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Cropcare Connect: Market Access & Disease Diagnosis For Farmers

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Abstract—Agriculture plays a vital role in our world, yet farmers continue to face major challenges—especially when it comes to identifying crop diseases early and finding the right markets to sell their produce. This project introduces a user-friendly mobile app designed to support farmers on both fronts: it combines a digital Farmers' Market with an AI-powered plant disease diagnosis tool. Using machine learning, the app allows farmers to simply upload a photo of their plant to detect diseases and receive treatment suggestions. At the same time, it helps them connect with agricultural experts and sell their harvest directly through an integrated marketplace[4]. This all-in-one solution aims to boost productivity, reduce crop losses, and make it easier for farmers to reach buyers. The app is designed to be simple, practical, and impactful—helping farmers grow smarter and sell better.[7].

Keywords—Plant Disease Detection, Image Processing, Machine Learning, Support Vector Machine (SVM), K-Means Clustering, Digital Agriculture, Farmers' Market Platform, Crop Health Diagnosis, Mobile Agriculture Application, Backpropagation Neural Network (BPNN), Smart Farming, AgriTech, Disease Classification, Marketplace Integration[7]

I . INTRODUCTION

Agriculture remains the backbone of many economies, especially in developing countries, where a large percentage of the population depends on farming for their livelihood. However, farmers often face two major challenges: timely identification and treatment of crop diseases, and limited access to reliable marketplaces to sell their produce at fair prices. Crop diseases can spread rapidly and lead to significant losses in yield and income if not detected early. Traditional methods of disease diagnosis often require expert knowledge, physical inspections, and lab tests, which may not be accessible to small-scale farmers. At the same time, market access is hindered by long supply chains, middlemen, and lack of digital platforms, making it difficult for farmers to get the best value for their hard work. This paper presents a mobile application that aims to address both issues through a unified platform. The app integrates a machine learning-based plant disease detection system using image processing techniques with a digital farmers' marketplace[4]. By simply uploading an image of a diseased plant, farmers can receive instant feedback on possible infections and recommended treatments. Simultaneously, they can list and sell their fresh produce directly through the platform, eliminating intermediaries and reaching more customers. The primary

objective of this application is to empower farmers by providing them with a smart, easy-to-use tool that promotes better crop management and enhances market reach. The system leverages algorithms like Support Vector Machines (SVM), K-Means Clustering, and Backpropagation Neural Networks (BPNN) for disease classification, ensuring accuracy and speed in detection. This paper discusses the design, development, and potential impact of this integrated solution on the agricultural ecosystem.[5]

II . LITERATURE REVIEW

(i) Literature Review:

"A Survey on Machine Learning Approaches for Smart Irrigation Systems in Agriculture", Mohammed Patel, Aisha Khan[7]

This survey investigates the application of machine learning in developing smart irrigation systems, analyzing how ML algorithms can optimize water usage and enhance crop productivity while conserving resources[4].

"Machine Learning Techniques for Crop Growth Monitoring and Management: A Comprehensive Review", Juan Rodriguez, Sofia Martinez[9]

Focused on monitoring crop growth stages and managing agricultural practices, this survey examines the use of machine learning for tasks such as plant phenotyping, nutrient management, and yield optimization[6].

"An Overview of Machine Learning Applications in Animal Health Monitoring and Management", Sarah Brown, Michael Clark[3]

This survey explores machine learning applications in animal farming, including disease detection, behavior analysis, and livestock management, aiming to improve overall animal health and welfare[15].

"Machine Learning Techniques for Crop Pest Detection and Management: A Review", Emily White, James Anderson[5]

Focusing on pest control in agriculture, this survey assesses the efficacy of machine learning methods for detecting and managing crop pests, discussing sensor-based approaches and decision support systems[14].

"A Review of Machine Learning Applications in Dairy Farming: Challenges and Opportunities", Daniel Miller, Rachel Wilson[11]

This survey examines the use of machine learning in dairy farming operations, addressing challenges such as milk yield prediction, disease detection, and automated milking systems, while highlighting opportunities for innovation[18].

