Uplifting a Farmer Through Connected Ecosystem

A PROJECT REPORT

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Under the guidance of,

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PRESIDENCY UNIVERSITY
SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the Project **"Uplifting a farmer through connected ecosystem"** being submitted by **"G. Ravi Teja, A. Vidhyadhari, C. Vinay Kumar Reddy, P. Monish"**

Bearing roll number(s) **"20211CSE0033, 20211CSE0072, 20211CSE0061, 20211CSE0314"** in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in Computer Science and Engineering is a bonafide work carried out under my supervision.

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DECLARATION

We hereby declare that the work, which is being presented in the project report entitled **"Uplifting a Farmer through Connected Ecosystem"** in partial fulfillment for the award of Degree of **Bachelor of Technology** in **Computer Science and Engineering**, is a record of our own investigations carried under the guidance of **Ms. Rohini A, Assistant Professor, School of Computer Science and Engineering, Presidency University, Bengaluru.**

We have not submitted the matter presented in this report anywhere for the award of any other Degree.

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ABSTRACT

This project focuses on developing a comprehensive platform that bridges the gap between farmers and consumers, allowing users to purchase agricultural products directly from farmers. The application provides seamless online payments, user and farmer profile management, and real-time inventory updates. Administrators play a key role in fostering trust by onboarding verified farmers and uploading schemes that are beneficial to them. Future expansions include vehicle and land renting functionalities as well as fertilizer management to support farmers further. This app allows farmers to effortlessly rent agricultural machinery, such as tractors and harvesters, at nominal costs, empowering them with technology that was previously out of reach. Through user-friendly interfaces and robust backend support, farmers can connect with rental providers, manage bookings, and access real-time updates. Administrators oversee the system, ensuring transparent transactions and efficient dispute resolution, while users can explore and contribute to the ecosystem. Our goal is to uplift the agricultural community by reducing operational costs, enhancing productivity, and fostering collaboration. By leveraging digital tools, this app bridges the gap between modern technology and traditional farming practices, paving the way for a sustainable and prosperous agricultural future.

Administrators play a crucial role in maintaining the platform's integrity by onboarding verified farmers and providing access to beneficial schemes, subsidies, and financial aid. The platform also envisions future expansions, including functionalities for vehicle and land rentals, fertilizer management, and agricultural machinery rentals, such as tractors and harvesters, at affordable rates. By integrating these tools, the platform empowers farmers with technology that enhances efficiency and reduces operational costs. Through user-friendly interfaces and robust backend support, the platform fosters collaboration, uplifts the agricultural community, and bridges the gap between traditional farming practices and modern technological advancements, paving the way for a sustainable and prosperous agricultural future.

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We thank our family and friends for the strong support and inspiration they have provided us in bringing out this project.

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INTRODUCTION

Motivation

The agricultural sector has long faced challenges with transparency, efficiency, and market accessibility, leaving farmers without direct avenues to reach consumers and maximize their profits. The motivation behind this project is to empower farmers by bridging the gap between them and consumers, creating an ecosystem that ensures fairness, trust, and accessibility. By integrating technology with agriculture, this platform provides farmers with tools to manage their products, streamline payments, and access beneficial schemes. This will not only uplift farmers' livelihoods but also foster a sustainable farm-to-consumer relationship, enhancing the overall agricultural economy.

The motivation behind this project stems from the desire to empower farmers through technology and address the challenges they face in accessing essential farming equipment. Many farmers, especially those with limited resources, struggle to afford mechanized tools like tractors, which are crucial for efficient agricultural practices. This app aims to create a connected ecosystem where farmers can easily hire equipment at nominal costs, bridging the gap between demand and supply. By improving access to modern tools, the project seeks to enhance productivity, promote economic upliftment, and foster sustainability through resource optimization. Additionally, it aligns with broader goals of encouraging digital transformation in rural areas, enabling farmers to embrace technology for smarter farming practices. As a Computer Science Engineering student, this project also represents an opportunity to apply technical expertise to solve real-world problems, contributing to a meaningful and impactful cause.

This project aims to empower farmers by providing an affordable platform to hire essential farming equipment, addressing challenges in accessibility and affordability. By improving access to modern tools, it enhances agricultural productivity, promotes economic upliftment, and fosters sustainability through resource optimization. The project also supports digital transformation in rural areas, enabling smarter farming practices while leveraging technical expertise to solve real-world problems.

Leveraging technology to solve challenges they face in accessing critical farming equipment. Many small-scale farmers cannot afford to purchase expensive tools like tractors, which are vital for efficient agricultural operations. This app aims to bridge that gap by creating a digital platform where farmers can hire the equipment they need at an affordable cost. By fostering a connected ecosystem, it ensures that even resource-limited farmers can benefit from modern mechanization, leading to increased productivity and improved agricultural outcomes.

Beyond addressing accessibility, the project promotes economic growth by creating opportunities for equipment owners to earn additional income through rentals, building a community-driven model. It also contributes to sustainability by encouraging optimal utilization of resources, reducing the wastage that comes from underutilized equipment. Furthermore, the app supports digital inclusion by introducing farmers to user-friendly technological tools, helping them adopt smarter farming methods and align with broader digital transformation goals.

As a Computer Science Engineering student, this project represents not only a chance to develop a solution for a pressing societal issue but also an opportunity to apply technical skills in Android development and problem-solving, creating meaningful impact in the lives of farmers.

Problem Statement

Traditional agricultural marketplaces often suffer from a lack of transparency and inefficient payment processes. Farmers are often isolated from direct market access, and consumers have limited opportunities to purchase fresh products directly from the source. This project addresses these gaps by creating a platform that connects farmers directly with consumers, ensuring transparency in product quality and prices, along with efficient payment processing.

The problem addressed by this project is the limited accessibility and affordability of mechanized farming equipment for small-scale and resource-constrained farmers. Many farmers face challenges in acquiring expensive tools like tractors and other machinery, which are critical for efficient and timely agricultural practices. This lack of access often leads to inefficiencies, reduced productivity, and increased costs, ultimately impacting their livelihoods. Additionally, there is a gap in connecting equipment owners with farmers who need such tools, resulting in underutilization of resources. The absence of a streamlined, affordable, and user-friendly solution further exacerbates the problem, especially in rural areas where digital transformation is still in its nascent stages.

Seeks to address is the lack of affordable and accessible mechanized farming equipment for small-scale farmers, who often struggle to compete with larger agricultural enterprises due to limited resources. Many farmers cannot afford to purchase equipment like tractors, harvesters, and plows, which are essential for modern, efficient, and productive farming. This financial barrier leads to labor-intensive practices, reduced efficiency, lower yields, and ultimately, a significant impact on their economic well-being.

Compounding this issue is the lack of a reliable and structured mechanism to connect equipment owners with farmers who need these tools. In many rural areas, available machinery often goes underutilized because farmers are unaware of its availability or do not have a convenient way to access it. This disconnect results in inefficiencies and missed opportunities for resource-sharing within the agricultural community.

Moreover, while smartphones and internet access are becoming more widespread in rural regions, there is a gap in digital solutions tailored to the specific needs of farmers. The absence of a user-friendly, affordable, and accessible platform to facilitate equipment sharing further exacerbates the problem, leaving small-scale farmers at a disadvantage in adopting modern agricultural practices. This project aims to address these challenges by leveraging technology to create a connected ecosystem that fosters resource optimization, economic upliftment, and sustainable farming practices.

Objective of the Project

The objective is to develop an application that connects consumers directly with farmers, offering a seamless and secure payment gateway, profile management, and inventory system. The platform will allow users to view and purchase products from verified farmers. Provide farmers with tools to manage their product listings, receive payments, and stay informed about government schemes. Enable administrators to maintain trust within the system by onboarding verified farmers and providing them access to beneficial schemes.

Develop an Android application that provides small-scale farmers with affordable and convenient access to farming equipment, addressing challenges related to affordability, accessibility, and resource optimization. The platform aims to connect farmers with equipment owners, fostering a community-driven approach to resource sharing while enhancing agricultural productivity by ensuring timely access to modern tools. By reducing the financial burden of purchasing expensive machinery, the app seeks to promote economic upliftment for

farmers and create income opportunities for equipment owners. Additionally, the project encourages digital adoption in rural areas by introducing farmers to user-friendly technology, enabling smarter farming practices. It also contributes to sustainability by optimizing resource utilization and minimizing waste, ultimately empowering farmers and strengthening the agricultural ecosystem.

Scope

The project focuses on creating a user-friendly mobile application that facilitates transactions between farmers and consumers. Users can browse, purchase, and make payments for farm products, while farmers can manage their inventory and receive payments directly via UPI. Admins will manage farmer onboarding and upload relevant agricultural schemes. Future extensions include vehicle renting for transporting produce, land renting, and fertilizer management systems.

Project Introduction

Agriculture is a cornerstone of rural economies, providing livelihoods for millions of small-scale farmers. However, these farmers face significant challenges, particularly limited access to mechanized farming equipment such as tractors, harvesters, and irrigation systems. The high costs of these tools and the lack of platforms connecting farmers with equipment owners for rentals hinder productivity and efficiency. To address these issues, this project proposes an Android-based mobile application that creates a seamless connection between farmers and equipment owners. The app provides a user-friendly interface, tailored for rural populations, to facilitate affordable access to essential farming machinery. Key features include location-based searches, real-time availability updates, secure payment gateways, and equipment comparisons. By promoting resource sharing, the platform reduces costs for farmers while allowing equipment owners to earn rental income, fostering economic growth and sustainability. Additionally, the app encourages digital inclusion by empowering farmers to adopt modern technologies for smarter farming practices. With a focus on sustainability, this solution optimizes equipment utilization, reduces waste, and enhances agricultural productivity. By combining technical expertise in Android development, database management, and cloud computing, this project aims to revolutionize farming practices

CHAPTER-2

LITERATURE SURVEY

Related Work

Pranav Shriram; Sunil Mhamane | Android App to Connect Farmers to Retailers and Food Processing Industry | 15-16 November 2018

Mobile internet will help the farmers to sell their products directly to consumers and food processing industries. This paper provides market information to a farmer using its easy interface on the mobile application. The mobile application is intended to be used for fast and updated information delivering system for farmers. Also, it has native language support to make the transaction easy for farmers. The mobile application treats farmers as a seller and a buyer. The intention behind this paper is to help farmers so they buy or sell their agriculture goods and products. Market prices provided by data.gov.in lets the system to keep the selling and buying prices in control. As the products are to be browsed and there may be plenty of products for the user. To make browsing easy many filters can provide. Farmers face many problems while selling their goods and products, this system promises to provide an easy and recreational way to sell the products. The system lets the farmers to sell goods at a reasonable price and makes business even fair and transparent. Consumers are the opposite side of the same coin. This system lets consumer to choose from a wide variety of products, select the product as per their requirement and also to apply price filters. Location is a one of parameter for consumer and producer while selling or buying their product it will helps the user to get the product nearby their location. The basic objective of the system is to considers every one need and full fills their requirement with fair and transparent agriculture business.

L.A. Imalka; K.G.A. Gunawardana; K.M.S.K. Kodithuwakku; H.K.E. Arachchi; S.M.B. Harshanath | Farming Through Technology Driven Solutions For Agriculture Industry Ceylon E-Agro mobile application-find technology based solutions for agricultural problems | 16-18 September 2022

Many developing countries are based on the agricultural sector. More than 60 percent of the population depends on this sector. This project is focused on maize cultivation. In agriculture, farmers play the most important role. Currently, farmers are facing many

problems related to maize cultivation in Sri Lanka. This mobile application will help the maize farmers to overcome these difficulties and provide a good consumer demand for maize cultivation. Through this mobile application, the farmer can find solutions for pest & diseases in maize, fire threat in the farm field. AI based Agri Agent will be provide real-time solutions, bring the farmers and the buyers into the one platform, and provide price prophesying, price index feature. IoT based smart farming features will be provided to remain soil moisture and quality of soil for maize plantation.

