PANIMALAR
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(JAISAKTHI EDUCATIONAL TRUST)
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PROGRESS THROUGH KNOWLEDGE

Department of Computer Science and Engineering

Crop Alignment Identification and farmer Aid Networking

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INTRODUCTION

Plant diseases pose a significant threat to global food production and supply, often resulting in substantial yield losses. Traditional disease detection methods rely on manual inspections conducted by experts, a process that is not only time-consuming and labor-intensive but also susceptible to human error. However, with the advent of deep learning algorithms, there is a promising avenue for revolutionizing disease detection in agriculture. Deep learning can swiftly process vast datasets, enabling the rapid identification of subtle disease indicators at an early stage. Moreover, recent advancements in imaging technology have made high-resolution images of plant leaves more readily available, providing a wealth of data for analysis. Many plant diseases manifest intricate patterns and subtle color variations that may challenge human observers, making deep learning an invaluable tool in improving accuracy. While initial setup costs may be involved, the implementation of deep learning-based disease detection holds the potential to mitigate agricultural losses, enhance food security on a global scale and development the networking farmer without a middle man.

ABSTRACT

This abstract introduces a crop disease prediction, production management system and building farmer network by employing deep learning techniques. With the growing demand for crops, ensuring their healthy cultivation is crucial. This system combines advanced deep learning algorithms with agricultural data to predict and manage crop diseases. By analyzing various factors such as weather conditions, soil quality, and historical disease occurrences, the system accurately forecasts potential disease outbreaks. This predictive capability empowers farmers to take proactive measures, minimizing crop losses and reducing the need for excessive chemical treatments. Additionally, the system aids in production management by optimizing irrigation, fertilizer application, and harvest scheduling, enhancing overall yield and quality. Through the fusion of deep learning and agricultural expertise, this innovative system contributes to sustainable crop cultivation, benefiting both farmers and consumers. The problems created by changing climatic conditions and rising global food demands require the incorporation of sophisticated technologies in agriculture. Using deep learning techniques has become a game-changing way to improve disease prediction and crop management in this situation. Utilize state-of-the-art pre-trained deep learning models, such as Res-Net, Inception, or Efficient-Net.

OBJECTIVE OF THE PROJECT

Develop a Deep Learning Model: Create a robust deep learning model tailored for plant disease detection, capable of processing and analyzing large datasets of high-resolution plant images.

Enhance Accuracy: Improve the accuracy of disease detection compared to traditional manual methods, with a focus on early disease identification to minimize crop damage.

Reduce Labor and Time: Reduce the labor-intensive and time-consuming nature of manual disease inspection by automating the detection process using deep learning algorithms.

Increase Efficiency: Enhance the efficiency of disease detection in agriculture to ensure timely responses and treatment, ultimately reducing yield losses.

User-Friendly Interface: Develop a user-friendly interface or application that allows farmers and experts to easily input images and receive prompt disease diagnosis and remedial suggestions and building farmer network .

LITERATURE SURVEY

S.no.	Title	Authors	Publication and years	methodology	pros	cons
1	Plant Disease Detection Using Machine Learning	Shima Ramesh P.v.vinod Niveditha M Pooja R	2018 International Conference on Design Innovations for 3Cs Compute Communicate Control (ICDI3C)	➢ To find out whether the leaf is diseased or healthy, certain steps must be followed. i.e., ➢ Preprocessing, ➢ Feature ➢ extraction, ➢ Training of classifier and Classification	➢ To develop a robust system, Ramesh et al.proposed an RFC-based ML technique for the identification between healthy and diseased papaya leaves	➢ However, the accuracy is low while differentiating between more than one disease which can be improved by using a robust descriptor and ML models.
2	Detection of Affected Part of Plant Leaves and Classification of Diseases Using CNN Technique	A.Blessy Dr.D.C.JoyWinnie Wise	IEEE-2018	➢ First the sample leaf image is given as input. Then, color channels are separated from the leaf image from these the green pixels are masked from the original image.	➢ Using CNN it gets more recall rate than other classifier techniques	➢ In existing, to detect the diseases they used spectroscopic techniques. ➢ These techniques are very expensive and can only be utilized by trained persons only

