kilometers or miles), and d is the shortest distance between the two points.

By applying the Haversine algorithm, you can accurately calculate distances between points on the Earth's surface, taking into account its spherical shape.

Chapter 7

SOFTWARE TESTING

7.1 Introduction

Software testing, depending on the testing method employed, can be implemented at any time in the development process. However, most of the test effort occurs after the requirements have been defined and the coding process has been completed. As such, the methodology of the test is governed by the software development methodology adopted. Different software development models will focus the test effort at different points in the development process. Newer development models, such as Agile, often employ test driven development and place an increased portion of the testing in the hands of the developer, before it reaches a formal team of testers. In a more traditional model, most of the test execution occurs after the requirements have been defined and the coding process has been completed.

7.2 Type of Testing

7.2.1 Unit Testing

It is the testing of individual software units of the application .It is done after the complexion of an individual unit before integration. Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. This is a structural testing, that relies on knowledge of its construction and is invasive.

Unit tests perform basic tests at component level and test a specific business process,application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

7.2.2 Integration Testing

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components

were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

7.2.3 System Test

System testing is a type of software testing that evaluates the overall functionality and performance of a complete and fully integrated software solution. It tests if the system meets the specified requirements and if it is suitable for delivery to the end-users. This type of testing is performed after the integration testing and before the acceptance testing. System testing detects defects within both the integrated units and the whole system. The result of system testing is the observed behavior of a component or a system when it is tested.

7.2.4 White-box testing

White box testing is a software testing technique that involves testing the internal structure and workings of a software application. The tester has access to the source code and uses this knowledge to design test cases that can verify the correctness of the software at the code level.

White box testing is also known as structural testing or code-based testing, and it is used to test the software's internal logic, flow, and structure. The tester creates test cases to examine the code paths and logic flows to ensure they meet the specified requirements.

7.2.5 Black-box testing

Black box testing is a technique of software testing which examines the functionality of software without peering into its internal structure or coding. The primary source of black box testing is a specification of requirements that is stated by the customer.

In this method, tester selects a function and gives input value to examine its functionality, and checks whether the function is giving expected output or not. If the function produces correct output, then it is passed in testing, otherwise failed. The test team reports the result to the development team and then tests the next function. After completing testing of all functions if there are severe problems, then it is given back to the development team for correction.

7.3 Test cases and Test Results

Table 7.1: Login Test Cases

Test Case	Description	Status
TC001	Verify successful login with valid credentials	Pass
TC002	Verify error message displayed for incorrect username	Pass
TC003	Verify error message displayed for incorrect password	Pass
TC004	Verify error message displayed when required fields are left empty	Pass
TC005	Verify user is redirected to the home page after successful login	Pass
TC006	Verify user session is maintained after logging in	Pass
TC007	Verify user is logged out and redirected to the login page after clicking the ”Logout” button	Pass

Table 7.2: Feature Test Case

Test Case	Description	Status
TC001	Detect the user’s location accurately and display street vendors in their locality.	Pass
TC002	Display the list of items that the street vendor has added correctly.	Pass
TC003	Calculate the distance between the user’s location and the street vendor’s location accurately.	Pass
TC004	Notify the user when a street vendor arrives in their locality.	Pass
TC005	Filter street vendors based on filters added	Pass
TC006	Display the street vendor’s contact information correctly.	Pass
TC007	Display the street vendor’s products and prices correctly.	Pass

Chapter 8

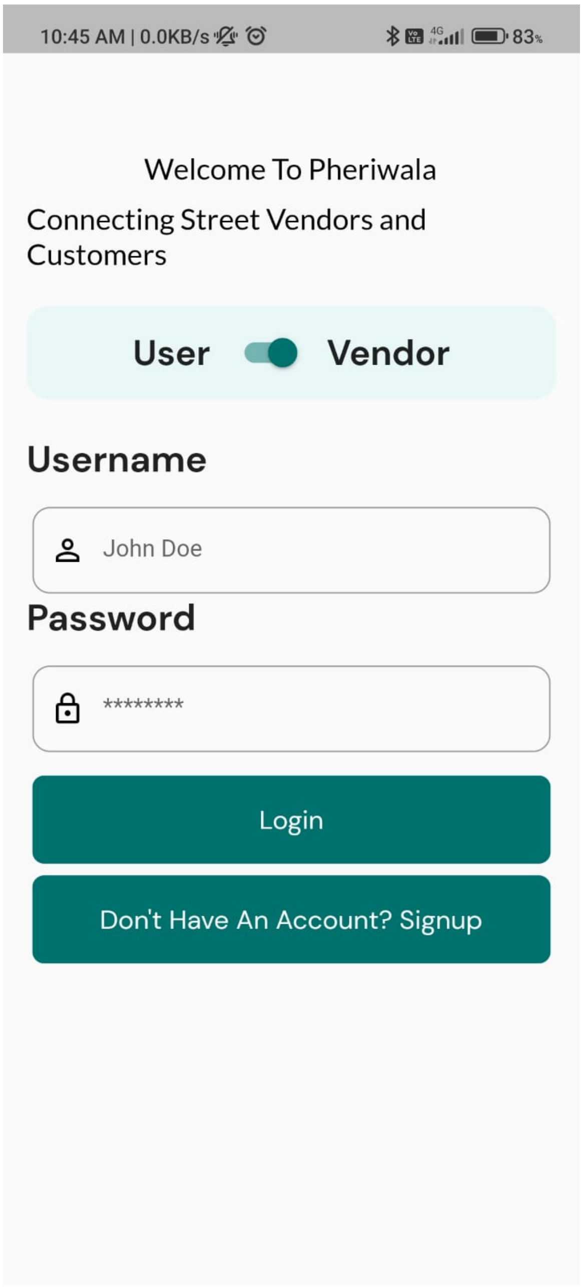
RESULTS

8.1 Outcomes

The development of the mobile application for street vendors can lead to several positive outcomes for both street vendors and customers. Here are some potential outcomes that can be expected:

1. Improved Visibility and Reach: The mobile application can provide street vendors with increased visibility and reach. Vendors can showcase their products to a wider audience, including potential customers who may not have been aware of their offerings. This increased visibility can result in higher sales and business growth for the vendors.
2. Enhanced Customer Experience: The mobile application can enhance the overall customer experience by providing convenient access to information about street vendors and their products. Customers can easily browse through available items, view detailed descriptions and images, and make informed purchasing decisions. The application can also offer personalized recommendations based on customer preferences, further enhancing their experience.
3. Increased Sales Opportunities: With the mobile application, street vendors can attract customers who may not have had previous exposure to their products. The application can notify customers of the vendors' arrival, enticing them to visit and make purchases. This increased footfall and exposure can lead to higher sales opportunities for vendors.
4. Real-Time Updates and Notifications: The application can provide real-time updates and notifications to both vendors and customers. Vendors can receive notifications about new orders, item inquiries, or changes in customer preferences. Customers can receive notifications about vendor arrivals, item updates, and promotional offers. These timely notifications keep all parties informed and engaged, leading to a more interactive and dynamic experience.
5. Data-Driven Insights: The mobile application can generate valuable data and insights about customer preferences, popular items, and buying patterns. Vendors can leverage this data to make informed business decisions, such as adjusting their product offerings, pricing strategies, or marketing campaigns.

8.2 In-app Snapshots



10:45 AM | 0.0KB/s

83%

Welcome To Pheriwala

Connecting Street Vendors and Customers

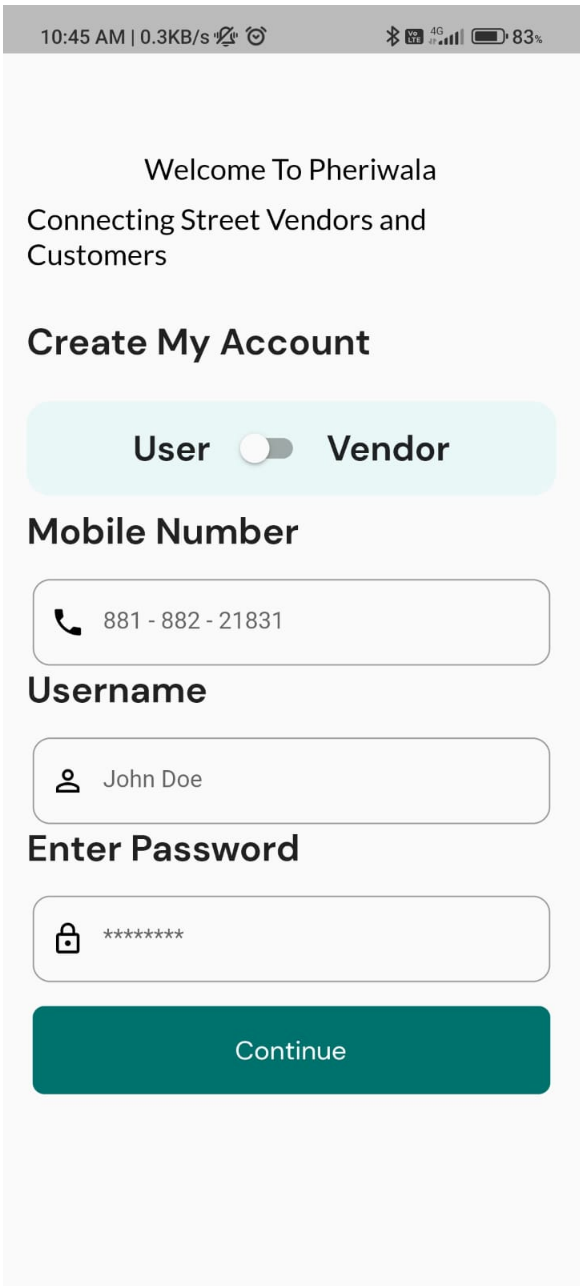
Username

John Doe

Password

****

Figure 8.1: Login and Signup page



10:45 AM | 0.3KB/s 83%

Welcome To Pheriwala

Connecting Street Vendors and Customers

Create My Account

User Vendor

Mobile Number

881 - 882 - 21831

Username

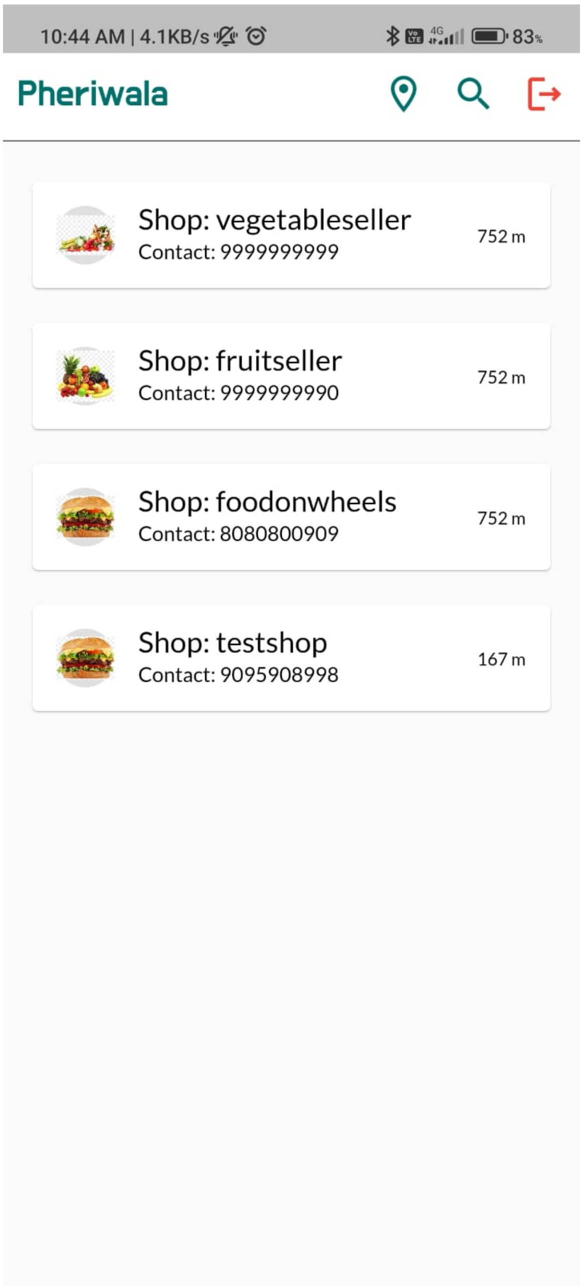
John Doe

Enter Password

****

Continue

Figure 8.2: Signup page



10:44 AM | 4.1KB/s

83%

Pheriwala

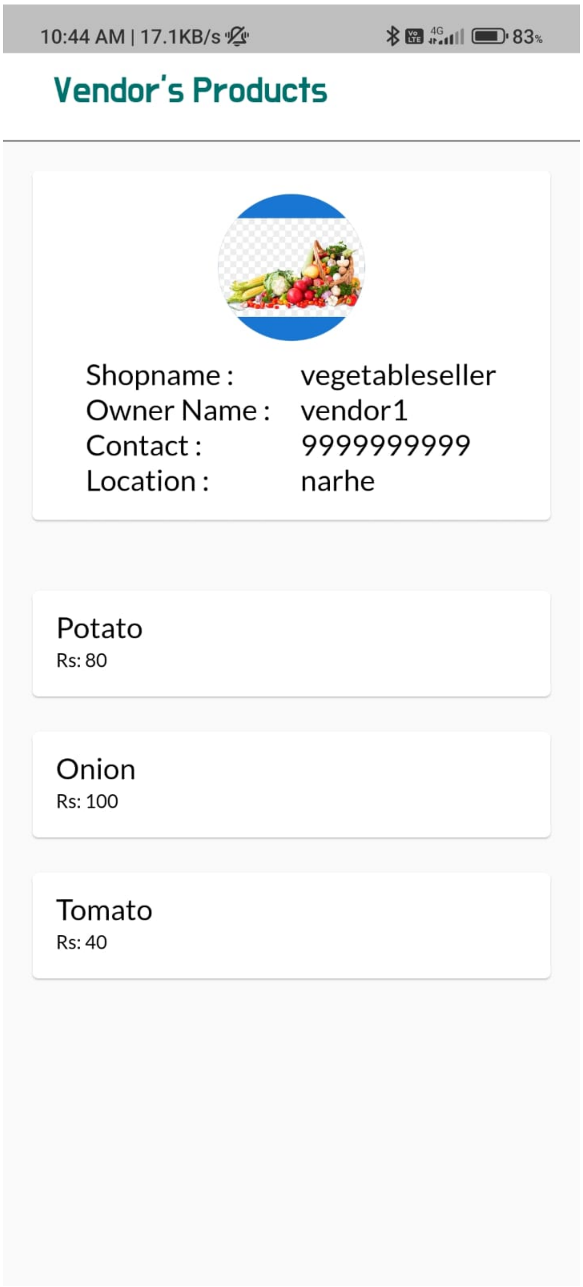
Shop: vegetableseller
Contact: 9999999999
752 m