R. Ranjana; T. Subha; Pravin Kumar P; Sneka L; Varsha S; Jothishree N |

Integrated App for Farmers - Agreliance | 16-17 December 2021

In this contemporary world, the development of telecommunication technology is far beyond the human knowledge that allows people to stay connected who are detached thousands of miles away by the internet. An integrated mobile app is created in such a way that it enhances the life of farmers both in their financial and mental status. Telehealth care systems emerged as one of the best alternate remedies for treating people during this covid - 19 crises, By video conferencing technology, doctors are likely to treat farmers who are emotionally and mentally downhearted. Tata Communications - Confidential It is as effective as traditional way of counselling in person and it's a proven fact. Not only for farmers but also crops need some attention as it is prone to some diseases, to tackle that issue experts will be providing consultations to the farmers by pre - booking them. Economic growth is highly distressed due to global pandemic, so retailing farmers goods to consumers in online platforms would greatly increase the economic growth and reduce price despite the secondary agents. Loan facilities which are available around the location of the farmers are made aware to them, Thus it will greatly influence their basic survival in agriculture.

Niket Chauhan; M. Krishnakanth; G. Praneeth Kumar; Prerna Jotwani; Utkarsh Tandon; | Crop Shop – An application to maximize profit for farmers | 30-31 March 2019

For several years, farmers in India have had little liberty in choosing markets and purchasers for their produce. All states in the country, except three, decree that marketing and selling of farm produce must be directed through state-owned mandis, retail markets where mediators (middlemen) crush farmers to increase margins. According to Goldman Sachs, mediators have become dominating buyers of the agricultural market, resulting them to take control over the plight of the farmers and gulping all the profits.

The farmers work day and night expecting a good yield. They use a lot of financial resources lending money and buying fertilisers, seeds etc. So, they have the right to enjoy every rupee gained on their corp. In this context, we propose a system which brings farmers close to the retailers cutting the middlemen. The middlemen usually take up to 70% of the profits of farmers leaving them helpless. Our system consists of a mobile application which will serve as a platform for the growers and retailers or customers to sell and buy their farm products. This system aims at giving a profitable price to farmers to their farm products cutting the middlemen. This allows the retailers or the customers to buy products from the farmers at a lower than the normal price.

Aina Marie Joseph; Nurfauza Jali; Amelia Jati Robert Jupit; Suriati Khartini Jali | eMarket for Local Farmers | 23-25 November 2021

The Covid-19 pandemic is a global health crisis that has brought an impact on everyone. A negative impact has made local farmers struggle to find their means of income other than selling their crops to their customers. The customers have had difficulties searching for good quality fresh produce other than from the supermarket. The purpose of this paper is twofold: firstly, to assess the manual and existing system on how consumers acquire their fresh produce during the Covid-19 pandemic, to design and implement a delivery system for local farmers to vend their fresh produce through a mobile application; and secondly, to test and evaluate the usability and functionality of the online farmers' market application. The existing mobile applications have changed everyone's approach in acquiring the daily essentials that the pandemic has brought. Therefore, the idea of developing an online marketplace for local farmers resulted in the proposed application, which will be explained in this paper. Rapid Application Development (RAD) was used as the methodology for the development of the eMarket application. A survey was conducted via Google form for twenty local farmers and another twenty potential customers during the pre-development stage. It was to collect data on the users' opinions regarding the proposed application. We then conducted the usability testing through Google form to collect the users' feedback on the eMarket application. Ten local farmers from Matang's market have participated in the testing phase. Additionally, ten students from a local university participated as potential customers in the usability testing. As a result of these testing’s, we have developed a usable farmer's market application that has been well-received by local farmers and customers.

CHAPTER-3

RESEARCH GAPS OF EXISTING METHODS

Here are some research gaps in existing methods for uplifting farmers through connected ecosystems:

1. Limited Accessibility for Marginal Farmers

- Gap: Many existing platforms and tools are inaccessible to small-scale or marginal farmers due to high costs or lack of localized support.
- Need: Solutions tailored to the needs and affordability of small and marginal farmers, especially in rural areas with limited digital literacy.

2. Fragmented Ecosystem

- Gap: Current systems often lack a unified approach, with separate platforms for rentals, information, and market access.
- Need: An integrated platform that combines all services (rentals, admin management, user interaction) seamlessly.

3. Integration with Government Policies and Subsidies

- Gap: Limited integration with government schemes, subsidies, and agricultural programs.
- Need: Collaboration with governmental organizations to provide financial incentives and policy support.

4. Lack of Farmer-Centric Design

- Gap: Many platforms prioritize technology features over user needs, leading to low adoption rates.
- Need: Human-centered design with features tailored to farmers' workflows and challenges.

Existing System

Current platforms in agriculture-based commerce either offer limited direct interaction between farmers and consumers or are complicated by lengthy payment processes. Farmers often face challenges in listing their products and managing payments. Additionally, government schemes that benefit farmers are often underutilized due to a lack of awareness and access.

Disadvantages

- Fragmented processes lead to inefficiencies in connecting farmers with consumers.
- Lack of seamless payment solutions hinders transaction completion.
- Limited visibility of government schemes results in missed opportunities for farmers.

Proposed System

The proposed system integrates a unified platform for farmers, users, and administrators. Users can browse and purchase products while completing payments through UPI-based gateways. Farmers can manage inventory, update product listings, and receive payments directly into their accounts. Administrators will onboard trusted farmers, upload helpful schemes, and manage the platform's ecosystem.

Advantages

- A cohesive system for purchasing agricultural products directly from farmers.
- Payments are processed securely through UPI-like gateways, reducing delays.
- Farmers can easily add and update their products.
- Admins can upload schemes beneficial to farmers, ensuring they are accessible.
- Future updates will allow for vehicle and land renting, as well as fertilizer management

CHAPTER-4

PROPOSED METHODOLOGY

Function and non-functional requirements

Requirement's analysis is very critical process that enables the success of a system or software project to be assessed. Requirements are generally split into two types: Functional and non-functional requirements.

Functional Requirements: These are the requirements that the end user specifically demands as basic facilities that the system should offer. All these functionalities need to be necessarily incorporated into the system as a part of the contract. These are represented or stated in the form of input to be given to the system, the operation performed and the output expected. They are basically the requirements stated by the user which one can see directly in the final product, unlike the non-functional requirements.

Examples of functional requirements:

1) Authentication of user whenever he/she logs into the system
2) System shutdown in case of a cyber-attack

Non-functional requirements: These are basically the quality constraints that the system must satisfy according to the project contract. The priority or extent to which these factors are implemented varies from one project to other. They are also called non-behavioral requirements.

They basically deal with issues like:

- Portability

Portability refers to a system's or software's ability to function across different platforms, environments, or devices with minimal modification. For example, a portable application can run seamlessly on Windows, macOS, and Linux. High portability ensures flexibility and reduces the effort required for adaptation.

- Security

Security focuses on protecting a system or software from unauthorized access, breaches, or attacks. It includes safeguarding data integrity, confidentiality, and availability. Security mechanisms, such as encryption, firewalls, and authentication protocols, are essential to prevent vulnerabilities.

- Maintainability

Maintainability refers to the ease with which a system or application can be updated, improved, or fixed over time. High maintainability ensures that developers can quickly adapt the system to meet changing requirements, fix bugs, or add new features. It often involves clean, modular code and comprehensive documentation.

- Reliability

Reliability is the ability of a system or application to perform its intended functions consistently and without failure over time. A reliable system can handle errors gracefully and recover from failures, ensuring that it remains operational even under stress or unforeseen circumstances, ensures that the mobile application consistently performs well under various conditions, providing users with a stable and trustworthy experience. The app is designed to minimize downtime and errors, with robust error-handling mechanisms in place to address potential issues like connectivity drops, payment failures, or data synchronization problems. Continuous monitoring using tools like Firebase Crashlytics will help identify and fix any performance bottlenecks or crashes, ensuring that the app remains stable over time. Furthermore, the app is built with redundant cloud storage and backup systems, ensuring that user data is securely stored and protected, even in case of server failures. By employing testing strategies, including unit, integration, and stress tests, the app can handle high traffic loads and extreme conditions, providing reliable service during peak usage. Regular updates and quick resolution of bugs or security vulnerabilities further enhance the app's reliability, making it a dependable tool for farmers who rely on it for their agricultural needs.

- Scalability

Scalability refers to a system's ability to handle increased load or demand without compromising performance. A scalable application can accommodate growing numbers of users, data, or transactions by efficiently utilizing resources like processing power, memory, and storage. Scalability is crucial for systems expected to grow over time, the ability of the mobile application to handle increasing numbers of users, data, and features without compromising performance or functionality. The app is built on a cloud-based backend, which allows for dynamic scaling of resources, such as server capacity and storage, as the user base grows. This ensures that the app can accommodate more farmers, equipment

listings, and transactions seamlessly. The modular architecture supports the addition of new features or integrations, such as support for multiple languages, regions, or advanced analytics, without requiring significant redesign. Efficient database management with techniques like indexing and caching ensures quick data retrieval even as the volume of records expands. Load balancing mechanisms further distribute traffic evenly, preventing server overload during peak usage periods. By planning for scalability from the outset, the app can evolve alongside the needs of its users, maintaining high performance and reliability as it grows in scope and adoption.

- Performance

The performance of the mobile application is critical to ensuring that it delivers a smooth, reliable, and efficient experience for farmers. The app is designed to be fast and responsive, with optimized load times and real-time data syncing, even in areas with limited connectivity. It will function offline, allowing farmers to browse and book equipment without an internet connection, syncing once the connection is restored. The app will be stable and reliable, with robust error handling, crash-free performance, and secure data storage. It is built to scale as the user base grows, with a cloud-based backend capable of handling increasing demands. The user experience is at the forefront, with an intuitive interface, localization for different regions, and minimal resource consumption to conserve battery and data usage. Regular testing, including load and stress tests, will ensure that the app can handle high traffic and peak usage periods without performance degradation. By focusing on speed, reliability, scalability, and usability, the app aims to provide a seamless experience for farmers, even in rural and resource-constrained environments.

- Reusability

The design and development of the mobile application in a way that allows components, code, and features to be reused across different parts of the app or in future projects, reducing the need for duplication and enhancing efficiency. By employing modular development, core functionalities such as user authentication, payment processing, and equipment management can be developed as reusable components or libraries that can be easily integrated into other sections of the app or even into future projects. Additionally, the use of standardized APIs for interacting with the backend and third-party services ensures that these interfaces can be reused across different platforms or applications. This approach not only accelerates

development but also makes it easier to maintain and update the app, as changes to a reusable component are reflected in all areas where it is used. Moreover, reusability extends to design elements and UI components, where consistent elements like buttons, forms, and navigation patterns can be reused, ensuring a consistent user experience and reducing development time for additional features. By focusing on reusability, the project remains scalable, cost-effective, and adaptable to future requirements or expansions.

