Android app to connect farmers to farmers & agricultural machinery rental business

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Abstract — This proposal helps farmers to rent modern machinery and equipment for agriculture and can also rent a place for storing crop fields as per their requirements. The app can also be linked to the government server to track the record of the crops the fertilizers they used, the government-aided funds, etc. We need to maintain a database for machinery and equipment availability data for this. And details of the availability of space for storing crops. In India, most of the population is dependent on farming for survival. Many farmers are unaware of the outside world and the technical advancement of farming. Most of the farmers don't have any idea about the rates of the crops and their products and they sell their products at any cost. In today's world, farmers get news through newspapers and television. The farmer does not get the information or news about the nearest market that is present in their region. In the end, they have to sell their products at a very low cost. So we are creating a platform for farmers who are using smartphones where they can get real-time updates about the vegetable, and fruit rates of every market in India and they will be a to sell their products at the proper rates. Our application gives a feature where all the farming-related notices from the government will be added and farmers will get proper information about different schemes. Depending upon certain market conditions we are predicting the Rates of the vegetables and fruits. Also, we are adding the feature of weather information which will help farmers to plan for the next 2-3 days

Keywords— Android, MySql, Smartphone, Weather forecasting, Market Rates, Vegetables

I. INTRODUCTION

India is an agricultural country. About 70% of our population depends on agriculture. One-third fraction of our National income comes from agriculture. The development of agriculture has much to do with the economic prosperity of our country. In the upcoming years, agriculture will see vital changes. The huge majority of Indian farmers, which includes minor producers are often unable to access the information and technological resources that could increase the yield and lead to better prices for their crops and products. The data regarding farming are available from many sources like printed media, audio and visual aids, newspapers, TV, internet, mobile, etc. but the structure and structures of data are variant. So it's very hard for farmers to get the information and to understand the various information which are disseminated from various sources. Sometimes many manual steps are required while processing data for transforming data from one format to another. In India, Many farmers are unaware of the outside world and the technical advancement of farming. Most of the farmers don't have any idea about the rates of the crops and their products and they sell their products at any cost. In today's world, farmers get news through newspapers and television. But not every farmer has time to read a newspaper or they don't watch TV as they don't have so much time to sit in front of the TV for some time. Because of that they don't get any idea about the current values of the farming schemes in the end they have to sell their products at very low cost. And because they get very little money, they end up taking loans from the bank or any other person on interest.

1) The first part introduction : This new mobile artifact not just topples the traditional business model of mobile industry, yet in addition makes new avenues of mobile market opportunities . application advancement is a relatively new phenomenon that is expanding quickly because of the popularity and the prevalence of cell phones among end-users . The mobile app marketplace is highly competitive . Cell

phones and applications give critical favourable circumstances to their clients, regarding compactness, location awareness, and accessibility . As smartphone's computing power keeps on developing and as mobile applications (apps) keep on dominating digital engagement, applications have turned into new frontiers for propelling field experiment methodology

2) The Second Part: Basic Models and Methods

-You can contact the resident directly through the app after shortlisting a property. This app provides a platform where residents and potential tenants can share their location, find contacts in their locality, and chat with them. It also allows you to sign up to find suitable visitor to share a rental with.

-Training & texting model

3) The Third Part: Introducing the Attention Mechanism

Application for agriculture can help farmers manage their farms more efficiently by providing real-time information on weather conditions, soil quality, and crop management. This information can help farmers make better decisions about when to plant and harvest their crops.

4) The Fourth Part: Datasets, Evaluation, and Comparative Analysis

Support vector machine works by depict data to a high-dimensional feature space so that data points can be categorized, even when the data are not otherwise linearly separable. A separator between the groups is found, then the data are transformed in such a way that the separator could be drawn as a hyperplane.

5) The Fifth Part: Summarizing Existing Work and Charting the Future

With our application, you will have all the agricultural content you need in one place. Whether you need poultry, pigs, dairy, feed, or precision farming content, this is the application you need. With our app, the articles are very easy to read on your mobile device with our reading view.

