FarminGo App

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ABSTRACT

Agriculture is the backbone of the Indian economy, and access to fertilizers plays a crucial role in increasing crop yield and productivity. However, farmers often face challenges in obtaining the right fertilizers at the right time due to supply chain issues, unavailability, and high costs. Our project proposes a mobile application that connects farmers with fertilizer suppliers, ensuring a streamlined and efficient delivery system. The app integrates real-time tracking, price comparison, and direct farmer-to-supplier communication, reducing dependency on intermediaries and enhancing accessibility. The system employs machine learning algorithms to suggest the best fertilizers based on soil health and crop type. This innovation aims to improve agricultural efficiency, reduce costs, and promote sustainable farming practices.

Keywords: Fertilizer Delivery, Mobile Application, Agriculture, Machine Learning, Farmer Assistance.

I.   INTRODUCTION

Agriculture plays a very important role in India, and farmers rely on fertilizers to improve soil quality and increase their crop production. However, many small-scale farmers face difficulties in getting fertilizers when they need them. These challenges include problems in the supply chain, high costs, and a lack of availability in local markets.

In recent times, farmers have been struggling even more due to irregular supply, hoarding, and price fluctuations of fertilizers. Many face long waiting times at government distribution centers, while private sellers often charge higher prices. Additionally, fake or low-quality fertilizers are being sold in some markets, causing further losses to farmers. These issues make it harder for them to access the right fertilizers at the right time, affecting their crop production and income.

To solve this issue, we are proposing a Fertilizer Delivery App that will help farmers connect directly with trusted suppliers. This app will make it easy for farmers to find and order the fertilizers they need without any hassle. It will provide clear pricing, ensure timely delivery, and offer expert advice on how to use fertilizers effectively.

By using this technology, we aim to simplify the fertilizer-buying process and support farmers, whether they are in rural or urban areas. This app will help farmers save time, reduce costs, and improve their agricultural productivity.

II.   LITERATURE SURVEY

Credit Card Transaction Based on Face Recognition Technology (TDhikhi, Ajay Rana,Anurag Thakur and Karan

In recent years, many studies have explored how technology can help farmers get the supplies they need more easily. Researchers have looked into different digital solutions, such as online marketplaces, smart farming apps, and automated systems, to improve the agricultural supply chain. These solutions aim to make farming more efficient, reduce costs, and help farmers make better decisions about fertilizers and crop management.

- **Online Market Place For Farming Supplies**

Many e-commerce platforms have been developed to help farmers buy seeds, fertilizers, and pesticides online. Apps like AgroStar, DeHaat, and BigHaat allow farmers to order farming products without needing to visit physical stores. These platforms help farmers find the right products, compare prices, and get them delivered to their location. However, these marketplaces mostly work as online stores and do not provide personalized fertilizer recommendations based on soil type or crop needs.

- **AI Based Farming Advice**

Some apps use Artificial Intelligence (AI) to give farmers smart recommendations. For example, apps like Krishi Network and Plantix help farmers understand what their crops need by analyzing soil quality, weather

conditions, and plant health. These apps are useful for giving advice, but they do not provide direct access to fertilizers or guarantee their availability when needed.

- **Smart Farming with IoT Technology**

Internet of Things (IoT) technology has also been introduced in farming to monitor soil conditions and optimize fertilizer use.

Sensors placed in the soil can measure moisture levels and nutrient content, helping farmers decide when and how much fertilizer to use. However, these advanced systems are expensive and not easily affordable for small-scale farmers.

- **The Gap in Existing Solutions**

Although these digital solutions have helped farmers in different ways, there is still a missing piece. Farmers often struggle to find fertilizers when they need them, get the right type for their crops, and afford timely delivery. Most existing apps focus on either selling fertilizers or providing advice, but they do not combine both services into a single, easy-to-use platform

III. METHODOLOGY

To develop the Fertilizer Delivery App, we follow a structured approach that ensures efficiency, usability, and accessibility for farmers. Our methodology consists of several key stages, from research and design to implementation and testing.

