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Tomato Leaf Disease Detection using Flask Frame Work

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Abstract: *In recent years, plant leaf diseases has become a widespread problem for which an accurate research and rapid application of deep learning in plant disease classification is required, tomato is also one of the most important plants and seeds which are used worldwide for cooking in either dried or fresh form, tomato are a great source of protein that offer many health benefits, but there are a lot of diseases associated with tomato leaf which hinder its production. Thus, an accurate classification of tomato leaf diseases is needed to solve the problem in the early stage. A deep learning approach is proposed to identify and classify leaf disease by using public dataset of leaf image and CNN model with the open source library TensorFlow. In this project, we proposed a method to classify tomato leaf disease and to find and describe the efficient network architecture (hyper parameters and optimization methods). Moreover, after applying each architecture separately, we compared their obtained results to find out the best architecture configuration for classifying tomato leaf diseases and their results. Furthermore, to satisfy the classification requirements, the model was trained using CNN architecture check if we could get faster training times, higher accuracy and easier retraining. Deep learning is a branch of artificial intelligence. In recent years, with the advantages of automatic learning and feature extraction, it has been widely concerned by academic and industrial circles. It has been widely used in image and video processing, voice processing, and natural language processing. At the same time, it has also become a research hotspot in the field of agricultural plant protection, such as plant disease recognition. The application of deep learning in plant disease recognition can avoid the disadvantages caused by artificial selection of disease spot features, make plant disease feature extraction more objective, and improve the research efficiency and technology transformation speed. This review provides the research progress of deep learning technology in the field of crop leaf disease identification in recent years. In this project, we present the current trends and challenges for the detection of plant leaf disease using deep learning and advanced imaging techniques. We hope that this project will be a valuable resource for researchers who study the detection of plant diseases. At the same time, we also discussed some of the current challenges and problems that need to be resolved.*

Keywords: plant leaf diseases

I. INTRODUCTION

Plant diseases affect the growth and crop yield of the plants and make social, ecological and economic impacts on agriculture. Recent studies on leaf diseases show how they harm the plants. Plant leaf diseases also cause significant economic losses to farmers. Early detection of the diseases deserves special attention. Plant diseases are studied in the literature, mostly focusing on the biological aspects. They make predictions according to the visible surface of plants and leaves. Detection of diseases as soon as they appear is a vital step for effective disease management. The detection is traditionally carried out by human experts. Human experts identify diseases visually but they face some difficulties that may harm their efforts. In this context, detecting and classifying diseases in an exact and timely manner is of the great importance.

Advances in artificial intelligence researches now make it possible to make automatic plant disease detection from raw images. Deep learning can be thought as a learning method on neural networks. One of the advantages of deep learning