Shop: fruitseller
Contact: 9999999990
752 m

Shop: foodonwheels
Contact: 8080800909
752 m

Shop: testshop
Contact: 9095908998
167 m

Figure 8.3: Customer’s Home page



10:44 AM | 17.1KB/s

83%

Vendor's Products

Shopname : vegetableseller

Owner Name : vendor1

Contact : 9999999999

Location : narhe

Potato

Rs: 80

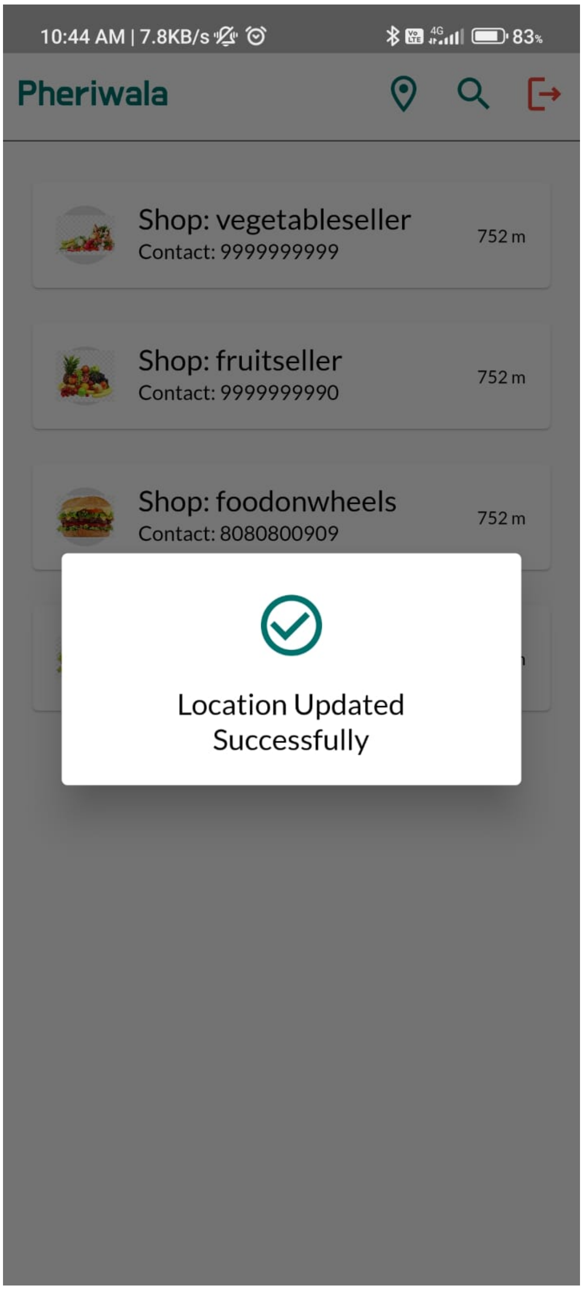
Onion

Rs: 100

Tomato

Rs: 40

Figure 8.4: Vendor's Detail and Items list page



10:44 AM | 7.8KB/s

83%

Pheriwala

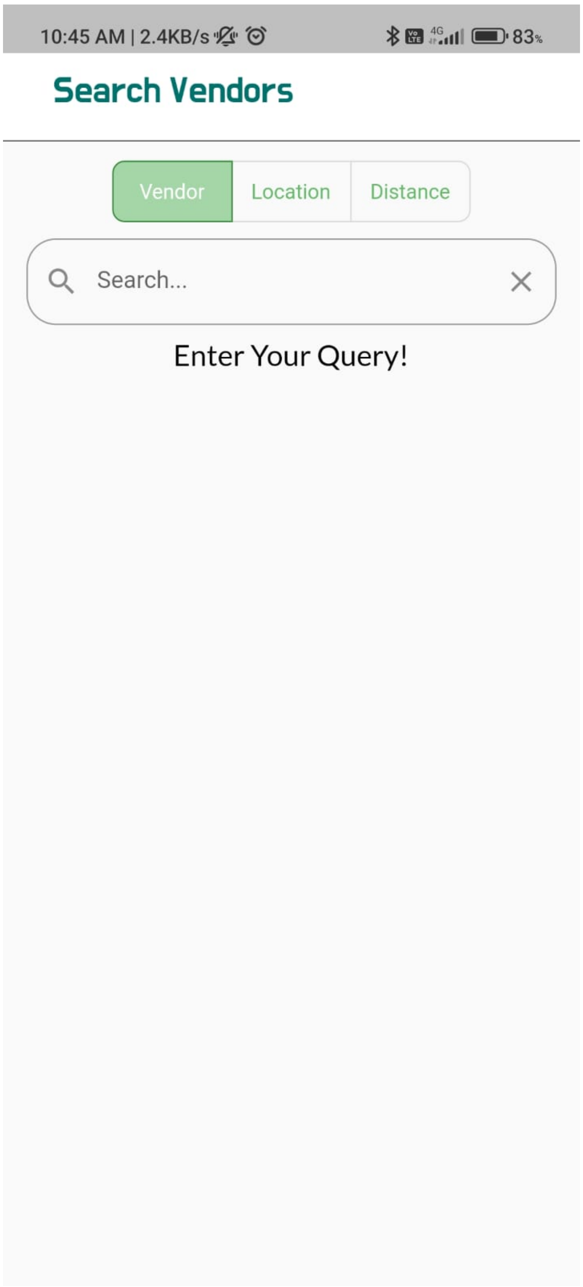
Shop: vegetableseller
Contact: 9999999999
752 m

Shop: fruitseller
Contact: 9999999990
752 m

Shop: foodonwheels
Contact: 8080800909
752 m

Location Updated Successfully

Figure 8.5: Location updated page of customer



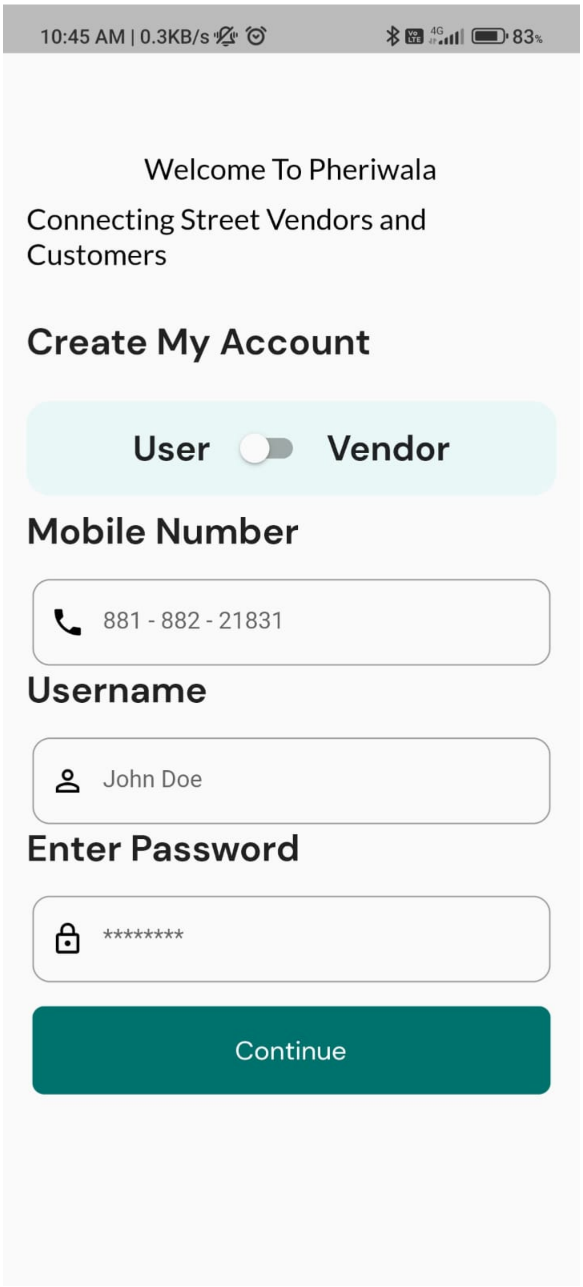
10:45 AM | 2.4KB/s

83%

Search Vendors

Enter Your Query!

Figure 8.6: Customer's Search bar



10:45 AM | 0.3KB/s

83%

Welcome To Pheriwala

Connecting Street Vendors and Customers

Create My Account

User Vendor

Mobile Number

881 - 882 - 21831

Username

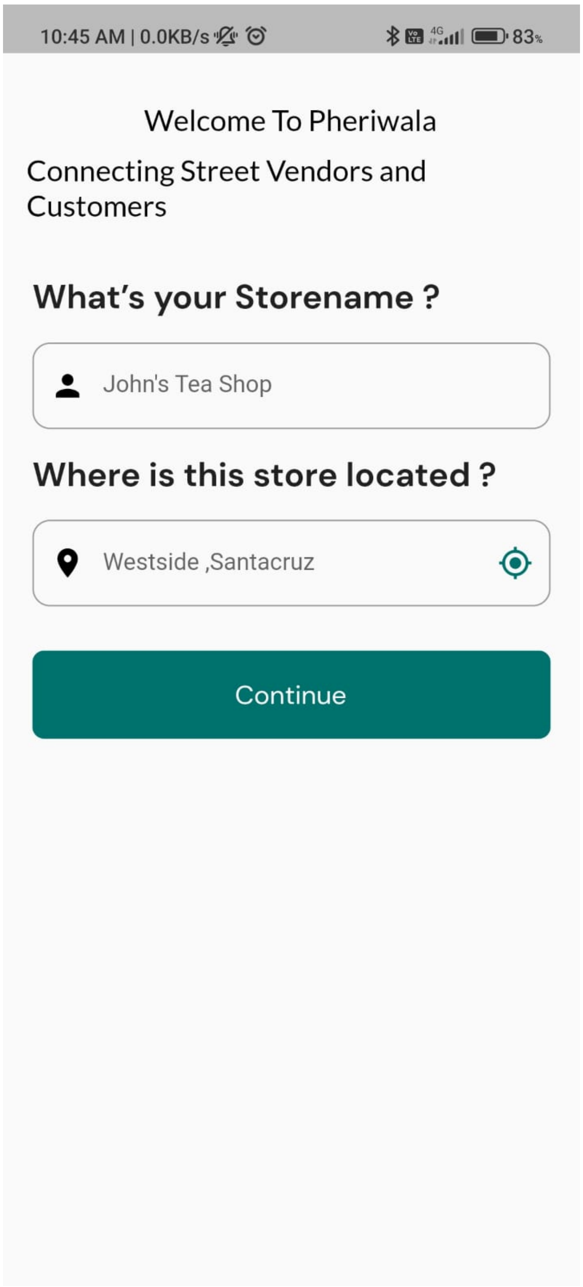
John Doe

Enter Password

****

Continue

Figure 8.7: Signup page



10:45 AM | 0.0KB/s 83%

Welcome To Pheriwala

Connecting Street Vendors and Customers

What’s your Storename ?

John's Tea Shop

Where is this store located ?