II. Importance of technology:

The use of technology, specifically Android applications, to connect farmers to each other and to agricultural machinery rental businesses can have several significant benefits for the agriculture industry. Some of the key advantages include:

1) Enhanced Connectivity: Android apps can facilitate a seamless connection between farmers, enabling them to share knowledge, resources, and experiences. This can lead to the creation of a supportive and collaborative farming community, fostering the exchange of best practices and information.

2) Improved Access to Machinery: By utilizing an Android app, farmers can easily access agricultural machinery rental services, which can be crucial for enhancing productivity and efficiency. This increased accessibility can help small-scale farmers gain access to expensive or specialized equipment that they might not be able to afford otherwise.

3)Increased Efficiency: Technology-enabled connectivity and machinery rental can significantly improve the overall efficiency of farming operations. By streamlining the process of finding and renting machinery, farmers can save time and resources, ultimately leading to increased productivity and improved yields.

4) Knowledge Sharing: Android apps can serve as platforms for farmers to share their experiences, expertise, and innovative farming techniques. This knowledge-sharing aspect can contribute to the adoption of modern agricultural practices, leading to improved crop quality and quantity.

5) Cost Reduction: By facilitating the sharing of resources, Android apps can help reduce overall operational costs for farmers. Access to shared machinery can eliminate the need for individual investments in expensive equipment, enabling farmers to allocate their resources more effectively.

6) Market Access: Through technology-driven platforms, farmers can gain better access to markets for their produce. Android apps can provide valuable information on market trends, prices, and demand, helping farmers make informed decisions about what and when to produce, leading to better market integration and higher profitability.

III. LITERATURE SURVEY

Anand Vijay K M [1] In agriculture-based countries, crop development is the main source of economy-generating fields, and farmers depend on crop fields for survival. This paper aims to improve crop production for better yield by developing a system with a sensor stack such as a soil moisture sensor and temperature sensor to sense the moister and temperature of the soil in the crop fields, and water is supplied according to the sensor information, and with the help of RFID tag geofencing is provided to the crop areas from animals and unauthorized person's entry, if entry is there alert is given to the farmer by alarming.

Ramide Augusto Sales Dantas [2] Smart agriculture requires new hardware and software solutions to achieve its goals of improved productivity. The SWAMP project expands a platform for smart water management using IoT, cloud and fog computing, and machine learning. The app improves farmers' situation awareness regarding water status by showing current and past moisture data from the fields, including map and chart views.

Junjin Chen [3] The mobile Internet provides a strong innovation power for improving the level of agricultural informatization, promoting the structural reform of the agricultural supply side, accelerating the realization of agricultural modernization, and integrating the foundation of building a moderately prosperous society in an all-round way. Based on the UTAUT theoretical model, this paper constructs an agricultural APP information adoption behavior model and uses the empirical method of the questionnaire and structural equation to test the relationship between the influencing factors of agriculture APP information adoption behavior.

Joe Marie D. Dormido [4] The agricultural sector in the Philippines is important in economic development. It helps supply crop products to the group and provides major employment in rural areas. But lately, the farmers are facing problems due to the low price value of crops produced locally because of high importation from the neighboring Asian countries. Most farmers belong to the marginal sector of the community and are sometimes given less importance in government support. Thus, the demand for food products increase rapidly as the population increases.

S. Aravindh Kumar and C. Karthikeyan [5] Smartphones can be regarded as one of the greatest inventions of this century and have become inseparable gadgets from everyone's pocket. The dispersion of smartphones has been expanding more rapidly due to its means for communication, gaming, education, entertainment, technical support, information, day-to-day news coverage, and trading and business. Mobile apps are software programs designed to run on smartphones

and other devices. There is a need for the design and development of a mobile application for farmers, students, and agriculture experts with the improvisation of content/features in both educational and advisory services.

Amos Gichamba [6] The number of Agriculture apps has steadily increased over the last 10 years in Kenya. The availability of mobile technology among a large portion of the population has created an opportunity to deploy mobile-based services among smallholder farmers. These platforms have been deployed in different areas of the country targeting smallholder farmers practicing various forms of agriculture including crop and livestock farming.