- Flexibility

The ability of the mobile application to adapt to changing requirements, user needs, and technological advancements over time. The app is designed with a modular architecture, allowing easy updates and additions of new features without disrupting the existing functionality. For instance, as new farming equipment becomes available or regional needs change, new categories can be added, or existing features can be customized to suit local requirements. The cloud-based backend further enhances flexibility by enabling seamless scaling to accommodate more users or data as the app grows. Additionally, the app is built to be compatible with various Android devices, ensuring that it can function across different models, screen sizes, and performance capabilities. Multi-language support and location-based features add to the app's adaptability, making it useful for farmers in diverse regions with different languages and agricultural practices. By maintaining a flexible approach, the app can evolve over time, incorporating new technologies and user feedback while continuing to meet the dynamic needs of the farming community.

Examples of non-functional requirements:

1) Emails should be sent with a latency of no greater than 12 hours from such an activity.
2) The processing of each request should be done within 10 seconds
3) The site should load in 3 seconds whenever of simultaneous users are > 10000

Hardware Requirements

- Processor - I3/Intel Processor
- RAM - 8 GB
- Hard Disk - 1TB

 A range of devices with varying specifications to test compatibility, including:

- Low-end devices with 2-4 GB RAM
- Mid-range devices with 4-8 GB RAM
- High-end devices with 8+ GB RAM

 Different screen sizes and resolutions to ensure a consistent user experience.

These hardware requirements ensure the project team has the necessary resources to develop, test, and deploy the application effectively while delivering a robust and reliable product to end-users.

Software Requirements

- Operating System - Windows 10
- JDK - java
- Plugin -Kotlin
- SDK - Android
- IDE -Android studio
- Database` - server script, my sql

Android Studio: The primary integrated development environment (IDE) for building and testing the Android application.

Java/Kotlin: Programming languages used for developing the app's frontend and core functionalities.

Payment Gateway APIs: Integration with services like Razorpay, Paytm, or Google Pay to enable secure transactions.

 Git: For version control and collaboration.

 GitHub/GitLab: For repository hosting and project management.

Windows or **macOS**: For the development environment, depending on the developer's preference.

By leveraging these software tools and technologies, the project will have a strong foundation for development, ensuring efficiency, reliability, and scalability throughout its lifecycle.

Architecture

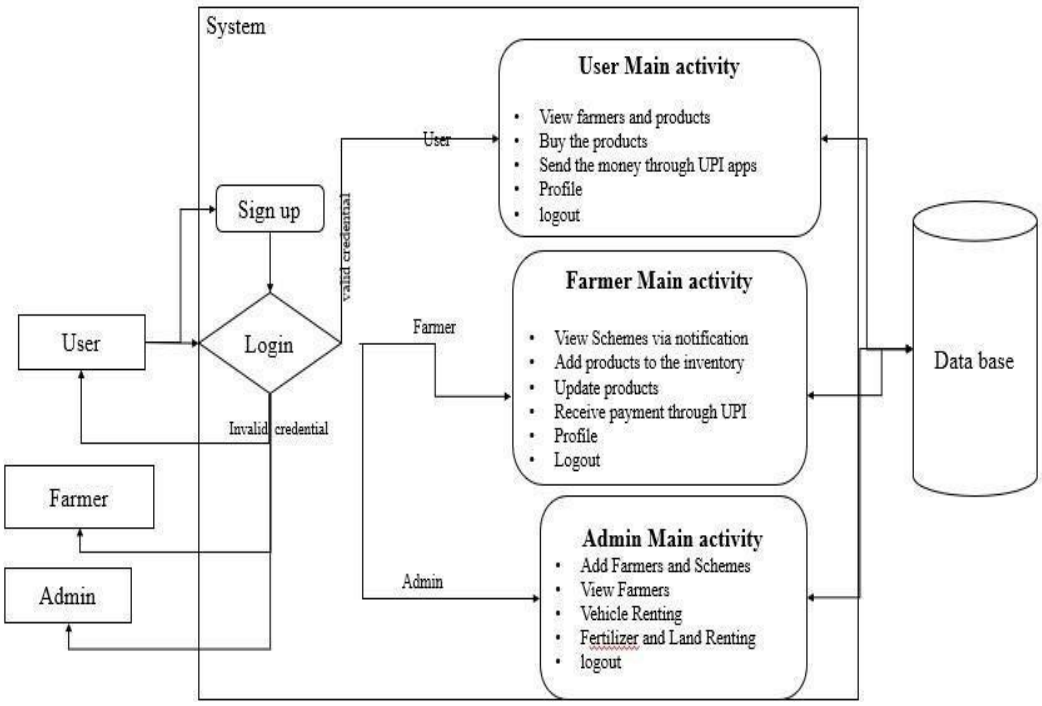

Fig 4.1 Title: "Architecture"

CHAPTER-5

OBJECTIVES

Empowering Farmers Through Technology

The primary objective is to bridge the technological gap for farmers by providing a user-friendly mobile application. This app will enable farmers to access farming equipment like tractors and mechanization tools at affordable rates, promoting efficiency and productivity in their agricultural activities.

Cornerstone of this project, aiming to bridge the digital divide and revolutionize traditional farming practices. The mobile application provides farmers with a powerful tool to access critical agricultural resources, enabling them to enhance productivity, reduce costs, and make informed decisions. By leveraging modern technology, the app transforms the way farmers interact with equipment providers, services, and each other, fostering independence and self-reliance.

Through the app, farmers gain access to advanced machinery and tools, which might otherwise be beyond their financial reach. This democratization of technology ensures that even small-scale farmers can adopt modern farming techniques, boosting efficiency and crop yields. Additionally, the app offers features like equipment availability tracking, real-time notifications, and location-based searches, making it easier for farmers to plan and execute their farming activities without delays.

The integration of technology also introduces farmers to a wealth of digital resources. For instance, the app can provide educational content on sustainable farming practices, crop management techniques, and market trends. This knowledge empowers farmers to improve their agricultural methods and make decisions based on data and insights rather than relying solely on traditional practices.

By including multi-language support and an intuitive interface, the app ensures accessibility for farmers with diverse linguistic and educational backgrounds. This inclusivity fosters widespread adoption of the technology, allowing farmers from different regions to benefit equally.

Furthermore, the app promotes transparency in transactions, enabling farmers to compare prices, read reviews, and make cost-effective choices. This reduces the exploitation often seen in traditional farming supply chains, giving farmers greater control over their

operations.

Ultimately, empowering farmers through technology goes beyond providing a tool; it creates opportunities for growth, resilience, and prosperity. By equipping farmers with the resources they need to succeed, the app lays the foundation for a more sustainable and thriving agricultural sector.

Creating a Connected Ecosystem: The project aims to establish a digital ecosystem where farmers can connect with equipment owners or service providers. This network will foster collaboration, resource sharing, and a sense of community among farmers, ultimately enhancing their farming capabilities.

Creating a Connected Ecosystem is a pivotal aspect of this project, focusing on fostering collaboration, interaction, and resource-sharing among various stakeholders in the agricultural community. The mobile application serves as a digital hub where farmers, equipment owners, service providers, and other relevant parties can connect seamlessly. This interconnected network streamlines communication and transactions, enabling participants to work together more effectively.

For farmers, the app provides a platform to find and book agricultural equipment or services from nearby providers without intermediaries, saving time and reducing costs. Equipment owners benefit by having a digital space to list their machinery for rent, maximizing the utilization of their assets and generating additional income. This mutual benefit strengthens trust and cooperation between the parties, creating a sense of community.

The ecosystem also extends beyond equipment sharing. By incorporating features such as forums or chat groups, the app enables farmers to exchange knowledge, share best practices, and seek advice on farming challenges. This collaborative environment empowers farmers to learn from each other, enhancing their agricultural expertise.

Service providers, including repair technicians or suppliers of seeds and fertilizers, can also participate in the ecosystem, offering their services directly through the platform. This creates a one-stop solution for farmers to access various agricultural resources and support systems.

Additionally, the app can integrate with government schemes, subsidies, or NGO programs, ensuring farmers are informed about and have access to these opportunities. By bringing all stakeholders onto a unified platform, the app reduces fragmentation in the agricultural sector, promotes efficient resource utilization, and fosters a community-

driven approach to solving agricultural challenges.

This connected ecosystem not only simplifies the day-to-day operations of farming but also drives innovation and collective growth, ensuring that all participants can thrive in a supportive and integrated environment.

Enhancing Accessibility and Affordability:

By digitizing the process of renting equipment, the project seeks to make essential agricultural tools more accessible and cost-effective for farmers, particularly those in rural areas with limited financial resources or infrastructure, aiming to address two critical challenges faced by farmers: the lack of access to essential agricultural equipment and the high costs associated with owning or renting such tools through traditional means. By leveraging mobile technology, the app provides a convenient platform where farmers can easily browse, compare, and book equipment without the need for intermediaries or extensive travel. This dramatically reduces the time and effort required to access these resources, making them more accessible to farmers in remote and underserved areas.

Affordability is addressed by creating a competitive and transparent marketplace that enables farmers to rent equipment at nominal costs. This model eliminates the financial burden of purchasing expensive machinery outright, which is often prohibitive for small and marginal farmers. The pay-per-use approach ensures that farmers only incur costs when they actually need the equipment, leading to better financial management and reduced capital expenditure.

Additionally, the app is designed to accommodate diverse economic conditions by offering flexible payment options, such as cash, digital wallets, or installment plans. Localized pricing based on regional standards further ensures fairness and affordability for users across different areas.

By integrating features like location-based searches, the app enhances accessibility by connecting farmers with nearby equipment providers, reducing transportation costs and logistical challenges. Furthermore, the platform's user-friendly interface and support for multiple languages lower the barrier to entry for digitally inexperienced farmers, encouraging widespread adoption.

Through these efforts, the project empowers farmers to overcome the limitations of traditional equipment procurement methods, ensuring that essential tools are both within

reach and economically viable, ultimately contributing to improved agricultural efficiency and productivity.

Improving Agricultural Productivity: Through timely access to necessary equipment and mechanization services, the project aims to improve farming efficiency, reduce manual labor, and enhance overall agricultural output, contributing to better livelihoods for farmers.

Improving Agricultural Productivity is a fundamental goal of this project, aimed at enhancing the efficiency and output of farming activities through the strategic use of technology. By providing farmers with timely access to essential farming equipment such as tractors, harvesters, and other mechanization tools, the application minimizes delays in critical agricultural operations like plowing, sowing, and harvesting. This ensures that farmers can optimize their crop cycles, reduce wastage, and achieve better yields.

The app empowers farmers to overcome challenges related to labor shortages, as mechanization can significantly reduce dependency on manual labor, enabling faster and more precise farming activities. Access to modern equipment also allows small-scale farmers to adopt advanced agricultural practices, such as precision farming, which enhances resource utilization, reduces costs, and improves crop quality.

In addition, the application facilitates better decision-making by providing farmers with a variety of options tailored to their specific needs and budgets. By offering access to high-quality machinery that they might not otherwise afford, the app levels the playing field for small and marginal farmers, helping them compete with larger agricultural enterprises.

The platform also saves time by streamlining the process of finding and booking equipment, allowing farmers to focus more on managing their farms rather than logistical challenges. Improved productivity not only benefits individual farmers but also contributes to the overall growth of the agricultural sector, ensuring food security and better economic outcomes for farming communities. This approach aligns with the broader goal of making agriculture more efficient, sustainable, and resilient in the face of modern challenges.

Encouraging Digital Adoption in Rural Areas: By introducing a straightforward and intuitive mobile app, the project also aims to promote digital literacy among farmers, encouraging the adoption of technology for various agricultural needs and transactions.

Encouraging Digital Adoption in Rural Areas is a key objective of this project, addressing the challenges that rural farmers often face in accessing and utilizing technology. In many rural regions, digital literacy is limited, and traditional farming methods dominate, making it difficult for farmers to tap into the full potential of modern technologies. This project seeks to bridge this gap by introducing a mobile application that is simple, user-friendly, and tailored to the needs of farmers, thus encouraging the adoption of digital tools for agriculture.

