**Project Team #: 20CSM\_B03**

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**Project Name:**

Develop a Mobile App through which Farmers can upload the photographs of disease affected plants/crops and solutions may be provided by experts/scientists linked to the app

**Abstract:**

AgriScan is a pioneering project with the aim of transforming crop disease management and bolstering sustainable agriculture practices. By developing a state-of-the-art mobile application equipped with cutting-edge image recognition technology, AgriScan enables rapid and precise disease identification. Farmers can capture images of disease-affected plants, allowing the app to provide immediate and accurate diagnoses. This empowers farmers to take timely action and prevent the spread of diseases, thus enhancing crop health and productivity.

One of AgriScan's distinctive features is its personalized disease management solutions. Tailored to each farmer's specific location, crop type, and environmental conditions, the app recommends integrated pest management strategies that reduce the reliance on chemical interventions. By promoting eco-friendly alternatives, AgriScan contributes to sustainable agricultural practices and safeguards the environment.

To foster collaboration and knowledge-sharing, AgriScan incorporates interactive platforms such as discussion forums and chat groups. This facilitates engagement between farmers, agricultural experts, researchers, extension officers, and agronomists. By sharing valuable insights, best practices, and innovative approaches, the app nurtures a supportive and proactive agricultural community.

With its emphasis on swift disease identification, tailored solutions, and knowledge-sharing, AgriScan aims to empower farmers, optimize crop disease management, and strengthen global food security. By overcoming the limitations of existing systems, the project paves the way for a more sustainable and resilient agricultural ecosystem

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| **Title** | AgriScan: Smart Crop Disease Diagnosis & Solutions App |
| **Clients** | MSME – Ministry of Micro Small & Medium Enterprises |
| **Objective** | The main objective of AgriScan is to revolutionize crop disease management and promote sustainable agriculture. The project aims to develop a mobile application with advanced image recognition technology, enabling farmers to rapidly and accurately identify crop diseases by capturing images of affected plants.  Based on the diagnosis, the app offers personalized disease management solutions, tailored to each farmer's specific location, crop type, and environmental conditions. Emphasizing integrated pest management strategies, AgriScan seeks to reduce reliance on chemical interventions and promote eco-friendly alternatives, contributing to a more sustainable agricultural ecosystem.  Furthermore, the app fosters knowledge-sharing and collaboration among farmers, agricultural experts, researchers, and agronomists, facilitating the exchange of insights and best practices for improved crop disease management. Overall, AgriScan aims to empower farmers, optimize crop health and productivity, and strengthen global food security. |
| **Users** | 1. Farmers  2. Agricultural Experts  3. Agricultural Consultants  4. Agricultural Students  5. Researchers  6. Government and Agricultural Agencies  7. Eco-conscious Consumers  8. NGOs and Non-profit Organizations |
| **Functional Requirements** | **F1: Image Recognition:**  The app must incorporate advanced image recognition technology to accurately identify various crop diseases based on images of affected plant parts uploaded by users.  **F2: Disease Database:**  AgriScan should maintain a comprehensive and up-to-date database of known crop diseases, providing detailed information on symptoms, causes, and recommended management solutions.  **F3: Disease Diagnosis:**  The app must promptly analyze uploaded images and provide users with accurate disease diagnoses by cross-referencing them with the disease database.  **F4: Personalized Solutions:**  AgriScan should offer tailored disease management recommendations, considering the user's specific geographical location, crop type, climate, and other environmental factors.  **F5: Integrated Pest Management (IPM):**  The app must emphasize the adoption of IPM strategies, suggesting eco-friendly alternatives to chemical pesticides for disease control and promoting sustainable agricultural practices.  **F6: Alerts and Notifications:**  AgriScan must send timely alerts and notifications to users about disease outbreaks, seasonal risks, and recommended preventive measures to enhance proactive disease management.  **F7: Knowledge-Sharing Platform:**  The app should facilitate interactive discussion forums and chat groups, allowing farmers, agricultural experts, researchers, extension officers, and agronomists to share their insights, best practices, and innovative approaches to improve crop disease management.  **F8: Progress Tracking:**  AgriScan must enable users to monitor the progression of diseases on their crops over time, enabling them to assess the effectiveness of implemented management solutions.  **F9: User-Friendly Interface:**  The app should have an intuitive and easy-to-use interface to cater to farmers with varying levels of technological expertise. |
| **Non-Functional Requirements** | **NF1: Performance:**  The app should provide fast and responsive image recognition and analysis to deliver quick results to farmers.Achieve this requirement by optimizing image processing algorithms and leveraging server-side processing for complex tasks.  **NF2: Scalability:**  The app should be designed to handle increasing numbers of users and images as its popularity grows.Achieve scalability by adopting cloud-based infrastructure and auto-scaling capabilities to dynamically adjust resources based on demand.  **NF3: Reliability:**  The app should be available and reliable to farmers whenever they need to access it.Ensure reliability by deploying the app on a robust and redundant server infrastructure with failover mechanisms.  **NF4:** Security**:**  The app should protect users' data and prevent unauthorized access to sensitive information.Achieve security by implementing encryption for data transmission, secure authentication mechanisms, and regular security audits.  **NF5: Privacy:**  Farmers' personal information and uploaded images should be kept private and not shared with third parties without consent.Ensure privacy by establishing clear data privacy policies and using anonymized data for research or analytical purposes.  **NF6: Usability:**  The app should have an intuitive and easy-to-navigate user interface to cater to farmers with varying levels of technological familiarity.Achieve usability through user testing and feedback during the app's development phase and continuous improvement based on user input.  **NF7: Compatibility:**  The app should be compatible with a wide range of devices, including smartphones, tablets, and desktop computers.Achieve compatibility by adopting responsive design principles to ensure a seamless user experience across different screen sizes and resolutions  **NF8: Interoperability:**  The app should be able to integrate with existing agricultural databases or systems to enhance its disease identification capabilities.Achieve interoperability by using open standards and APIs to facilitate data exchange with other agricultural platforms.  **NF9: Load Balancing:**  The app should distribute incoming traffic evenly across multiple servers to prevent overloading and ensure smooth performance during peak usage.Achieve load balancing by implementing a load balancer that intelligently routes requests to available server instances, adjusting the distribution based on server health and capacity. |
| **Software and Hardware Requirements** | **Software Requirements**: 1. Mobile App Development Platform: Android Studio 2. Programming Language: Java or Kotlin 3. Front-End Technologies: XML and Android XML Layouts 4. Database Management System: Firebase Realtime Database or Firestore 5. Version Control System: Git 6. Integrated Development Environment (IDE): Android Studio 7. Backend as a Service (BaaS) Platform: Firebase Cloud Functions or AWS Lambda 8. Push Notification Service: Firebase Cloud Messaging (FCM) or OneSignal 9. Secure Authentication: Firebase Authentication or AWS Cognito 10. User Interface Design Tools: Figma or Sketch 11. Testing Framework: Espresso 12. Mobile Device Emulators: Android Emulator  **Hardware Requirements:** 1. Operating System: Android 6.0 (Marshmallow) or higher  2. Processor (CPU): Octa-core 1.8 GHz processor or higher 3. Memory (RAM): 4 GB or higher 4. Storage (Internal Memory): 32 GB internal storage or higher  5. Display: 1080x1920 pixels, 5.5 inches or larger  6. Camera: : 12 MP rear camera with autofocus or higher 7. Internet Connectivity:  Wi-Fi: 802.11 b/g/n/ac  Mobile Data: 4G LTE  8. GPS and Location Services |

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