LITERATURE SURVEY

3	**Detection and Classification technique Of Yellow Vein Mosaic Virus Disease in Okra Leaf Images Using Naïve Bayesian Classifier.**	**Dhiman Mondal, Dipak Kumar Kole, Aruna Chakraborty, D. Dutta Majumder**	**2015 International Conference on Soft Computing Techniques and Implementations (ICSCTI)**	➢ **RGB images are converted into white and then converted into grey-level images** ➢ **To extract the image of the vein from each leaf.**	➢ **Present an efficient technique to detect and classify the YVMV disease in okra leaf.**
4	Detection of Plant Leaf by Image Processing Using MATLAB	Tejoindhi M.R, Nanjesh B.R, JagadeeshGujanuru Math, AshwinGeetD'sa	Bioscience Biotechnology Research Communications 13(14):116-119-2020	➢ They have proposed for a technique Bhattacharaya's similarity calculation that can be used for detecting paddy plant disease by comparing it with 100 healthy images .	➢ It is beneficial as it requires a large amount of work of monitoring in the big farm of crops. ➢ At the very early stage itself it detects sympoms of diseases means where they appear on plant leaves.

EXISTING SYSTEM

- Manual Vision based Inspection

- Computer Vision

  Machine learning has demonstrated to be a viable strategy for distinguishing infections.

  1. Support Vector Machine (SVM) classifier
  2. Artificial Neural Networks (ANN) or Back Propagation
  3. Neural Networks.
  4. KNN Classifiers
  5. Genetic Algorithm
  6. Fuzzy Classifier

PROPOSED SYSTEM

- The proposed system for the recognition of rice plant diseases adopts a computer vision-based approach that employs the techniques of deep learning.
- Utilize state-of-the-art pre-trained deep learning models, such as Noise Filter, Binarization, Segmentation, Feature extraction.
- Attention mechanisms can help the model focus on relevant regions of leaf.
- Fine-tuning hyper-parameters can significantly impact the model's performance.
- Online learning can ensure the model remains accurate and up-to-date.