The app's intuitive interface is designed to be accessible even to farmers with limited technological experience. With easy navigation and a straightforward user experience, the app reduces the intimidation often associated with new technologies. Moreover, the integration of multi-language support ensures that language barriers are minimized, allowing farmers in diverse regions to engage with the platform in their native languages.

To promote digital adoption, the app also includes educational resources and tutorials that help users understand how to use the platform effectively. These resources explain how the app can simplify tasks like booking equipment, accessing services, and tracking farming activities. Additionally, the app can offer tips on digital literacy, gradually guiding farmers in using smartphones and the internet for other purposes, like online banking or e-commerce.

The project takes advantage of existing mobile penetration in rural areas, where even farmers in remote regions often own smartphones. By leveraging these devices, the app can deliver instant access to agricultural resources, services, and even weather updates, offering solutions directly in the palm of the farmers' hands.

Encouraging digital adoption goes beyond the app's immediate functionality—it fosters a shift in mindset. As farmers begin to experience the benefits of digital tools, such as increased access to information, better resource management, and the ability to make data-driven decisions, they are more likely to embrace other forms of technology that can further improve their farming practices. Over time, this creates a digital ecosystem in rural areas where technology becomes an integral part of agricultural life.

By introducing and nurturing digital adoption in rural communities, the project helps farmers transition from traditional methods to more efficient, data-driven, and sustainable agricultural practices. This digital transformation empowers farmers, improves productivity, and creates a ripple effect of economic growth and development in rural areas.

Supporting Sustainable Practices:

The project indirectly supports sustainable farming by enabling resource sharing and reducing the need for every farmer to own costly equipment, thereby minimizing wastage and promoting optimal resource utilization, focusing on promoting resource efficiency, environmental conservation, and long-term viability in agriculture. By enabling farmers to share and rent agricultural equipment rather than owning individual machinery, the project encourages optimal use of resources, reducing the need for each farmer to invest in costly and underutilized equipment. This practice not only lowers the financial burden on farmers but also minimizes the environmental impact associated with manufacturing and maintaining excessive machinery.

The app fosters collaboration among farmers, allowing them to access advanced tools for precision farming. Such tools can help optimize water usage, reduce fertilizer and pesticide application, and enhance soil health, leading to more sustainable farming practices. By reducing dependency on manual labor and improving mechanization, the project also supports efficient land use and better crop management, ensuring higher yields with fewer resources.

Furthermore, the platform indirectly contributes to reducing carbon emissions. Shared equipment usage means fewer machines are produced and transported, decreasing the carbon footprint associated with their lifecycle. Additionally, timely access to modern equipment can help farmers adopt eco-friendly practices like no-till farming, crop rotation, and integrated pest management, which are crucial for sustainable agriculture.

By integrating features such as educational content and updates on sustainable farming techniques, the app can further empower farmers to make environmentally conscious decisions. Supporting sustainable practices through this project not only benefits the agricultural community but also contributes to broader environmental goals, creating a balance between productivity and ecological preservation.

Ensuring Scalability and Long-Term Impact:

The project is designed to be scalable, allowing it to expand its features and reach more regions over time. The ultimate goal is to create a platform that can be adapted to the evolving needs of farmers, ensuring its relevance and long-term benefits.

The objectives of this project are multifaceted, aiming to create a transformative impact on the agricultural sector by leveraging technology. At its core, the project seeks to empower farmers by providing a user-friendly mobile application that facilitates access to essential farming equipment like tractors and other mechanization tools at nominal costs.

This not only enhances their productivity but also bridges the technological gap that often limits rural farmers. Another key objective is to establish a connected ecosystem where farmers can interact with equipment owners or service providers, fostering collaboration, resource sharing, and a sense of community. By digitizing the equipment rental process, the project aims to make these resources more accessible and affordable, particularly for small-scale farmers with limited financial means. Additionally, the initiative focuses on improving agricultural efficiency by ensuring farmers have timely access to the tools they need, which reduces manual labor and boosts overall output. Beyond immediate utility, the app promotes digital literacy among farmers, encouraging them to adopt technology for their farming activities and transactions. It also supports sustainable farming practices by facilitating resource sharing, which minimizes wastage and optimizes the use of expensive equipment. Designed for scalability, the project envisions long-term relevance, adapting to the evolving needs of the farming community and expanding its impact across regions. Ultimately, the project aims to uplift the agricultural sector, improve farmer livelihoods, and contribute to sustainable development.

CHAPTER-6

SYSTEM DESIGN AND IMPLEMENTATION

Introduction of Input design

INPUT DESIGN

The input design is the link between the information system and the user. It comprises the developing specification and procedures for data preparation and those steps are necessary to put transaction data in to a usable form for processing can be achieved by inspecting the computer to read data from a written or printed document or it can occur by having people keying the data directly into the system. The design of input focuses on controlling the amount of input required, controlling the errors, avoiding delay, avoiding extra steps and keeping the process simple. The input is designed in such a way so that it provides security and ease of use with retaining the privacy. Input Design considered the following things:

- What data should be given as input?
- How the data should be arranged or coded?
- The dialog to guide the operating personnel in providing input.
- Methods for preparing input validations and steps to follow when error occur.

OBJECTIVES

1. Input Design is the process of converting a user-oriented description of the input into a computer-based system. This design is important to avoid errors in the data input process and show the correct direction to the management for getting correct information from the computerized system.

2. It is achieved by creating user-friendly screens for the data entry to handle large volume of data. The goal of designing input is to make data entry easier and to be free from errors. The data entry screen is designed in such a way that all the data manipulates can be performed. It also provides record viewing facilities.

3. When the data is entered it will check for its validity. Data can be entered with the help of screens. Appropriate messages are provided as when needed so that the user will not be in

maize of instant. Thus the objective of input design is to create an input layout that is easy to follow

OUTPUT DESIGN

A quality output is one, which meets the requirements of the end user and presents the information clearly. In any system results of processing are communicated to the users and to other system through outputs. In output design it is determined how the information is to be displaced for immediate need and also the hard copy output. It is the most important and direct source information to the user. Efficient and intelligent output design improves the system's relationship to help user decision-making.

1. Designing computer output should proceed in an organized, well thought out manner; the right output must be developed while ensuring that each output element is designed so that people will find the system can use easily and effectively. When analysis design computer output, they should Identify the specific output that is needed to meet the requirements.

2. Select methods for presenting information.

3. Create document, report, or other formats that contain information produced by the system.

The output form of an information system should accomplish one or more of the following objectives.

- Convey information about past activities, current status or projections of the
- Future.
- Signal important events, opportunities, problems, or warnings.
- Trigger an action.
- Confirm an action.

UML Diagram

UML stands for Unified Modelling Language. UML is a standardized general-purpose modelling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group.

The goal is for UML to become a common language for creating models of object-oriented computer software. In its current form UML is comprised of two major components:

A Meta-model and a notation. In the future, some form of method or process may also be added to; or associated with, UML.

The Unified modelling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modelling and other non-software systems.

The UML represents a collection of best engineering practices that have proven successful in the modelling of large and complex systems.

The UML is a very important part of developing objects-oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

GOALS:

The Primary goals in the design of the UML are as follows:

1. Provide users a ready-to-use, expressive visual modelling Language so that they can develop and exchange meaningful models.
2. Provide extendibility and specialization mechanisms to extend the core concepts.
3. Be independent of particular programming languages and development process.
4. Provide a formal basis for understanding the modelling language.
5. Encourage the growth of OO tools market.
6. Support higher level development concepts such as collaborations, frameworks, patterns and components.
7. Integrate best practices.

USE CASE DIAGRAM:

A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted.

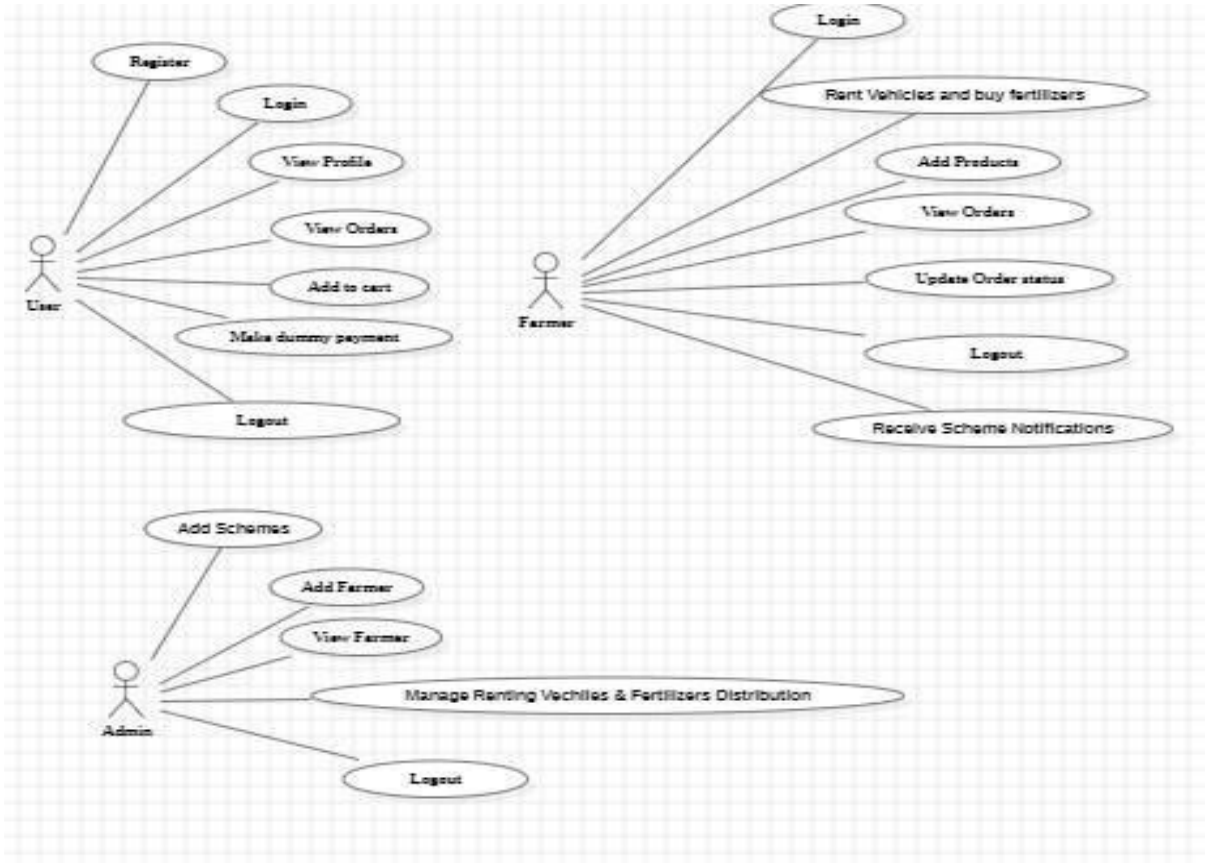

Fig 6.1 Title: "Use Case Diagram"

CLASS DIAGRAM:

In software engineering, a class diagram in the Unified Modelling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among the classes. It explains which class contains information.

