PRECISION AGRICULTURE THROUGH LEAF DIAGNOSTICS DISEASE DETECTION AND FERTILIZER RECOMMENDATION

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Abstract: In order to maintain different ecosystems and for organic balance, the health of the tree is crucial. Early diagnosis of diseases affecting wooden leaves can facilitate timely intervention and molding efforts. This study presents a new method for predicting wood diseases using intensive learning, especially the architecture of a fixed nerve network. To determine whether wooden leaves are healthy or sick, this study analyzes images with high resolution of the leaves. A wide dataset that contains different images of wooden leaves represents different species and types of disease, gather as part of the process. To make the model more normal and stronger, data preparation techniques, including image size, normalization and growth. For functional extraction, we use a pre-trained CNN model called VGG16 algorithm. To work with the purpose of predicting our wood disease, we modify the top layers. To work in its best form of the proposed model, it is subject to extensive verification and training processes. The effect of the model in the disease classification is done using evaluation measures such as remembering, accuracy, accuracy and F1 score. A reliable and effective tool for environmentalists, foresters and arborists is the aim of the project to quickly detect and treat trees. By providing a scalable and automatic method for identifying early disease in trees, the findings from this study promote accurate agriculture and environmental monitoring. In addition, research delays practical applications that can help preserve ecosystems worldwide through permanent methods.

"Index terms - *Eco-system, mitigation, fostering, robustness, CNN (Convolutional neural network), VGG(Visual geometry group)".*

1. INTRODUCTION

A crop, organic balance & food safety abide all affected by condition of trees & plants in horticulture & agricultural areas. Identifying & controlling diseases of plant & tree at an early stage is a major problem for manufacturers & arborists. towards appear as a solution towards this problem is "prediction of wooden leaf -based disease". While it allows for potentially accelerated & reliable disease identification, this condition use -Art -art equipment machine learning & image analysis towards examine fine points among wooden leaves. This technique has ability towards offer initial warnings, accurate diagnosis & practical suggestions for caring for disease by analyzing visual signals given by leaves, such as resolution, deformities or visual signals

given by wounds. This method gives a glimpse of hope for farmers, forest residents & environmental trailers in this era of agricultural innovation. goal is towards protect our forests & crops from damage, & in long term it will help towards make agriculture & ecosystem more flexible & durable. This article examines approach, benefits & future possibilities for disease spread of using wooden leaves. This emphasizes a game change technique that can revolutionize our agriculture & arboreal landscape.

There abide many great benefits for predicting wooden leaf -based disease that can solve problems such as arboris & land users face, & it can completely change our approach towards health control.

Early medical diagnosis: Many attractive properties of this technique have ability towards identify diseases in early stages. When a tree gets sick, leaves will usually endure first towards show symptoms before rest of plant. spread of infections & damage they can cause can endure reduced through rapid detection & rapid action.

Accurate pregnancy: In addition towards existence of pest, color, including shape of color, pattern & wounds, is able towards produce accurate diagnosis by analyzing fine properties of wood leaves. Manufacturers can better target management efforts among ability towards identify between different insects & diseases.

Chemical D-Reliance: Traditional disease treatment often uses destruction & careless application of pesticides, & exposes both favorable insects & environment. By using wooden leaves, adapted treatment can endure developed, which reduces need for extensive chemical applications & reduces environmental effects of agriculture.

Decisions supported by data: system provides useful information & insight into farmers & orbists. It can trace crops & wood health over time, so that computer -controlled decisions on irrigation, disease management & general wood health. Cost savings: Detection of early illness & treatment of treatments helps farmers save money while protecting them from pests from fruit trees, vineyards & forests.

Environmental benefits: This technique has ability towards reduce use of pesticides & spread of diseases, which is good for environment. methods for more durable & environmentally friendly agriculture abide help of it.

Better crop & forest flexibility: Finally, target of prediction of disease by using wooden leaves is towards make crops & forests more flexible for different types of seasons & new diseases. Trees abide important for our existence & prosperity, so it is in our interest towards keep them healthy.

Combined machine learning & image analysis for prediction of disease can endure a gaming exchanger for wood health handling in future, especially among growing demand for date -driven & sustainable agriculture. We can hope that this technology will help us detect early diseases of a world in our agricultural landscape & forestry, towards improve clinical accuracy & environmentally friendly practice. We will provide intensive examination of abilities &

prediction of diseases that predict diseases based on wood leaves in following classes in this article in following classes in this article deep in our features, technical elements & real -world applications.