SOFTWARE / HARDWARE

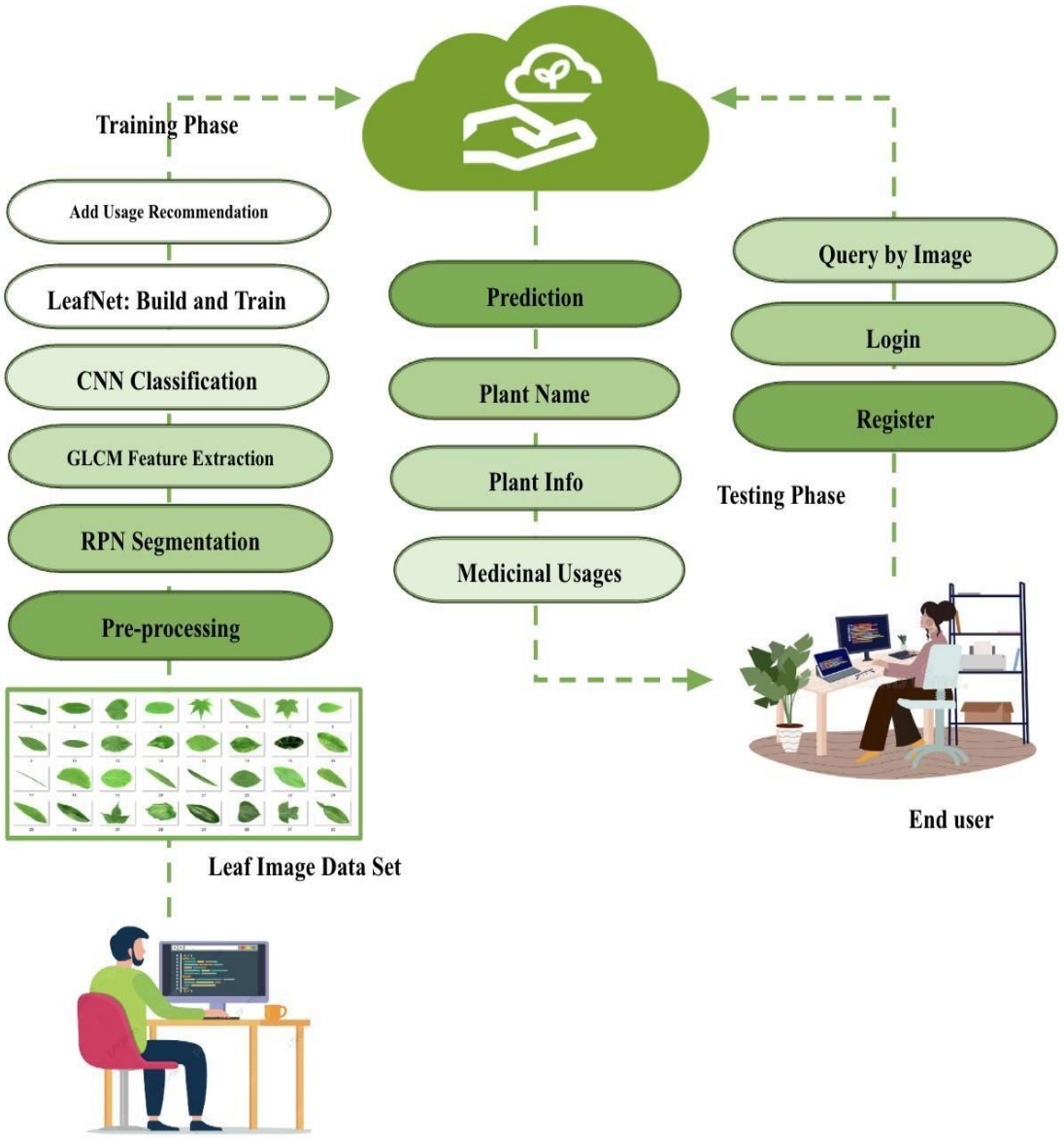
HARDWARE REQUIREMENTS:

1. Laptop / PC with any OS (Window 7 or later, Mac OS (any version), Linux (any version)) or Mobile Device (Android or iOS).
2. Internet connection (12kbps is the minimum requirement).
3. Uninterrupted power supply.

SOFTWARE REQUIREMENTS

1. Front End : Python 3.7.4(64-bit) or (32-bit)
2. Web Design : HTML, CSS, Bootstrap, js
3. IDE : IDLE
4. Web Framework : Flask 3.0.2
5. Back End : MySQL 5.2
6. Server : Wampserver 2i

ARCHITECTURE / METHODOLOGY



REQUIREMENT GATHERING

- Clearly outline the objectives of the plant leaf disease detection and remedial assistance system. Specify the types of plants and diseases to be covered, as well as the geographical regions of interest.
- Engage with botanists, agronomists, and plant pathologists to gain insights into the specific diseases, symptoms, and environmental factors that affect plant health. Their expertise is invaluable for accurate disease identification.
- Gather a comprehensive dataset of high-resolution leaf images. Include samples of healthy leaves and leaves with various disease symptoms. Ensure a variety of plant species and lighting conditions are represented.
- Label the collected images with disease categories and severity levels. Annotation is crucial for training and evaluating deep learning models effectively. Consider involving experts in this process for accurate annotations.
- Select appropriate deep learning algorithms, such as convolutional neural networks (CNNs), for image classification. Experiment with pre-trained models like Efficient Net, fine-tuning them for your specific task.

ALGORITHMS USED IN MODULES

- Image Processing Algorithm
- GLCM - Gray-level Co-occurrence Matrix
- RPN - Region Proposal Network
- CNN- Convolutional Neural Network

MODULE DESCRIPTION AND IMPLEMENTATION

Admin

1. Image uploading and cache saving.
2. Image class detection using Image processing algorithm and gray-level co-occurrence matrix.
3. Image augmentation.

