Detection Of Plant Leaf Disease Using Machine Learning Techniques

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ABSTRACT_ One of the main variables affecting agricultural yield loss in crop production and agriculture is the identification and detection of plant diseases. Plant disease research focuses on any observable characteristics in any section of the plant that allow us to distinguish between two plants, technically any spots or colour variations. One of the most important factors in the growth of agriculture is plant sustainability. Correctly identifying plant diseases is exceedingly challenging. It takes a lot of effort and skill to identify a disease, as well as extensive knowledge of plants and studies on the detection of certain diseases. Consequently, plant disease detection uses image processing. The methods of picture acquisition, image extraction, image segmentation, and image pre-processing are used for illness detection. Understanding the training data and incorporating it into models that should be helpful to people is the basic goal of machine learning. Therefore, plant diseases can be detected using machine learning. It has aided in making wise decisions and forecasting the vast amount of data generated. Classification factors include the colour of the leaves, the severity of the damage, and the location of the ill plant leaf. In this article, we looked at various machine learning algorithms to diagnose various plant leaf diseases and determine which had the highest accuracy.

KEYWORD: Image Registration, Image blending, Document image, video

1.INTRODUCTION

In India, farmers grow a huge range of crops, and the problem of environmentally friendly plant disease safety is closely related to the problems of sustainable agriculture and local weather change. Different pathogens are present in the environment, which negatively impacts the vegetation and soil in which the plant is planted, affecting the production of plants. Different diseases are present on the plant life and vegetation. The leaves of the affected plant or crop are crucial for identifying it. The leaf's numerous coloured dots and patterns are highly helpful in spotting the condition. The prior situation for detecting plant disorders involved direct eye inspection, keeping in mind the specific set of disorders depending on the climate, season, etc. These methods have taken a lot of time and have undoubtedly been wrong. Modern methods of plant disease identification involved a number of laboratory tests, qualified individuals, appropriately equipped facilities, etc. These items are no longer useful everywhere, especially in remote areas. The use of an automated system for disease detection is advantageous since it lowers the need for labor-intensive manual inspection of big crop farms and recognises probable disease symptoms as soon as they develop on plant leaves.

2.LITERATURE SURVEY

Different processes to identification and quantification of factory sickness are in exercise and splint image-grounded identification of factory sickness is one of them(11- 17). It's by way of a ways the stylish way to mechanically come apprehensive of factory sickness and can be used for identification of quite a number ails(12). The prevalence of factory complaint reasons precise variations in the texture and shade of the splint and accordingly splint imagery can be used to prize shade and texturebased rudiments to instruct a classifier. Some of the full- size literature in the area of factory splint- grounded sickness identification is furnished below.

There are two tactics for splint picture primarily grounded factory sickness identification(i) deep gaining knowledge of grounded, which use complicated infrastructures to routinely examine angles(ii) point- grounded, which prize home made angles similar as shade and texture angles to educate a traditional laptop gaining knowledge of algorithm. The deep mastering primarily grounded ways has supplied lesser rigor still they bear lesser calculation and accordingly now not applicable for cellular or handheld widgets with confined reminiscence and calculations. Some of the designed structures are concentrated one- of-a-kind ails of some unique factory, whereas the different procedures thing a couple of factory conditions. Phadikar etal.(18) has introduced a function primarily grounded strategy to disease identification of rice factory.

