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Design and Development Enhanced GRU-Based Plant Disease Detection Using Deep Learning

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ABSTRACT:

Crop disease identification plays a pivotal role in ensuring food security and agricultural sustainability. The advent of deep learning has significantly advanced the field of computer vision, providing powerful tools for automated image analysis. In this study, investigation of application with deep learning algorithms for image segmentation in the context of crop disease identification is carried out. So started to conduct an extensive review with the existing literature, that focus on prominent deep learning architectures such as U-Net, FCN, DeepLab and their variants. The research involved the development of a novel dataset comprising images of both healthy and diseased crops, representing diverse crop types. The labeled dataset facilitates the training and evaluation of the proposed deep learning models. The effectiveness of Convolution Neural Network (CNN) using Gated Recurrent Unit (GRU)in capturing intricate details relevant to crop disease segmentation. Additionally, explore the impact of transfer learning to leverage pre-trained models on large-scale datasets. Then results try to highlight the potential of transfer learning in enhancing the performance of deep learning models particularly when training data is limited. Furthermore, various comparison of segmentation accuracy with different architectures is developed. Then discuss their strengths and limitations in the context of crop disease identification. Multi-scale information integration and comparative analyses contributes valuable insights into the selection of appropriate architectures for specific agricultural scenarios.

Keywords: *CNN, CNN-GRU. deep learning, Image Segmentation.*