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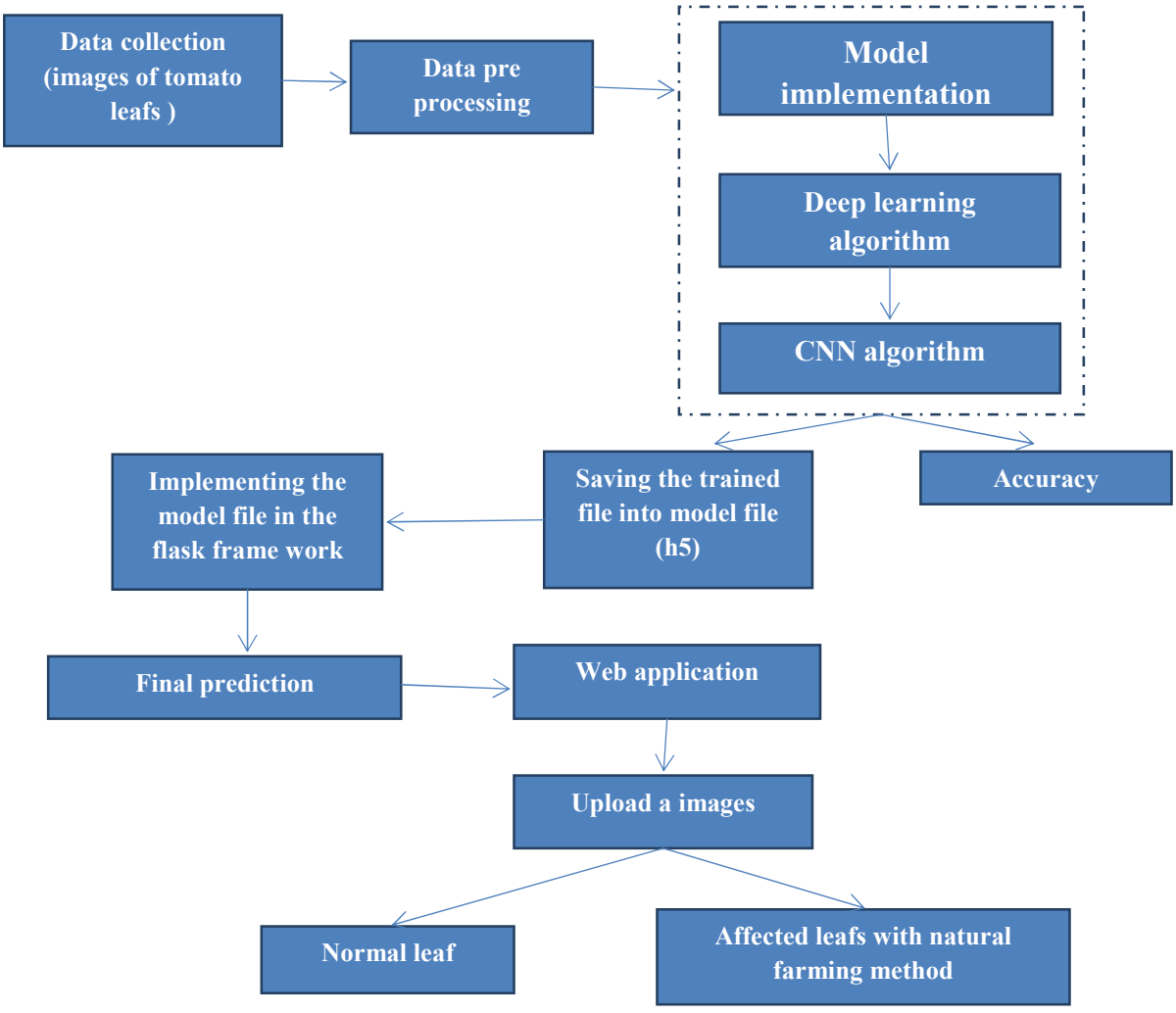
is that it can extract features from images automatically. The neural network learns how to extract features while training. CNN is a multi-layer feed-forward neural network and is the popular deep learning model.

In recent years, CNN models have been widely used in image classification problems. Introduce a hybrid model to extract contextual information of leaf features using CNN Performed several pre-trained CNN models on a large open leaves dataset. Their studies show that CNN is highly suitable for automatic plant disease identification. The occurrence of plant diseases has a negative impact on agricultural production. If 6 plant diseases are not discovered in time, food insecurity will increase. Early detection is the basis for effective prevention and control of plant diseases, and they play a vital role in the management and decision-making of agricultural production. In recent years, plant disease identification has been a crucial issue. Disease-infected plants usually show obvious marks or lesions on leaves, stems, flowers, or fruits. Generally, each disease presents a unique visible pattern that can be used to uniquely diagnose abnormalities. Usually, the leaves of plants are the primary source for identifying plant diseases, and most of the symptoms of diseases may begin to appear on the leaves.

In most cases, agricultural and forestry experts are used to identify on-site or farmers identify fruit tree diseases and pests based on experience.