They've used Fermi strength primarily grounded fashion for segmentation observed by way of color, figure and position mapping. Rough set principle is used for determination of essential angles and rule mining with10-foldcross-validation is used for contrivance testing. Baquero etal.(19) has introduced a Content- Grounded Image Retrieval(CBIR) device which makes use of achromatism shape descriptors and nearest neighbors to classify vital affections or sickness signs and symptoms similar as chlorosis, sooty molds and early scar. also, Patil etal.(20) has also introduced a CBIR and uprooted color, structure and texture grounded completely features. Sandika etal.(21) has proposed a point- grounded strategy for disease identification of grapes leaves. They've also carried out the evaluation of texture point's performance. of Their Oberti etal.(22) has concentrated the fungal disease of conduit factory(fine mildew) due to its dangerous issues on the crop yield and great of yield. They've usedmulti-spectral imaging and captured connections splint filmland at a vary of angles(0 to seventy five degrees). They've also stressed that the discovery perceptivity will increase with the expand in perspective and veritably stylish figure is bought at 60 categories and for early center a long time the perceptivity improves from 9-75 with trade in perspective from 0- 60 degrees. also, Zhang etal.(15) has introduced a point- grounded strategy which radically change the print into superpixel illustration and also section the favored place the operation of k-means and excerpt aggregate of histogram of exposure grade(PHOG). Sharif etal.(23) has introduced a point-grounded system for citrus fruit factory complaint. They've used a mongrel characteristic decision system grounded completely on abecedarian factor evaluation and function statistics. Singh etal.(24) has also introduced a function primarily grounded system for pine trees. Bai etal.(25) has centered cucumber factory sickness and proposed an accelerated fuzzy c- mean primarily grounded clustering system to section the diseased splint area. Hlaing etal. has introduced a function primarily grounded strategy and used PlantVillage dataset. The have uprooted SIFT points and employed generalized pareto distributions to calculate viscosity function. Support vector machines is used to educate on these points and furnished a10-

foldcross-validation delicacy of84.7.

3.PROPOSED SYSTEM

Concerns about sustainable agriculture and climate change are closely related to the problem of environmentally friendly plant disease safety. India's farmers have access to an incredible array of crops. Numerous diseases are present in the environment, which has a negative impact on the soil where plants are planted and the surrounding vegetation. This has an impact on how plants are produced. The vegetation and plant life contain many different diseases. The leaves of the damaged plant or crop are a key indicator of its identity. The leaf's numerous coloured dots and patterns are highly helpful in spotting the condition. The prior situation for detecting plant disorders involved direct eye inspection, keeping in mind the specific set of disorders depending on the climate, season, etc. These methods have taken a lot of time and have undoubtedly been wrong. Modern methods of plant disease identification involved a number of laboratory tests, qualified individuals, appropriately equipped facilities, etc. These items are no longer useful everywhere, especially in remote areas. The use of an automated system for disease detection is advantageous since it lowers the need for labor-intensive manual inspection of big crop farms and recognises probable disease symptoms as soon as they develop on plant leaves.