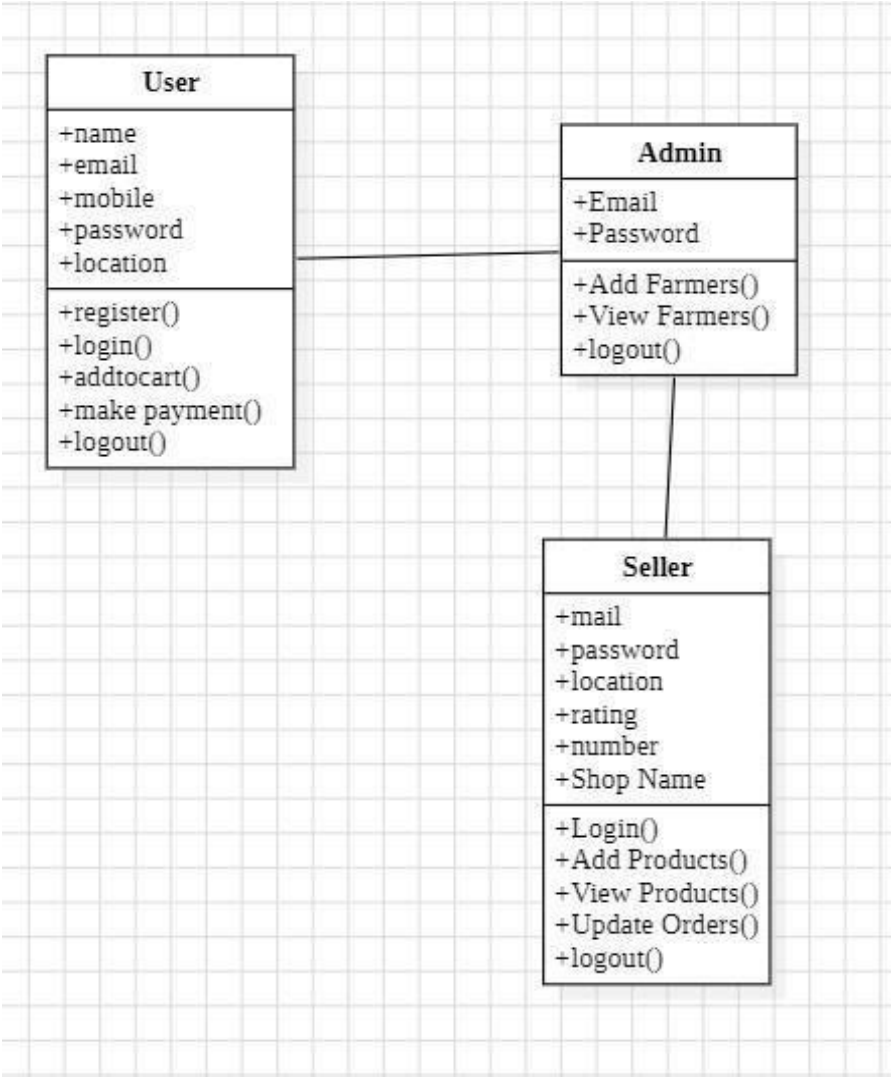

Fig 6.2 Title: "Class Diagram"

SEQUENCE DIAGRAM:

A sequence diagram in Unified Modelling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. Sequence diagrams are sometimes called event diagrams, event scenarios, and timing diagrams.

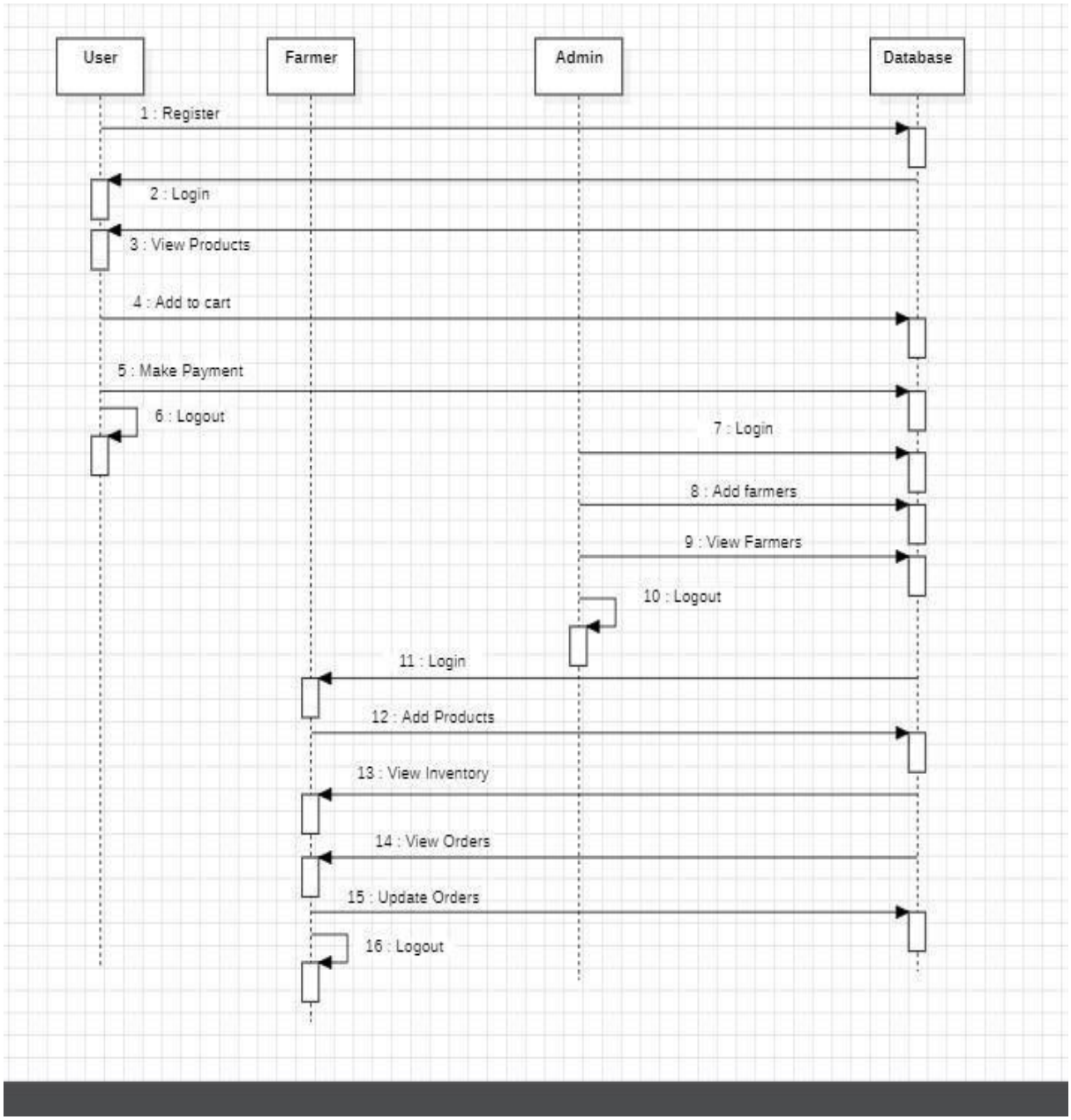

Fig 6.3 Title: "Sequence Diagram"

COLLABORATION DIAGRAM:

In collaboration diagram the method call sequence is indicated by some numbering technique as shown below. The number indicates how the methods are called one after another. We have taken the same order management system to describe the collaboration diagram. The method calls are similar to that of a sequence diagram. But the difference is that the sequence diagram does not describe the object organization whereas the collaboration diagram shows the object organization.

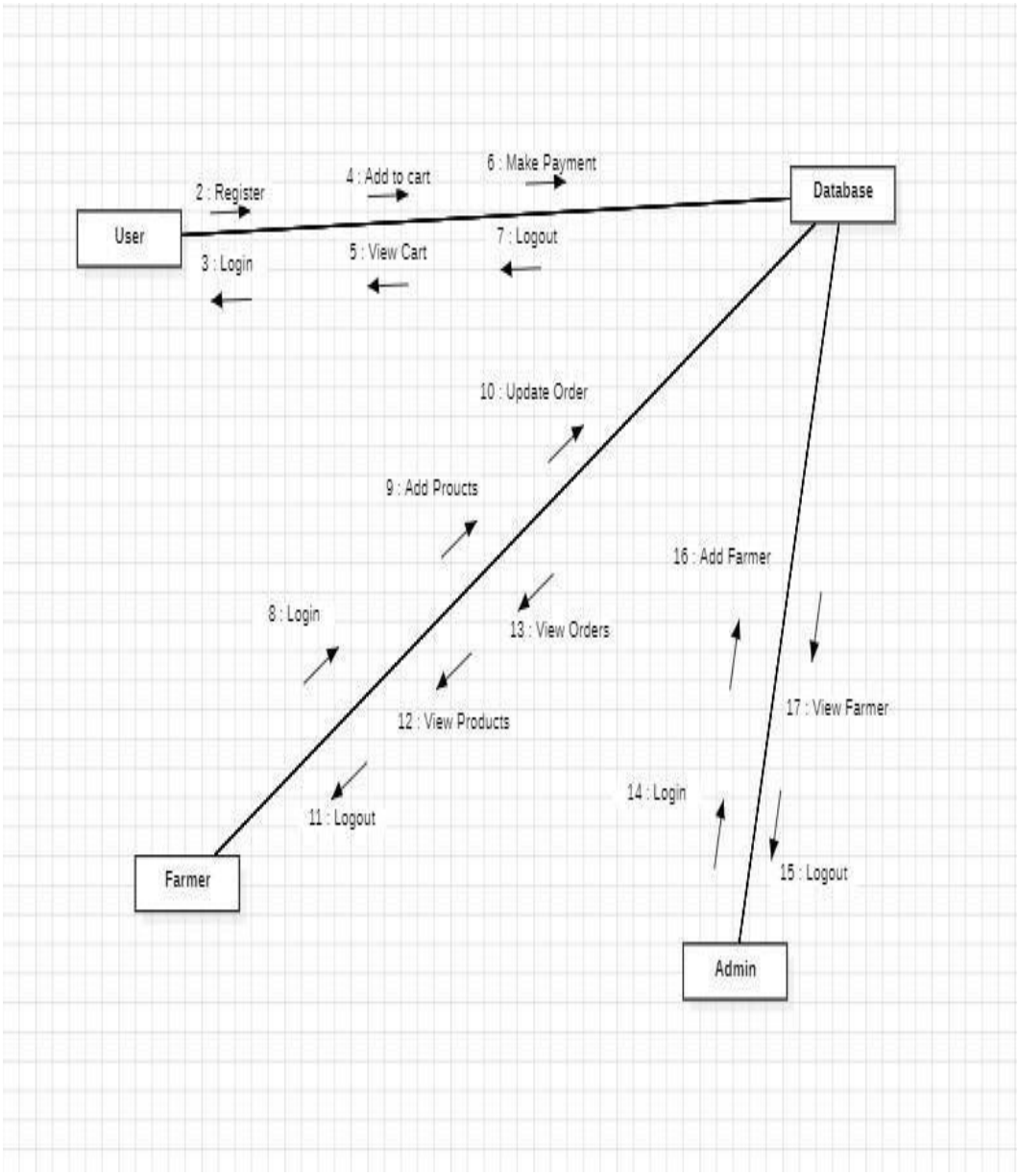

Fig 6.4 Title: "Collaboration Diagram"

ACTIVITY DIAGRAM:

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modelling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control.