This method is not only subjective, but also time-consuming, laborious, and inefficient

II. SYSTEM ARCHITECTURE:



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III. SYSTEM MODULES

Module 1: Dataset collection
Module 2: Pre-processing
Module 3: Model Implementation
Module 4: Implementing in the flask frame work
Module 5: final prediction

MODULE 1: Data Collection

Data represents information collected in the form of numbers and text. Data collection is generally done after the experiment or observation. Primary data and Secondary data are helpful in planning and estimating. Data collection is either qualitative or quantitative.

Here for this project we are using images of leafs. The images were taken from kaggle website

Module 2: Pre processing

Data pre-processing is the process of transforming raw data into a useful, understandable format. Real-world or raw data usually has inconsistent formatting, human errors, and can also be incomplete. Data preprocessing resolves such issues and makes datasets more complete and efficient to perform data analysis.

Module 3: Model Implementation

For this project we are using deep learning method to identify the plant leafs disease by using CNN algorithm.

CNN:

The convolutional layer is the first layer of a convolutional network. While convolutional layers can be followed by additional convolutional layers or pooling layers, the fully-connected layer is the final layer. With each layer, the CNN increases in its complexity, identifying greater portions of the image.

Earlier layers focus on simple features, such as colors and edges. As the image data progresses through the layers of the CNN, it starts to recognize larger elements or shapes of the object until it finally identifies the intended object.

Module 4: Implementing in the flask frame work

By using the CNN algorithm we train the dataset and predicted the accuracy for the dataset.

The trained model is saved as a model file (h5)

The model file is implemented in the flask frame work to build a web application format.

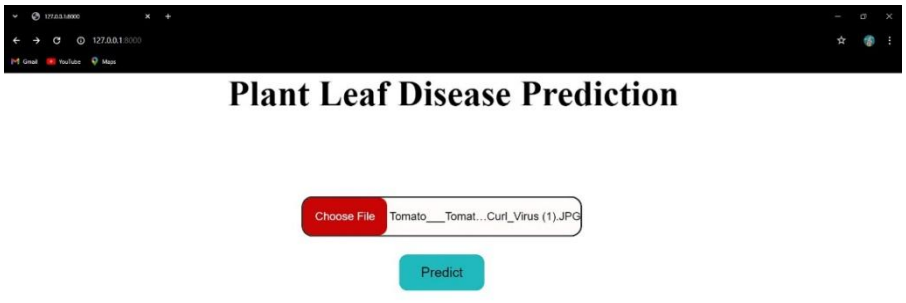
Module 5: final prediction

Implementing in the flask frame work to get the output in the web application format.

Upload the image and get the final output as a solution for medical treatment and natural farming methods.

The final prediction is normal or with disease affected.

IV. SAMPLE SCREENSHOTS



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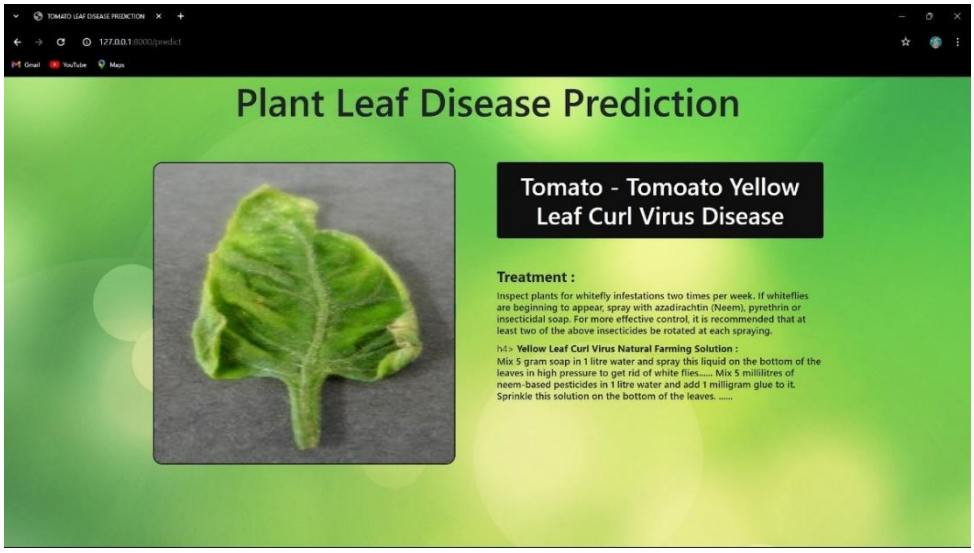

