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“Deep Learning-Based Plant Disease Detection and Agriculture Equipment Rental System”

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Objectives

1. **Direct Access to Mandi Prices-**
   - Give farmers real-time market price updates.
   - Remove dependence on middlemen and ensure fair value for produce.

2. **Early Crop Disease Detection-**
   - Use AI-based image scanning to identify crop diseases at an early stage.
   - Provide treatment suggestions to minimize yield loss.

3. **Rental Platform for Farming Tools-**
   - Allow farmers to rent modern machinery (tractors, harvesters, drones, etc.).
   - Reduce financial burden on small farmers who cannot afford to buy equipment.

4. **Community & Knowledge-Sharing Hub-**
   - Build an online space where farmers can share experiences, solutions, and best practices.
   - Provide access to government schemes, weather updates, and expert advice.

Literature Survey

Various studies and solutions have aimed to improve agriculture using technology:

- **Government of India Digital Agriculture Mission**: Promotes AI, IoT, and Big Data but lacks farmer-friendly interfaces.
- **ICAR & KVK Initiatives:** Provide crop advisory services but do not integrate AI-based disease detection.
- **PlantVillage & AI Research:** Uses smartphone images for disease detection but lacks marketplace integration.
- **eNAM & Other Platforms:** Focus on crop trading but ignore disease prediction and community knowledge sharing.
- **AgriTech Startups (DeHaat, Ninjacart)**: Offer input/output supply chains but are limited in coverage. Research Gaps:

Problem Statement

Lack of Transparent Pricing in Mandi Markets-

- Farmers often depend on middlemen who exploit them by paying less than the actual market price.
- Absence of real-time mandi rates makes farmers unaware of the fair value of their produce.

Delayed or Inaccurate Disease Identification-

- Many farmers rely on traditional methods or local advice, which may not be scientifically accurate.
- By the time the disease is identified, crop damage is already severe, leading to reduced yield and income.

High Cost of Farming Machinery-

- Modern equipment like tractors, harvesters, and drones are too expensive for small and marginal farmers.
- Since the equipment is not used daily, owning it is not cost-effective

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Need for a Unified Digital Platform-

- Currently, separate solutions exist (market info apps, agri-consultancy services, tool rental services), but none integrate all needs in one place.
- A single platform would save time, reduce costs, and provide farmers with a complete ecosystem for farming support.

Proposed Solution

- **Direct Market Access:** By eliminating intermediaries, farmers can sell directly to consumers, ensuring better pricing for both parties and increasing farmers' profit margins.

- **Resource Optimization**: The platform promotes equipment rental services, allowing farmers to access necessary tools without the burden of ownership, leading to cost savings and improved resource utilization.

- **Community Support Network**: Facilitating discussions and knowledge-sharing events helps foster a supportive community, empowering farmers with sustainable agricultural practices and improving overall agricultural literacy.

- **Early Disease Detection:** The AI-driven crop disease predictor enables timely identification and intervention, minimizing crop losses and enhancing yield quality, ultimately contributing to food security.

References

1. Ministry of Agriculture & Farmers Welfare - https://agricoop.nic.in

2. Indian Council of Agricultural Research (ICAR) - https://icar.org.in

3. Research Paper: AI-Based Crop Disease Detection using Deep Learning

4. OpenCV & TensorFlow Documentation for Image Processing

5. Government of India Digital Agriculture Initiatives

Thank you!