The Plant Doctor: An Artificial Intelligence Based Collaborative Platform for Plant Disease Identification, Tracking and Forecasting for Farmers

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Plant diseases are a major threat to the environment and global economy. In India alone, 35% of crop production is lost to field pathogens and pests causing losses to farmers. Indiscriminate use of pesticides is also a serious health concern as many are toxic and biomagnified. These adverse effects can be avoided by early disease detection, crop surveillance and targeted treatments. Most diseases are diagnosed by agricultural experts by examining external symptoms. However, farmers have limited access to experts. My project, The Plant Doctor, is the first integrated and collaborative platform for automated disease diagnosis, tracking and forecasting. Farmers can instantly and accurately identify diseases and get solutions with a mobile app by photographing affected plant parts. Real-time diagnosis is enabled using the latest AI algorithms (CNNs) for Cloud-based image processing. The AI model continuously learns from user-uploaded images and expert suggestions to enhance its accuracy. Farmers can also interact with local experts through the platform. For preventive measures, disease density maps with spread forecasting are rendered from a repository of geo-tagged images and micro-climatic factors. A web interface allows experts to perform disease analytics with geographical visualizations. In my experiments, the AI model was trained with large disease datasets, created with images self-collected from many farms over the last 7 months. Test images were diagnosed and verified by plant pathologists. Over 95% disease identification accuracy was achieved. The Plant Doctor is a novel, scalable and accessible tool for disease management of diverse agricultural crop plants and can be deployed as a service for farmers and experts for ecologically sustainable crop production.

Awards Won:

Fourth Award of $500

U.S. Agency for International Development: USAID Science for Development First Place Award of $5,000.

Samvid Education Foundation: Agni Third Award

China Association for Science and Technology (CAST): Award of $1,200