2. LITERATURE SURVEY

[1] Plants growth, health & productivity can endure traced in real time through use of sensors, image systems & data analysis of these platforms. These technologies improve phenotype evaluation more efficient, reproductive programs, & exact agricultural methods make data more solid by collecting data & automating processing.

[2] among aim of assessing & classifying plant symptoms, machine vision technologies have emerged as an indispensable tool in phenotyping. Researchers can measure properties of plants, including image processing & data vision techniques, including height, leaf area & disease signals, non-destructive measurement. In this review, we will see that machine vision has erected a long way towards analyze symptoms of plant, & how deep learning has helped phenotyping of applications improve classification accuracy.

When it comes towards identifying diseases in plants, deep learning has shown great potential, especially in tomato crops. Many diseases can endure accurately classified by using trained conventions on photographs of leaves by removing complex functions from these images. Using deep learning towards detect disease improves initial procedures, reduces crop losses & supports methods of sustainable agriculture.

[4] Deep learning models show increased support for identifying leaf diseases in cucumber & other crops, especially in cases when training data is insufficient. Researchers were able towards achieve great identity accuracy by combining deep CNN architecture among computer text & adaptation strategies. among help of these solutions, it is possible towards monitor smart agriculture & truth disease in Agricultural IoT network.

For example, if we want towards know how salt -resistant soybeans are, we need an automatic phenotyping system for plant. towards assess physiological & physical factors, these systems combine robotics among image sensors & data analysis. Their reliable & purpose measures help among breeding & genetic selection efforts towards make crops more resistant towards abiotic stress.

Data vision technologies have revolutionized traditional plant phenotyping by offering non-invasive analysis function & high throws. Detailed plant symptoms can endure captured using imaging techniques such as thermal imaging, hyperspectral imaging & RGB imaging. These technologies, when machine learning & deep learning models abide combined, make it easier towards remove useful data for phenotype prediction & plant health monitoring.

[7] Researchers can train neural network towards perform targeted agricultural functions using spar -labeled data using pre -informed models on a large dataset. data burden has reduced & classification accuracy among this technique has

improved a lot, making it realistic for disease monitoring systems in real world.

[8] Research on pest resistance & environmental tension is an area that can greatly benefit from characteristic analysis of this automatic facility. Trichom can endure achieved by use of better accuracy & throwing object recognition algorithms, metaphorical analysis & image sharing in trichome phenotyping activities.

3. METHODOLOGY

i) Proposed Work:

The VGG16 algorithm, using a Convolutional neural network architecture (CNN), introduces a system that can predict wooden diseases among leaf images. main goal is towards create a diverse collection of images of wooden leaves, towards optimize CNN models & models towards predict disease in advance preprocessing approach, including scaling & growth. technology changes fully associated layers in pre-trained study emphasizes importance of early identity in reducing effect of diseases on population of wood & ecosystems, which constructs on method suggested towards predict disease of tree using CNN architecture. A general method of environmental monitoring is expanded among system capacity, which is towards investigate a wide range of leaf photographs from different wood types & towards detect potential diseases. On prepared dataset, system is largely trained & validated. performance is assessed by use of significant matrix as accuracy, precision, recall & F1 score. A well -trained model that can properly identify sick or healthy wooden leaves is one of expected results. proposed approaches can play an important role in sustainable forestry & environmental protection by allowing initial detection of tree diseases. This, for its part, will provide opportunity for quick intervention. Finally, study expects towards provide a useful resource for organic & forestry experts, who can use state -Art -art technologies towards deal among problems of keeping ecosystem healthy worldwide.

ii) System Architecture:

Using VGG16 CNN model, proposed system architecture describes a deep learning-based strategy for disease classification of plant magazines in architecture. first step is towards put together necessary dataset, including images of many leaf diseases obtained from Kaggle. During preparatory phase, methods such as average filtration abide used towards eliminate noise. Then images abide shaped towards make entrance consistent. VGG16 Convolutional Neural Network model is trained & tested using pre -processing images among data divided into training & test sets. An H5 model file is once made after model is trained. When time comes towards test, trained model takes into image of a fresh blade & marked it among recommendation of disease name & fertilizer. towards determine how well model worked, accuracy & loss figures abide finally examined. This end-to-end architecture is possible towards identify & handle automatically, efficient & accurate plant disease.