(ii) Existing System:[1]

Over the years, technology has started to make its way into farming, helping farmers tackle specific challenges like identifying plant diseases or selling their produce online. However, most of the available solutions work separately and only focus on one problem at a time—either crop health or market access—not both together[5].

Plant Disease Detection Tools:

Some mobile and web apps allow farmers to upload photos of their crops to check for diseases. These apps use image processing and machine learning to spot signs of infection. While helpful, they usually offer limited information and don't always explain treatment options in simple terms. Plus, many of these tools

require a stable internet connection or are too technical, making them hard to use for farmers in remote or rural areas[5].

Online Marketplaces for Farmers:

There are platforms like eNAM and some private apps that help farmers sell their produce directly to buyers. These aim to cut out middlemen and give farmers better prices. But these platforms mainly focus on selling, not on helping farmers grow healthier crops or deal with diseases. Also, some of them are not user-friendly or available in local languages, which can be a barrier for many users[5].

What's Missing:

- No single platform supports both disease diagnosis and produce selling.
- Lack of personalized help or expert advice when farmers need it.
- Many apps are either too complex or not accessible offline.
- Local needs and languages are often not considered in the app design.

Sr. No	Title	Methodology used	Limitations
1	E-Farming:A Breakthrough for Farmers[9]	We are targeting the horticulture sector in which smartphones can be used to provide the farmer with the details of all the different types of crops that he can harvest and also the best efficient way in which he can get the yield. All this information will be provided in regional audio form also so that it will be easy for farmers to understand.	Mobile phone costs should be lowered to enable the majority of farmers to have access to the current information about the agriculture business within the state or country.
2	Design and Development of Mobile App for Farmers[6]	There are a variety of Mobile app developments in the marketplace, designed to make farming easy. Some mobile applications have been designed to specifically provide information services to farmers. In this work various research papers and Mobile App have been reviewed related to the agriculture sector.	The government should also conduct workshops/seminars to create awareness for the farmers on how to avail these benefits.
3	Development of an Android Application for Smart Farming in Crop Management[5]	The development of mobile applications used Master App Builder software . Since farmers are semi- literate community, hence the	The negative impact is to human health such as eye problems and depression [10] and wasting time on

		application developed using these applications such as game farmers native language, the Malay application. language. In mobile applications, there are 3 layers known as presentation layer, application layer and database layer. The presentation layer is utilized by users from their mobile devices such as smartphones and mobile tablets. This layer is made up of User Interface (UI) and its process components. Its focus is	
4	Crop Shop – An application to maximize profit for farmers[15]	The existing work regarding agricultural marketing comes up with the drawbacks such as issues with transportation, GPS system and biggest of all the trust problems. We will address the solution for the issues with the proposed process flow architecture. The requirements of the mobile applications are smartphones with Android 5.0+ version and GPS features availability. There are four parts of the systems architecture:	The drawbacks which are particularly found in the systems are the lack and availability of the trust factor which has caused a greater deal of inconveniences to the farmers. The imposition of trust factor in the proposed system helps to develop a consumerism bond between the two vendors.

III . PROPOSED SYSTEM

To bridge the gap between crop health management and market access, we propose a smart and user-friendly mobile application that combines both features in a single platform. The app is designed to support farmers by helping them **detect plant diseases early, get recommended treatments, and sell their produce directly**—all from the comfort of their mobile phones.

How It Works:

The app uses **machine learning and image processing** techniques to detect diseases in plants. Farmers can simply take a picture of the affected crop using their phone, and the app will analyze it to identify possible diseases. Based on the results, it will provide **easy-to-understand treatment suggestions** and even allow users to connect with agricultural experts for further advice.

At the same time, the app includes a built-in **Farmers' Market platform**, where farmers can list their fresh produce and sell it directly to customers, retailers, or wholesalers. This helps eliminate middlemen, ensuring fair prices and better profits[14].