Arshad P Muhammed, Shon C J, Shemeera P S, Arya P Muralidharan, Veena K Viswam [7] Nowadays, everyone is familiar with smartphones including farmers. Mobile phones play an indispensable role in the daily life of people. The use of traditional methods in farming results in slow progress. People can see the advantages of using better approaches to cultivate crops with the tools and technologies that support farming are yet to move into the agricultural field. Farmers are mainly not aware of the technical advancements in farming and they are unable to know the rates of the crops and the products they sell.

Prakash Pattan, Aditi A Maski, Aishwarya Patil [8] In India most of the population depends on agriculture and it is the backbone of the Indian economy. Agriculture is generally said to be an uncertain profession in terms of yeild due to various reasons. The most prominent reason apart from natural calamity is the lack of information in scientifically practicing agriculture.

IV. EXISTING SYSTEM

EXISTING SYSTEM (Farmer app):

Market Research: Manage thorough market research to understand the needs and desires of your target audience. Identify the pain points in the existing system and find out how your app can provide a better solution.

Conceptualization and Planning: Define the features and functionalities of your app. This should include user registration, profile creation, machinery listing, location-based services, communication channels, secure payment gateways, and more.

Development: Choose the appropriate technology stack and development framework for your app. If you are not proficient in Android app development, consider hiring experienced developers or a reputable app development company.

Features and Functionalities:
User Registration and Authentication: permit users to create accounts and authenticate themselves.
User Profiles: Enable users to create detailed profiles with information about their farming activities and machinery.

Machinery Listing: Provide a platform for farmers to list their available machinery for rent, along with specifications, availability, and rental rates.

Search and Filter: Implement advanced search and filter options to help users find specific machinery or other farmers based on location, availability, and more.

Communication: Include a secure messaging system that allows users to communicate with each other to discuss rental terms, farming tips, or any other relevant topics.

Reviews and Ratings: Incorporate a review and rating system to help users make informed decisions about renting machinery or collaborating with other farmers.

Payment Integration: Integrate a secure payment gateway to facilitate transactions between users for machinery rentals and other services.

Testing: Thoroughly test the app to ensure that it functions smoothly, without any glitches or bugs. Conduct both alpha and beta testing to gather feedback from a select group of users and make necessary improvements.

Launch and Marketing: Launch the app on the Google Play Store and implement a comprehensive marketing strategy to reach your target audience. Utilize social media, content marketing, and other promotional channels to create awareness and drive app downloads.

V. ARCHITECTURAL DIAGRAM

android application user interface
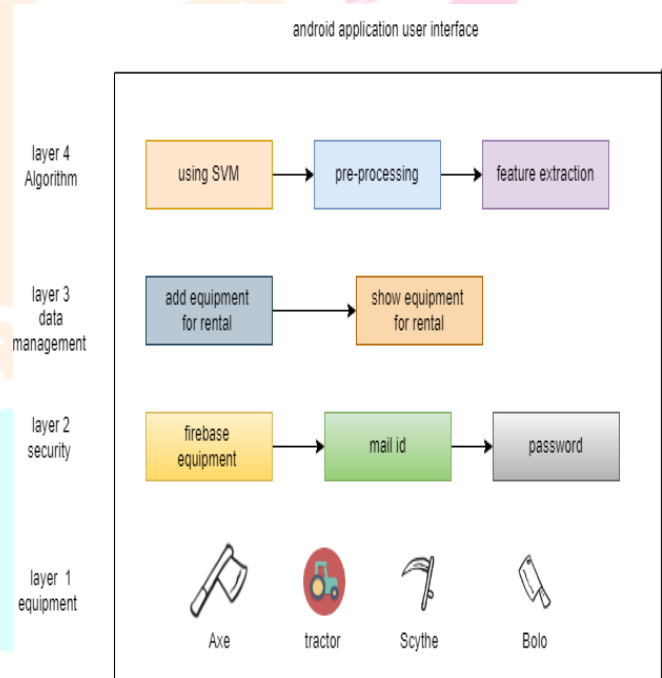
Layer 1:- Equipment in rental

