AI IN PLANT DISEASE DIAGNOSIS AND MANAGEMENT

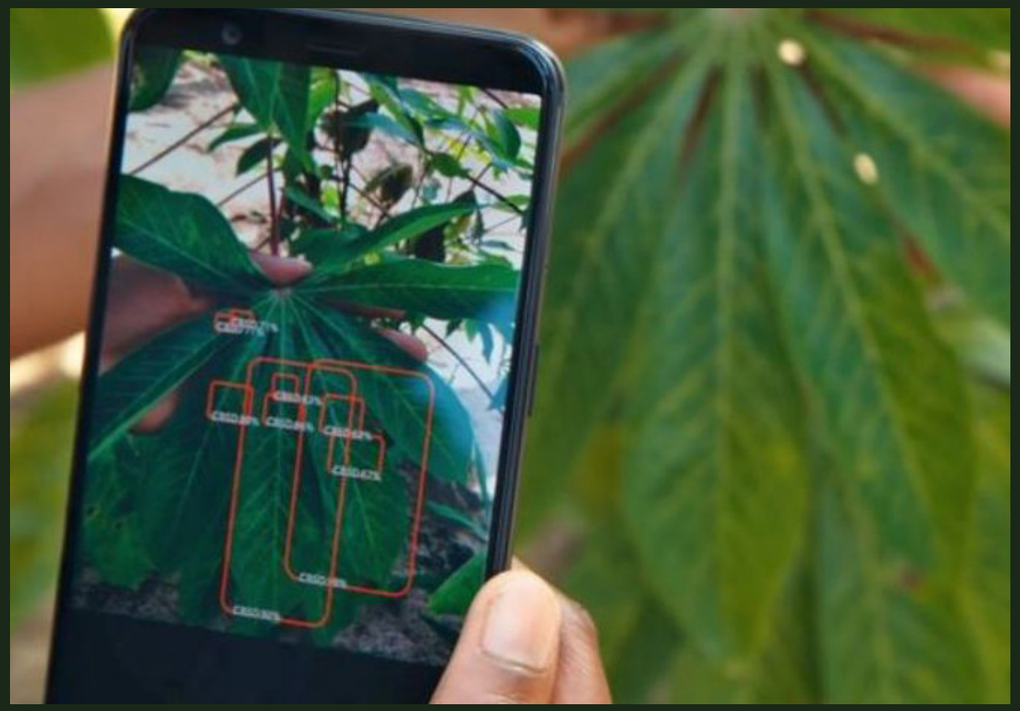
Gaurav Rakhonde[1], Himani Jeena[2], Kumari Surbhi[2], Shalaka Ahale[3]
[1]Department of Plant Pathology, University of Agricultural Sciences, GKVK, Bangalore
[2]Department of Plant Pathology, College of Agriculture, GBPUAT, Pantnagar
[3]Department of Plant Pathology, PAU, Ludhiana

INTRODUCTION:

Artificial Intelligence (AI) in agriculture has recently expanded fame. AI specialty is about elasticity, performance, precision, and price competence. The application is used to increase productivity. These approaches provide precision, speed, and affordability for long-term safe food production. To maximize yield, area appearances frequent challenges with unsuitable soil action, disease and pest invasion, immense data necessities, little output with an information breach between farmers and technology. It is critical to use in soil and crop management, weed management, and disease management.

AI IN DISEASE MANAGEMENT

Disease switch is required for optimal agricultural harvest yield. Plant diseases perform as significant constraint. Soil type, genetic makeup, rain, dry weather, wind, temperature, and other factors all play a crucial part in development of these plant diseases. Because of these factors, as well as the unreliable nature of diseases' causative influences, managing the effects is a significant challenge, particularly in large-scale farming. A farmer should use an integrated disease control and management model that includes physical, chemical, and biological measures to efficiently manage diseases and curtail losses. To achieve these, it takes time and is not very cost effective, so essential for an AI approach



to disease. EB (Explanation block) provides a vibrant sight of mechanism by expert system's kernel. Getting intelligent inferences for plant disease management, an innovative tactic to rule preferment built on fuzzy reason is used. TTS (Text-to-speech) convertor is exploited to provide text-to-talking user facility. It offers a highly effective interactive web live communication. A rule-based and onward chaining inference machine was used to develop programme aids in disease recognition and treatment recommendation.

IMPACT OF AI

Plant diseases pose a significant risk to farmers, consumers, the environment, and the global economy. In India alone, pathogens and pests destroy 35% of field crops. Pesticide indiscriminate use is also a serious concern, as many are toxic and biomagnified. These adverse penalties are preventable through early disease detection, crop surveillance, and targeted treatments but farmers have limited access to experts. AI is a collaborative and integrated platform for automated disease diagnosis, tracking, and forecasting. Farmers can use a mobile app to quickly and accurately identify diseases and get solutions. The latest Artificial Intelligence (AI) algorithms for Cloud-based image processing enable real-time diagnosis. To improve its accuracy, the AI model continuously learns from user-submitted images and expert suggestions. Farmers can use the platform to communicate with local experts. Disease density maps with spread forecasting are generated for preventive measures using a Cloud-based repository of geo-tagged images and micro-climatic factors. Experts can perform disease analytics with geographical visualizations using a web interface. AI model (CNN) was trained using large disease datasets created from plant images collected from multiple farms over a seven-month period. The automated CNN model was used to diagnose test images, and the results were validated by plant pathologists. The disease identification accuracy was greater than 95%. The solution is novel, scalable, and easily accessible disease management tool for a various agricultural crop plant.

APPLICATION IN DISEASE MANAGEMENT

Rice blast is utmost devastating plant diseases. Monitoring the farm for disease detection is time-consuming and labor-intensive. Plant disease detection is made more effective by utilizing the IoT (Internet of Things) and AI. The Rice Talk project detects rice blast using nonimage IoT devices that are based on an IoT platform for soil agriculture. Rice Talk is that the AI model is considered as an IoT device and controlled similarly to other IoT devices, lowering platform administration costs while providing real-time training and predictions. It also proposes a unique spore germination process and has an accuracy of 89.4% in rice blast prediction.

CONCLUSION

This novel approach is good with integration of IDM practices and will be more effective in disease management.