Key Features:

- **Image-Based Disease Detection** using ML models like SVM, BPNN, and K-Means Clustering
- **Instant Treatment Suggestions** based on identified symptoms
- **Expert Support** for personalized guidance
- **Integrated Marketplace** for listing and selling agricultural produce
- **User-Friendly Interface** in local languages to ensure ease of access.
- **Notifications & Updates** about farming tips, weather forecasts, and market trends.

By bringing together plant care and product sales in one place, this system aims to **reduce crop loss**, **increase productivity**, and **empower farmers** with the tools they need to succeed in the modern agricultural landscape[16].

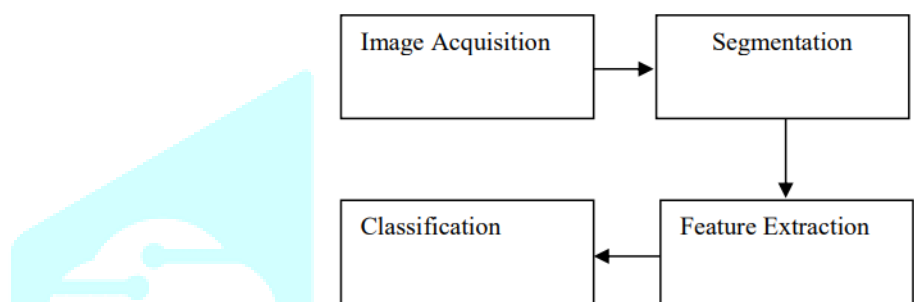


Fig. 1. Phases of Detection[7]

IV . METHODOLOGIES

The proposed system combines image processing, machine learning, and mobile development techniques to deliver a complete solution for plant disease detection and an integrated marketplace. Below is an overview of the main methodologies used in building the application[13]:

1. Image Acquisition and Preprocessing

Farmers upload images of the affected crop using their phone cameras. These images are first preprocessed to remove noise, resize to a standard format, and improve clarity using techniques like[18]:

- Grayscale conversion
- Image smoothing (Gaussian filter)
- Contrast enhancement

This step ensures that the image quality is suitable for accurate analysis.

2. Feature Extraction

Once the image is preprocessed, the system extracts key features such as:

- Color patterns
- Leaf texture
- Shape and edges of infected areas

These features help in distinguishing between healthy and diseased crops, and in classifying the type of disease.

3. Disease Classification using Machine Learning

The extracted features are fed into trained machine learning models for classification. Some of the algorithms used include:

- **Support Vector Machine (SVM):** Effective for classifying images based on complex patterns.
- **K-Means Clustering:** Helps in segmenting infected regions from the healthy parts of the plant.
- **Backpropagation Neural Network (BPNN):** Used to improve accuracy by learning from previously labeled disease data[15].

The model identifies the disease and suggests treatment options accordingly.

4. Marketplace Module

The app also includes a digital Farmers' Market where farmers can:

- Create a profile and list their products (vegetables, fruits, grains, etc.)
- View market trends and today's deals
- Add produce to cart, mark favorites, and set delivery locations
- Connect directly with buyers for better profit margins

5. User Interaction & Backend Integration

The front-end is built with a simple, intuitive interface designed for rural users, possibly in regional languages. The backend includes[7]:

- A cloud database to store images, disease data, and market listings
- APIs for login/signup, product management, and disease analysis
- Notification systems for updates on crop care and market activity



Fig 2. Components of Android Studio[5].

MySQL:

MySQL operates as an open-source relational database management system (RDBMS) centered upon Structured Query Language (SQL)[1]. Its design entails storing data within distinct tables, as opposed to a single large repository [1]