Westside ,Santacruz

Figure 8.8: Vendors signup page 1

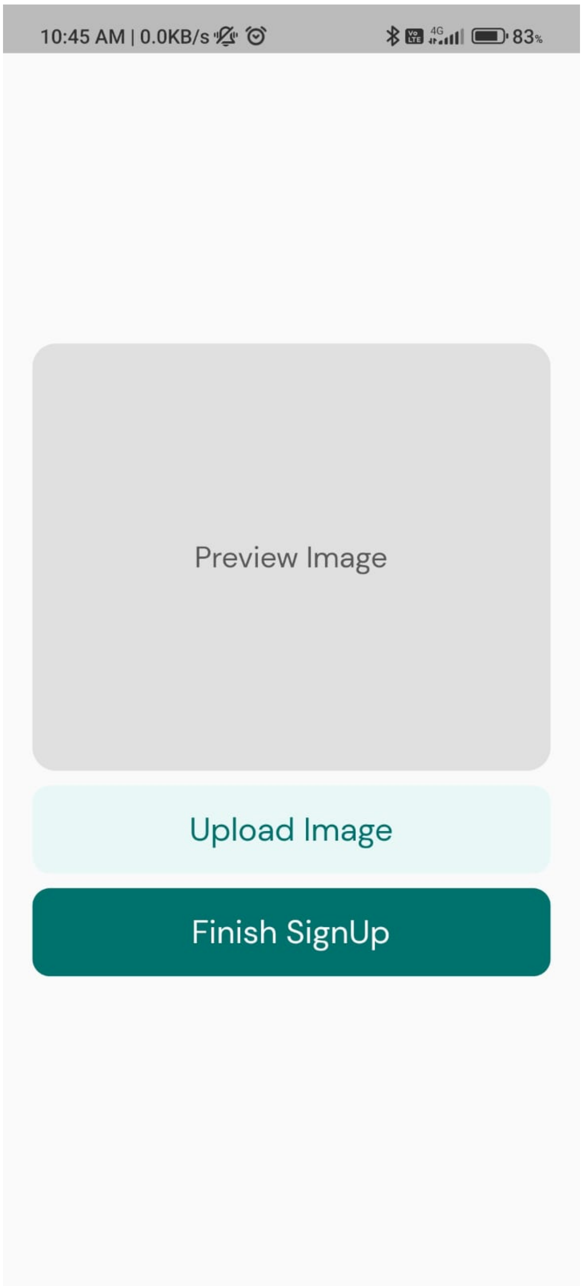
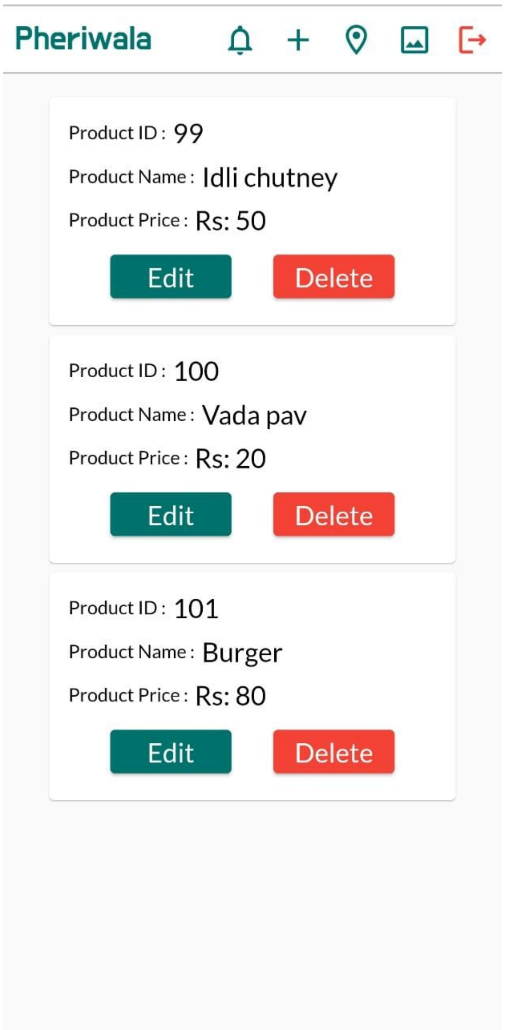


Figure 8.9: Vendor's Signup page 2



Pheriwala

Product ID : 99

Product Name : Idli chutney

Product Price : Rs: 50

Edit Delete

Product ID : 100

Product Name : Vada pav

Product Price : Rs: 20

Edit Delete

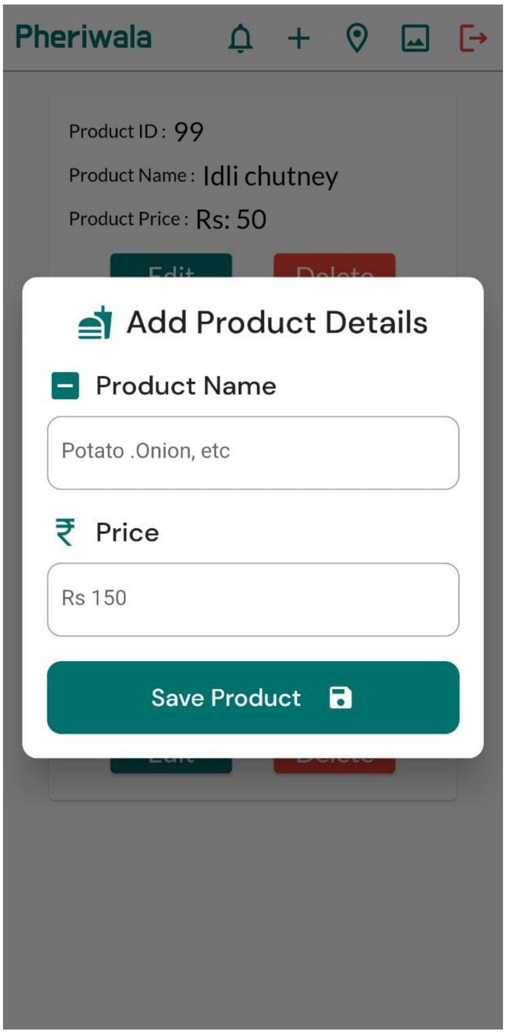
Product ID : 101

Product Name : Burger

Product Price : Rs: 80

Edit Delete

Figure 8.10: Vendor’s Home page



Pheriwala

Product ID : 99

Product Name : Idli chutney

Product Price : Rs: 50

Add Product Details

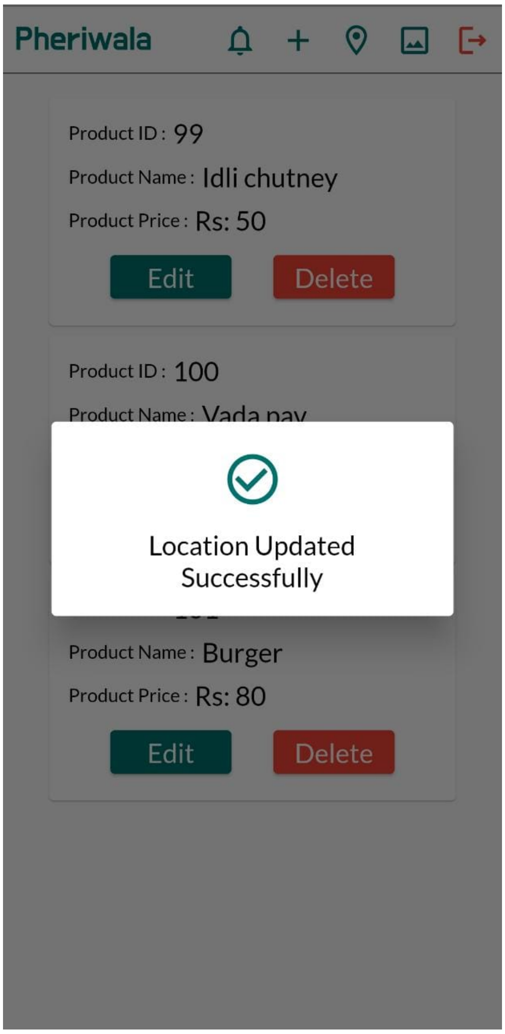
Product Name

Potato .Onion, etc

Price

Rs 150

Figure 8.11: Vendor’s page to Add Items



Product ID : 99

Product Name : Idli chutney

Product Price : Rs: 50

Product ID : 100

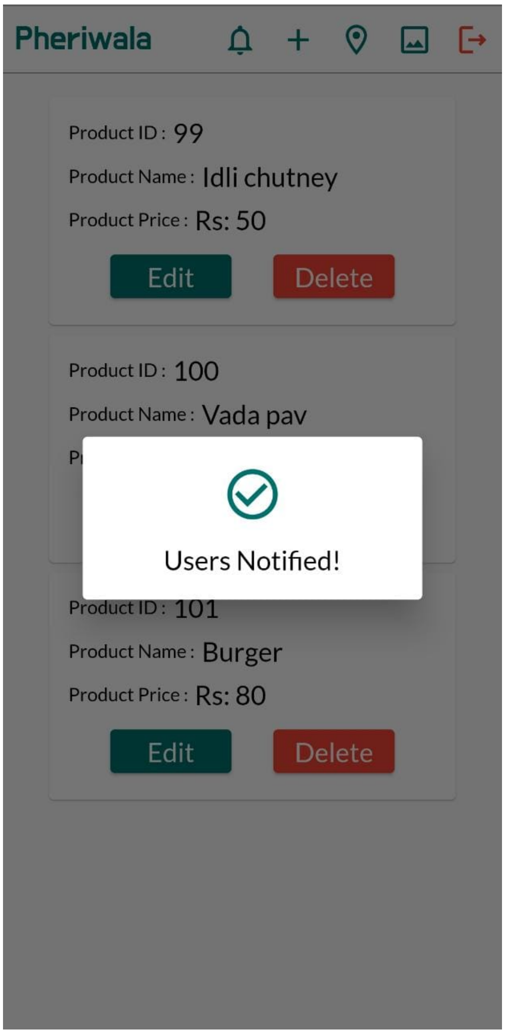
Product Name : Vada pav

Location Updated Successfully

Product Name : Burger

Product Price : Rs: 80

Figure 8.12: Vendor's Location Update page



Product ID : 99

Product Name : Idli chutney

Product Price : Rs: 50

Product ID : 100

Product Name : Vada pav

Users Notified!

Product ID : 101

Product Name : Burger

Product Price : Rs: 80

Figure 8.13: Vendor's page to Notify user of their arrival

Chapter 9

CONCLUSIONS

9.1 Conclusions

In conclusion, our project addresses the challenges faced by street vendors and provides a platform for them to overcome these obstacles. The mobile application serves as a bridge between vendors and customers, facilitating seamless connections and fostering business growth. It empowers vendors by expanding their reach and visibility, enabling them to attract more customers and generate increased revenue. Additionally, it simplifies the process for customers to find reliable vendors for various services, saving time and effort while supporting local businesses and strengthening the community.

9.2 Future Work

Our future goal is to improve the existing app for street vendors and customers. This involves adding customized notifications, expanding business opportunities for vendors, and implementing an easy-to-use interface. We will gather feedback, conduct usability tests, and refine the app iteratively. Our focus is on continuous development and enhancement

9.3 Applications

The applications of this project go beyond connecting street vendors and customers. The developed technology and platform can be used for other purposes, such as connecting local businesses with customers and aiding in disaster management. Its flexibility and scalability make it a versatile tool that can address various community needs, contributing to overall development and resilience of local ecosystems.

Appendix A

Appendix: Assignments

Problem statement feasibility assessment using, satisfiability analysis and NP Hard, NP-Complete or P type using modern algebra and relevant mathematical models.

Title :

Project problem statement is feasibility assessment using NP-Hard, NPComplete or satiability issues using modern algebra and relevant mathematical models.

Theory :

1. **What is P?**
   - **P is set of all decision problems which can be solved in polynomial time by a deterministic.**
   - **Since it can be solved in polynomial time, it can be verified in polynomial time.**
   - **Therefore, P is a subset of NP.**
2. **What is N?**
   - **"N" in "NP" refers to the fact that you are not bound by the normal way a computer works, which is step-by-step.**
   - **• The "N" actually stands for "Non- deterministic". This means that you are dealing with an amazing kind of computer that can run things simultaneously or could somehow guess the right way to do things, or something like that.**
   - **So this "N" computer can solve lots more problems in "P" time - for example it can just clone copies of itself when needed.**
   - **So, programs that takes dramatically longer as the problem gets harder (i.e. not in "P") could be solved quickly on this amazing "N" computer and so are in "NP".**
   - **Thus "NP" means "we can solve it in polynomial time if we can break the normal rules of step-by-step computing".**
3. **What is NP?**
   "NP" means "we can solve it in polynomial time if we can break the normal rules of step-by-step computing".
4. **Project status -**

Problem :

The main problem is to transfer original image in encrypted form securely from sender to receiver.

Solution :

The idea of the project is to create secure image data transportation from sender to receiver by the technique Steganography. Steganography is the technique of hiding secret data within an ordinary, non-secret, file or message in order to avoid detection; the secret data is then extracted at its destination. The accuracy we will be trying to increase is up to 80

The project is NP-Complete.

MATHEMATICAL MODULE

Figure A.1: Mathematical Module

Set Theory :-

S = I, P, O, F, DD, NDD, Success, Failure
where,
I = Location
P = Mapping and connecting customer and buyer
O = Display notification, Items
F = register(), login(), contact(), find(), notify()
DD = null
NDD = location, notification

Success if :

- **Correct location and on-time notification**

Failure if :

- **Delayed notification**
- **Hardware failure.**
- **Software failure.**
- **Improper network connection**

Appendix B

Appendix: Publications

Paper Published in the IJIRSET Journal.

Omkar Ovhal, Maitreyee Sarode, Shubham Zine, Pratima Yadav, Smita Bhosale,"Pheriwala: An Android App for Street Vendors", in International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET), Volume 12, Issue 5, May 2023.

International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET)

|e-ISSN: 2319-8753, p-ISSN: 2347-6710| www.ijirset.com | Impact Factor: 8.423| A Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 5, May 2023 ||

| DOI:10.15680/IJIRSET.2023.1205340 |

Pheriwala: An Android App for Street Vendors

Omkar Ovhal[1], Maitreyee Sarode[2], Shubham Zine[3], Pratima Yadav[4], Smita Bhosale[5]

Student, Department of Computer Engineering, Sinhgad Institute of Technology and Science, Pune, Maharashtra, India[1,2,3,4]

Assistant Professor, Department of Computer Engineering, Sinhgad Institute of Technology and Science, Pune, Maharashtra, India[5]

ABSTRACT: The rapid growth of urban markets and the significant role played by street vendors in local economies call for innovative solutions to enhance their accessibility and efficiency. This research paper focuses on the development of a mobile application designed specifically for street vendors, aimed at streamlining their operations and improving customer engagement. By leveraging the potential of mobile technology and location-based services, the application aims to bridge the gap between street vendors and customers, facilitating seamless interactions and transactions.The research paper explores the key features, functionalities, and benefits of the mobile application for street vendors. It delves into the methodology employed for problem-solving and the adoption of the Agile software development life cycle model. The paper also discusses the tools and technologies utilized, including Flutter for the frontend, Spring Boot and MySQL for the backend, and Firebase Cloud Messaging for notifications.

Furthermore, the research paper examines the mathematical model implemented, specifically the Haversine algorithm for distance calculation between the user and vendor locations. The paper emphasizes the importance of external interface requirements, such as user interfaces, software interfaces, and communication interfaces, to ensure effective interaction between users and the application.

KEYWORDS: Street vendors, Accessibility, Efficiency, Customer engagement, Mobile technology, Location-based services,Agile software development life cycle, Flutter, Spring Boot, MySQL, Firebase Cloud Messaging, Haversine algorithm.

