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Deep Learning Based Detection of Arecanut Disease

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Abstract
The Deep Learning-Based Early Detection of Areca nut Disease project aims to use advanced technology to identify diseases in areca nut plants early. Areca nut is an important crop in many tropical regions, but it often faces challenges from various diseases such as Mahali, Stem Bleeding, and Yellow Leaf spots that can harm yields.
The project starts by collecting lots of images of areca nut leaves showing different disease symptoms. These images are then prepared for analysis by making sure they are all the same size and have consistent colors. The ResNet model is then trained using these images to recognize patterns associated with different diseases.

1. Introduction

Deep Learning Based Early Detection of Arecanut Disease is a groundbreaking project aimed at revolutionizing agricultural practices through the integration of advanced technology. Focused on the pivotal crop of arecanut, this endeavor leverages the ResNet architecture, a state-of-the-art deep learning framework, to enable the early identification and mitigation of diseases affecting arecanut plants. Arecanut, also known as betel nut, is a vital cash crop in many tropical regions, contributing significantly to the economy and livelihoods of numerous communities.
At the core of the Deep Learning Based Early Detection of Arecanut Disease project lies a comprehensive pipeline encompassing data collection, preprocessing, model development, training, and evaluation. Image data containing visual representations of arecanut plant leaves exhibiting various disease symptoms are collected from fields and annotated with corresponding labels.

2. Literature survey

Srdjan Sladojevic et al,2016 [1], There are many methods in automated or computer vision plant disease detection and classification process, but still, this research field is lacking. In addition, there are still no commercial solutions on the market, except those dealing with plant species recognition based on the leaves images. In this paper, a new approach of using deep learning method was explored in order to automatically classify and detect plant diseases from leaf images.

Muhammad Dedi Irawan et al, 2020 [2], The study has been implemented a forward chain- based expert system. The result showed the inference engine has been successfully predict a disease, starting from the fact symptoms of areca nut collection and the areca nut disease prediction. Therefore, a solution for handling the disease can be taken which can become beneficial information to farmers for which the farmers can take good care of areca plants.

Narendra Nath Singh et al,2016 [3], each individual/ phenomenon has two aspects – Good & Bad. In this paper they have dedicated ample amount of time in explaining the deleterious effects of Areca nut. Time has come to explore the other aspects of Areca nut. Areca nut seed biochemical compounds have been recently recognized as functionally active molecules, possessing antioxidant, antidiabetic, antiallergic and other useful properties, as well as exert protective effects against cardiovascular and other diseases.

3. System Design

The design of the system deals with how the system is developed. It explains the flow of functionalities in brief.

Flowchart:

A flow chart is a type of diagram that represents a workflow or process. A flowchart can also be defined as a diagrammatic representation of an algorithm, a step by step approach to solving a task. The flow chart shows the steps as boxes of various kinds, and their order by connecting the boxes with arrows.

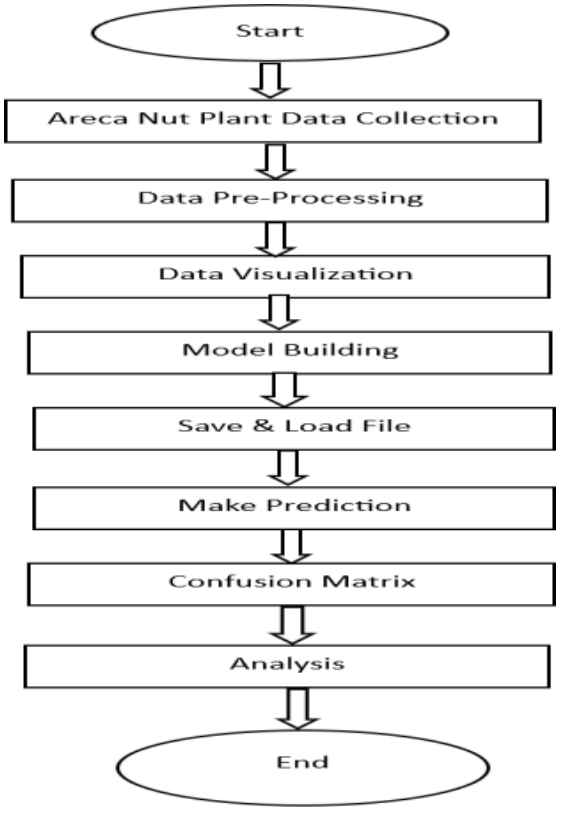

Fig 1: Flowchart of early detection of areca nut plant diseases.