3.1 DATASET

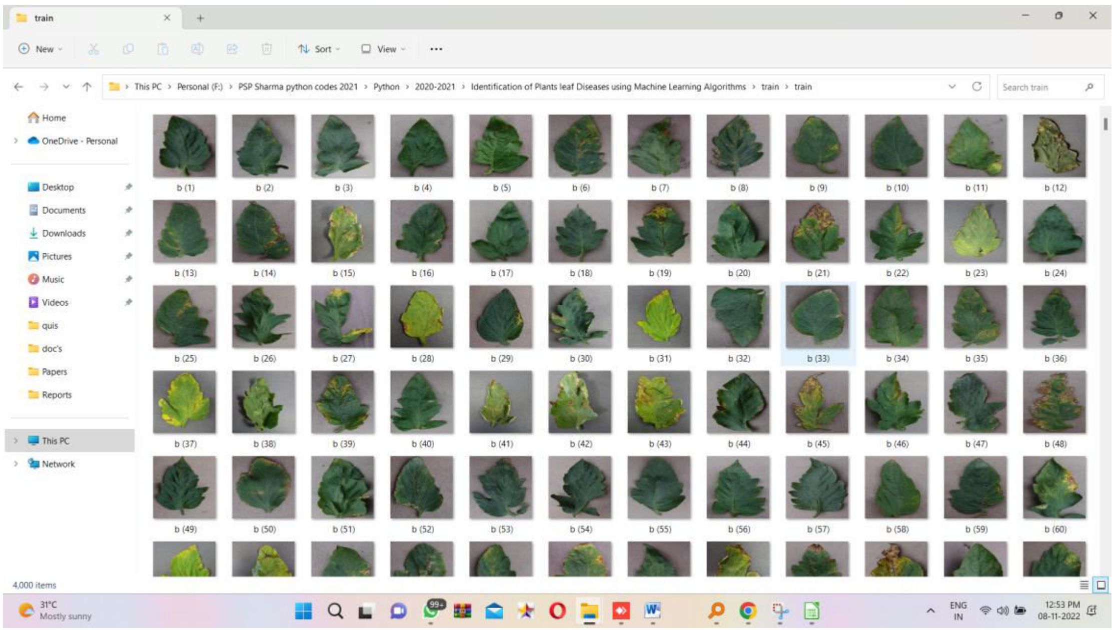

Fig 1:Dataset

4.PROPOSED SYSTEM ARCHITECTURE

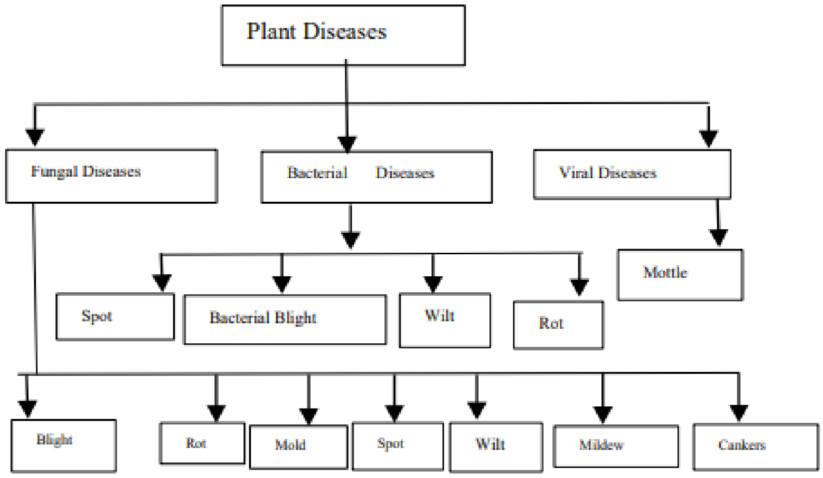

Fig. 1. Classification of Plant Diseases

The diseases that can affect plants are represented in fig. 1 and include fungi, bacteria, and viruses. Blight, rot, mould, spot, wilt, mildew, and cankers are just a few examples of the many fungal diseases that can affect plants. Different types of bacteria can cause various illnesses, such as spot, bacterial blight, wilt, and rot. Diseases caused by viruses include the common cold, flu, and the mottle virus.

5.EXPERIMENTAL RESULTS

We evaluate the effectiveness of a method for detecting diseases in plant leaves here. The system's overall performance is measured by the percentage of times it correctly identifies the presence of a disease. Using this method, achievements can be tallied.

We found that bacterial, fungal, viral, and fungal diseases all impact leaves (especially tomato leaves) during our analysis of the system's efficacy. The proposed method assessed the leaves' disease levels. The proposed system requires a unique image of the exit. The presence or absence of disease in the leaves can be determined based on the photograph.