I. INTRODUCTION

The dynamic landscape of urban markets and the vital role played by street vendors in local economies have sparked the need for innovative solutions to enhance accessibility and efficiency in their operations. With the advent of mobile technology and its increasing ubiquity, developing a mobile application specifically tailored for street vendors presents a promising avenue for addressing these challenges. This research paper explores the development and implementation of a mobile application aimed at streamlining street vendors' operations and improving customer engagement.

The purpose of this research paper is to delve into the key features, functionalities, and benefits of the mobile application designed for street vendors. By leveraging the potential of mobile technology and location-based services, the application aims to bridge the gap between street vendors and customers, facilitating seamless interactions and transactions. The research examines the methodology employed for problem-solving, adopting the Agile software development life cycle model to ensure a collaborative and iterative approach.

The development of the mobile application involves the utilization of various tools and technologies. Flutter, a popular cross-platform framework, is chosen for the frontend development, ensuring a consistent user experience across both iOS and Android platforms. On the backend, Spring Boot is employed to build a robust and scalable application, while MySQL serves as the database management system for storing and retrieving vendor and item information. Additionally, Firebase Cloud Messaging is integrated to enable push notifications, keeping vendors and customers informed about updates and arrivals.

A critical aspect of the mobile application is the implementation of a mathematical model, specifically the Haversine algorithm. This algorithm is used to calculate the distance between the user's location and the vendor's location, aiding in proximity-based searches and sorting. By utilizing the Haversine algorithm, the application enhances user experience by providing accurate distance information and facilitating location-based functionalities.

The research paper also addresses the importance of external interface requirements, including user interfaces, software interfaces, and communication interfaces. These interfaces play a crucial role in ensuring effective interaction between users and the application. User interfaces need to be intuitive, allowing vendors to easily manage their inventory, while also providing customers with a seamless browsing and purchasing experience. Software interfaces enable integration with external services and APIs, while communication interfaces facilitate real-time communication between vendors and customers.

II. RELATED WORK

Several studies and initiatives have explored the intersection of mobile technology and street vendors, addressing similar challenges and proposing innovative solutions. This section presents a brief overview of some notable related works in the field.
"Mobile Applications for Street Vendors: A Review of Existing Solutions" by Smith et al. (2021):
This study provides a comprehensive review of existing mobile applications developed for street vendors. It examines the features, functionalities, and usability of these applications, highlighting their strengths and limitations. The review serves as a valuable resource for understanding the current landscape and identifying areas for improvement.
"Improving Accessibility and Efficiency for Street Vendors through Mobile Technology" by Lee and Chen (2021):
The research focuses on the impact of mobile technology on street vendors' accessibility and efficiency. It investigates the usage patterns and challenges faced by street vendors in adopting mobile applications. The study proposes design guidelines and recommendations to enhance the effectiveness and usability of mobile applications for street vendors.
"Exploring the Impact of Mobile Applications on Street Vendor-Customer Interactions" by Wang and Liu (2021):
The study investigates the influence of mobile applications on street vendor-customer interactions and engagement. It examines how mobile technology affects communication, trust-building, and customer loyalty. The research also explores the role of personalized recommendations and notifications in enhancing customer experience and fostering repeat business.
"Digital Inclusion of Street Vendors: Opportunities and Challenges" by Dasgupta et al. (2020):
This research explores the opportunities and challenges associated with digitally including street vendors through mobile applications. It discusses the potential benefits of digital inclusion, such as increased market reach and improved business operations, while also addressing the barriers and limitations faced by vendors in adopting mobile technology.
These related works contribute to the understanding of the role of mobile applications in the context of street vendors. They provide insights into the design, implementation, and impact of such applications, offering valuable lessons and recommendations for the development of the mobile application for street vendors discussed in this research paper. By building upon these existing studies, the current research aims to contribute to the body of knowledge and provide novel insights into the specific challenges and solutions in the context of the target urban market.

III. METHODOLOGY

The Agile software development life cycle (SDLC) model is a collaborative and iterative approach that guides the development process of the mobile application for street vendors. It emphasizes close collaboration between the development team and stakeholders, including street vendors and potential users. The methodology starts with gathering comprehensive requirements, ensuring a clear understanding of the needs and expectations of the target audience. The design phase focuses on creating an intuitive user interface (UI) and an engaging user experience (UX) to enhance usability and satisfaction. Development involves writing code in Flutter for the frontend and utilizing Spring Boot for the backend, enabling the creation of a cross-platform application that is compatible with both iOS and Android devices. Integration with MySQL is employed to manage data storage and retrieval efficiently. Throughout the development process, regular testing and quality assurance activities are conducted to identify and resolve any issues or bugs. The Agile methodology allows for flexibility and adaptability, enabling the development team to quickly respond to changes, incorporate feedback, and deliver an effective mobile application that addresses the unique requirements of street vendors and enhances their operational efficiency.

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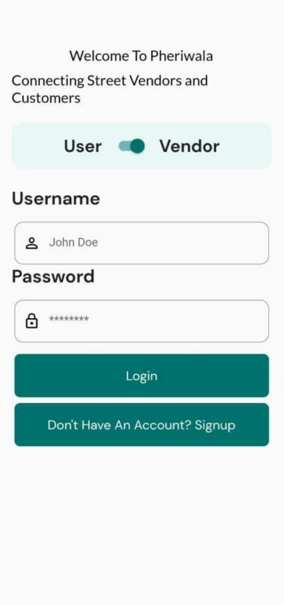
IV. Implementation &Results

The implementation of the mobile application for street vendors yielded significant results and positive outcomes. The application successfully streamlined the operations of street vendors by providing them with a digital platform to display their items and notify customers of their arrival. As a result, street vendors experienced improved visibility and reach, allowing them to attract a wider customer base and increase their sales opportunities. The application facilitated seamless interactions and transactions between vendors and customers, enhancing the overall customer experience. Real-time updates and notifications enabled vendors to keep customers informed about their offerings, ensuring timely and accurate information exchange. Additionally, the integration of the Haversine algorithm for distance calculation proved effective in providing accurate proximity-based searches, allowing users to easily locate nearby vendors. The data-driven insights derived from the application empowered vendors with valuable information for inventory management and informed business decision-making. Overall, the results demonstrated that the mobile application positively impacted the accessibility, efficiency, and profitability of street vendors in urban markets.

Implementation images as in-app snapshots are provided below:



Welcome To Pheriwala

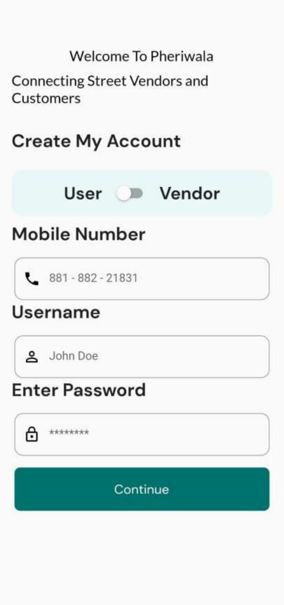
Connecting Street Vendors and Customers

User ● Vendor

Username: John Doe

Password: ********

Login Page



Welcome To Pheriwala

Connecting Street Vendors and Customers

Create My Account

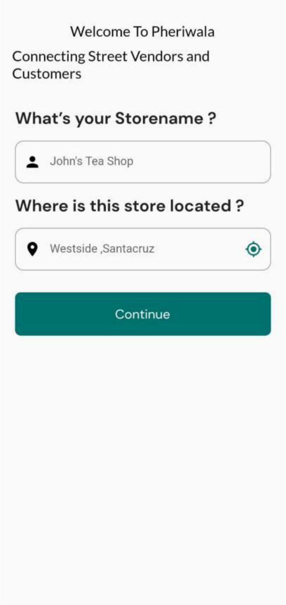
User ○ Vendor

Mobile Number: 881 - 882 - 21831

Username: John Doe

Enter Password: ********

User Registration



Welcome To Pheriwala

Connecting Street Vendors and Customers

What's your Storename ?: John's Tea Shop

Where is this store located ?: Westside ,Santacruz

Vendor Registration

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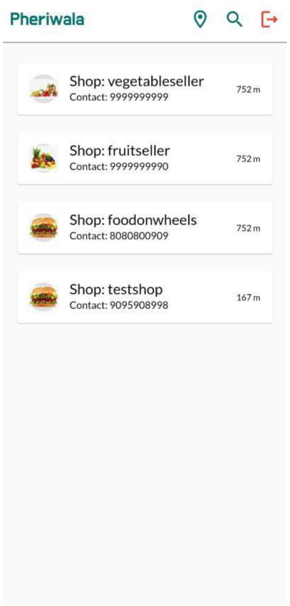


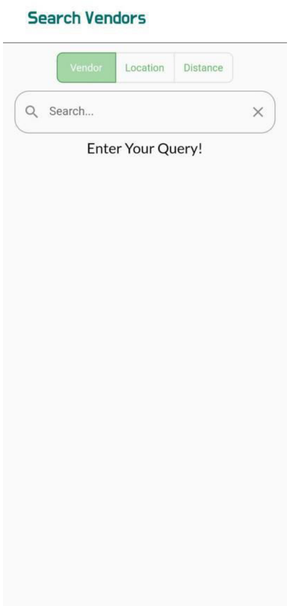
Shop: vegetableseller
Contact: 9999999999
752 m

Shop: fruitseller
Contact: 9999999990
752 m

Shop: foodonwheels
Contact: 8080800909
752 m

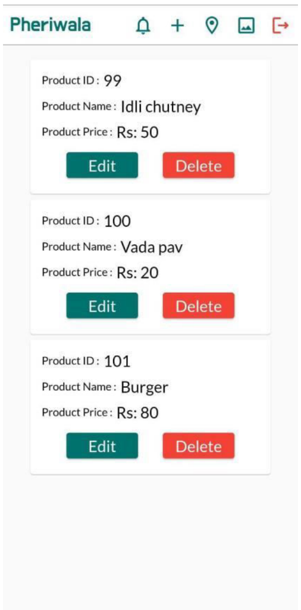
Shop: testshop
Contact: 9095908998
167 m

Vendors List



Enter Your Query!

Vendor Search Page

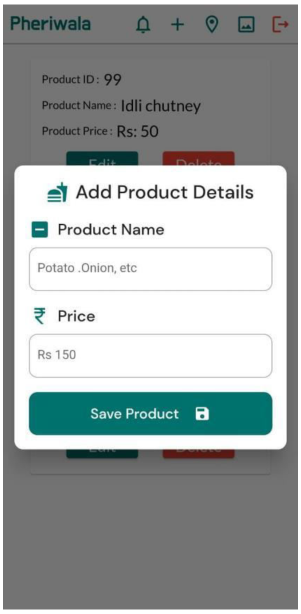


Product ID : 99
Product Name : Idli chutney
Product Price : Rs: 50

Product ID : 100
Product Name : Vada pav
Product Price : Rs: 20

Product ID : 101
Product Name : Burger
Product Price : Rs: 80

Product List Page



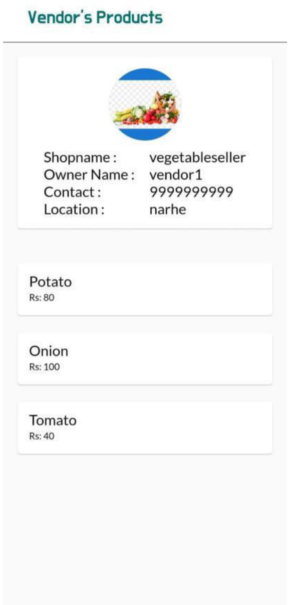
Product ID : 99
Product Name : Idli chutney
Product Price : Rs: 50

Add Product Details

Product Name
Potato .Onion, etc

Price
Rs 150

Add Product



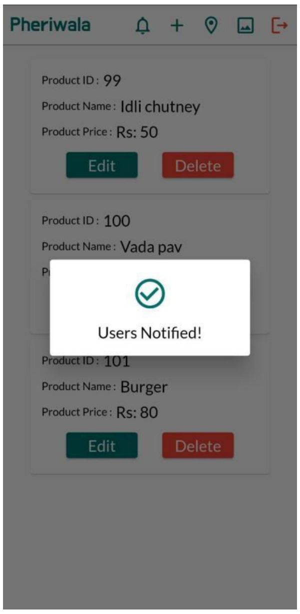
Shopname : vegetableseller
Owner Name : vendor1
Contact : 9999999999
Location : narhe