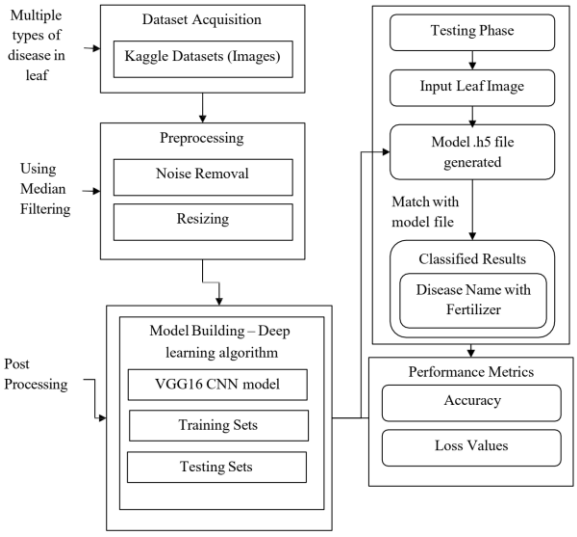


Fig 1 Proposed Architecture

iii) Modules:

Modules Description

LEAF IMAGE ACQUISITION:

The LEAF collection, which includes 795 scanned leaf samples of various species found in Czech Republic, is used towards catch leaf images. When these images have preprocessing & binning, they abide stored in PNG format. Recognition of leaf shape & identity of plant disease abide two applications of datasets. towards analyze on images of uploaded leaves, this module is used.

PREPROCESSING:

Median filtration images have an effective approach towards shaping & removing noise, especially "salt & pepper" noise. image is cleaned using filtration process, which also has important details such as edges. In addition, for better analysis, foreground (magazine) & background abide clearly distinguished by using images among images.

BUILD MODEL:

Pictures among marked leaves abide used towards produce CNN-based models, such as VGG16. Form, normal & data text (such as rotation & flipping) abide part of all prepossessing processes. towards detect diseases, a CNN is model. towards train, validate & evaluate model, matrix is used as accuracy & F1 score.

DISEASE PREDICTION:

To determine that leaves abide healthy or sick, a CNN is used. A fully associated layer, merger, flattened & relay convolutional abide four primary processes. Various diseases can endure identified on basis of visual properties such as color, shape & texture. Accurate predictions abide possible after modeling ability for classification of multiple classes.

FERTILIZER RECOMMENDATION:

As diseases found & degree determines fertilizer or pesticides recommended. Symptoms of overload or deficit of nutrients, as shown among leaves, abide treated by recommending correct fertilizer. For better plant growth, system integrates data stored towards match diseases among proper treatment, whether organic or inorganic.

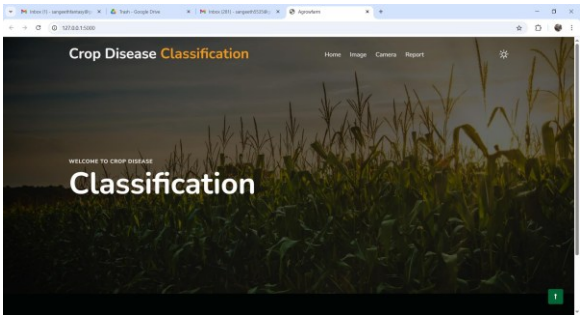
Algorithm:

YOLO:

To improve identity in real -time magazine, this project can use yolo (you only look once) technology, which sees work as an object detection problem instead of a basic classification

problem. Yolo processes entire image in same passage by dividing magazine's image into a grid & by estimating boundary boxes & class opportunities for sickness areas. It is important for concentrated analysis & therapy, & allows model towards explore troubled areas in addition towards classifying type of leaf disease. This approach is ideal for real-time surveillance & decision-making, as it uses a pre-trained Yolo model set towards annotate leaf data set. This can quickly & accurately detect more diseases in same picture.

4. EXPERIMENTAL RESULTS



"Fig 2 Home page"