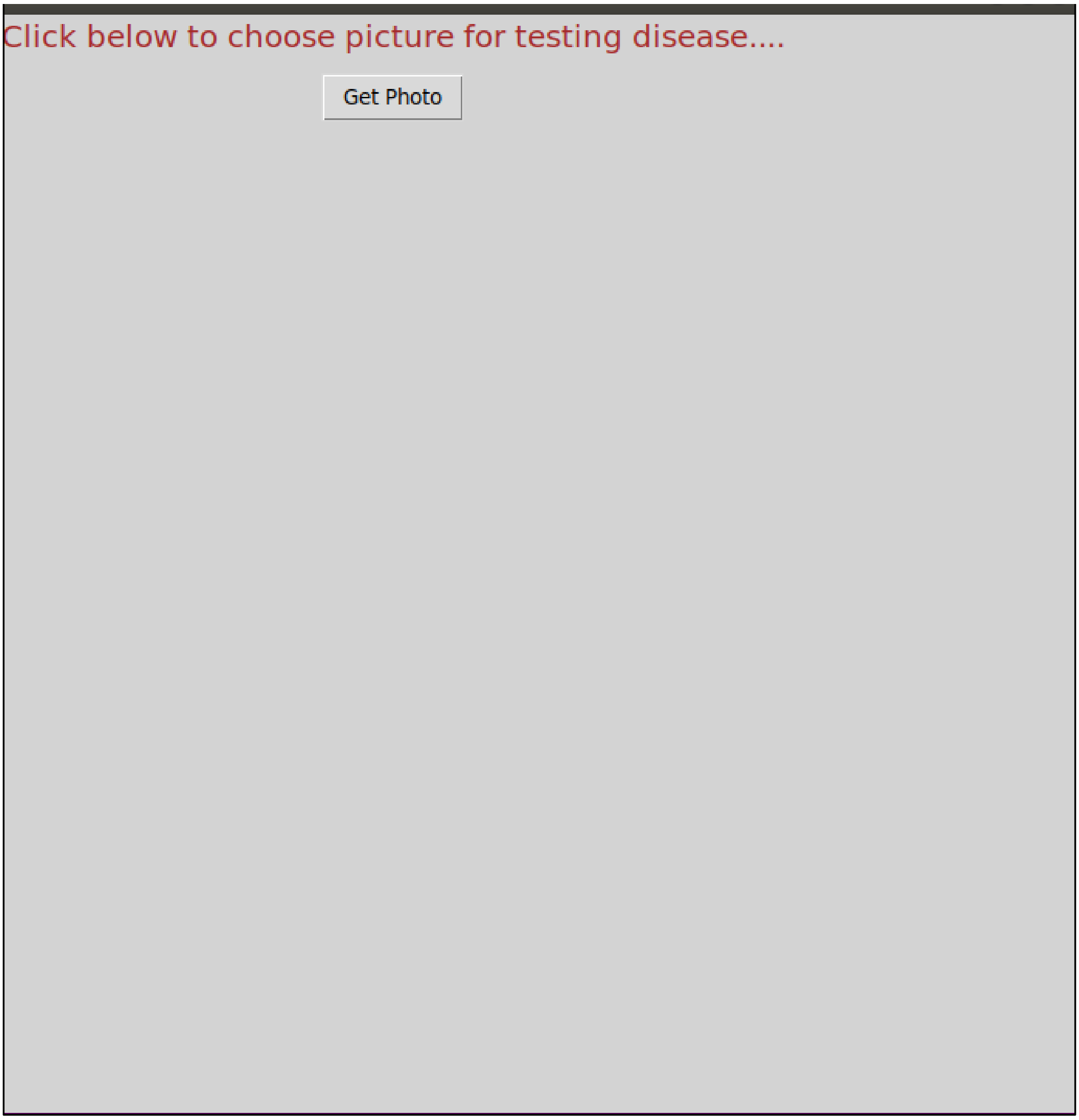

Fig 5.1 In this screen user will choose image for identifying disease by using uploaded image. here already we have collected some images by applying training and modeling for images

