Plant Leaf Disease Identification and Classification using Deep Learning Technique

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Abstract: *In countries like India, whose important occupation is agriculture, face a huge loss when the crops get affected by any type of disease. These diseases attack the crops in various stages and can destroy the entire production. Since most diseases are transmitted from one crop to another there is an essential requirement to detect the type of disease in the early stage so that farmers can take the required action to "save the crops" and production. However, detection of the kind of disease in a huge amount of crops is very difficult for farmers, and sometimes it becomes more difficult due to lake of knowledge about the disease since there are various kinds of diseases. The automated detection of crop disease with images has been done using many classification techniques, such as k- Nearest Neighbor Classifier, Probabilistic Neural Network, Genetic Algorithm, Support Vector Machine, and Main Component Analysis, Artificial Neural Network, and Fuzzy Logic. In this paper to improve detection capability, CNN has been used with an available database having sufficient knowledge of the disease. In this simulation, analysis of CNN-based leaf disease detection has been done for different values of learning rate and with different training algorithms. K-fold cross-validation has been used for the validation of the classifier. With this configuration, ~90% accuracy has been achieved.*

Keywords: Image classification, Plant Disease Detection, image Segmentation, deep learning, CNN

REFERENCES

[1]. S.Bashir,N.Sharma,"RemoteAreaPlantdiseasedetectionusingImageProcessing",IOSRJournalofElectro.and Communication Engineering , Volume 2, Issue 6 , pp.31-34,2012.

[2]. Pranali K. Kosamkar,Dr.V.Y.Kulkarni, Krushna Mantri, Shubham Rudrawar,Shubhan Salmpuria, Nishant Gadekar Leaf Disease Detection and Recommendation of Pesticides using Convolution Neural Network in IEEE Fourth International Conference on Computing Communication Control andutomation (ICCUBEA) ,978-1-5386-5257-2 , year 2018

[3]. Loyce Selwyn Pinto, Argha Ray, M.Udhayeswar Reddy, PavithraPerumal, Aishwarya P., "cropdisease class using texture analysis," in IEEE international conference on recent trends in electronicsinfo. comm technology, 2016.

[4]. Santhosh Kumar., B.K.Raghavendra "Diseases Detection of Various Plant Leaf Using Image processing tech. A Review" , 5th International Conference on Advanced Computing &communication system in IEEE 978-1-5386-9533-3 in year 2019.

[5]. Vijai S, et al. Detection of plant leaf diseases using image segmentation and soft com techniques,information processing in agriculture, in Elsevier.

[6]. Godliver O, et al. "Machine learning for plant disease incidence and severity measurements from leaf images " in 15th ieee international conference on machine learning and applications. 2016.

[7]. Yuxia U, et al. "Spatial pyramid-oriented encoder- decoder cascade convolution neural network for cropdeis. leaf segmentation". IEEE Access. 2021.

[8]. Suhaili BK. "Classification of watermelon leaf diseases using neural network analysis," ieeebusiness engg. and industrial applications colloquium. 2013.

[9]. P Sachin, et al. "Plant disease detection using image processing," in ieee 2015 international conference on computing communication control and automation, pune, 2015.

[10]. Athanikar, .Girish and Ms.PritiBadar."Potato Leaf Diseases Detection and Classification system 2016.

[11]. C. U. Kumari, S. Jeevan Prasad and G. Mounika, "Leaf Disease Detection: Feature Extraction with K means clustering and Classification with ANN," 2019 3rd International Conference on Computing Methodologies and Communication (ICCMC), Erode, India, 2019, pp. 1095-1098.

[12]. M. Islam, AnhDinh, K. Wahid and P. Bhowmik, "Detection of potato diseases using image segmentation and multiclass support vector machine," 2017 IEEE 30th Canadian Conference on Electrical and Computerengg (CCECE), Windsor, ON,2017

[13]. Li, Guanlin& Ma, Zhanhong& Wang, Haiguang. (2012). Image Recognition of Grape DownyMildew and Gra Powdery Mildew Based on Support Vector Machine. IFIP Advances inInformation and Communication Tech . 370. 151-162,

[14]. Chen, jing&liu ,qi&gao, Lingwang. (2019). Visual Tea Leaf Disease Recognition Using a Convolutional Neur Network model , Symmetry2019,11,343; doi:10.3390/sym11030343

[15]. DivyanshTiwari [2020]Potato Leaf Diseases Detection Using Deep Learning, Proceedings of the International Conference on Intelligent Computing and Control Systems (ICICCS 2020)IEEEXplorePart Number:CFP20K4 ART, ISBN: 978-1-7281- 4876-2.

[16]. A Survey on Disease Detection of a potato Leaf Using CNN, SindhujaBangari Department ofComputer Sci. and Engineering, New Horizon College of Engineering, Bangalore,India,IEEE,10.11

[17]. A Review of Different Plant Leaf Diseases and an Analysis of Different Plant Leaf DiseasesIdentification TechniquesResearch and Reviews Journal of Agriculture and Allied Sciences, RRJAAS | Volume 10|Issue 4 | December 2021