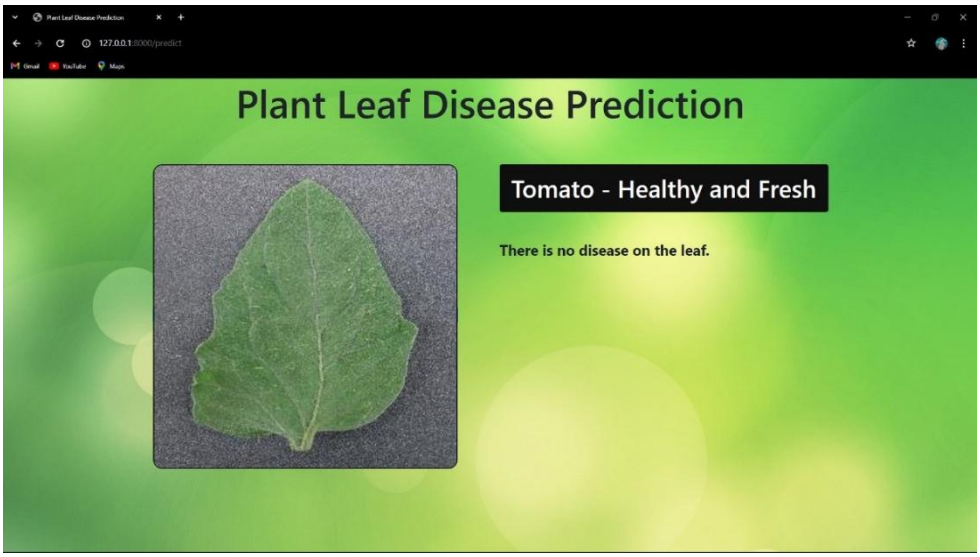

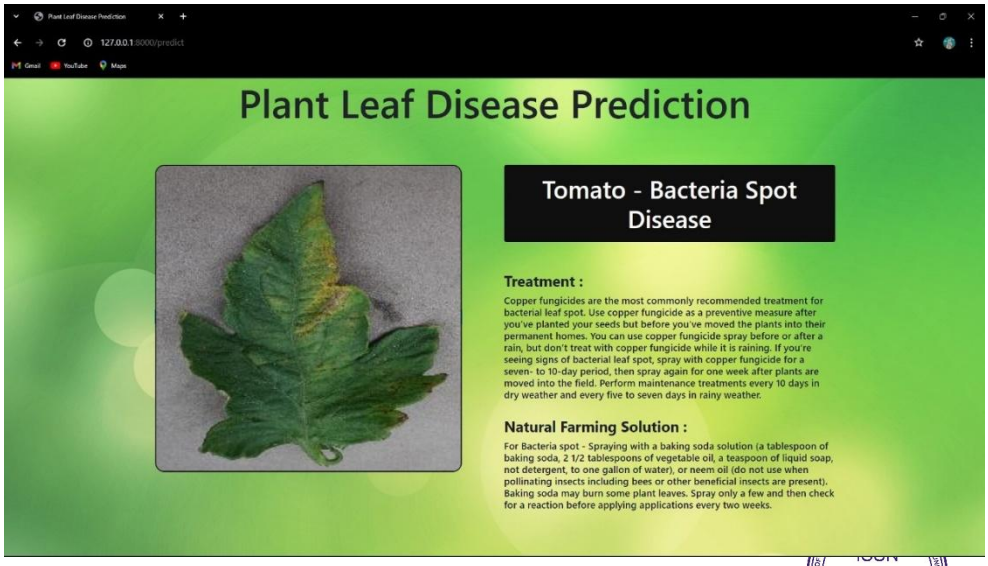

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V. CONCLUSION

In this project, tomato leaf diseases detection and classification method is presented based on Convolutional Neural Network algorithm. The dataset consist of tomato leaves images. Three different input matrices have been obtained for R, G and B channels to start convolution for every image in the dataset. The experiments have been carried out on healthy and diseased leaf images to perform classification. It is concluded that the proposed method effectively recognizes four different types of tomato leaf diseases. To improve recognition rate in classification process different filters or different size of convolutions can also be used. And implemented in the web application by using the flask frame work. The natural farming method is also applied in this concept.

REFERENCES

[1] Swapnil Pakhare, Abhijeet More, AjeemMakandar, VaibhavTodkar, Leaf Disease Detection System Using Flask,International Research Journal of Modernization in Engineering Technology and Science (Peer-Reviewed, Open Access, Fully Refereed International Journal) Volume:05/Issue:11/November-2023 Impact Factor- 7.868 www.irjmets.com www.irjmets.com @International Research Journal of Modernization in Engineering, Technology and Science [3262]

[2] ShafiullaShariff, Saraswathi H S, Panchami M P, Vaishnavi S, SumayyaBanu,Leaf Disease Detection Using Hybrid Feature Extraction Techniques And Machine Learning,International Journal of Engineering,Science& Technology(IJERT), https://www.ijert.org/icei-2023-volume-11-issue-05,