4. Implementation

Collaborate with agricultural experts and field researchers to collect a diverse dataset comprising images of areca nut plants exhibiting various disease symptoms.Ensure the dataset includes examples of healthy plants as well as those affected by common.

Resizing: Resizing images to a fixed size suitable for the neural network input. This ensures all images have the same dimensions.
Normalization: Scaling pixel values to a range between 0 and 1 or -1 and 1. Normalization helps in faster convergence during training.
Data Augmentation: Techniques like rotation, flipping, zooming, and shifting are applied to increase the diversity of training samples and improve the model's generalization capability.

5. Results:

5.1 Initial User Interface

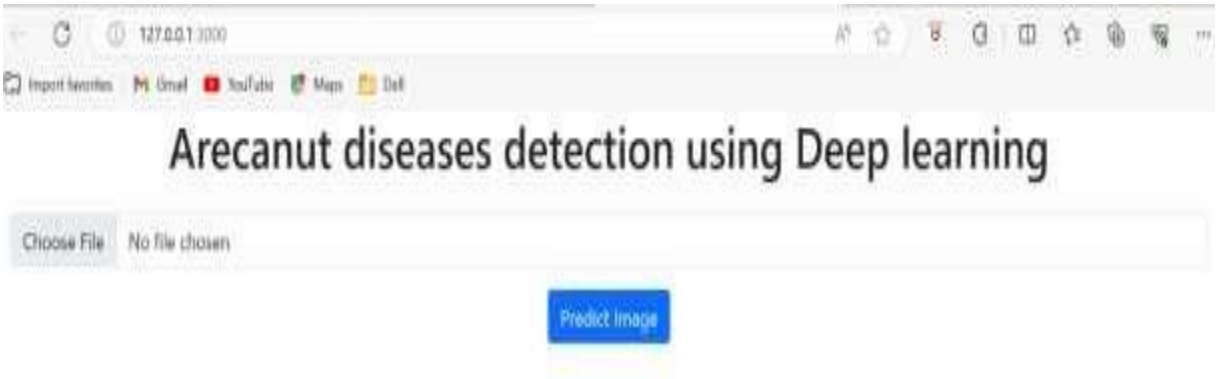

Fig 2.1: Prediction Screen

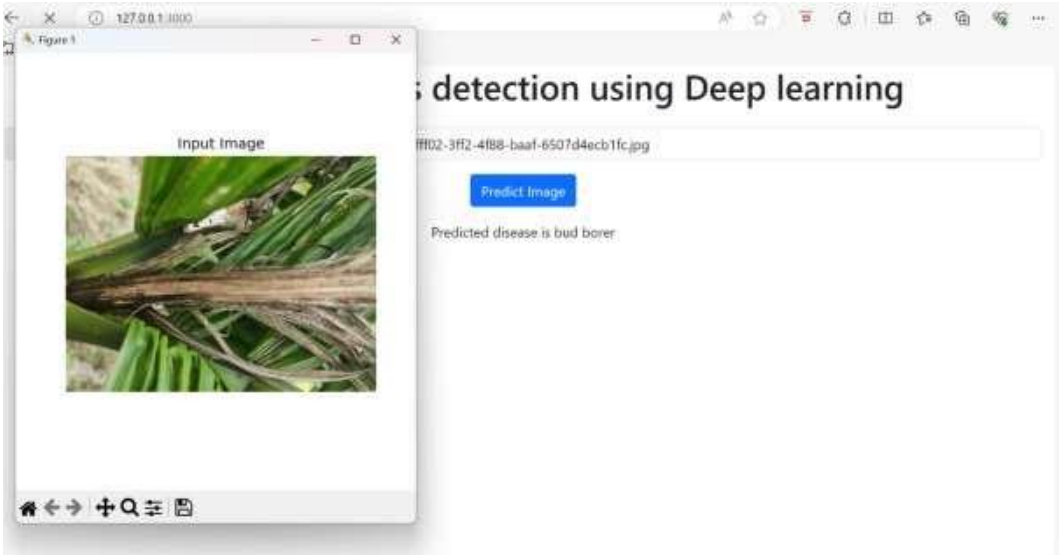

Fig 2.2: Bud Borer Disease Detection

6. Conclusion

Deep Learning Based Early Detection of Arecanut Disease project represents a significant advancement in agricultural disease management practices. By harnessing the power of deep learning techniques, particularly the ResNet architecture, the project aims to revolutionize the early identification and mitigation of diseases affecting areca nut plants.
Through the development and deployment of a robust deep learning model, farmers and agricultural stakeholders will have access to an automated and efficient tool for detecting diseases in areca nut plants based on visual symptoms depicted in images of areca nut leaves. Diseases such as Mahali, Stem

Bleeding, and Yellow Leaf spots will be detected and cured, further enhancing the resilience of areca nut cultivation.

7. References

1. Martina Machová, Tomáš Bajer, David Šilha, Karel Ventura and Petra Bajerová, "Volatiles Composition and Antimicrobial Activities of Areca Nut Extracts Obtained by Simultaneous Distillation–Extraction and Headspace Solid-Phase Microextraction," Published: 7 December © 2023 JETIR May 2023, Volume 10, Issue 5 www.jetir.org (ISSN-2349-5162) JETIR2305376 Journal of Emerging Technologies and Innovative Research (JETIR) www.jetir.org d571 2021 at Molecules.
