Leaves Disease Detection using Deep Learning

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Abstract: *Plant diseases are important factors in determining plant yield and quality. Plant disease identification can be accomplished through digital image processing. Deep learning has made significant advances in digital image processing in recent years, far outperforming traditional methods. One of the primary factors determining crop yield loss in crop production and agriculture is the identification and detection of plant diseases. Plant disease research is the study of any visible points in any part of the plant that aids in the differentiation of two plants, technically any spots or colour shades. It is extremely difficult to correctly identify plant diseases. Identification of the disease necessitates a lot of work and expertise, as well as a lot of knowledge in the field of plants and disease detection studies. As a result, image processing is used to detect plant diseases. Disease detection employs image acquisition, image extraction, image segmentation, and image pre-processing techniques.*

Keywords: CNN, Pooling Layer, ReLU, ConvNet

REFERENCES

[1]. Stefania Barburiceanu, Serban Meza, Bogdan Orza, Raul Malutan, Romulus Terebes "Convolutional Neural Networks for Texture Feature Extraction. Applications to Leaf Disease Classification in Precision Agriculture" IEEE Access (Volume: 9) Page(s): 160085 – 160103.

[2]. V. Singh, N. Sharma, and S. Singh, ''A review of imaging techniques for plant disease detection,'' Artif. Intell. Agricult., vol. 4, pp. 229–242, Oct. 2020

[3]. M. H. Saleem, J. Potgieter, and K. M. Arif, ''Plant disease detection and classification by deep learning,'' Plants, vol. 8, no. 11, pp. 468–489, Oct. 2019

[4]. B. Liu, C. Tan, S. Li, J. He, and H. Wang, ''A data augmentation method based on generative adversarial networks for grape leaf disease identification,'' IEEE Access, vol. 8, pp. 102188–102198, 2020

[5]. S. P. Mohanty, D. P. Hughes and M. Salathé, "Using deep learning for image-based plant disease detection", Frontiers Plant Sci., vol. 7, pp. 1419, Sep. 2016

[6]. F. Alvaro, Y. Sook, K. Sang and P. Dong, "A robust deep-learning-based detector for real-time tomato plant diseases and pests recognition", Sensors, vol. 17, no. 9, pp. 2022, 2017

[7]. S. Sladojevic, M. Arsenovic, A. Anderla, D. Culibrk and D. Stefanovic, "Deep neural networks-based recognition of plant diseases by leaf image classification", Comput. Intell. Neurosci., vol. 2016, pp. 1-11, May 2016

[8]. K. P. Ferentinos, "Deep learning models for plant disease detection and diagnosis", Comput. Electron. Agricult., vol. 145, pp. 311-318, Feb. 2018

[9]. G. Geetharamani and P. J. Arun, "Identification of plant leaf diseases using a nine-layer deep convolutional neural network", Comput. Electr. Eng., vol. 76, pp. 323-338, Jun. 2019.

[10]. E. C. Too, L. Yujian, S. Njuki and L. Yingchun, "A comparative study of fine-tuning deep learning models for plant disease identification", Comput. Electron. Agric., vol. 161, pp. 272-279, Jun. 2019.

[11]. P. K. Sethy, N. K. Barpanda, A. K. Rath and S. K. Behera, "Deep feature-based Rice leaf disease identification using support vector machine", Comput. Electron. Agricult., vol. 175, Aug. 2020

[12]. Q. Wu, Y. Chen, and J. Meng, ''DCGAN-based data augmentation for tomato leaf disease identification,'' IEEE Access, vol. 8, pp. 98716–98728, 2020

[13]. LILI LI, SHUJUAN ZHANG, AND BIN WANG, "Plant Disease Detection and Classification by Deep Learning—A Review", IEEE Access, 10.1109/ACCESS.2021.3069646, April 8, 2021

[14]. PENG JIANG, YUEHAN CHEN, BIN LIU, DONGJIAN HE, AND CHUNQUAN LIANG "Real-Time Detection of Apple Leaf Diseases Using Deep Learning Approach Based on Improved Convolutional Neural Networks "IEEE Access, /ACCESS.2019.2914929 May 6, 2019

[15]. A. Johannes et al., ''Automatic plant disease diagnosis using mobile capture devices, applied on a wheat use case,'' Comput. Electron. Agricult., vol. 138, pp. 200–209, Jun. 2017

[16]. TAN NHAT PHAM, LY VAN TRAN, AND SON VU TRUONG DAO "Early Disease Classification of Mango Leaves Using Feed-Forward Neural Network and Hybrid Metaheuristic Feature Selection" IEEE ACCESS.2020.3031914, October 19, 2020

[17]. J. G. A. Barbedo, ''Factors influencing the use of deep learning for plant disease recognition,'' Biosyst. Eng., vol. 172, pp. 84–91, Aug. 2018, doi: 10.1016/j.biosystemseng.2018.05.013

[18]. V. Singh and A. K. Misra, ''Detection of plant leaf diseases using image segmentation and soft computing techniques,'' Inf. Process. Agricult., vol. 4, no. 1, pp. 41–49, Mar. 2017, doi: 10.1016/j.inpa.2016.10.005