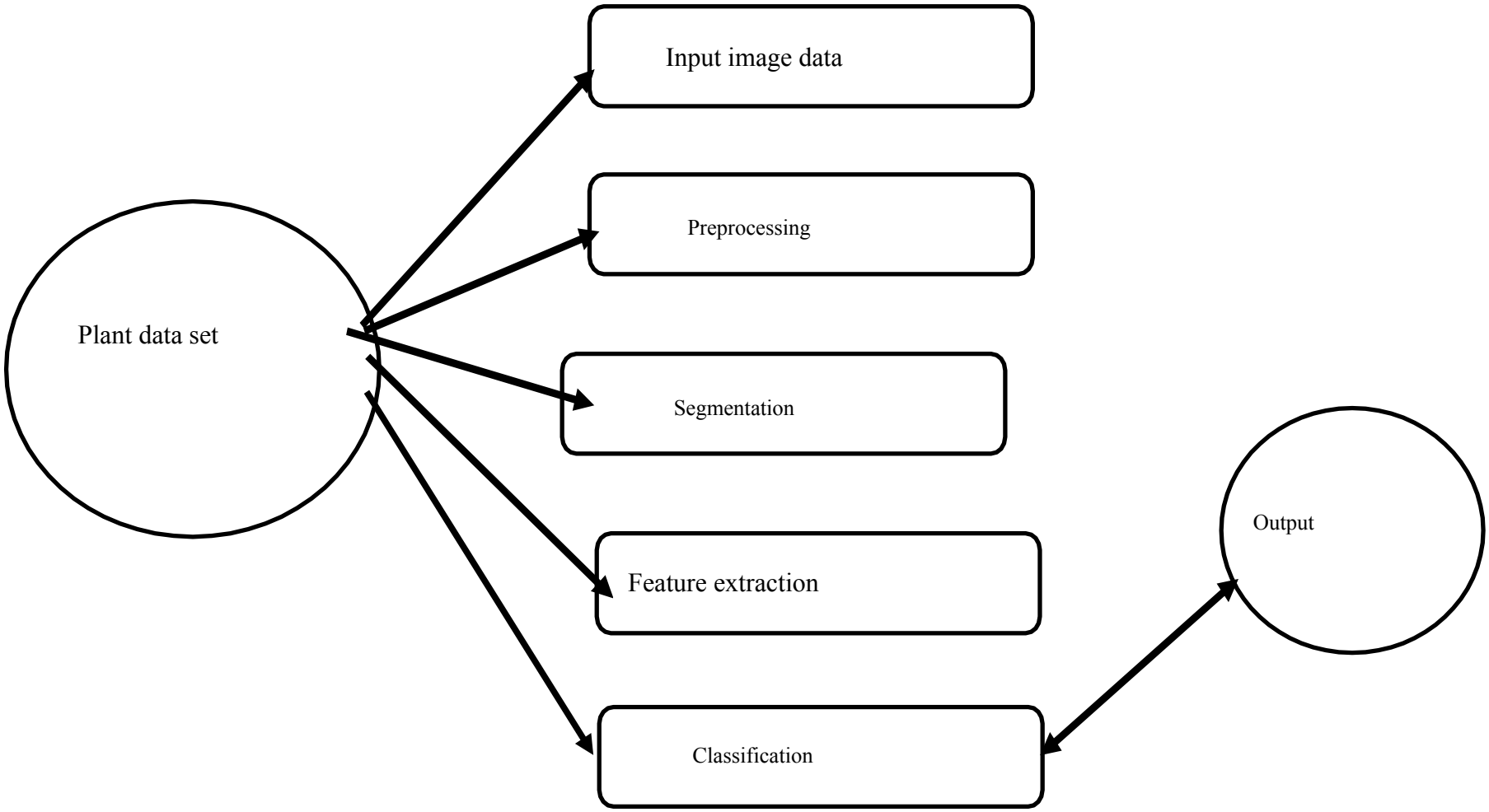
Customer

1. Customer can test the leaf using testing option.
2. Customer can buy the fruits and vegetables directly from farmer.
3. Customer can book the video call facility.