Agricultural equipment plays a vital role in modern farming practice. Tractors serve as multipurpose workhorses, aiding in tasks such as plowing, planting, and transporting materials. Balers efficiently compress harvested crops, such as hay or straw, into compact bales for storage and transportation. Combines revolutionize harvesting by cutting, threshing, and cleaning grains in one operation. Plows, both traditional and modern, prepare the soil by turning it over, breaking it up, and incorporating nutrients. Mowers help maintain fields by cutting down grass or crops. Planters precisely distribute seeds in prepared soil, ensuring optimal spacing for healthy crop growth. Sprayers facilitate pest control and fertilization,

enhancing crop yield and quality. Despite technological advancements, the traditional hand tool, the axe, remains useful for various farm tasks such as clearing land, trimming trees, and processing wood. Collectively, these equipment foster efficient and sustainable agricultural practices, contributing to global food security and the economy.

Layer 2 :- Security

firebase authentication :- Firebase Authentication direct to make building secure authentication systems easy, while improving the sign-in and onboarding experience for end users. It provides an end-to-end identity solution, supporting email and password accounts, phone auth, and Google, Twitter, Facebook and more.

Mail id:- An email ID or address is an identifier of electronic mail aka email sent over the internet. Similar to physical mail, email requires an address for both the sender and receiver. Since the 1980s, all email addresses have been following the same format: a distinctive name followed by @ and the domain name.

Password:- Your password are saved in your Google Account. To view a list of accounts with saved passwords, go-to passwords.google.comorview your passwords in Chrome. To view passwords, you require to sign in again.

Layer 3:- Data management

Add equipment for rental :- Rental equipment is typically classified as an operating expense, as it is necessary for the day-to-day operations of the business. This is the most ordinary expense category for rental equipment, and is typically the most straightforward to classify.

Show equipment for rental:- Equipment rental, also called plant hire in some countries (in the UK for instance), is a service industry providing machinery, equipment and tools of all kinds and sizes.

Layer 4:- Algorithm

SVM Algorithm :- SVM is a powerful supervised algorithm that works best on smaller datasets but on complex ones. Support Vector Machine, abbreviated as SVM can be used for both regression and classification tasks, but generally, they work good in classification problems.

Pre-processing :-
- Remove any blank rows in Data.
- Word Tokenization.
- Remove Stop words.
- Remove Non-alpha text.
- Word Lemmatization.

Feature extraction :- In developing a successful SVM forecaster, feature extraction is the first important step. This paper proposes the applications of principal component analysis , kernel principal component analysis and independent component analysis to SVM for feature extraction.

VI. RESEARCH METHODOLOGIES

Developing an Android app that connects farmers and facilitates agricultural machinery rentals requires comprehensive research methodologies to ensure the app's efficacy, user-friendliness, and relevance. Below are some research methodologies that can be employed during the development process:

User Surveys and Interviews: Conduct surveys and interviews with farmers to understand their specific needs, challenges, and preferences when it comes to connecting with other farmers and renting agricultural machinery. This will provide valuable insights into the features and functionalities that would be most beneficial to them.

Competitive Analysis: Analyze existing agricultural apps and platforms to identify their strengths, weaknesses, and areas for improvement. This research will help in understanding the market landscape, identifying unique selling points, and incorporating innovative features into your app.

Focus Groups: Organize focus groups comprising farmers and agricultural experts to gather feedback on app prototypes, user interface designs, and feature ideas. These sessions can provide in-depth insights into the usability and functionality of the app from the perspective of the end users.

Pilot Studies: Conduct pilot studies in specific farming communities or regions to test the app's performance, usability, and overall effectiveness in addressing the needs of farmers. Collect feedback from the participants to make necessary improvements before launching the app on a larger scale.

Data Analysis: Analyze agricultural data, market trends, and industry reports to understand the prevalent challenges faced by farmers, the demand for machinery rentals, and the regional variations in farming practices. This analysis will help in designing targeted features and services that cater to the specific requirements of different farming communities.

Technology Assessment: Stay updated with the latest technological advancements in the agricultural sector, including IoT devices, precision farming tools, and agricultural automation. Evaluate how these technologies can be integrated into the app to enhance its functionality and provide added value to the users.

