

Project Team# : 20CSM_B14

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Project Title :

Tele-Consultation application for farmers to facilitate agriculture

Abstract :

The agricultural and horticultural sectors are pivotal to the sustenance of a nation's economy and its people. However, the vast expanse of cultivated lands makes it increasingly challenging to provide personalized attention to individual farmers, leading to issues in disease identification and overall plant health assessment. To address these challenges and promote the welfare of farmers across the country, we propose the development of an innovative solution that integrates tele-consultation services with cutting-edge image processing technology, complemented by the creation of a comprehensive national database. The primary objective of this project is to establish a robust tele-consultation platform, connecting farmers with agricultural experts, plant pathologies, and horticulturists. Farmers will be able to seek expert advice, thus bridging the gap between rural areas and specialized knowledge centers. Farmers will be able to capture images of their crops, leaves or specific plant parts using smartphones or other devices. These images will be processed to extract vital information about the plant's health, growth status. In conclusion, the integration of tele-consultation with image processing technology will revolutionize the agriculture and horticulture sectors, making farming more efficient, sustainable and productive. By providing farmers with expert support and leveraging data-driven insights, this project aims to uplift the livelihoods of farmers and strengthen the agricultural backbone of the nation.

Title	Tele-consultation application for farmers to facilitate agriculture.
Client	Defense Research and Development Organization (DRDO), Ministry Of Defense.
Objective	The main objective of this project is to develop and implement an integrated tele-consultation and image processing system, supported by the establishment of a national agricultural database, to address the challenges faced by farmers in disease identification, plant health assessment, and agricultural decision-making.
Users	<ol style="list-style-type: none"> 1. Farmers 2. Agricultural Experts 3. Government Agricultural Officers 4. Web App Administrators
Functional Requirements	<ol style="list-style-type: none"> 1. Registration and profile creation: Provide user registration and login functionality for users to access the web application. Farmers should be able to create and manage their profiles, including information like name, location, type of crops grown, farm size etc. 2. Image processing and disease identification: Farmers should be able to share the images of crops, diseases, or any agricultural related documents for expert advice. The application employs image processing algorithms to analyze the images and identify the diseases. 3. Language Support: Considering the diversity of farmers and experts, the web application should support multiple languages to accommodate users from different regions and language preferences . 4. Scheduling and appointment management: Farmers should be able to schedule appointments with agricultural experts based on their availability. Both parties should receive notifications and reminders for upcoming consultations. 5. Crop data and disease repository: The system should maintain a comprehensive repository of crop data and disease information to aid in accurate disease identification. This repository could include data on crop varieties, common diseases, pest management practices, and best agricultural practices.

	<p>6. Geo-location: The web application shall integrate geo-location service to allow users to provide the location of their crop. The experts can provide weather information of the location provided.</p> <p>7. Tele-consultation interface: The web application should offer an interface enabling chat between farmers and agricultural experts. The text based chat feature should require integration with API's.</p> <p>8. Feedback and Ratings: Allow users to provide feedback, reviews, and ratings for the service and agricultural expert. This will help maintain the quality of consultations and build trust among the users.</p>
Non-Functional Requirements	<p>1. Performance: The tele-consultation application for farmers should have fast response times to ensure real-time communication and minimize waiting periods during consultations. It should be able to handle a significant number of concurrent users without performance degradation.</p> <p>2. Reliability: The web application should be highly reliable with minimal downtime or service interruptions to ensure farmers can access consultations when needed. It should also have a robust error handling mechanism to handle unexpected issues.</p> <p>3. Image Processing Speed: Image processing algorithms should provide quick and accurate results to maintain efficient disease identification and plant health assessment.</p> <p>4. Security: Data transmission and storage should be encrypted to protect user information and communication during consultations. Encryption mechanisms should be employed to safeguard user data in the backend and during storage.</p> <p>5. Usability: The user interface should be intuitive, easy to navigate and accessible to users with varying levels of technical expertise.</p> <p>6. Optimization of Various Devices: The application should be optimized for different devices, including desktops, tablets, and smartphones.</p>

	<p>7. Data backup and recovery : Regular backups should be performed to prevent data loss in case of system failures. Cloud based backups should be automated to ensure data is regularly and securely backed up.</p> <p>8. Scalability : The web application should be designed to scale easily as the user base grows or during the peak times to handle increased demand . Cloud based infrastructure that allows automatic scaling based on user load.</p>
Software and Hardware Requirements	<p>Software Requirements:</p> <ol style="list-style-type: none"> 1. UI Design : Figma 2. Integrated Development Environment(IDE): Visual Studio Code 3. Front-end Development : HTML, CSS, JavaScript, React 4. Back-end Development: Python, Django 5. Database Management: MySQL 6. Image Processing: OpenCV 7. Deep Learning Model Development: PyTorch , ResNet 8. APIs: OpenStreetMap(OSM) Nominatim API 9. Containerization: Docker 10. Version Control System: Git 11. Web hosting: AWS <p>Hardware Requirements:</p> <ol style="list-style-type: none"> 1. Processor: A modern multicore processor (e.g., Intel Core i7 or AMD Ryzen 7) with a clock speed of at least 3.0 GHz or higher. 2. RAM: 16GB to 32GB of RAM. 3. Storage: An SSD (Solid State Drive) with at least 500GB of storage space. 4. Graphic Card: A dedicated graphics card (e.g., NVIDIA GeForce GTX or RTX series) with at least 4GB of VRAM. 5. Operating System: Windows 10, macOS, or a popular Linux distribution (e.g., Ubuntu, CentOS). 6. Net-Bandwidth: 5 Mbps