Cinnamon Care: A novel deep learning enabled cinnamon diseases identification platform

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This study presents the design, development, and evaluation of a mobile-based cinnamon disease identification platform to support cinnamon farmers by early detection of several diseases affecting the cinnamon crop using deep learning. Cinnamon, a major agricultural export crop in Sri Lanka, is highly susceptible to several leaf and stem diseases that can significantly reduce quality and yield. Several systems have already been introduced to identify some of these diseases. However, a specific system that identifies three main diseases and provides recommendations for their treatment is not available. To address these challenges, this study introduces an AI-driven solution powered by a Convolutional Neural Network (CNN) deployed through a Flutter mobile application. The system integrates a transfer learning-based CNN model hosted on Microsoft Azure, with Firebase used for image storage and real-time data exchange. The Flutter application allows users to upload images of affected leaves and stems, which are then sent to the cloud-based model through Firebase for prediction. The model returns disease classification results, which are stored in Firebase Firestore, and displayed to the user along with historical records. Deployment is managed using GitHub Actions for consistent updates. Experimental results show that the MobileNetV2 model has an impressive accuracy of 90.76% and effective performance in real-time disease prediction. The average prediction response time is minimal, and the system ensures user-friendly access, even on basic smartphone. Further research and development, expanding the dataset using real-world field imagery and integrating emerging technologies with the system, can increase the accuracy of the system, thereby contributing to the growth and sustainability of the cinnamon cultivation export industry.

Keywords: *Cinnamon disease, Deep learning, CNN, MobileNetV2, Transfer learning*