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A Capsule Attention Network for Plant Disease Classification

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Abstract:

The identification of plant diseases is one of the most essential and difficult concerns in agriculture, necessitating solutions with a brighter light. With the onset of artificial intelligence (AI), machine learning (ML) and deep learning (DL) algorithms have aided farmers in identifying and classifying plant features with a high degree of intellectual precision. However, accurate disease classification in plants is essential for empowering farmers to cultivate more and produce more. This study therefore presents a unique assembly of attention, capsule, and feedforward classification layers for reaching the maximum classification accuracy for plant diseases. The proposed system uses user-defined customized Convolutional Transfer Learning networks (CTLN) to extract features and the attention networks exclude unnecessary features and highlight only critical features for classification. Finally, the selected characteristics are sent to the Feedforward Capsule networks to improve performance.

This paper proposes a paradigm that overcomes the constraints of existing deep learning networks and drastically decreases the computing burden. The suggested network is thoroughly evaluated utilizing Plant Village databases containing over 50,000 photos of healthy and diseased plants. The performance metrics of the proposed method are evaluated and compared to those of other learning networks. Compared to previous models, experimental results indicate that the proposed model has a 99.8 percent accuracy rate, lending support to the new categorization method that benefits farmer well-being.

Keywords:

artificial intelligence, machine learning, deep learning, plant diseases, capsule feedforward networks, attention layers

1. Introduction

2. Related Works

3. Proposed Methodology

4. System Setup

5. Evaluation Metrics

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