Fig 5.2 In this screen we are going to analyze the uploaded image

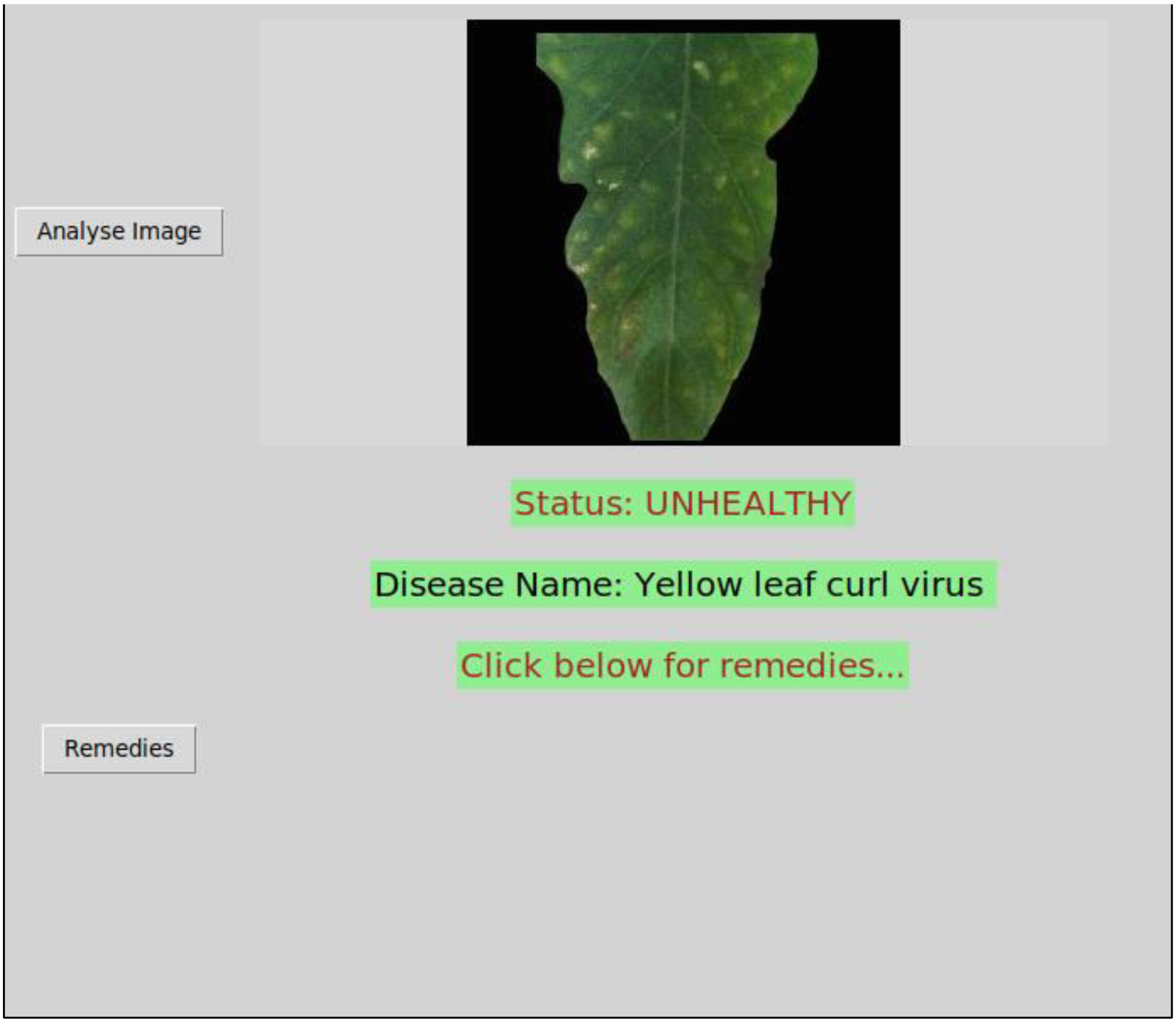

Fig 5.3 The above screen displays the submitted image's health status. In this paper, we examine the necessity of a comprehensive and flawless dataset for plant disease recognition processes in leaves. The proposed system begins with a training phase. Assess the system's efficiency after feeding it data. There must be a dataset for the machine learning algorithm. Essentially, both healthy and unhealthy leaves are needed as training data. Tomato and potato leaves, in particular, are used as part of this dataset due to their prevalence in commercial agriculture. One thousand photographs are amassed from various locations for the train system.

6.Comparitive Study

Sno	Algorithm	Accuracy
1	k-means	88.6
2	SVM	91%

It was determined that separate algorithms, such as the k-means process and the support vector machine, yield efficiencies of 88.6 and 91.1 percent, respectively. However, the proposed approach yields superior results. The precision exceeds that of any single algorithm.

7.Conclusion

The recommended strategy is valuable and has the potential to improve results. The K-mean technique did not perform well on a global scale, and it also struggled with clusters that had varying sizes and densities of data. To get the best results from classification, it is recommended to use multiple SVM classes after clustering. This hybrid algorithm outperforms both of the individual methods in the comparisons of performance. This approach has been shown to be effective at training and testing large datasets for illness prediction. This way of thinking is extremely helpful in modern life. This proposed technology will be particularly useful in the agriculture and medical fields because it would allow for the use of extremely low doses of pesticides on plants.

REFERENCE

1. Sherly Puspha Annabel, T Annapoorani, and P Deepalakshmi. Machine learning for plant leaf disease detection and classification–a review.