2. Narendra Nath Singh, Naheela Rasheed and Abdul Rasheed Ansari, "ETIOPATHOGENESIS OF OSMF VERSUS BENEFICIAL EFFECTS OF ARECA NUT: A REVIEW," International Journal of Current Research Published online 30th October, 2016.
3. Muhammad Dedi Irawan, Helmi Fauzi Siregar, Muhammad Yasin Simargolang, Tika Liana, "Expert System for Areca Plant Disease Detection Using Forward Chaining Method," Published: 25 September 2020, Journal Penelitian Ilmu computer, System Embedded & Logic.
4. Srdjan Sladojevic, Marko Arsenovic, Andras Anderla, Dubravko Culibrk, and Darko Stefanovic, "Deep Neural Networks Based Recognition of Plant Diseases by Leaf Image Classification," Published 29 May 2016 at Hindawi Publishing Corporation Computational Intelligence and Neuroscience.
5. Edurado Assuncao, Pedro Dinis gaspar, Hugo Proenca," Decision-making suppor system for fruit diseases classification using Deep Learning", Published on November 2020 International Conference on Decision Aid Sciences and Application (DASA).
6. Chaitali G. Dhaware, Mrs. K.H. Wanjale, "A Modern Approach for Plant Leaf Disease Classification Which Depends on Leaf Image Processing", 2017 International Conference on Computer Communication and Informatics (ICCCI -2017), Jan. 05 – 07, 2017, Coimbatore, INDIA.
7. Shuhan Lei, Jianbiao Luo, Xiaojun Tao and Zixuan Qiu, "Remote Sensing Detecting of Yellow Leaf Disease of Arecanut Based on UAV Multisource Sensors", Published: 13 November 2021 at Remote Sens.
8. K. A. Garrett, S. P. Dendy, E. E. Frank, M. N. Rouse, and S. E. Travers, "Climate Change Effects on Plant Disease: Genomes to Ecosystems", Published by Boston University on 09/08/13.
9. Raman Ramesh, Maruthadurai Ramasamy, N. P. Singh, "Management of fruit rot (Koleroga/ Mahali) disease of arecanut", Technical Report Published by Research gate on January 2013.