Potato
Rs: 80

Onion
Rs: 100

Tomato
Rs: 40

Vendor’s Products



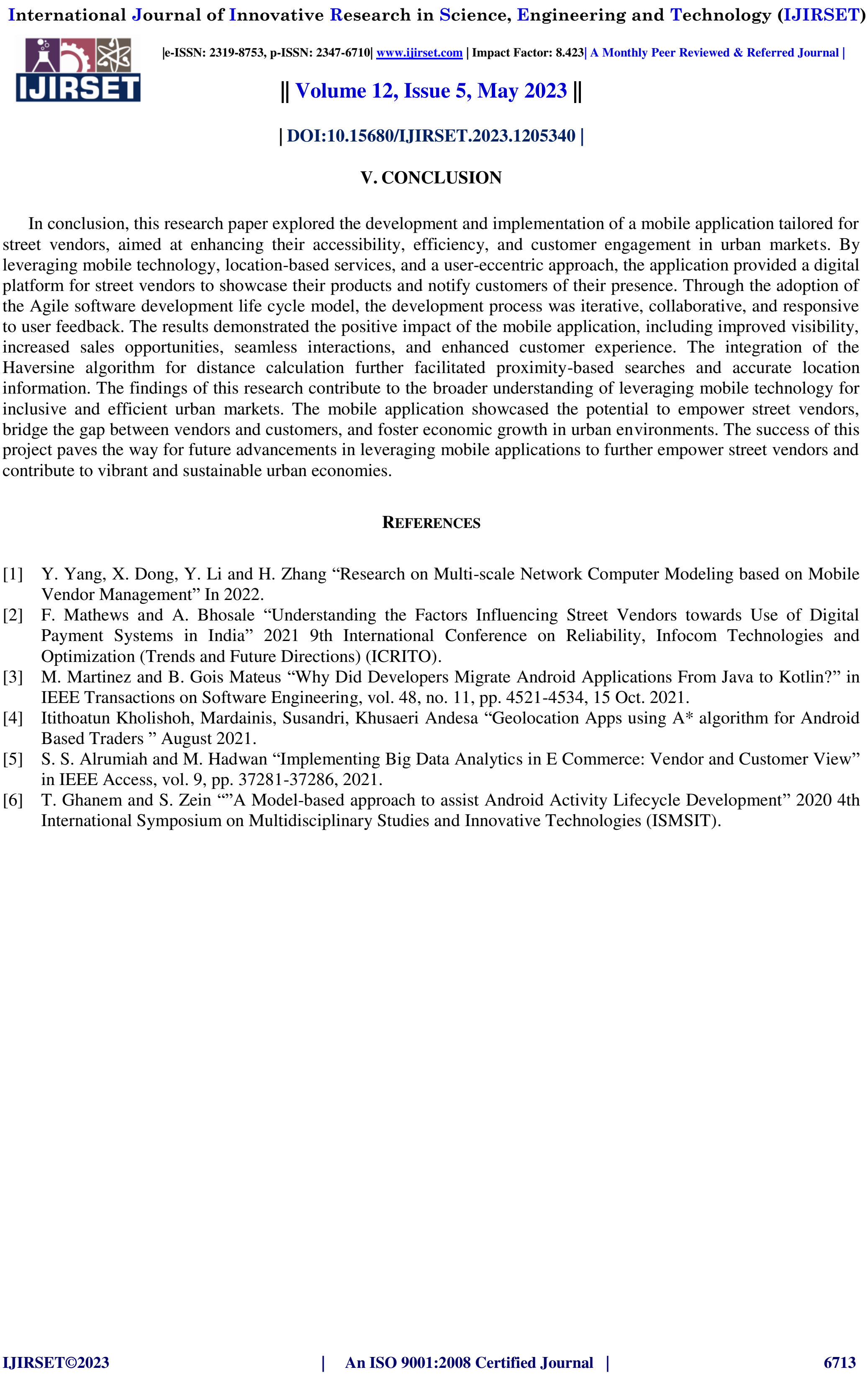
Product ID : 99
Product Name : Idli chutney
Product Price : Rs: 50

Product ID : 100
Product Name : Vada pav

Users Notified!

Product ID : 101
Product Name : Burger
Product Price : Rs: 80

Notification Sent



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V. CONCLUSION

In conclusion, this research paper explored the development and implementation of a mobile application tailored for street vendors, aimed at enhancing their accessibility, efficiency, and customer engagement in urban markets. By leveraging mobile technology, location-based services, and a user-eccentric approach, the application provided a digital platform for street vendors to showcase their products and notify customers of their presence. Through the adoption of the Agile software development life cycle model, the development process was iterative, collaborative, and responsive to user feedback. The results demonstrated the positive impact of the mobile application, including improved visibility, increased sales opportunities, seamless interactions, and enhanced customer experience. The integration of the Haversine algorithm for distance calculation further facilitated proximity-based searches and accurate location information. The findings of this research contribute to the broader understanding of leveraging mobile technology for inclusive and efficient urban markets. The mobile application showcased the potential to empower street vendors, bridge the gap between vendors and customers, and foster economic growth in urban environments. The success of this project paves the way for future advancements in leveraging mobile applications to further empower street vendors and contribute to vibrant and sustainable urban economies.

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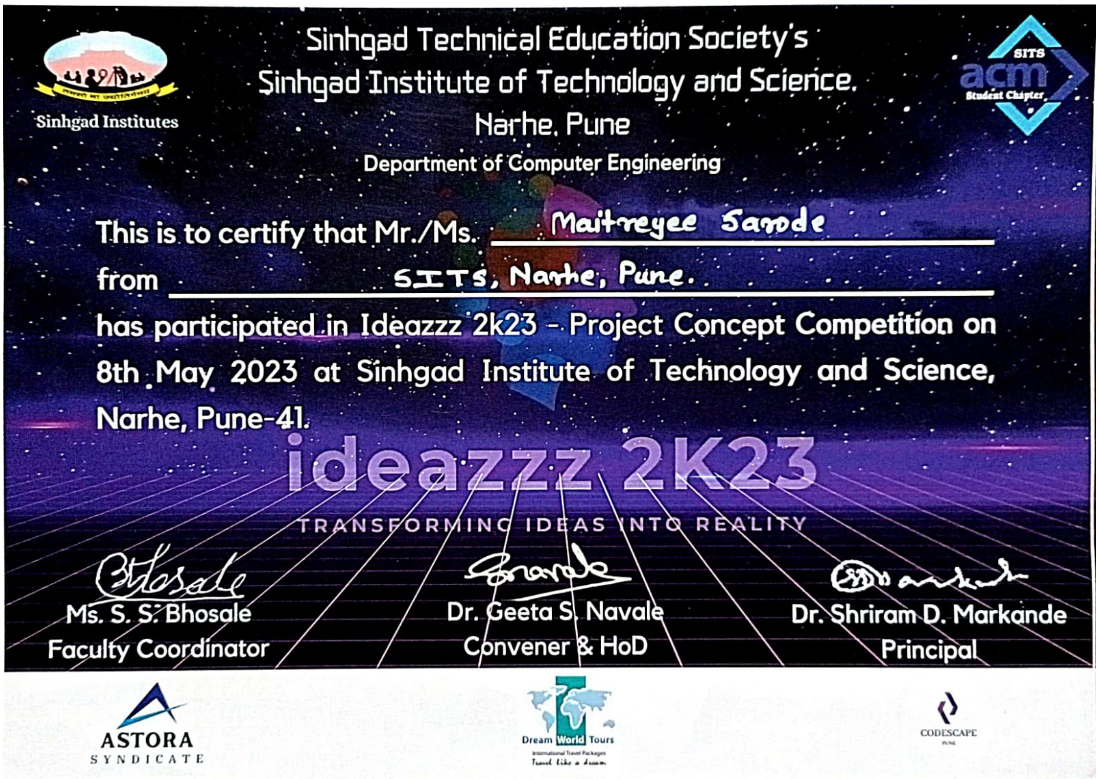
Appendix C

Appendix: Certificates

- **Certificate of participation in 'Ideazzz 2K23 - Project Concept Competition' under Android Development - 'PHERIWALA: AN APP FOR STREET VENDORS' held on 8th May 2023 at SITS, Pune.**
- **Certificate of Paper Publication in ' International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET)' for the Project- 'PHERIWALA: AN APP FOR STREET VENDORS', published on 5th May 2023.**

  Certified to -

  1. **Ms. Maitreyee Sarode**
  2. **Mr. Omkar Ovhal**
  3. **Ms. Pratima Yadav**
  4. **Mr. Shubham Zine**



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Department of Computer Engineering

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Faculty Coordinator

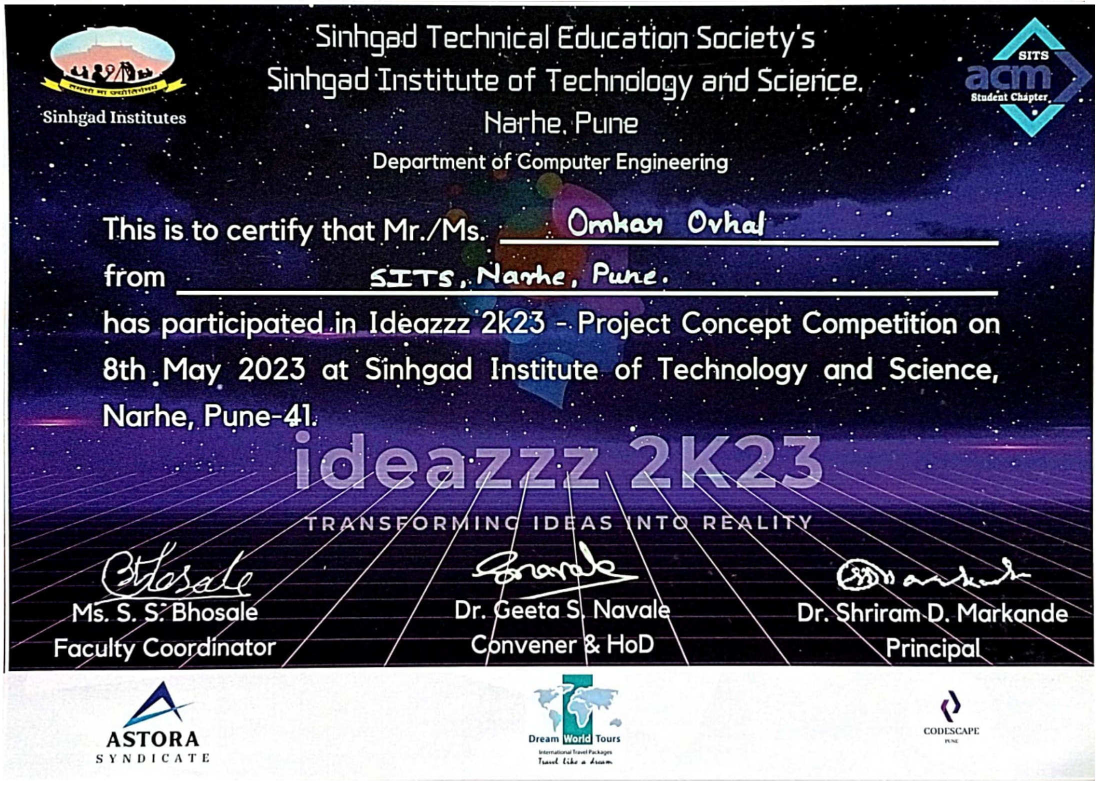
Dr. Geeta S. Navale
Convener & HoD

Dr. Shriram D. Markande
Principal

ASTORA SYNDICATE

Dream World Tours
International Travel Packages
Travel like a dream

CODESCAPE
PUNE



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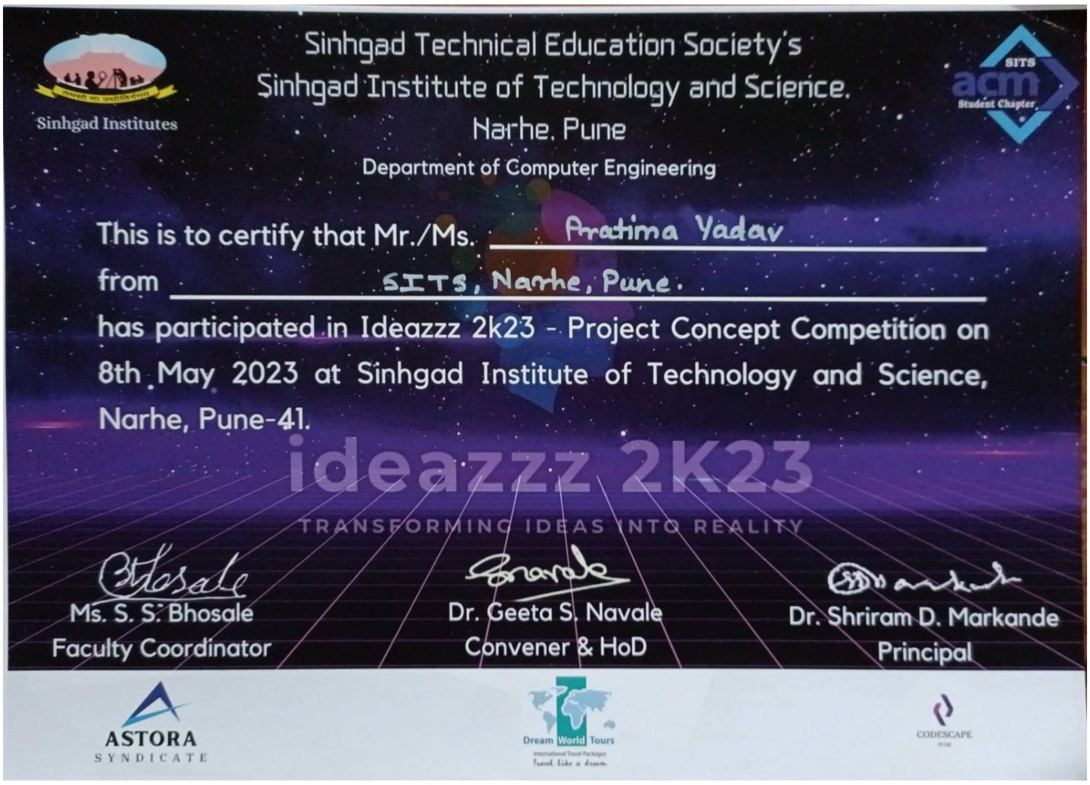