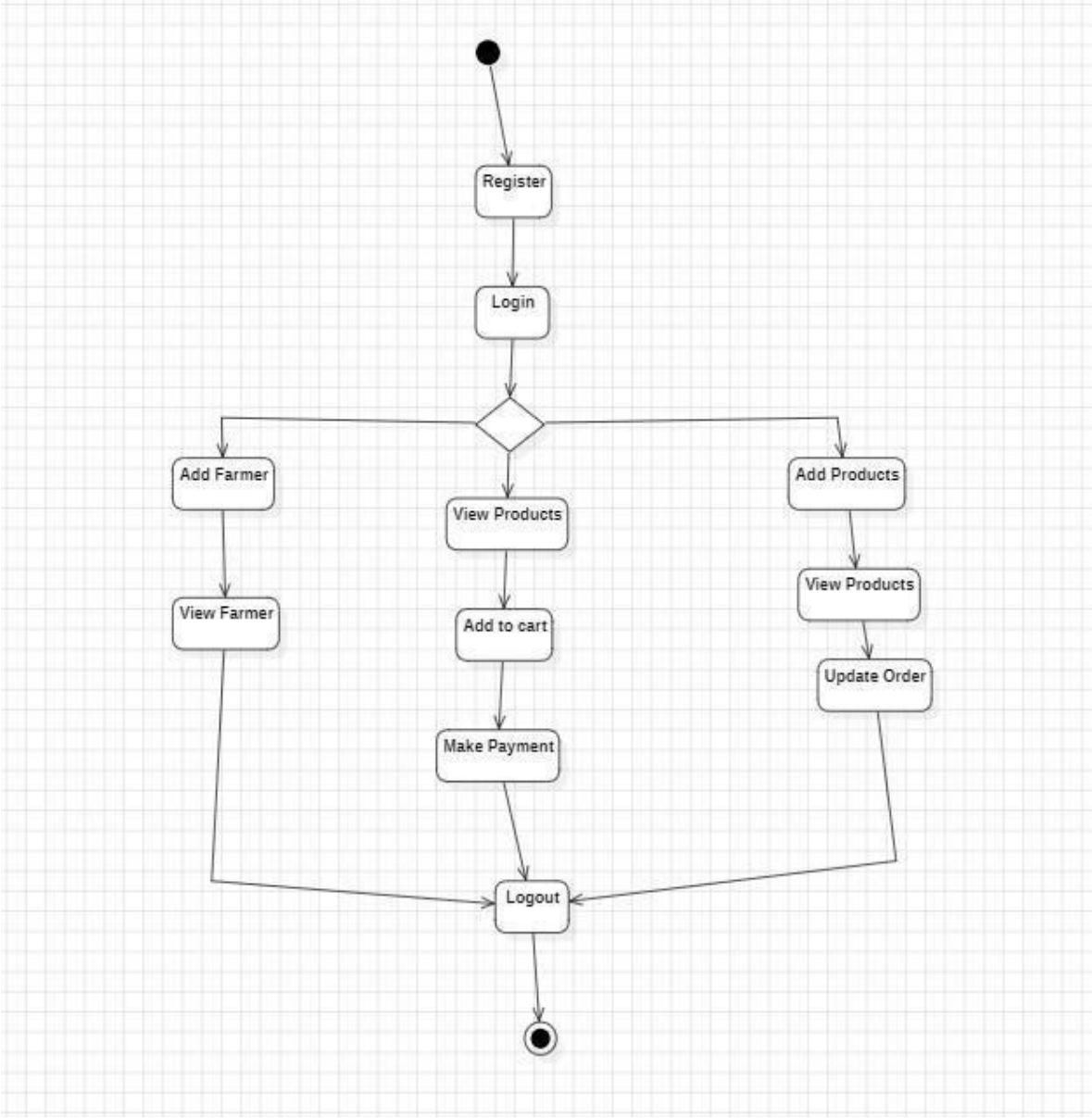

Fig 6.5 Title: "Activity Diagram"

Data Flow Diagram:

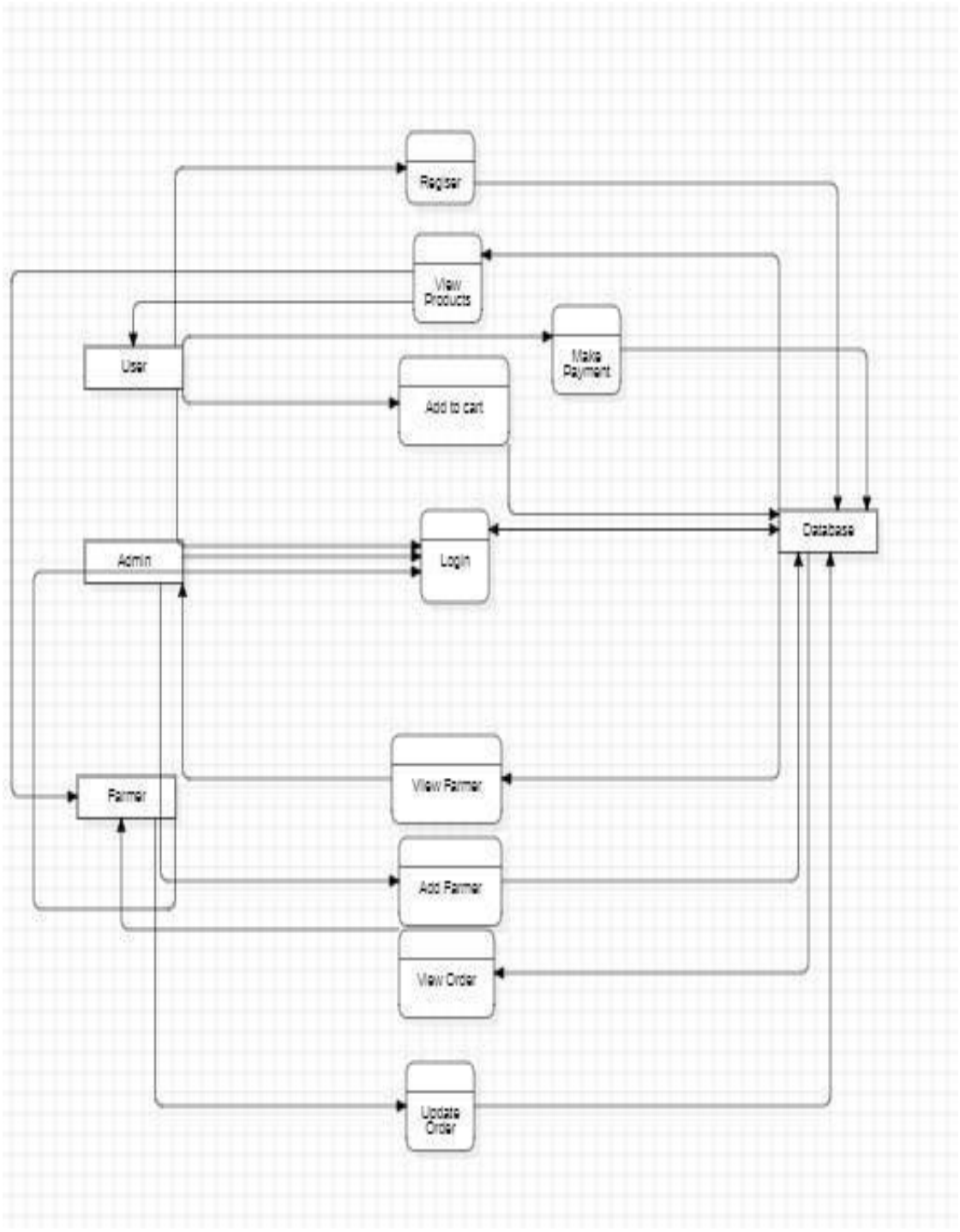

Fig 6.6 Title: "Data Flow Diagram"

CHAPTER-7

TIMELINE FOR EXECUTION OF PROJECT

(GANTT CHART)

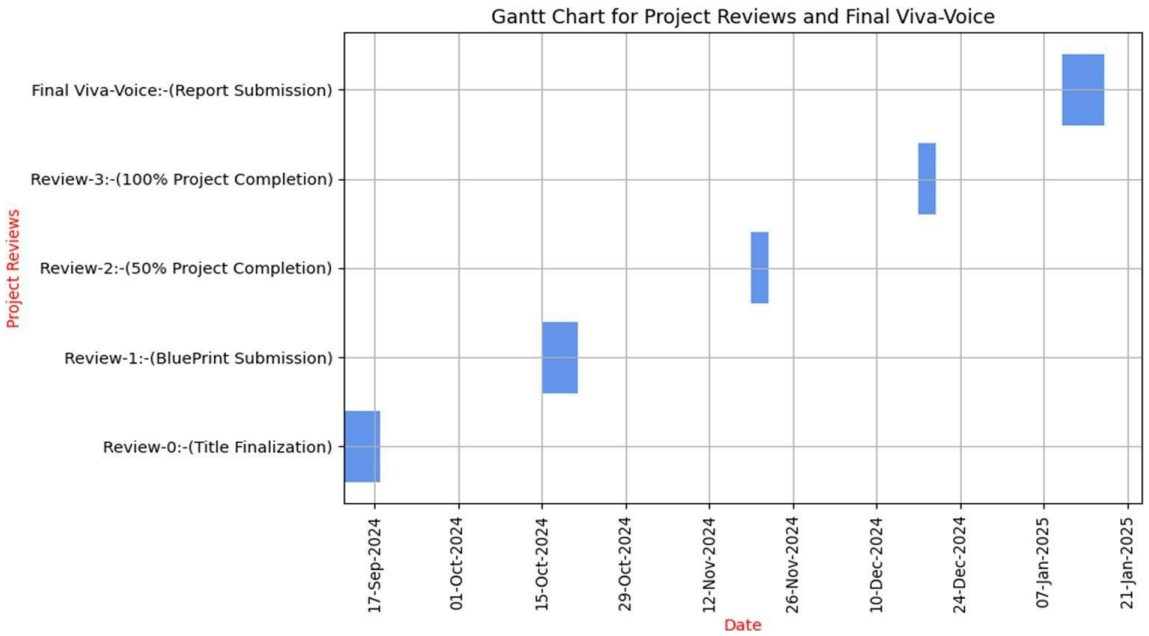

Fig 7.1 Title: "Gantt Chart"

CHAPTER-8

OUTCOMES

1. Increased Access to Agricultural Mechanization

- Farmers can easily hire tractors, harvesters, and other machinery at affordable rates, reducing dependency on manual labor.
- Improved efficiency in farming operations and reduced turnaround time.

2. Cost-Effectiveness

- Shared access to expensive machinery reduces the financial burden on individual farmers.
- Optimized resource allocation, ensuring no machinery lies idle.

3. Enhanced Productivity

- Timely access to tools and resources enables better crop yields.
- Farmers can focus on other aspects of farming while mechanization handles labor-intensive tasks.

4. Connected Community

- Creates a network among farmers for sharing resources, knowledge, and best practices.
- Encourages collaboration and collective problem-solving.

5. Environmental Sustainability

- Encourages optimal use of resources and reduces wastage by using shared tools efficiently.
- Reduces carbon footprint through better management of machinery usage.

6. Digital Empowerment

- Familiarizes farmers with technology, increasing their adaptability in the modern agricultural ecosystem.
- Bridges the digital divide between rural and urban areas.

7. Economic Upliftment

- Additional income sources for farmers who own machinery by renting it out to others.
- Reduced operational costs lead to better profit margins.

8. Improved Decision-Making

- Access to analytics and insights about resource utilization and farming practices via the app.

- Informed decisions result in higher returns and lower risks.

9. Scalability and Innovation

- Potential to scale the project to include other services like seed procurement, fertilizer delivery, or weather forecasting.
- Encourages innovation in solving agriculture-related challenges.

10. Socio-Economic Impact

- Promotes community well-being by uplifting farmers financially and socially.
- Reduces rural unemployment by creating opportunities for machine operators and support staff.