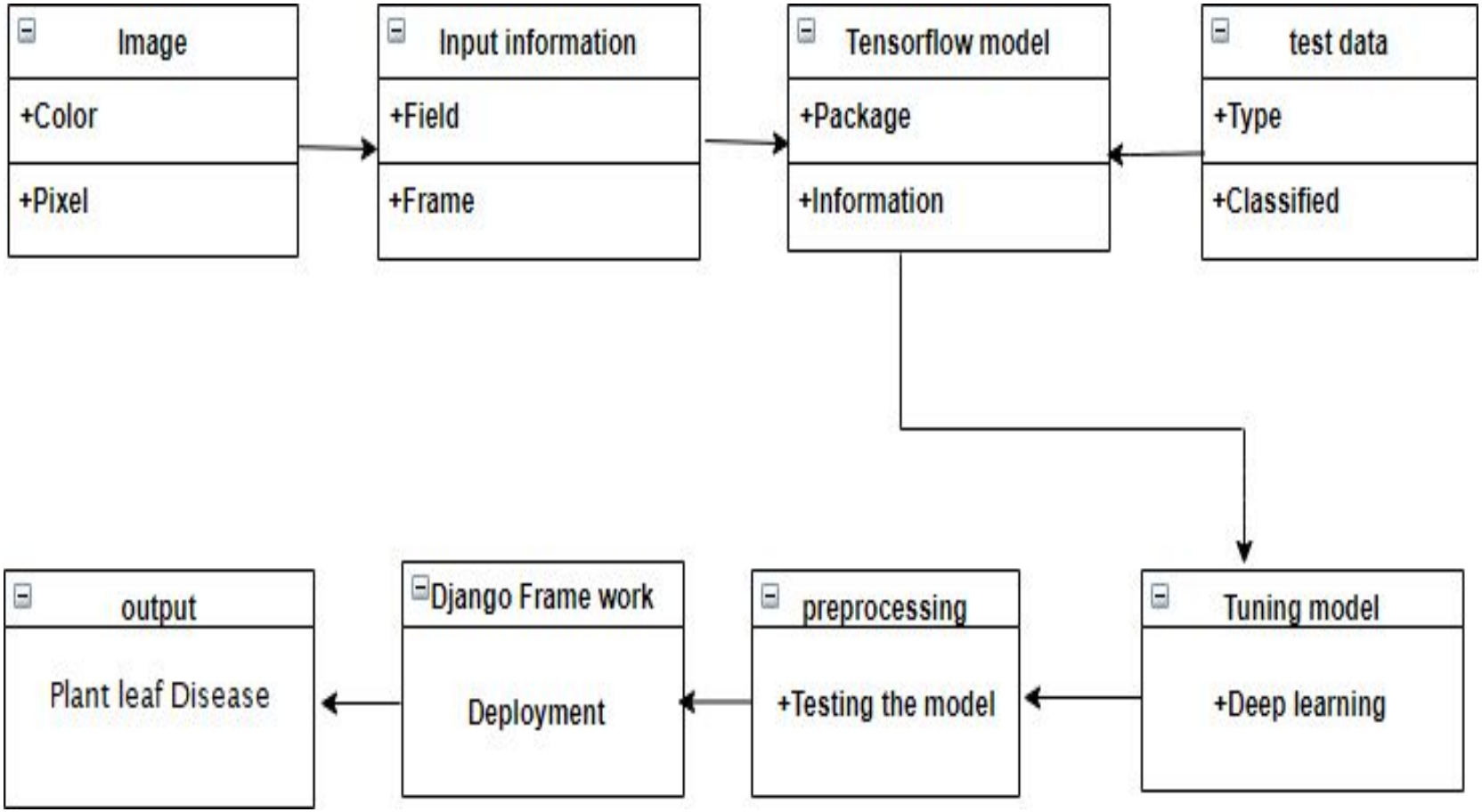
Farmer

1. Farmer can post the fruits and vegetables on the website.
2. Farmer can provide the video facility to show stock using my Requests.
3. Farmer can see the order and by seeing them he can delivery the item.