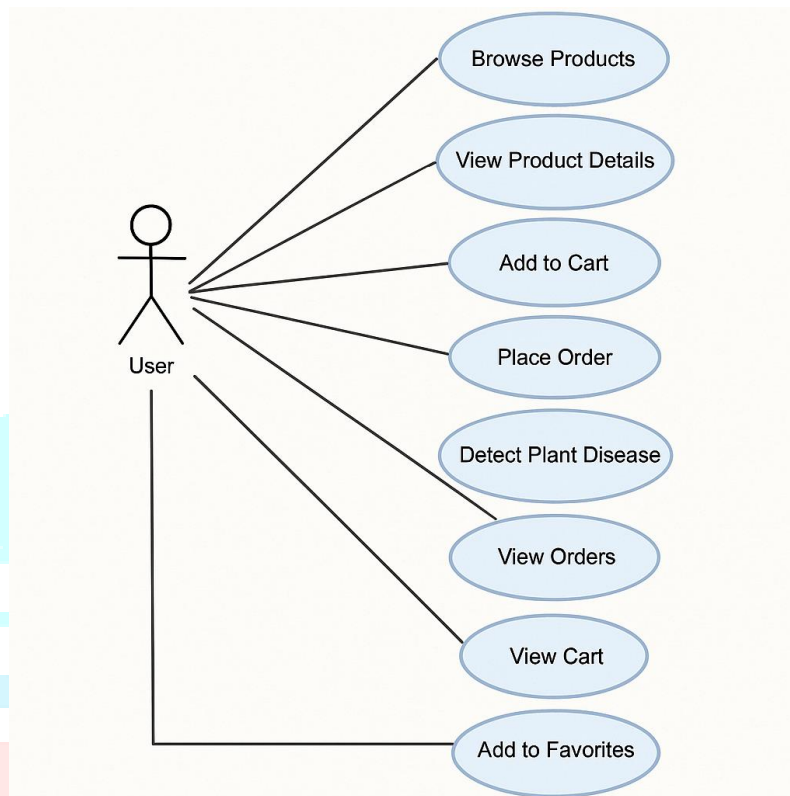
V . Use Case Diagram

Fig. 3.Use Case Diagram

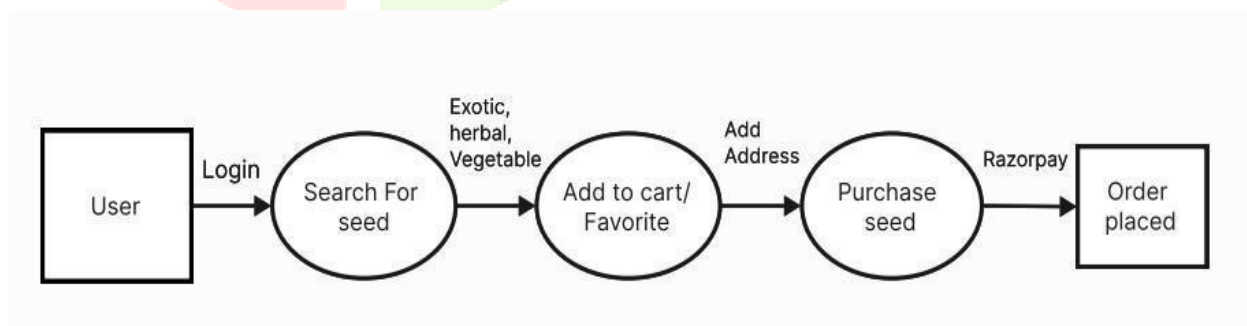
VI . System Design

Fig. 4.DFD Level 0

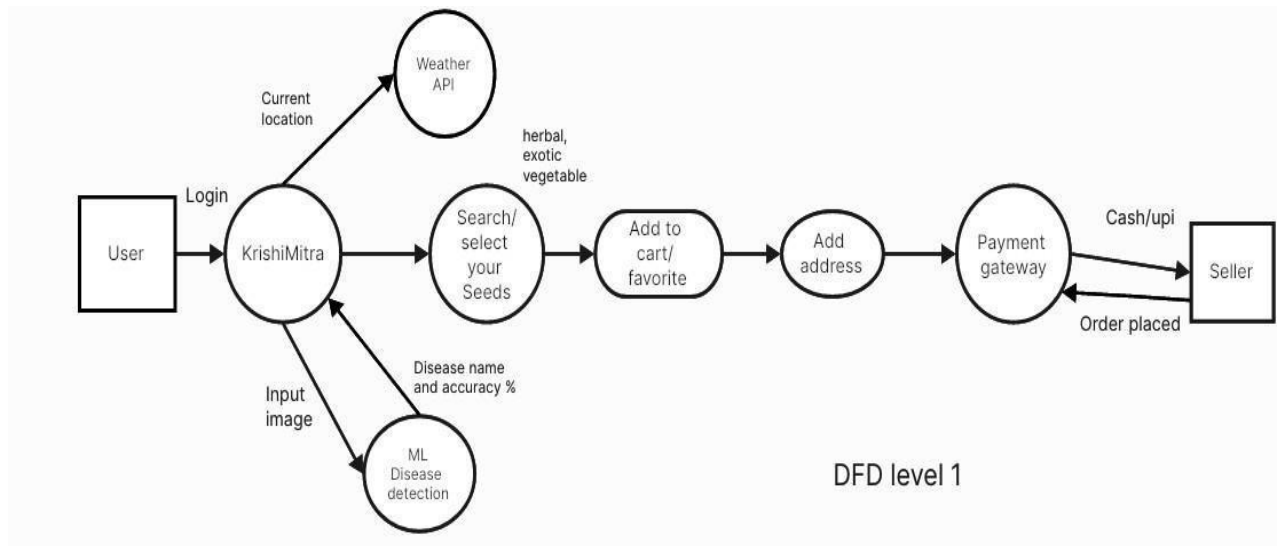


Fig. 5.DFD Level !

VII . IMPLEMENTATION

- Admin Panel view: After authentication, administrators have the authority to manage blood banks and camps, view user profiles, change their passwords, and accept or reject user requests[1].
- Login Panel: Administrators log in using their credentials to access the system[1].
- Adding Blood Bank: Authorized administrators can add new blood banks to the database, providing necessary details such as name, address, contact number, email, and available blood group[1].
- Update Blood Bank: Administrators can modify existing blood bank information whenever necessary.
- Change Password: Administrators have the option to change their passwords at any time.
- Send Notifications: Administrators can post notifications to communicate with registered users.