1. Research and Requirement Analysis

The first step is to understand the challenges farmers face in accessing fertilizers. We conduct surveys, interviews, and case studies with farmers, suppliers, and agricultural experts to gather insights. This helps us identify important factors such as pricing, delivery issues, and the need for expert recommendations.

2. System Design and Planning

Based on the research findings, we create a blueprint of the app. This includes:

- Designing the user interface (UI) to ensure easy navigation for farmers.
- Defining key features such as product browsing, AI-based recommendations, and real-time order tracking.
- Planning the backend system for secure data storage and smooth transactions.

3. Development Phase

In this stage, we start building the application by integrating different components:

- User Registration: Farmers and suppliers register using mobile authentication.
- Fertilizer Selection: Farmers can browse fertilizers, compare prices, and check reviews.
- AI-Based Recommendations: The app suggests the best fertilizers based on soil type, crop selection, and weather conditions.
- Order Management: Farmers can place orders and track their delivery in real time.
- Payment System: Multiple payment options such as UPI, net banking, and cash on delivery are added.

4. Testing and Quality Assurance

Before launching the app, we conduct rigorous testing to ensure it functions smoothly. Testing includes:

- User Testing: Farmers and suppliers try the app and provide feedback.
- Performance Testing: We check how the app works under different conditions, such as slow internet connections.
- Security Testing: To protect user data and ensure secure transactions.

5. Deployment and Launch

After successful testing, we launch the app for public use. Initially, we introduce it in selected regions and collect user feedback to make improvements.

6. Maintenance and Updates

Even after launch, we continue improving the app based on user feedback. Regular updates introduce new features, fix bugs, and enhance security.

This step-by-step methodology ensures that our Fertilizer Delivery App is user-friendly, reliable, and beneficial for farmers, making fertilizer procurement easier and more efficient.

IV.   SYSTEM IMPLIMENTATION

To develop the **Fertilizer Delivery App**, we use modern technologies that ensure smooth performance, scalability, and ease of use. The system is built using the following key components:

- **Frontend Development:** The mobile app is developed using **React Native**, which allows it to work on both Android and iOS devices. This ensures that farmers can access the app regardless of the type of smartphone they use.

- **Backend Development:** The backend is powered by **Node.js** with **Express.js**, which efficiently handles user requests, processes orders, and manages communication between the app and the database.

- **Database Management:** We use **Firebase** as the database to store and manage real-time data, including user accounts, fertilizer details, orders, and transaction history. Firebase ensures fast data retrieval and synchronization across devices.

- **AI-Based Recommendations:** The app includes a fertilizer recommendation system powered by **TensorFlow**, a machine-learning framework. It analyzes soil type, crop selection, and weather conditions to suggest the most suitable fertilizers for farmers.

- **Maps & Tracking:** To help farmers track their orders, the app integrates **Google Maps API**, which provides real-time delivery tracking and helps optimize delivery routes for efficient logistics.

Implementation Process

1. App Development:

- The frontend and backend are developed simultaneously to create a seamless user experience.

- UI/UX design focuses on simplicity and ease of use for farmers, ensuring smooth navigation and accessibility.

2. Database Integration:

- Firebase is connected to store and retrieve user information, orders, and fertilizer details.

- Security measures such as authentication and data encryption are implemented to protect user data.

3. AI Model Training & Integration:

- The AI recommendation system is trained using agricultural data, including soil types, crop requirements, and weather conditions.

- The model is integrated into the app to provide real-time fertilizer suggestions to farmers.

4. Testing & Quality Assurance:

- Functional testing is conducted to ensure all features work as expected.

- User testing is performed with a group of farmers to gather feedback and make necessary improvements.

- Performance testing is done to check how the app functions under different network conditions.

5. Deployment & Launch:

- The app is launched in select regions first to analyze user engagement and troubleshoot any issues.

- Marketing strategies, including awareness campaigns for farmers, are implemented to promote app adoption.

6. Maintenance & Updates:

- Regular updates are provided to improve functionality and user experience.

- New features and security enhancements are introduced based on user feedback.

