IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 2, December 2023

Tomato Leaf Disease Identification by Restructured Deep Residual Dense Network

Prof. Aghav S. E.[1], Gunjal Vicky D.[2], Mahale Shubham R.[3], Rajude Rohit D.[4], Avhad Abhishek N.[5], Mane Vaibhav B.[6]

Asst. Professor, Department of Computer Engineering [1]
Students, Department of Computer Engineering[2,3,4,5,6]
SND College of Engineering and Research Center, Yeola, India
sandhya.aghav070@gmail.com[1], vickygunjal92@gmail.com[2], shubhammahale2668@gmail.com[3], rohitrajude02@gmail.com[4], abhishekavhad20@gmail.com[5], vaibhavmane1401@gmail.com[6]

Abstract: *As COVID-19 spread worldwide, many major grain-producing countries have adopted measures to restrict their grain exports; food security has aroused great concern from various parties. How to improve grain production has become one of the most important issues facing all countries. However, crop diseases are a difficult problem for many farmers so it is important to master the severity of crop diseases timely and accurately to help staff take further intervention measures to minimize plants being further infected. In this paper, a restructured residual dense network was proposed for tomato leaf disease identification; this hybrid deep learning model combines the advantages of deep residual networks and dense networks, which can reduce the number of training process parameters to improve calculation accuracy as well as enhance the flow of information and gradients. The original RDN model was first used in image super resolution, so we need to restructure the network architecture for classification tasks through adjusted input image features and hyper parameters. Experimental results show that this model can achieve a top-1 average identification accuracy of 95% on the Tomato test dataset in AI Challenger 2018 datasets, which verifies its satisfactory performance. The restructured residual dense network model can obtain significant improvements over most of the state-of-the-art models in crop leaf identification, as well as requiring less computation to achieve high performance.*

Keywords: Residual dense network, leaf disease identification, agricultural artificial intelligence, tomato leaf diseases

REFERENCES

[1]. S. Savary, A. Ficke, J.-N. Aubertot, and C. Hollier, "Crop losses due to diseases and their implications for global food production losses and food security," 2012.

[2]. B. Ney, M.-O. Bancal, P. Bancal, I. Bingham, J. Foulkes, D. Gouache, N. Paveley, and J. Smith, "Crop architecture and crop tolerance to fungal diseases and insect herbivory. mechanisms to limit crop losses," European Journal of Plant Pathology, vol. 135, no. 3, pp. 561–580, 2013.

[3]. F. N. Iandola, M. W. Moskewicz, K. Ashraf, S. Han, W. J. Dally, and K. Keutzer, "Squeezenet: Alexnet-level accuracy with 50x fewer parameters and ¡1mb model size," CoRR, vol. abs/1602.07360, 2016. [Online]. Available: http://arxiv.org/abs/1602.07360

[4]. F. N. Iandola, S. Han, M. W. Moskewicz, K. Ashraf, W. J. Dally, and K. Keutzer, "Squeezenet: Alexnet-level accuracy with 50x fewer parameters and¡ 0.5 mb model size," arXiv preprint arXiv:1602.07360, 2016.

[5]. S. Xie, R. Girshick, P. Dollar, Z. Tu, and K. He, "Aggregated ´ residual transformations for deep neural networks," arXiv preprint arXiv:1611.05431, 2016.

[6]. K. He, X. Zhang, S. Ren, and J. Sun, "Deep residual learning for image recognition," in The IEEE Conference on Computer Vision and Pattern Recognition (CVPR), June 2016.

[7]. M. Lin, Q. Chen, and S. Yan, "Network in network," arXiv preprint arXiv:1312.4400, 2013.