In 2019 (ICCSP), pages 0538– 0542. IEEE, 2019.

2. Shima Ramesh Maniyath, PV Vinod, M Niveditha, R Pooja, N Shashank, Ramachandra Hebbar. Plant disease detection using machine learning. In 2018 I (ICDI3C), pages 41–45. IEEE, 2018.

3. G. Prem Rishi Kranth, M. Hema Lalitha, LaharikaBasava, Anjali Mathur. Plant Disease prediction using Machine learning algorithms. In 2018 IJCA (09758887), volume 182-No. 25. IEEE, 2018.

4. Bin Liu, Yun Zhang, DongJian He, and Yuxiang Li. Identification of apple leaf diseases based on deep convolutional neural networks. Symmetry, 10(1):11, 2017.

5. Prakash M Mainkar, ShreekantGhorpade, and Mayur Adawadkar. Plant leaf disease detection and classification using image processing techniques. International Journal of Innovative and Emerging Research in Engineering, 2(4):139–144, 2015.

6. DS Gaikwad and KJ Karande. Image processing approach for grading and identification of diseases on pomegranate fruit: An overview. IJCSIT) International Journal of Computer Science and Information Technologies, 7(2):519–522, 2016.

7. Sharada P Mohanty, David P Hughes, and Marcel Salath´e. Using deep learning for image-based plant disease detection. Frontiers in plant science, 7:1419, 2016.

8. P.Karthika, R.Ganesh Babu, and P.A.Karthik, "Fog Computing using Interoperatibility and IoT Security Issues in Health Care," In: Devendra Kumar Sharma., Valentina Emilia Balas., Le Hoang Son., Rohit Sharma., Korhan Cengi. (eds) Proceedings of Third International Conference on Micro-Electronics and Telecommunication Engineering. Lecture Notes in Networks and Systems, vol. 106, pp. 97–105. Springer, 2020.

9. PreethaRajan, B Radhakrishnan, and L Padma Suresh. Detection and classification of pests from crop images using support vector machine. In 2016 international conference on emerging technological trends (ICETT), pages 1–6. IEEE, 2016.

10. Sushma R Huddar, Swarna Gowri, K Keerthana, S Vasanthi, and Sudhir Rao Rupanagudi. Novel algorithm for segmentation and automatic

identification of pests 18 on plants using image processing. In 2012 Third International Conference on Computing, Communication and Networking Technologies (ICCCNT'12), pages 1–5. IEEE, 2012.

11. Rakesh Kaundal, Amar S Kapoor, and Gajendra PS Raghava. Machine learning techniques in disease forecasting: a case study on rice blast prediction. BMC bioinformatics, 7(1):485, 2006.

12. R.Ganesh Babu, P.Karthika, and G.Manikandan, "Polynomial Equation Based Localization and Recognition Intelligent Vehicles Axis using Wireless Sensor in MANET", In: Second International Conference on Computational Intelligence and Data Science in association with Elsevier-Procedia Computer Science, Gurugram, India, vol. 167, pp. 1281–1290, 2020.

[13] K. Renugambal and B. Senthilraja, "Application of image processing technique in plant disease recognition," International journal of engineering research and technology, vol. 4, no. 03, Mar. 2015. D. Luna, G. Robert G. Renann, Baldovino, E. A. Cotoco, Anton Louise P. de Ocampo, C. Ira,Valenzuela, A. B. Culaba, and E. P. Dadios Gokongwei, "Identification of philippine herbal medicine plant leaf using artificial neural network," 9th IEEE International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment and Management (HNICEM), pp. 1-8, 2017.

[14] Sandika Biswas, Bhushan Jagyasi, Bir Pal Singhy and Mehi Lal, "Severity Identification of Potato Late Blight Disease from Crop Images Captured under Uncontrolled Environment," IEEE Canada International Humanitarian Technology Conference - (IHTC), 2014.

[15] Bin Liu, Yun Zhang, Dong Jian He and Yuxiang Li, "Identification of Apple Leaf Diseases Based on Deep Convolutional Neural Networks," Symmetry, vol. 10, no. 11, 2017.

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