By implementing these outcomes effectively, your project can create a significant positive impact on the farming community while fostering a sustainable and interconnected ecosystem.

CHAPTER-9

RESULTS AND DISCUSSIONS

Modules

1. **User Module:**

Users will sign up, log in, and browse a list of farmers and their products. After selecting products, users can purchase them and complete payments through a UPI-like dummy payment gateway. Users can manage their profiles, track orders, and view their order history.

2. Farmer Module:

Farmers can log in, manage their profiles, and add or update products in the inventory. Farmers will receive notifications for new orders and can fulfil them. Payments will be credited directly to their UPI accounts. Farmers can view schemes uploaded by the admin, with notifications available in the app.

3. Admin Module:

Admins will onboard trusted farmers, creating a verified environment for users. They will upload and manage schemes that are beneficial for farmers. Admins will also be responsible for suggesting and providing references for applying to these schemes, fostering an efficient farming ecosystem. They can also monitor platform performance and manage system operations.

CHAPTER-10

CONCLUSION

The creation of a connected ecosystem for farmers represents a transformative step in modernizing agriculture and addressing the systemic challenges faced by the farming community. This mobile application is not merely a tool but a gateway to empowering farmers by democratizing access to resources, enhancing operational efficiency, and fostering a collaborative environment.

By providing a platform that integrates machinery rentals, administrative oversight, and user engagement, the app eliminates the traditional barriers of cost, accessibility, and communication. Its user-friendly design ensures inclusivity for farmers with diverse levels of digital literacy, while real-time updates and offline functionality make it reliable even in remote areas with limited internet connectivity.

The app's emphasis on transparency, accountability, and trust through secure transactions strengthens user confidence and encourages adoption. Furthermore, its alignment with government schemes and policies bridges the gap between public sector support and grassroots-level implementation, ensuring that farmers benefit from subsidies, training, and other incentives.

This initiative also has broader implications for sustainable development. By promoting the shared use of machinery, reducing operational costs, and enabling data-driven decision-making, it supports environmentally friendly farming practices. Additionally, the platform creates opportunities for knowledge sharing and community engagement, fostering innovation and resilience within the agricultural sector.

Ultimately, this connected ecosystem is designed to be a scalable and sustainable solution, capable of adapting to the evolving needs of farmers and the agricultural landscape. By uplifting farmers through technology and collaboration, the initiative not only enhances livelihoods but also contributes to the socio-economic growth of rural communities and the overall agricultural economy.

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APPENDIX-A
PSEUDOCODE

SIGNUP ACTIVTY:-

```
package com.project.upliftingthefarmerthroughaconnectedecosystem.ui
import . . .
class SignupActivity : AppCompatActivity() {
  private val bind by lazy { ActivitySignupBinding.inflate(layoutInflater) }
  @SuppressLint("ClickableViewAccessibility")
  override fun onCreate(savedInstanceState: Bundle?) {
    super.onCreate(savedInstanceState)
    setContentView(bind.root)
    bind.Login.setOnClickListener {
      finish() }
    bind.addData.setOnClickListener {
      val name = bind.editTextName.text.toString().trim()
      val mobile = bind.editTextMoblie.text.toString().trim()
      val password = bind.editTextPassword.text.toString().trim()
      val email = bind.editTextEmail.text.toString().trim()
      val location = bind.editTextAdress.text.toString().trim()
      when {
        name.isEmpty() -> showToast("Please enter your name")
        mobile.isEmpty() || mobile.length < 10 -> showToast("Please enter a valid 10-digit
mobile number")
        password.isEmpty() || password.length < 6 -> showToast("Password must be at least 6
characters long")
        email.isEmpty() || !email.contains("@gmail.com") -> showToast("Please enter a valid
email")
        location.isEmpty() -> showToast("Please enter your address")
        else -> {
          bind.progressBar5.isVisible = true
          CoroutineScope(IO).launch {
            RetrofitInstance.instance.userRegister(
              name, mobile, password, location,
```

```
            email, "UserEcosystem","0"
        ).enqueue(object : Callback<CommonResponse?> {
            override fun onResponse(
                call: Call<CommonResponse?>,
                response: Response<CommonResponse?>
            ) {
                val registerResponse = response.body()!!
                if (!registerResponse.error) {
                    finish()
                    runOnUiThread {
                        showToast("Registration Successful") }
                } else {
                    showToast(
                        response.body()?.message
                            ?: "Registration failed" ) }
                bind.progressBar5.isVisible = false }
            override fun onFailure(
                call: Call<CommonResponse?>,
                t: Throwable ) {
                showToast("Error: ${t.message}")
                bind.progressBar5.isVisible = false
        }})}}}}}
```

TRANSACTION SUCCESS:

```
package com.project.upliftingthefarmerthroughaconnectedecosystem.ui
import . . .
class TransactionSuccess : AppCompatActivity() {
    private val bind by lazy { ActivityUpiBinding.inflate(layoutInflater) }
    @SuppressLint("SetTextI18n")
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(bind.root)
        val intent = intent.getStringExtra("orderId")
```

```
        bind.transactionId.text = "OrderId : $intent"
        bind.intentDash.setOnClickListener {
            startActivity(Intent(this, UserDashboard::class.java))
        }}}
```

JAVA GENERATED

```
package com.project.upliftingthefarmerthroughaconnectedecosystem.room;
import . . .
@Generated("androidx.room.RoomProcessor")
@SuppressWarnings({"unchecked", "deprecation"})
public final class AppDao_Impl implements AppDao {
private final RoomDatabase __db;
  private final EntityInsertionAdapter<FertilizerVehicle> __insertionAdapterOfFertilizerVehicle;
  private final EntityInsertionAdapter<RequestEntity> __insertionAdapterOfRequestEntity;
  private final SharedSQLiteStatement __preparedStmtOfUpdateRequestStatus;
  public AppDao_Impl(@NonNull final RoomDatabase __db) {
    this.__db = __db;
    this.__insertionAdapterOfFertilizerVehicle = new
EntityInsertionAdapter<FertilizerVehicle>(__db) {
      @Override
      @NonNull
      protected String createQuery() {
        return "INSERT OR REPLACE INTO `fertilizer_vehicle`
(`id`,`name`,`description`,`type`,`imageUrl`) VALUES (?,?,?,?,?)";
      }
      @Override
      protected void bind(@NonNull final SupportSQLiteStatement statement,
          @NonNull final FertilizerVehicle entity) {
        statement.bindString(1, entity.getId());
        statement.bindString(2, entity.getName());
        statement.bindString(3, entity.getDescription());
        statement.bindString(4, entity.getType());
        statement.bindString(5, entity.getImageUrl());
      } };
```

```
    this.__insertionAdapterOfRequestEntity = new EntityInsertionAdapter<RequestEntity>(__db)
{
      @Override
      @NonNull
      protected String createQuery() {
        return "INSERT OR REPLACE INTO `requests`
(`id`,`itemName`,`requester`,`status`,`role`) VALUES (?,?,?,?,?)";
      }
      @Override
      protected void bind(@NonNull final SupportSQLiteStatement statement,
          @NonNull final RequestEntity entity) {
        statement.bindString(1, entity.getId());
        statement.bindString(2, entity.getItemName());
        statement.bindString(3, entity.getRequester());
        statement.bindString(4, entity.getStatus());
        statement.bindString(5, entity.getRole());
      }
    };
    this.__preparedStmtOfUpdateRequestStatus = new SharedSQLiteStatement(__db) {
      @Override
      @NonNull
      public String createQuery() {
        final String _query = "UPDATE requests SET status = ? WHERE id = ?";
        return _query;
      }
    };
  }
  @Override
  public Object insertFertilizerVehicles(final List<FertilizerVehicle> items,
      final Continuation<? super Unit> $completion) {
    return CoroutinesRoom.execute(__db, true, new Callable<Unit>() {
      @Override
```

```
    @NonNull
    public Unit call() throws Exception {
      __db.beginTransaction();
      try {
        __insertionAdapterOfFertilizerVehicle.insert(items);
        __db.setTransactionSuccessful();
        return Unit.INSTANCE;
      } finally {
        __db.endTransaction();
      }
    }
  }, $completion);
}

@Override
public Object insertRequest(final RequestEntity request,
    final Continuation<? super Unit> $completion) {
  return CoroutinesRoom.execute(__db, true, new Callable<Unit>() {
    @Override
    @NonNull
    public Unit call() throws Exception {
      __db.beginTransaction();
      try {
        __insertionAdapterOfRequestEntity.insert(request);
        __db.setTransactionSuccessful();
        return Unit.INSTANCE;
      } finally {
        __db.endTransaction();
      }
    }
  }, $completion);
}
```

```
@Override
public Object updateRequestStatus(final String id, final String status,
    final Continuation<? super Unit> $completion) {
  return CoroutinesRoom.execute(__db, true, new Callable<Unit>() {
    @Override
    @NonNull
    public Unit call() throws Exception {
      final SupportSQLiteStatement _stmt = __preparedStmtOfUpdateRequestStatus.acquire();
      int _argIndex = 1;
      _stmt.bindString(_argIndex, status);
      _argIndex = 2;
      _stmt.bindString(_argIndex, id);
      try {
        __db.beginTransaction();
        try {
          _stmt.executeUpdateDelete();
          __db.setTransactionSuccessful();
          return Unit.INSTANCE;
        } finally {
          __db.endTransaction();
        }
      } finally {
        __preparedStmtOfUpdateRequestStatus.release(_stmt);
      }
    }
  }, $completion);
}

@Override
public Object getAllFertilizerVehicles(
    final Continuation<? super List<FertilizerVehicle>> $completion) {
  final String _sql = "SELECT * FROM fertilizer_vehicle";
  final RoomSQLiteQuery _statement = RoomSQLiteQuery.acquire(_sql, 0);
```

```
    final CancellationSignal _cancellationSignal = DBUtil.createCancellationSignal();
    return CoroutinesRoom.execute(__db, false, _cancellationSignal, new
Callable<List<FertilizerVehicle>>() {
      @Override
      @NonNull
      public List<FertilizerVehicle> call() throws Exception {
        final Cursor _cursor = DBUtil.query(__db, _statement, false, null);
        try {
          final int _cursorIndexOfId = CursorUtil.getColumnIndexOrThrow(_cursor, "id");
          final int _cursorIndexOfName = CursorUtil.getColumnIndexOrThrow(_cursor, "name");
          final int _cursorIndexOfDescription = CursorUtil.getColumnIndexOrThrow(_cursor,
"description");
          final int _cursorIndexOfType = CursorUtil.getColumnIndexOrThrow(_cursor, "type");
          final int _cursorIndexOfImageUrl = CursorUtil.getColumnIndexOrThrow(_cursor,
"imageUrl");
          final List<FertilizerVehicle> _result = new
ArrayList<FertilizerVehicle>(_cursor.getCount());
          while (_cursor.moveToNext()) {
            final FertilizerVehicle _item;
            final String _tmpId;
            _tmpId = _cursor.getString(_cursorIndexOfId);
            final String _tmpName;
            _tmpName = _cursor.getString(_cursorIndexOfName);
            final String _tmpDescription;
            _tmpDescription = _cursor.getString(_cursorIndexOfDescription);
            final String _tmpType;
            _tmpType = _cursor.getString(_cursorIndexOfType);
            final String _tmpImageUrl;
            _tmpImageUrl = _cursor.getString(_cursorIndexOfImageUrl);
            _item = new
FertilizerVehicle(_tmpId,_tmpName,_tmpDescription,_tmpType,_tmpImageUrl);
            _result.add(_item);
          }
```

```
        return _result;
      } finally {
        _cursor.close();
        _statement.release();
      }
    }
  }, $completion);
 }
 @Override
 public LiveData<List<RequestEntity>> getRequestsByRole(final String requester) {
  final String _sql = "SELECT * FROM requests WHERE requester = ? ORDER BY id DESC";
  final RoomSQLiteQuery _statement = RoomSQLiteQuery.acquire(_sql, 1);
  int _argIndex = 1;
  _statement.bindString(_argIndex, requester);
  return __db.getInvalidationTracker().createLiveData(new String[] {"requests"}, false, new
Callable<List<RequestEntity>>() {
    @Override
    @Nullable
    public List<RequestEntity> call() throws Exception {
      final Cursor _cursor = DBUtil.query(__db, _statement, false, null);
      try {
        final int _cursorIndexOfId = CursorUtil.getColumnIndexOrThrow(_cursor, "id");
        final int _cursorIndexOfItemName = CursorUtil.getColumnIndexOrThrow(_cursor,
"itemName");
        final int _cursorIndexOfRequester = CursorUtil.getColumnIndexOrThrow(_cursor,
"requester");
        final int _cursorIndexOfStatus = CursorUtil.getColumnIndexOrThrow(_cursor, "status");
        final int _cursorIndexOfRole = CursorUtil.getColumnIndexOrThrow(_cursor, "role");
        final List<RequestEntity> _result = new ArrayList<RequestEntity>(_cursor.getCount());
        while (_cursor.moveToNext()) {
          final RequestEntity _item;
          final String _tmpId;
          _tmpId = _cursor.getString(_cursorIndexOfId);
```

```
          final String _tmpItemName;
          _tmpItemName = _cursor.getString(_cursorIndexOfItemName);
          final String _tmpRequester;
          _tmpRequester = _cursor.getString(_cursorIndexOfRequester);
          final String _tmpStatus;
          _tmpStatus = _cursor.getString(_cursorIndexOfStatus);
          final String _tmpRole;
          _tmpRole = _cursor.getString(_cursorIndexOfRole);
          _item = new
RequestEntity(_tmpId,_tmpItemName,_tmpRequester,_tmpStatus,_tmpRole);
          _result.add(_item);
        }
        return _result;
      } finally {
        _cursor.close();
      }
    }
    @Override
    protected void finalize() {
      _statement.release();
    }
  });
 }
 @Override
 public LiveData<List<RequestEntity>> getAllRequests() {
  final String _sql = "SELECT * FROM requests ORDER BY id DESC";
  final RoomSQLiteQuery _statement = RoomSQLiteQuery.acquire(_sql, 0);
  return __db.getInvalidationTracker().createLiveData(new String[] {"requests"}, false, new
Callable<List<RequestEntity>>() {
    @Override
    @Nullable
    public List<RequestEntity> call() throws Exception {
      final Cursor _cursor = DBUtil.query(__db, _statement, false, null);
```

```
      try {
        final int _cursorIndexOfId = CursorUtil.getColumnIndexOrThrow(_cursor, "id");
        final int _cursorIndexOfItemName = CursorUtil.getColumnIndexOrThrow(_cursor,
"itemName");
        final int _cursorIndexOfRequester = CursorUtil.getColumnIndexOrThrow(_cursor,
"requester");
        final int _cursorIndexOfStatus = CursorUtil.getColumnIndexOrThrow(_cursor, "status");
        final int _cursorIndexOfRole = CursorUtil.getColumnIndexOrThrow(_cursor, "role");
        final List<RequestEntity> _result = new ArrayList<RequestEntity>(_cursor.getCount());
        while (_cursor.moveToNext()) {
          final RequestEntity _item;
          final String _tmpId;
          _tmpId = _cursor.getString(_cursorIndexOfId);
          final String _tmpItemName;
          _tmpItemName = _cursor.getString(_cursorIndexOfItemName);
          final String _tmpRequester;
          _tmpRequester = _cursor.getString(_cursorIndexOfRequester);
          final String _tmpStatus;
          _tmpStatus = _cursor.getString(_cursorIndexOfStatus);
          final String _tmpRole;
          _tmpRole = _cursor.getString(_cursorIndexOfRole);
          _item = new
RequestEntity(_tmpId,_tmpItemName,_tmpRequester,_tmpStatus,_tmpRole);
          _result.add(_item);
        }
        return _result;
      } finally {
        _cursor.close();
      }
    }
    @Override
    protected void finalize() {
      _statement.release();
```

```
      }
    });
  }

  @NonNull
  public static List<Class<?>> getRequiredConverters() {
    return Collections.emptyList();
  }
}
```