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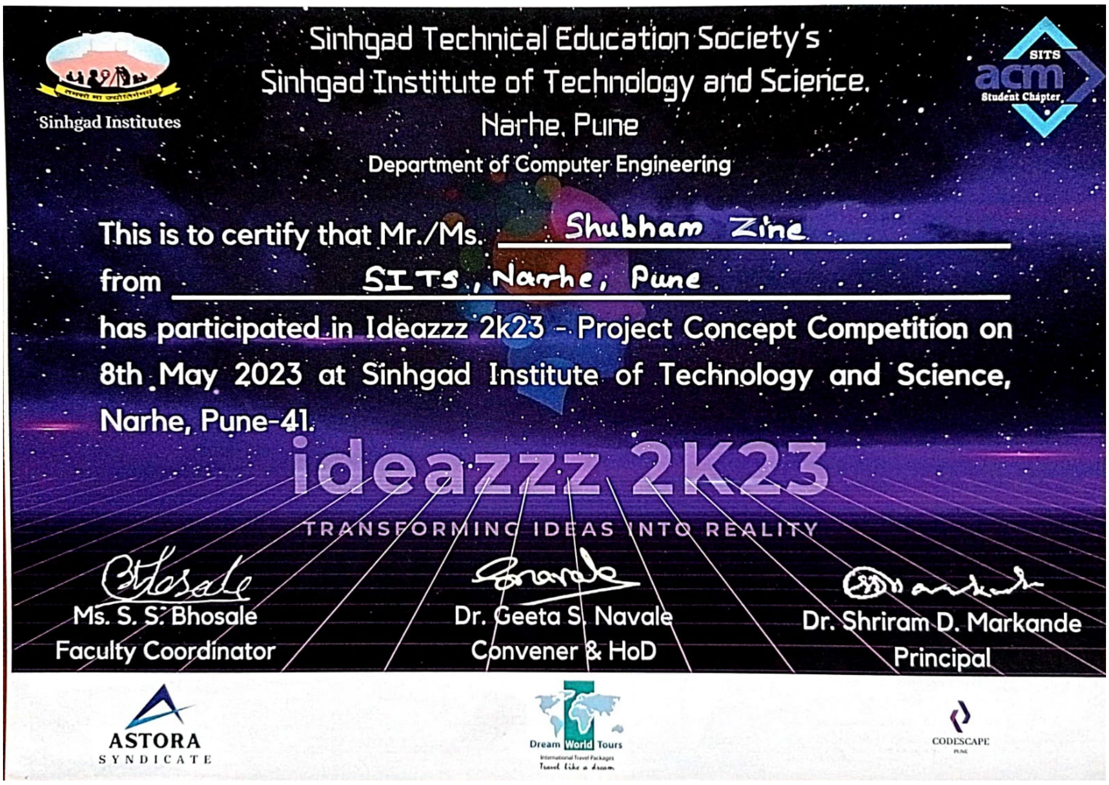

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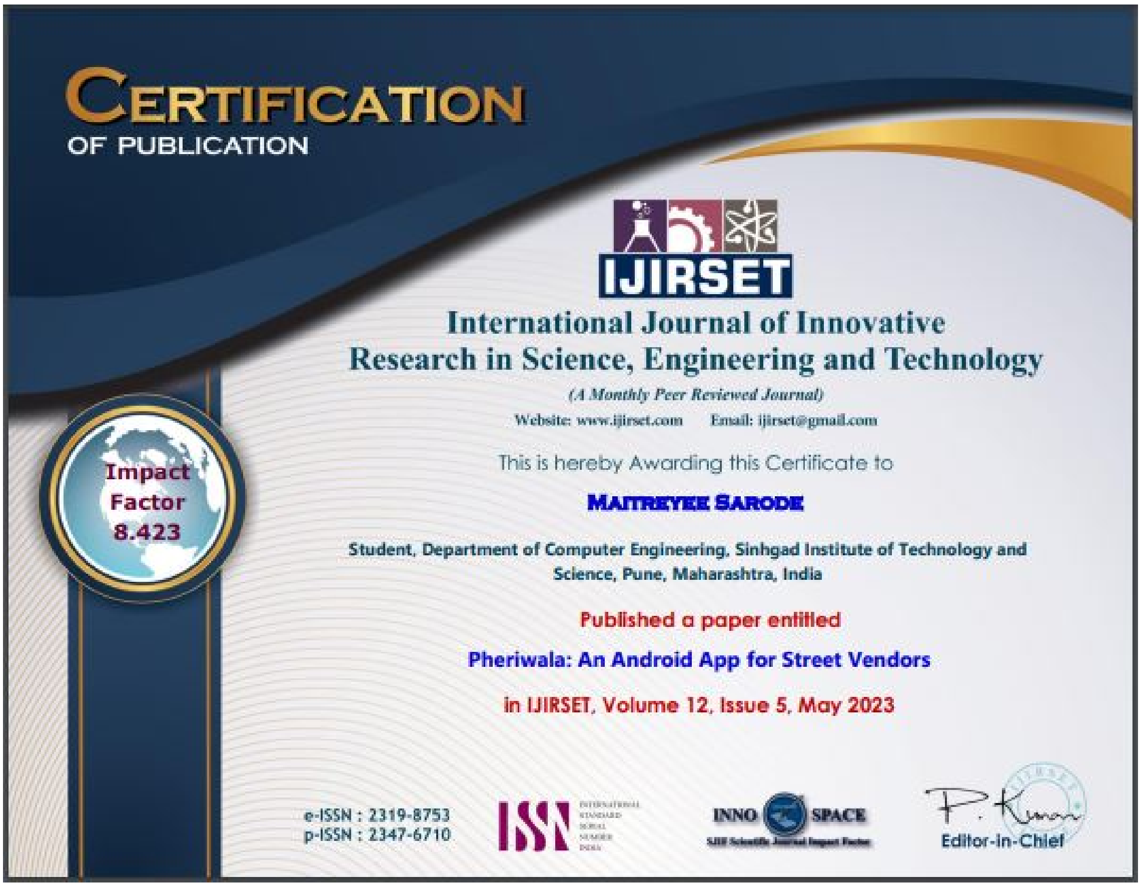

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Pheriwala: An Android App for Street Vendors

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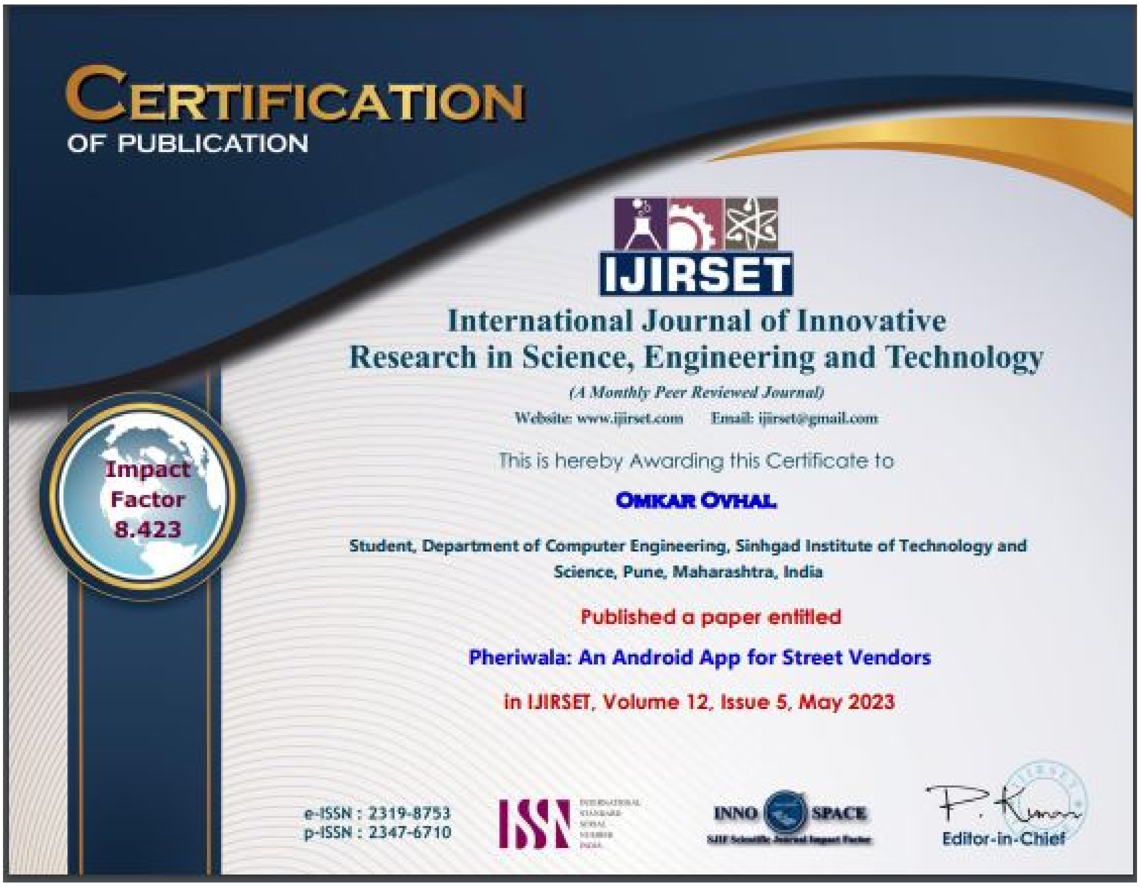

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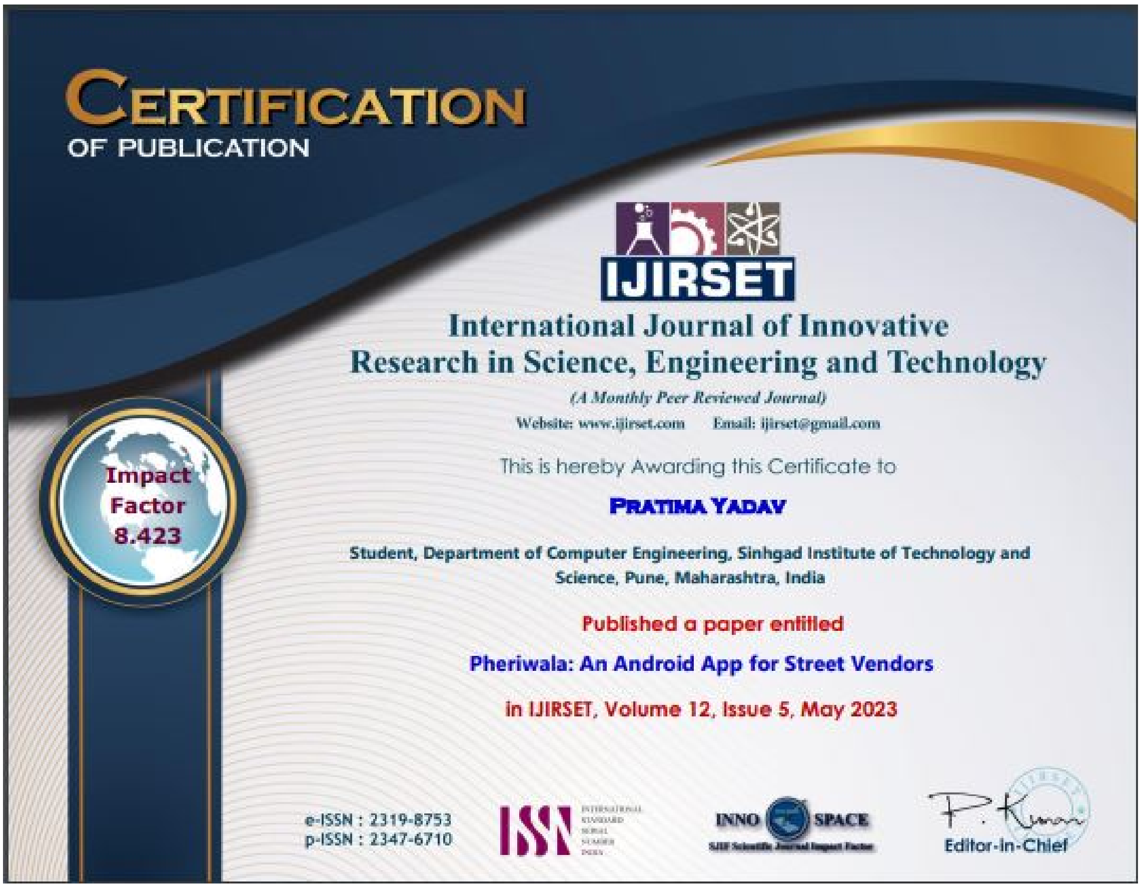

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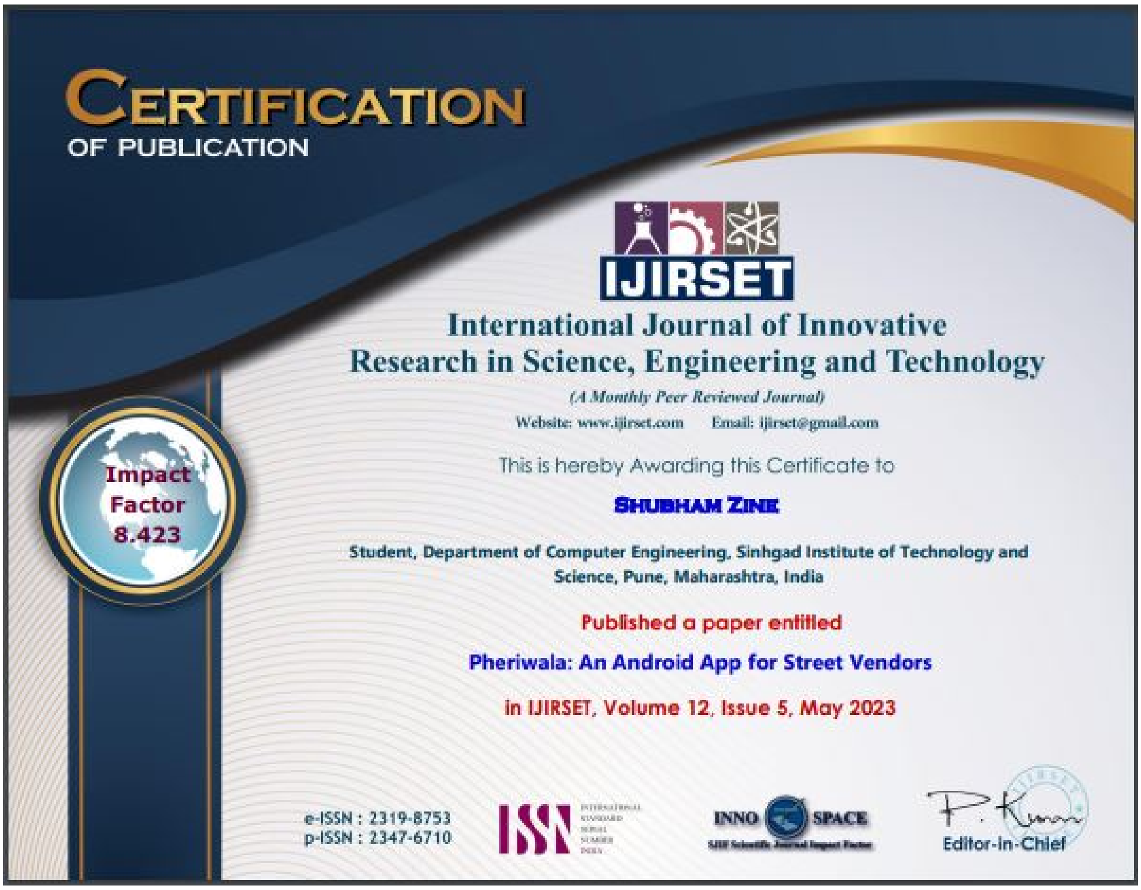