Regulatory Compliance Research: Research the regulatory framework and policies governing the agricultural sector, including regulations related to machinery rentals, data privacy, and user safety. Ensure that the app complies with all relevant laws and guidelines to avoid any legal issues in the future.

VII. ALGORITHM

1. Load the important libraries.
2. Import the dataset and extract the X variables and Y separately.
3. Divide the dataset into train and test.
4. Initializing the SVM classifier model.
5. Fitting the SVM classifier model.
6. Coming up with predictions.
7. Termination of the System

VIII. FLOW DIAGRAM OF PROPOSED WORK
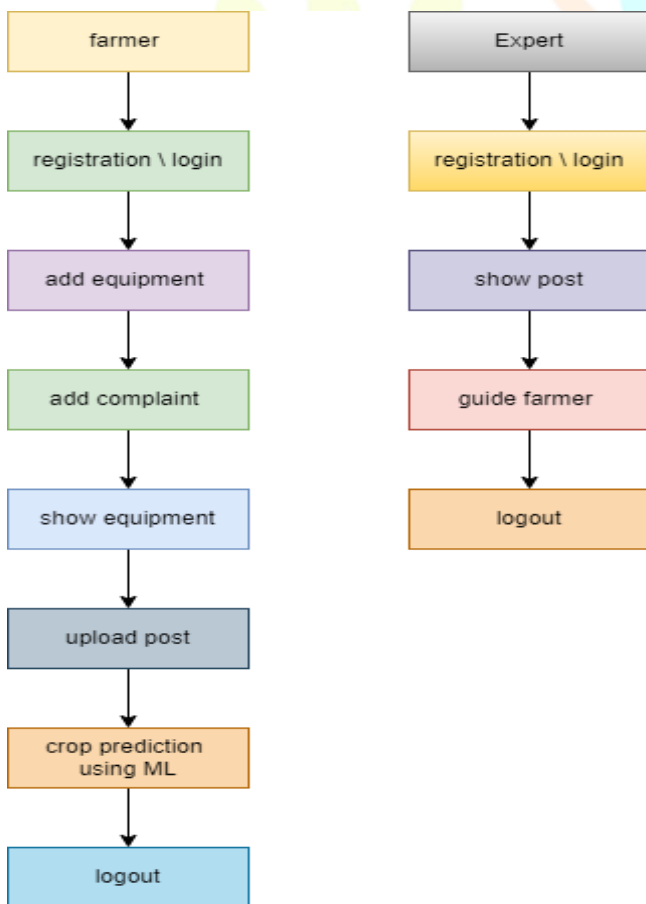
FLOW DIAGRAM OF THE PROPOSED SYSTEM

The proposed Android app aims to connect farmers and facilitate agricultural machinery rental. The flow begins with farmer registration and machinery listing. Farmers can then connect with each other or rent machinery. Rental transactions are recorded, and farmers can review their rental history. The app promotes efficient farming practices and community collaboration.

IX. ADVANTAGES OF THE PROPOSED MODEL

Increased Efficiency:
1) The app can significantly improve the efficiency of agricultural operations. Farmers can quickly find nearby farmers who offer specific services or have the required machinery, reducing downtime and delays.
2) Resource Optimization:
 - By sharing agricultural machinery, farmers can reduce their capital investments, making better use of available resources and saving costs.
3) Access to Modern Equipment:
- Smaller-scale or resource-constrained farmers who might not afford expensive machinery can access modern and efficient equipment through rentals.
4) Cost Reduction:
- Renting machinery when needed can be more cost-effective than purchasing and maintaining equipment. This can be especially beneficial for seasonal or one-off tasks.
5) Income Generation:
- Farmers who own machinery can generate extra income by renting it out when they are not using it.
6) Community Building:
- The app fosters a sense of community among farmers. It encourages cooperation, collaboration, and networking among agricultural stakeholders.
7) Increased Agricultural Productivity:
-With access to proper machinery, farmers can increase their productivity, leading to higher crop yields and, ultimately, higher income.
8) Data and Insights:
-The app can collect valuable data on equipment availability, demand, and utilization. This data can be used for future planning and improving the efficiency of the agricultural sector.
9) Reduced Environmental Impact:
- Shared machinery reduces the need for multiple farmers to own and operate similar equipment, which can lead to more sustainable farming practices and a reduced environmental footprint.
10) Market Expansion:
- For those offering machinery rentals, the app can help them reach a broader market and increase their customer base.
11) Streamlined Communication:
- The app provides a centralized platform for communication and coordination among farmers, reducing the complexity of arranging rentals or services.
12) Customization and Rating System:
- The app can allow users to customize their search criteria, such as location, equipment type, and price. Additionally, it can incorporate a rating and review system to establish trust and reliability.
13) Support for Rural Communities:
- In regions with predominantly rural and agricultural economies, the app can contribute to economic development and improved livelihoods.
14) Time Saving:
- Finding and renting machinery or services through the app can save time for farmers who would otherwise spend hours or days searching for available resources.By bridging the gap between farmers and machinery rentals, the proposed Android app has the potential to modernize agriculture,