VIII . E-R Diagram

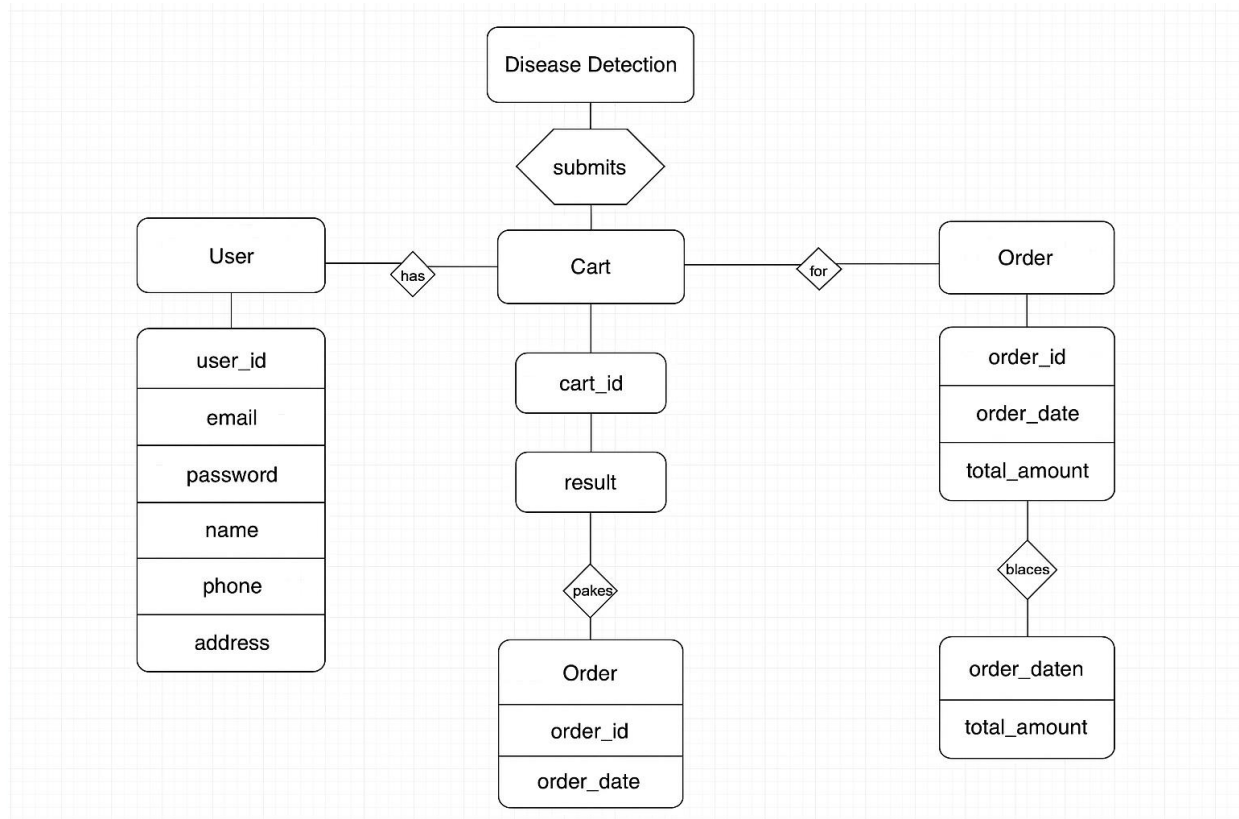


Fig. 6.E-R Diagram

IX . SYSTEM OVERVIEW

The Blood Unity App is a breakthrough system that has the potential to alter blood management and transfusion procedures. Donors may simply create profiles, schedule appointments, and receive real-time alerts about nearby blood drives thanks to an intuitive interface. The software uses geolocation technologies to assist donors in locating convenient blood donation sites, hence increasing accessibility. a recipient matching system facilitates quick answers to urgent needs by seamlessly connecting recipients with potential contributors. Furthermore, the software has robust inventory management, which reduces waste and ensures a steady supply of safe blood supplies[8].

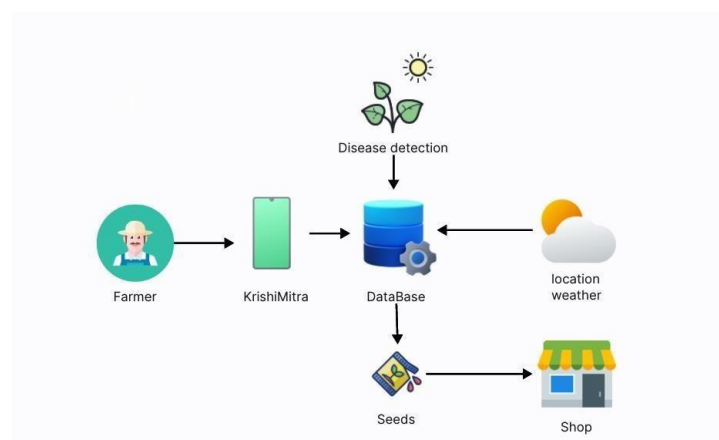


Fig. 7.Graphical Representation[11]

X . CONCLUSION

This project presents a smart and practical solution to two of the most common problems faced by farmers today—early detection of crop diseases and limited access to a reliable marketplace. By combining machine learning-based image analysis with an integrated digital farmers' market, the proposed mobile application offers a one-stop platform for both crop care and selling produce. With simple image uploads, farmers can identify plant diseases early, get treatment suggestions, and even consult agricultural experts. At the same time, they can list and sell their harvest directly to customers, reducing dependency on middlemen and increasing profits. The application is designed to be user-friendly, accessible, and supportive of farmers' real-world needs. In doing so, it not only improves agricultural productivity but also helps build a more connected and empowered farming community. This system has the potential to make farming more efficient, profitable, and sustainable in the long run.

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