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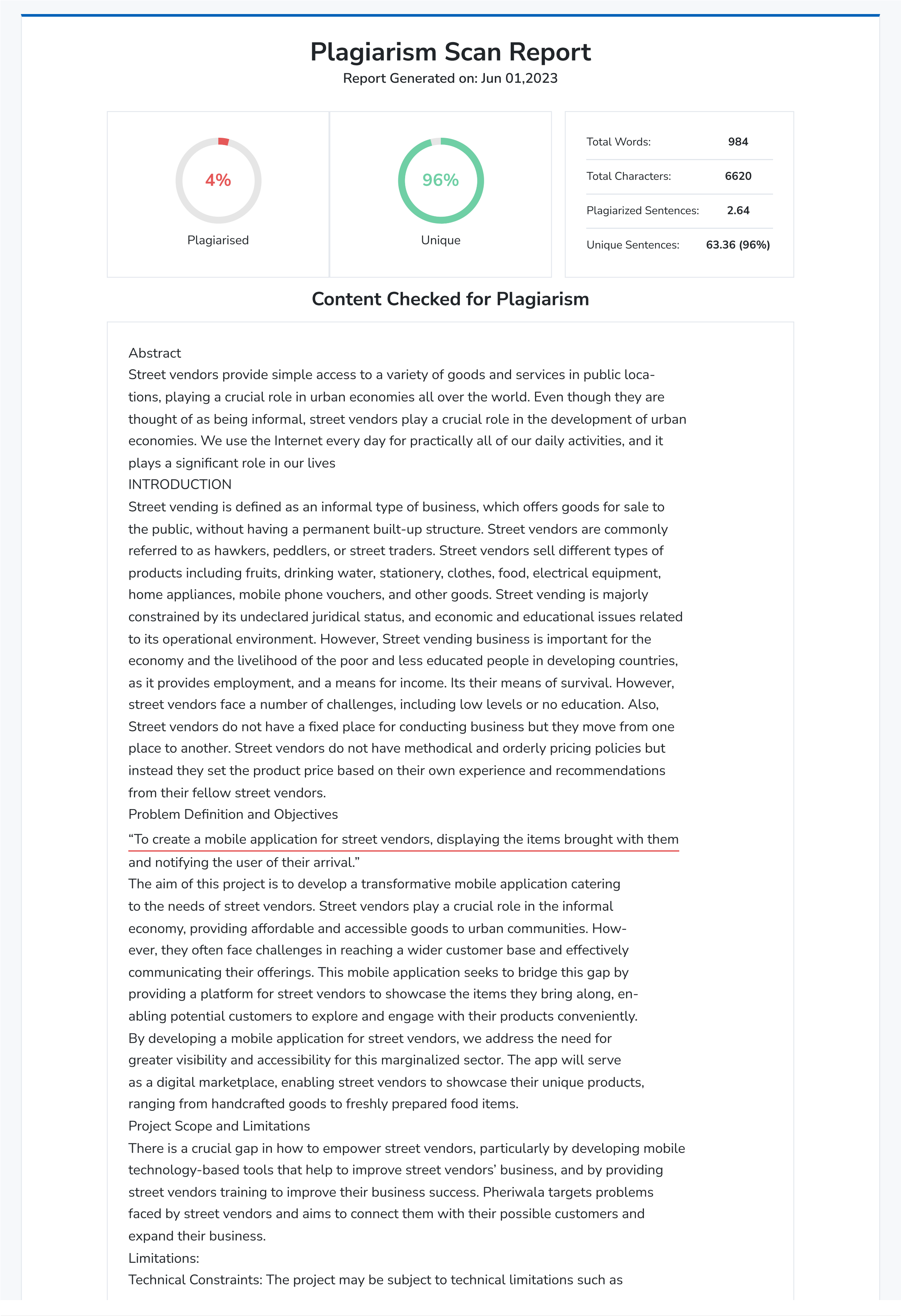
Appendix D

Appendix: Plagiarism Report

Plagiarism Report of project report



Plagiarism Scan Report

Report Generated on: Jun 01,2023

4%

Plagiarised

96%

Unique

Total Words:	984
Total Characters:	6620
Plagiarized Sentences:	2.64
Unique Sentences:	63.36 (96%)

Content Checked for Plagiarism

Abstract

Street vendors provide simple access to a variety of goods and services in public locations, playing a crucial role in urban economies all over the world. Even though they are thought of as being informal, street vendors play a crucial role in the development of urban economies. We use the Internet every day for practically all of our daily activities, and it plays a significant role in our lives

INTRODUCTION

Street vending is defined as an informal type of business, which offers goods for sale to the public, without having a permanent built-up structure. Street vendors are commonly referred to as hawkers, peddlers, or street traders. Street vendors sell different types of products including fruits, drinking water, stationery, clothes, food, electrical equipment, home appliances, mobile phone vouchers, and other goods. Street vending is majorly constrained by its undeclared juridical status, and economic and educational issues related to its operational environment. However, Street vending business is important for the economy and the livelihood of the poor and less educated people in developing countries, as it provides employment, and a means for income. Its their means of survival. However, street vendors face a number of challenges, including low levels or no education. Also, Street vendors do not have a fixed place for conducting business but they move from one place to another. Street vendors do not have methodical and orderly pricing policies but instead they set the product price based on their own experience and recommendations from their fellow street vendors.

Problem Definition and Objectives

“To create a mobile application for street vendors, displaying the items brought with them and notifying the user of their arrival.”

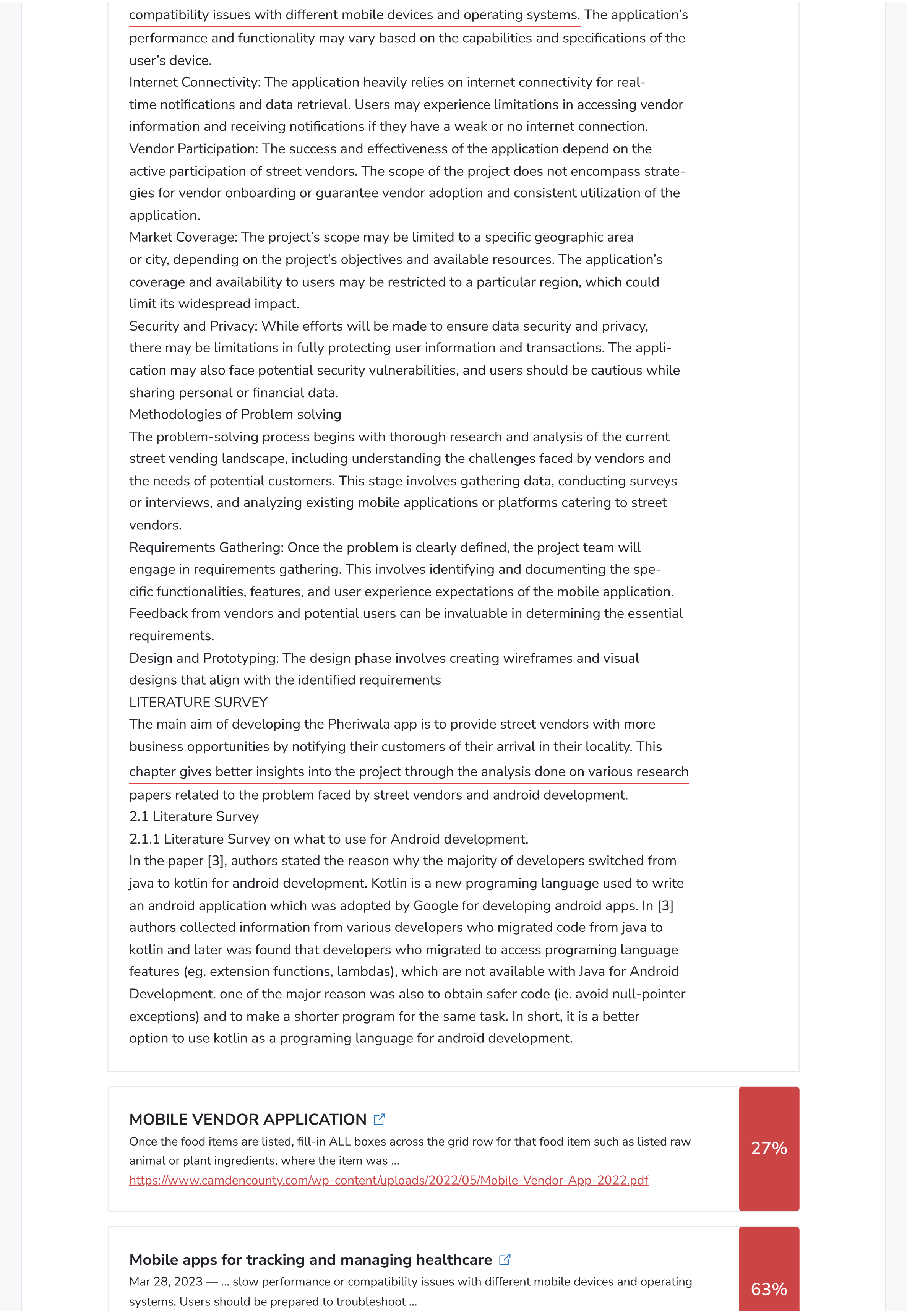
The aim of this project is to develop a transformative mobile application catering to the needs of street vendors. Street vendors play a crucial role in the informal economy, providing affordable and accessible goods to urban communities. However, they often face challenges in reaching a wider customer base and effectively communicating their offerings. This mobile application seeks to bridge this gap by providing a platform for street vendors to showcase the items they bring along, enabling potential customers to explore and engage with their products conveniently. By developing a mobile application for street vendors, we address the need for greater visibility and accessibility for this marginalized sector. The app will serve as a digital marketplace, enabling street vendors to showcase their unique products, ranging from handcrafted goods to freshly prepared food items.

Project Scope and Limitations

There is a crucial gap in how to empower street vendors, particularly by developing mobile technology-based tools that help to improve street vendors’ business, and by providing street vendors training to improve their business success. Pheriwala targets problems faced by street vendors and aims to connect them with their possible customers and expand their business.

Limitations:

Technical Constraints: The project may be subject to technical limitations such as



compatibility issues with different mobile devices and operating systems. The application's performance and functionality may vary based on the capabilities and specifications of the user's device.
Internet Connectivity: The application heavily relies on internet connectivity for real-time notifications and data retrieval. Users may experience limitations in accessing vendor information and receiving notifications if they have a weak or no internet connection.
Vendor Participation: The success and effectiveness of the application depend on the active participation of street vendors. The scope of the project does not encompass strategies for vendor onboarding or guarantee vendor adoption and consistent utilization of the application.
Market Coverage: The project's scope may be limited to a specific geographic area or city, depending on the project's objectives and available resources. The application's coverage and availability to users may be restricted to a particular region, which could limit its widespread impact.
Security and Privacy: While efforts will be made to ensure data security and privacy, there may be limitations in fully protecting user information and transactions. The application may also face potential security vulnerabilities, and users should be cautious while sharing personal or financial data.
Methodologies of Problem solving
The problem-solving process begins with thorough research and analysis of the current street vending landscape, including understanding the challenges faced by vendors and the needs of potential customers. This stage involves gathering data, conducting surveys or interviews, and analyzing existing mobile applications or platforms catering to street vendors.
Requirements Gathering: Once the problem is clearly defined, the project team will engage in requirements gathering. This involves identifying and documenting the specific functionalities, features, and user experience expectations of the mobile application. Feedback from vendors and potential users can be invaluable in determining the essential requirements.
Design and Prototyping: The design phase involves creating wireframes and visual designs that align with the identified requirements
LITERATURE SURVEY
The main aim of developing the Pheriwala app is to provide street vendors with more business opportunities by notifying their customers of their arrival in their locality. This chapter gives better insights into the project through the analysis done on various research papers related to the problem faced by street vendors and android development.
2.1 Literature Survey
2.1.1 Literature Survey on what to use for Android development.
In the paper [3], authors stated the reason why the majority of developers switched from java to kotlin for android development. Kotlin is a new programing language used to write an android application which was adopted by Google for developing android apps. In [3] authors collected information from various developers who migrated code from java to kotlin and later was found that developers who migrated to access programing language features (eg. extension functions, lambdas), which are not available with Java for Android Development. one of the major reason was also to obtain safer code (ie. avoid null-pointer exceptions) and to make a shorter program for the same task. In short, it is a better option to use kotlin as a programing language for android development.