improve resource utilization, and enhance the livelihoods of farming communities. It offers an efficient, cost-effective, and community-driven approach to agricultural operations.

X. CONCLUSION

Farmers will derive greater benefits when they can make better decisions about where to sell their output after getting market prices for a variety of local and distant markets and societal problems in the agriculture sector. It would assist in protecting the crops in different weather and the main approach is for buying and selling of the crops, which helps the farmer to sell the product and get a better profit rate than the markets. The transport feature helps the farmer to share a ride with other people who are taking the same route. The compensation is distributed resulting in profit to the farmers. We have used modern tools and platforms like Android Studio and Firebase. During the development, we have understood the importance of individual and teamwork during project development and management. While presenting our project in various seminars we have enhanced our communication skills and displayed professional ethics which will result in lifelong learning.

XI. FUTURE SCOPE

1) Marketplace Expansion: Gradually expand the platform to cover a wider geographic area. Initially, you can start with a particular region and then scale to a national or even international level.
2) Crop-Specific Services: Integrate features that cater to specific crops or agricultural practices. For example, provide information and resources tailored to the needs of rice, wheat, cotton, or any other prevalent crop in your target area.
3) Weather Forecast Integration: Include real-time weather data and forecasts to help farmers plan their activities better. This can be especially crucial for crop planting and harvesting.
5) Agricultural Expertise: Offer access to agricultural experts or consultants who can provide advice on crop management, pest control, and more.
6) Mobile Payment Integration: Enable secure mobile payment options to facilitate machinery rentals and transactions within the app.
7) IoT Integration: Consider incorporating IoT devices like soil moisture sensors, weather stations, or GPS trackers to provide farmers with real-time data and insights.
8) Agricultural Equipment Reviews: Allow users to rate and review agricultural equipment and services to help others make informed decisions.
9) Community Building: Develop features for creating a strong community within the app, including discussion forums, chat, and user-generated content. This can help farmers share knowledge and experiences.
10) Offline Capabilities: Many rural areas may have limited internet connectivity. Ensure your app has offline capabilities, allowing users to access critical information even without a stable internet connection.
11) Subscription Models: Implement premium features for users who want more advanced services or insights, generating revenue for the app.
12) Local Language Support: If your target audience primarily speaks regional or local languages, offer multilingual support to make the app more accessible.

13) Government Subsidy Information: Provide information about government agricultural subsidies and support programs to help farmers access financial assistance.
14) Sustainable Farming Practices: Promote sustainable farming practices, such as organic farming, no-till farming, or precision agriculture, through educational content and tools.
15) Partnerships: Collaborate with agricultural organizations, co-operatives, and other stakeholders in the agricultural sector to expand your network and improve the value of your app.
16) Machine Learning for Price Prediction: Implement machine learning algorithms to predict commodity prices, helping farmers make informed decisions about when to sell their produce.
17) Supply Chain Integration: Connect farmers with local markets, wholesalers, and retailers to streamline the supply chain, reducing waste and improving profitability.
18) Insurance Integration: Partner with insurance companies to offer crop insurance services within the app, providing financial security to farmers.
19) Sustainability Metrics: Develop tools to help farmers track and improve sustainability metrics, such as water usage, carbon footprint, and soil health.

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