APPENDIX-B
SCREENSHOTS

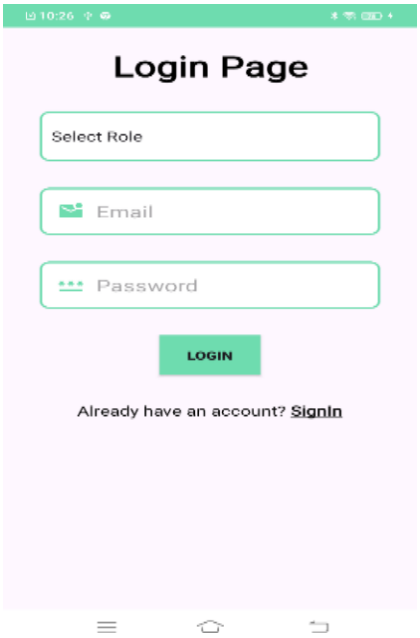

Fig A-B-1 Title: "Login Page"

Fig A-B-2 Title: "Admin Page"

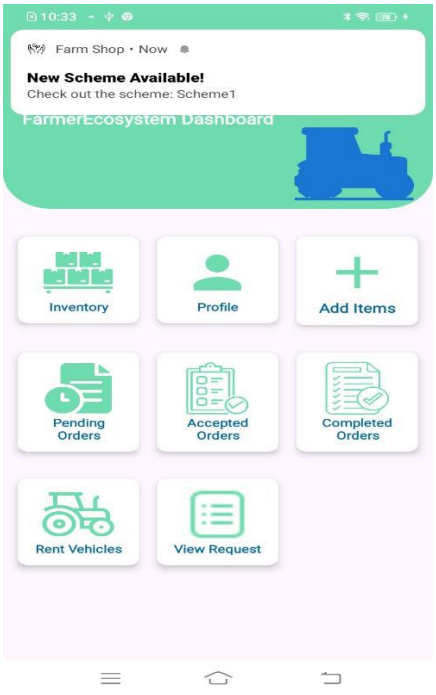

Fig A-B-3 Title: "Farmer Page"

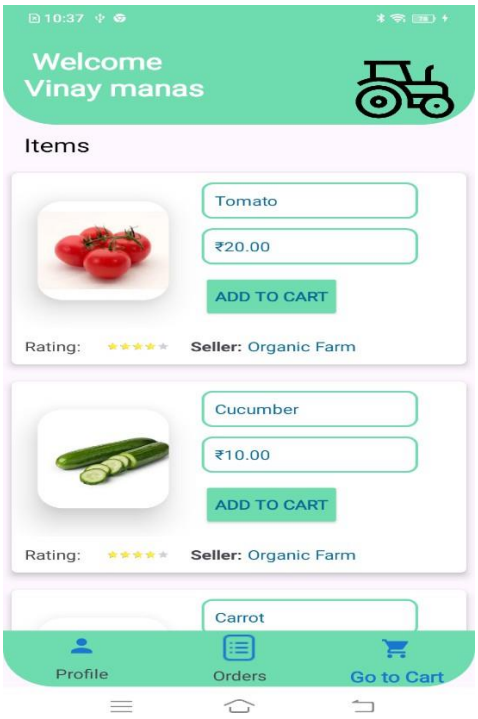

Fig A-B-4 Title: "User Page"

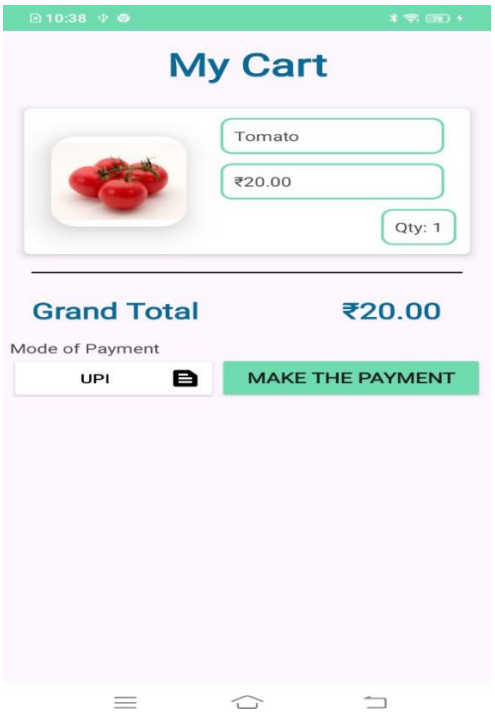

Fig A-B-5 Title: "Payment Page"

APPENDIX-C
ENCLOSURES

1. Journal publication/Conference Paper Presented

Certificates of all students.

International Journal of Scientific Research and Engineering Trends (IJSRET)

This is to certify that
C Vinay Kumar Reddy
has published a paper entitled
"Uplifting a Farmer through Connected Ecosystem"
in International Journal of Scientific Research and Engineering Trends, in volume 11, Issue 01, Jan-Feb, 2025.

Editor-in-Chief
IJSRET
www.ijsret.com
ISSN : 2395-566X

International Journal of Scientific Research and Engineering Trends (IJSRET)

This is to certify that
P Monish
has published a paper entitled
"Uplifting a Farmer through Connected Ecosystem"
in International Journal of Scientific Research and Engineering Trends, in volume 11, Issue 01, Jan-Feb, 2025.

Editor-in-Chief
IJSRET
www.ijsret.com
ISSN : 2395-566X

2. Similarity Index / Plagiarism Check report clearly showing the Percentage (%). No need for a page-wise explanation.

Rohini - Uplifting a farmer through a connected ecosystem research paper V1

ORIGINALITY REPORT

8%	4%	6%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Niket Chauhan, M. Krishnakanth, G. Praneeth Kumar, Prerna Jotwani, Utkarsh Tandon, Abhishek Gosh, Nishant Garg, Santhi V.. "Crop Shop – An application to maximize profit for farmers", 2019 International Conference on Vision Towards Emerging Trends in Communication and Networking (ViTECoN), 2019 Publication	1%
2	rda.sliit.lk Internet Source	1%
3	Aina Marie Joseph, Nurfauza Jali, Amelia Jati Robert Jupit, Suriati Khartini Jali. "eMarket for Local Farmers", 2021 IEEE 19th Student Conference on Research and Development (SCOReD), 2021 Publication	1%
4	ir.unimas.my Internet Source	1%
	Submitted to University of Westminster	

3. Details of mapping the project with the Sustainable Development Goals (SDGs).

Good Health and Well-being. By leveraging digital platforms, farmers can gain better access to essential health services such as telemedicine, health education, and wellness resources, bridging gaps in healthcare delivery and promoting healthier outcomes. Additionally, educating farmers on sustainable agricultural practices enhances productivity while minimizing exposure to harmful chemicals, thereby improving their physical well-being. Such an ecosystem can also empower farmers to cultivate diverse and nutritious crops, fostering nutritional security within their communities and combating malnutrition. Moreover, economic stability achieved through market linkages, fair pricing, and access to financial resources reduces stress and supports mental health, ensuring a holistic improvement in farmers' lives.