MOBILE VENDOR APPLICATION
Once the food items are listed, fill-in ALL boxes across the grid row for that food item such as listed raw animal or plant ingredients, where the item was ...
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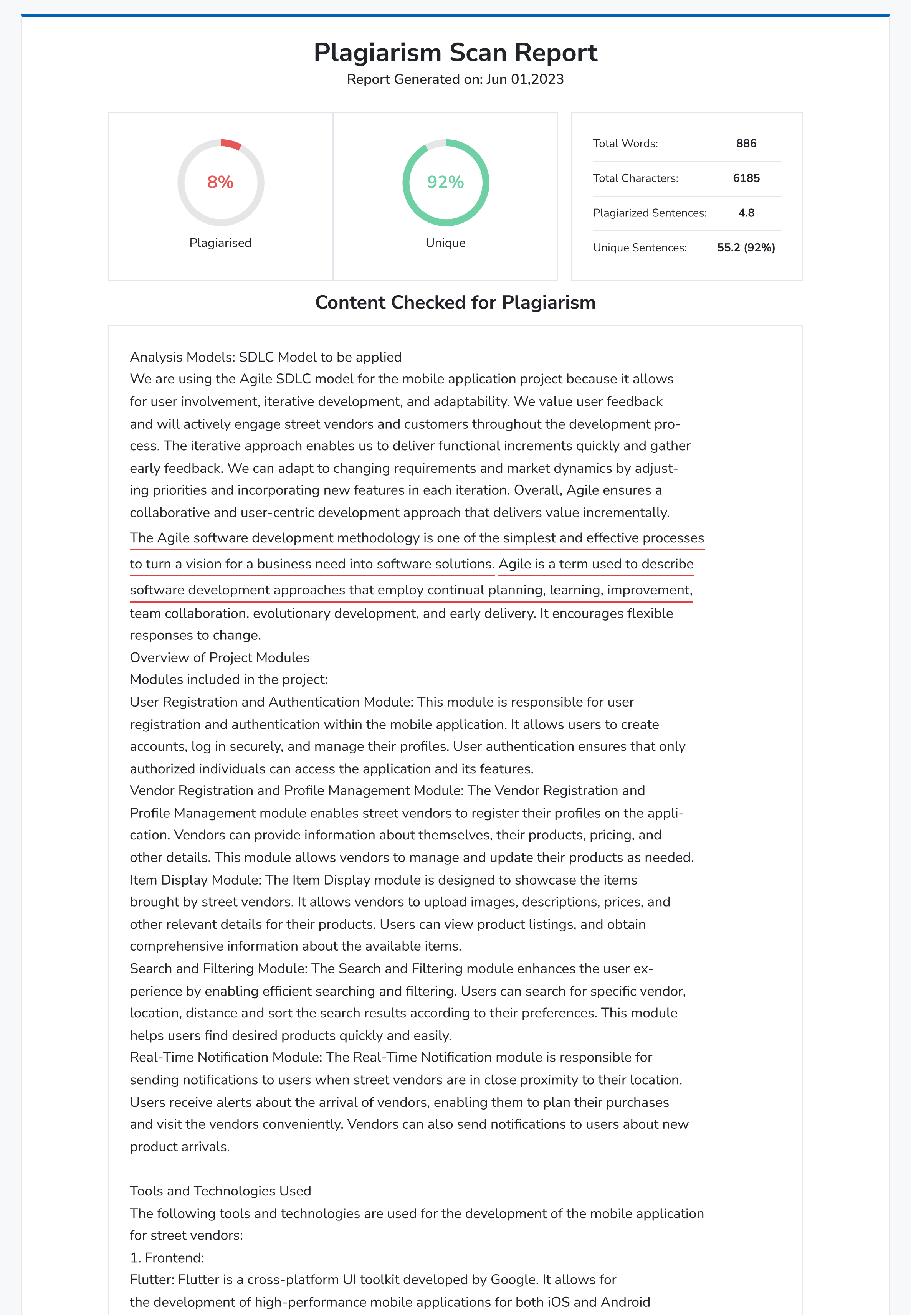

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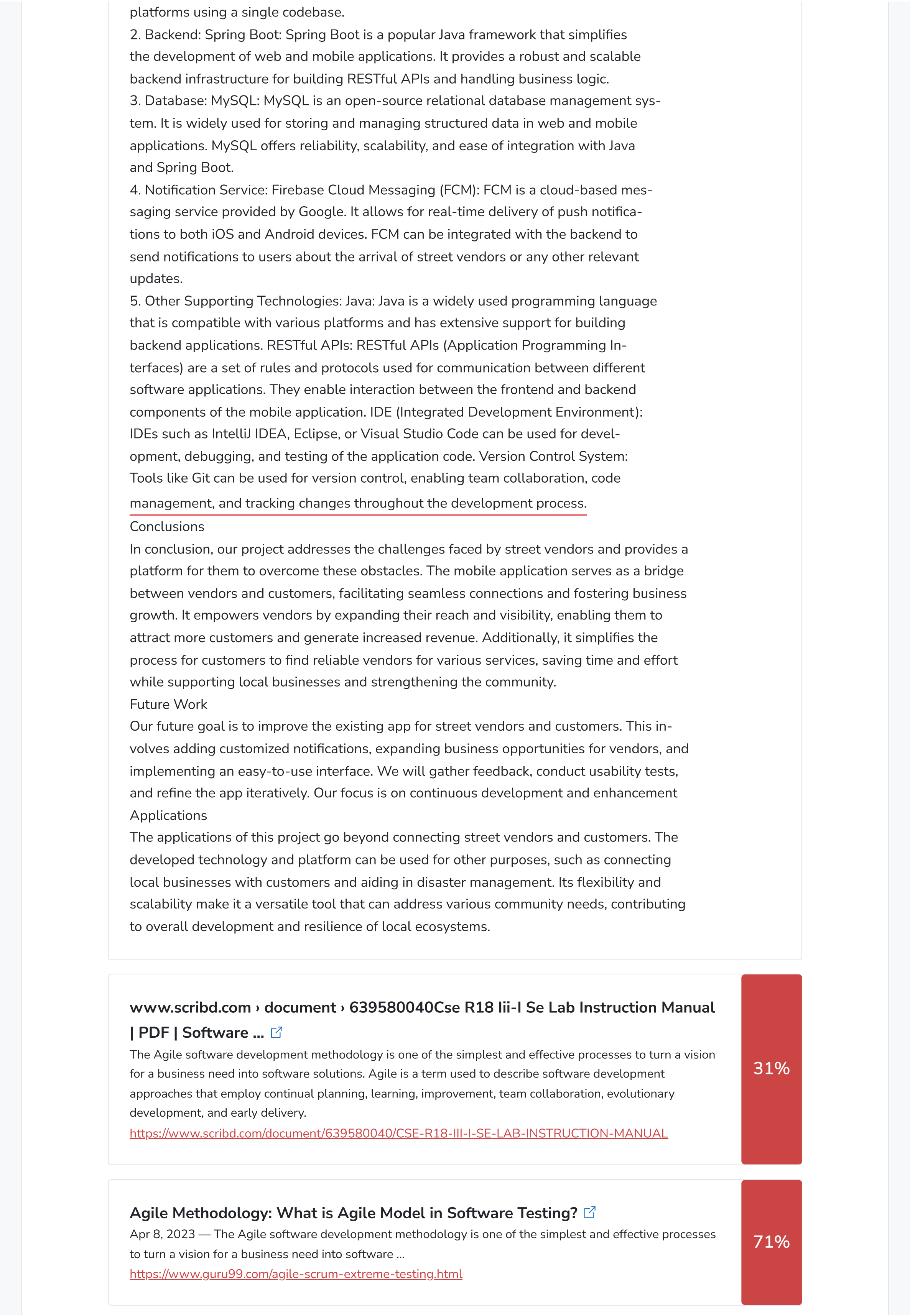
Analysis Models: SDLC Model to be applied
We are using the Agile SDLC model for the mobile application project because it allows for user involvement, iterative development, and adaptability. We value user feedback and will actively engage street vendors and customers throughout the development process. The iterative approach enables us to deliver functional increments quickly and gather early feedback. We can adapt to changing requirements and market dynamics by adjusting priorities and incorporating new features in each iteration. Overall, Agile ensures a collaborative and user-centric development approach that delivers value incrementally. The Agile software development methodology is one of the simplest and effective processes to turn a vision for a business need into software solutions. Agile is a term used to describe software development approaches that employ continual planning, learning, improvement, team collaboration, evolutionary development, and early delivery. It encourages flexible responses to change.
Overview of Project Modules
Modules included in the project:
User Registration and Authentication Module: This module is responsible for user registration and authentication within the mobile application. It allows users to create accounts, log in securely, and manage their profiles. User authentication ensures that only authorized individuals can access the application and its features.
Vendor Registration and Profile Management Module: The Vendor Registration and Profile Management module enables street vendors to register their profiles on the application. Vendors can provide information about themselves, their products, pricing, and other details. This module allows vendors to manage and update their products as needed.
Item Display Module: The Item Display module is designed to showcase the items brought by street vendors. It allows vendors to upload images, descriptions, prices, and other relevant details for their products. Users can view product listings, and obtain comprehensive information about the available items.
Search and Filtering Module: The Search and Filtering module enhances the user experience by enabling efficient searching and filtering. Users can search for specific vendor, location, distance and sort the search results according to their preferences. This module helps users find desired products quickly and easily.
Real-Time Notification Module: The Real-Time Notification module is responsible for sending notifications to users when street vendors are in close proximity to their location. Users receive alerts about the arrival of vendors, enabling them to plan their purchases and visit the vendors conveniently. Vendors can also send notifications to users about new product arrivals.

Tools and Technologies Used
The following tools and technologies are used for the development of the mobile application for street vendors:
1. Frontend:
Flutter: Flutter is a cross-platform UI toolkit developed by Google. It allows for the development of high-performance mobile applications for both iOS and Android



platforms using a single codebase.
2. Backend: Spring Boot: Spring Boot is a popular Java framework that simplifies the development of web and mobile applications. It provides a robust and scalable backend infrastructure for building RESTful APIs and handling business logic.
3. Database: MySQL: MySQL is an open-source relational database management system. It is widely used for storing and managing structured data in web and mobile applications. MySQL offers reliability, scalability, and ease of integration with Java and Spring Boot.
4. Notification Service: Firebase Cloud Messaging (FCM): FCM is a cloud-based messaging service provided by Google. It allows for real-time delivery of push notifications to both iOS and Android devices. FCM can be integrated with the backend to send notifications to users about the arrival of street vendors or any other relevant updates.
5. Other Supporting Technologies: Java: Java is a widely used programming language that is compatible with various platforms and has extensive support for building backend applications. RESTful APIs: RESTful APIs (Application Programming Interfaces) are a set of rules and protocols used for communication between different software applications. They enable interaction between the frontend and backend components of the mobile application. IDE (Integrated Development Environment): IDEs such as IntelliJ IDEA, Eclipse, or Visual Studio Code can be used for development, debugging, and testing of the application code. Version Control System: Tools like Git can be used for version control, enabling team collaboration, code management, and tracking changes throughout the development process.
Conclusions
In conclusion, our project addresses the challenges faced by street vendors and provides a platform for them to overcome these obstacles. The mobile application serves as a bridge between vendors and customers, facilitating seamless connections and fostering business growth. It empowers vendors by expanding their reach and visibility, enabling them to attract more customers and generate increased revenue. Additionally, it simplifies the process for customers to find reliable vendors for various services, saving time and effort while supporting local businesses and strengthening the community.
Future Work
Our future goal is to improve the existing app for street vendors and customers. This involves adding customized notifications, expanding business opportunities for vendors, and implementing an easy-to-use interface. We will gather feedback, conduct usability tests, and refine the app iteratively. Our focus is on continuous development and enhancement
Applications
The applications of this project go beyond connecting street vendors and customers. The developed technology and platform can be used for other purposes, such as connecting local businesses with customers and aiding in disaster management. Its flexibility and scalability make it a versatile tool that can address various community needs, contributing to overall development and resilience of local ecosystems.

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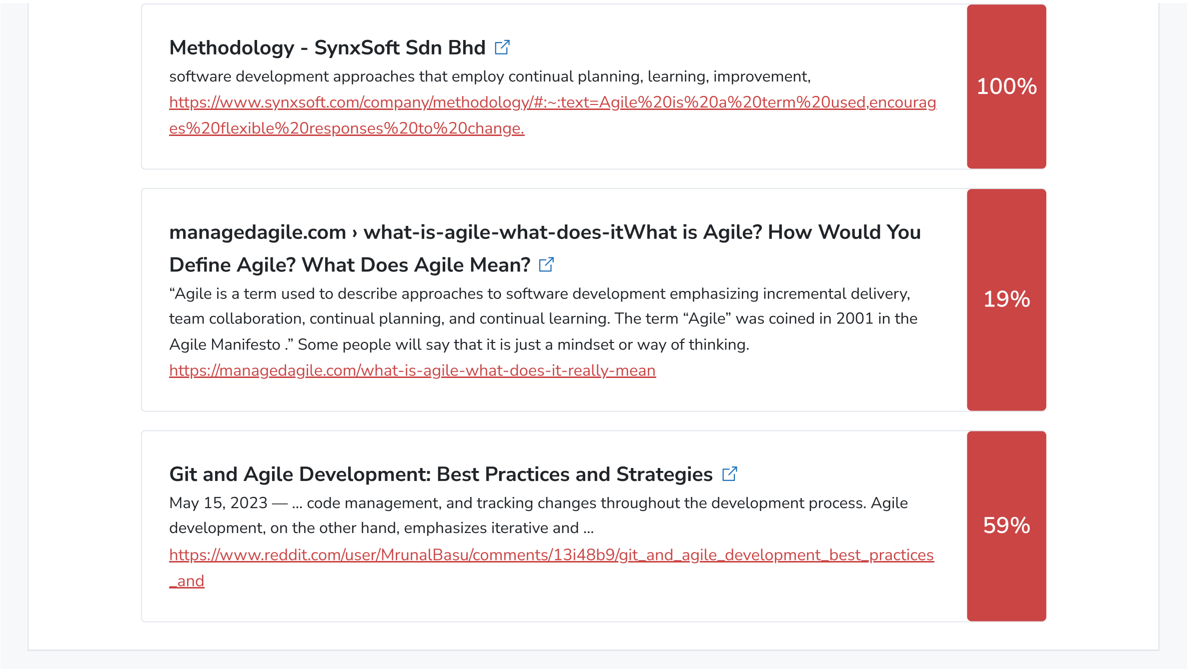

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