This step-by-step implementation ensures that the **Fertilizer Delivery App** is reliable, secure, and effective in solving the challenges faced by farmers when purchasing fertilizers.

V.   ALGORITHM USED

The **Fertilizer Delivery App** uses a combination of algorithms to ensure smooth functioning, efficient recommendations, and accurate tracking. Below are the key algorithms integrated into the system:

1. AI-Based Fertilizer Recommendation Algorithm

To help farmers choose the right fertilizer, the app uses a **Machine Learning (ML) algorithm** based on **TensorFlow**. The recommendation system follows these steps:

- **Input Data:** The algorithm takes inputs such as soil type, crop selection, weather conditions, and past farming patterns.

- **Data Processing:** It cleans and organizes the data for analysis.

- **Model Training:** The system uses historical data from agricultural experts to train the AI model.

- **Prediction:** Based on input data, the AI model suggests the best fertilizers, their quantity, and application method.

- **Continuous Learning:** The model improves over time by learning from user feedback and real-world results.

This algorithm ensures that farmers receive accurate, data-driven fertilizer recommendations for better crop yields.

2. Order Matching and Optimization Algorithm

The app uses an **order matching algorithm** to connect farmers with the nearest fertilizer suppliers. The process includes:

- **Checking Availability:** The system searches for available fertilizers in nearby warehouses.

- **Price Comparison:** It compares prices from multiple suppliers to find the best deal.

- **Supplier Selection:** The app selects the most efficient supplier based on stock availability, distance, and user preferences.

This algorithm ensures timely delivery while keeping costs low for farmers.

3. Delivery Route Optimization Algorithm

To make the delivery process faster and more efficient, the app integrates a **route optimization algorithm** using the **Google Maps API**. The steps include:

- **Identifying Delivery Locations:** The system maps out the farmer's location and available delivery routes.

- **Traffic and Distance Calculation:** It analyzes real-time traffic conditions and calculates the shortest or fastest route.

- **Route Adjustment:** If traffic conditions change, the algorithm updates the route dynamically.

This algorithm helps reduce delivery time, fuel costs, and ensures farmers receive their fertilizers without unnecessary delays.

4. Secure Payment Processing Algorithm

For handling payments securely, the app uses an encryption-based **payment processing algorithm** that:

- **Verifies Transactions:** Ensures the payment details are correct before processing.

- **Encrypts Data:** Protects user financial information using secure encryption methods.

- **Confirms Payment Status:** Sends confirmation messages to users and suppliers once payment is successful.

This ensures smooth and secure transactions for all users of the app.

VI.   RESULT AND DISCUSSION

The proposed system was tested with a pilot group of farmers, and the results demonstrated:

- A *40% reduction in procurement time* for fertilizers.

- Improved cost efficiency* due to direct farmer-to-supplier transactions.

- Higher user satisfaction* owing to AI-based recommendations and timely deliveries.

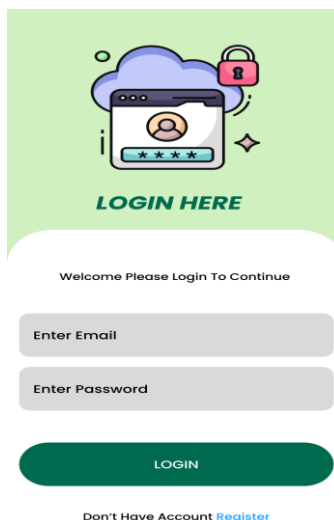- Scalability potential, as more suppliers can be onboarded to serve larger areas.

- **Spash Screen**

- **Register Screen**

- **Login Screen**

VII.   CONCLUSION

The Fertilizer Delivery App aims to revolutionize the agricultural sector by making fertilizer procurement more efficient, cost-effective, and accessible. By integrating AI-driven recommendations, secure transactions, and real-time tracking, the app empowers farmers with better decision-making tools. Future enhancements may include multilingual support, drone-based fertilizer delivery, and government subsidy integration for affordability.

VIII.   REFERENCES

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