[3] NiharikaSaxena ,Neha Sharma ,Identification Of Tomato Leaf Disease Prediction Using Cnn,. https://www.granthaalayahpublication.org/ojs-sys/ijoest/article/view/397/256, International Journal of Engineering Science Technology,2022.DOI 10.29121/IJOEST.v6.i5.2022.397

[4] Dr. P. Sivakumar, 2Rakesh Kancharla, 3G. Prasanth Kumar, 4PCS Nagendra Setti,An Intelligent Approach to Detect Diseases of Tomato Plants from Its Leaf using Deep Learning Algorithms, YMER || ISSN : 0044-0477, VOLUME 21 : ISSUE 11 (Nov) - 2022 http://ymerdigital.com Page No:2848

[5] H. Park, J. S. Eun and S. H. Kim, “Image-based disease diagnosing and predicting of the crops through the deep learning mechanism”, In Information and Communication Technology Convergence (ICTC), IEEE 2017 International Conference on, pp. 129-131, 2017.

[6] K. Elangovan and S. Nalini, “Plant disease classification using image segmentation and SVM techniques”, International Journal of Computational Intelligence Research, vol. 13(7), pp. 1821-1828, 2017.

[7] S. H. Lee, C. S. Chan, S. J. Mayo and P. Remagnino, “How deep learning extracts and learns leaf features for plant classification”, Pattern Recognition, vol. 71, pp. 1-13, 2017.

[8] K. P. Ferentinos, “Deep learning models for plant disease detection and diagnosis”, Computers and Electronics in Agriculture, vol. 145, pp. 311- 318, 2018.

[9] H. Durmus¸, E. O. Gunes ¨ ¸ and M. Kırcı, “Disease detection on the leaves of the tomato plants by using deep learning”, In Agro-Geoinformatics, IEEE 6th International Conference on, pp. 1-5, 2017. [6] H. A. Atabay, “Deep residual learning for tomato plant leaf disease identification”, Journal of Theoretical & Applied Information Technology, vol. 95(24), 2017.

[10] S. Zhang, W. Huang and C. Zhang, “Tree-channel convolutional neural networks for vegetable leaf disease recognition”, Cognitive Systems Research, 2018