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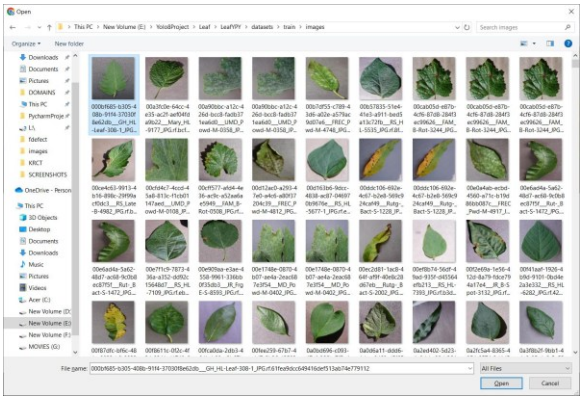
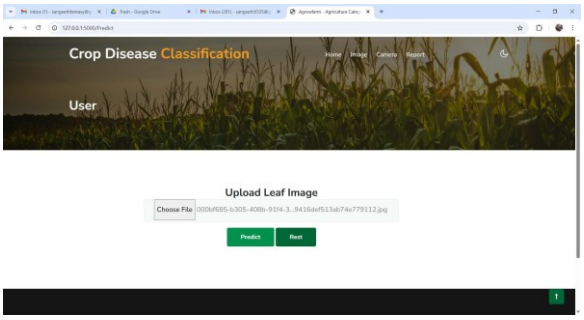
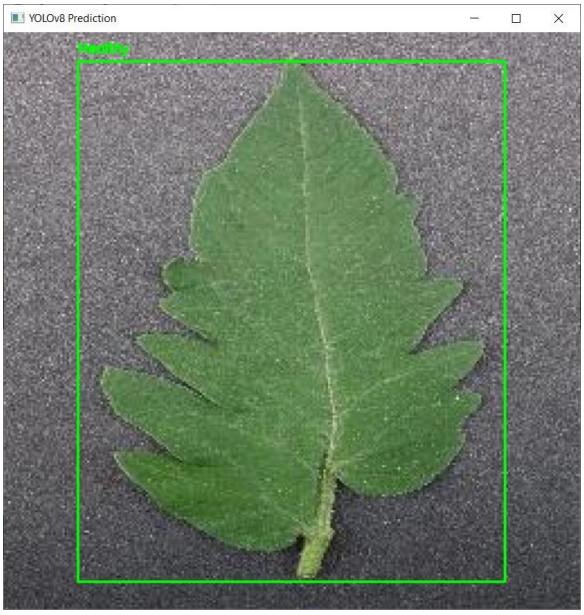


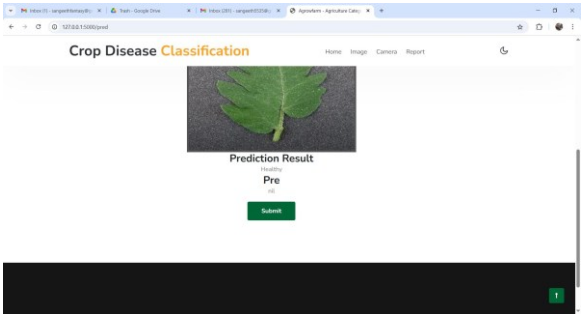
"Fig 3 Dataset images"



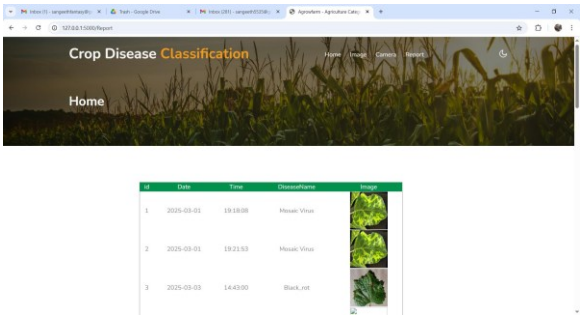
"Fig 4 User input"



"Fig 5 Prediction result"



"Fig 6 Crop disease classification"



"Fig 7 Classification details"

5. CONCLUSION

In order towards improve quality of partition, project will investigate various partitions & classification algorithms & strategies. Nevertheless, results suggest that partition methods abide not effective & abide challenging towards use in larger datasets than proposed graph cutting model. We have introduced a technique towards divide a leaf into an external setting by adjusting polygon model towards leaf, which is used as first form of precisely gripping cut segmentation. In addition, it has a set of global geometric details that can endure used towards classify tree species in combination among local curvature -based information obtained from final contour. A light -independent color model makes basis for partition technique. A global color model for whole image may not endure enough for leaves that abide not well defined alone. Adequate upgrading may endure possible among inclusion of a structured model & an adaptable color model. Finally, sequential leaf diseases in bacteria, fungal & viral types using a nervous network classification approach. After that, use fertilizer on sick leaves based on measurement.

6. FUTURE SCOPE

To address problems such as light variation & uneven image quality must endure focused on future updates, whose purpose is towards promote accuracy towards detect. use of large & more diverse data sets in combination among sophisticated image preparation methods can complete it. Further progress in accurate agriculture & durable agricultural methods can endure achieved by integrating system of IoT tools for monitoring real time & by expanding support towards new tree species.

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