

AgriPath: An AI-Driven Assistant Empowering Farmers with Real-Time Guidance, Multilingual Access, and Tailored Farming Support

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Abstract: Agriculture is the backbone of many developing countries, yet small and marginal farmers face persistent challenges such as low productivity, limited access to modern farming knowledge, poor soil and pest management, and lack of awareness about government schemes. To address these issues, this paper presents AgriPath, an AI-based agriculture companion that offers real-time, location-specific, multi-language support. Delivered through a cartoon chatbot, AgriPath enables farmers to interact via voice and text in their local language to receive timely guidance on climate conditions, crop selection, market trends, and agricultural policies. The system leverages Natural Language Processing (NLP), machine learning, and computer vision to analyze soil images and identify pests using deep learning models trained on agricultural datasets. Its modular design includes a Chatbot Interface, Pest Recognition Unit, and Soil Assessment Engine, all integrated into a scalable cloud-based infrastructure. The application is accessible via mobile and web platforms, built using Kotlin/Java for Android and React Native, and powered by TensorFlow, OpenCV, Firebase, MySQL, and voice recognition APIs. By bridging the digital divide, AgriPath empowers farmers with actionable insights, fostering improved productivity, sustainable practices, and long-term food security.

Keywords: AI agriculture assistant, multiple languages, image processing, CNN, RNN, OpenCV, RGB image classification.