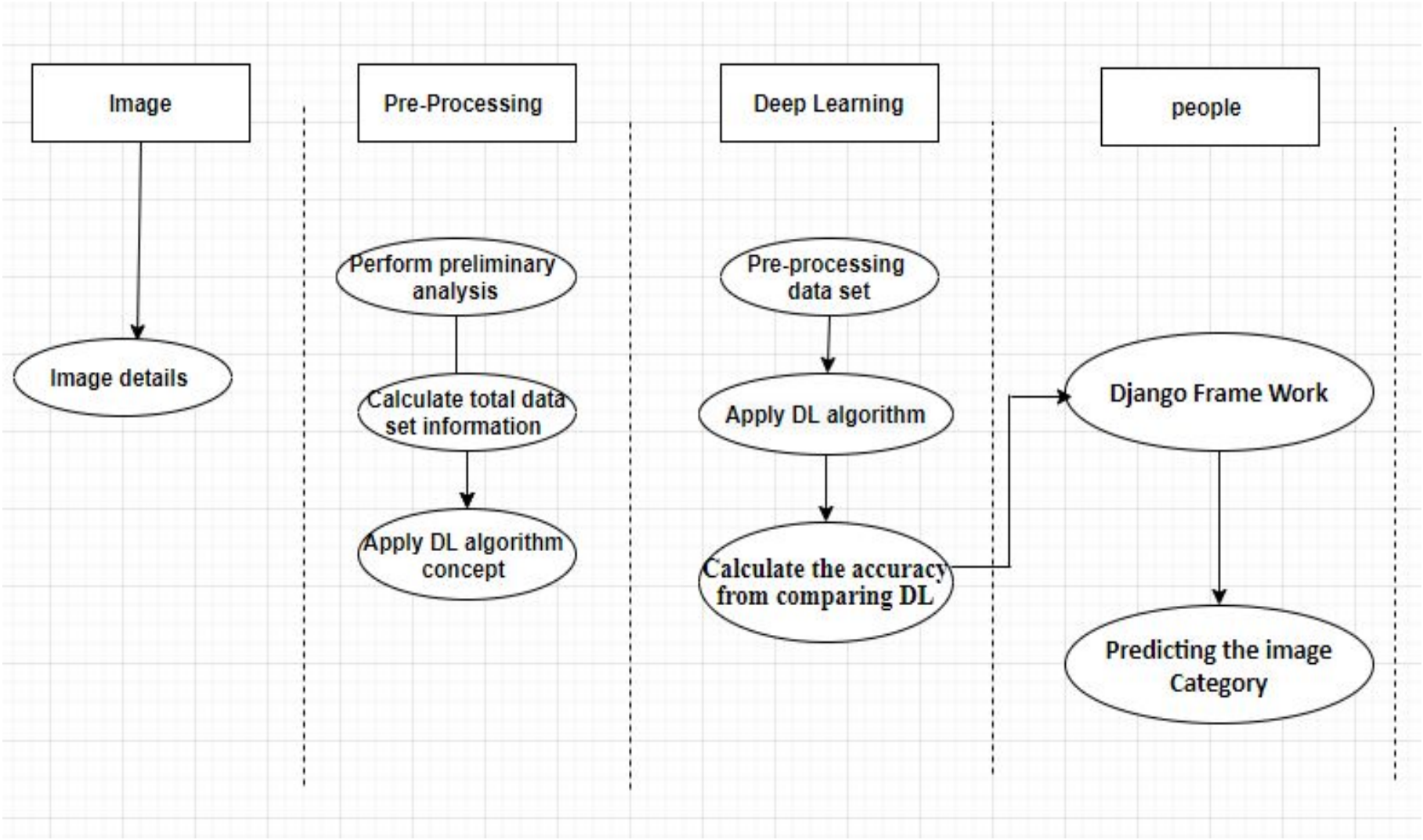
USE CASE DIAGRAM



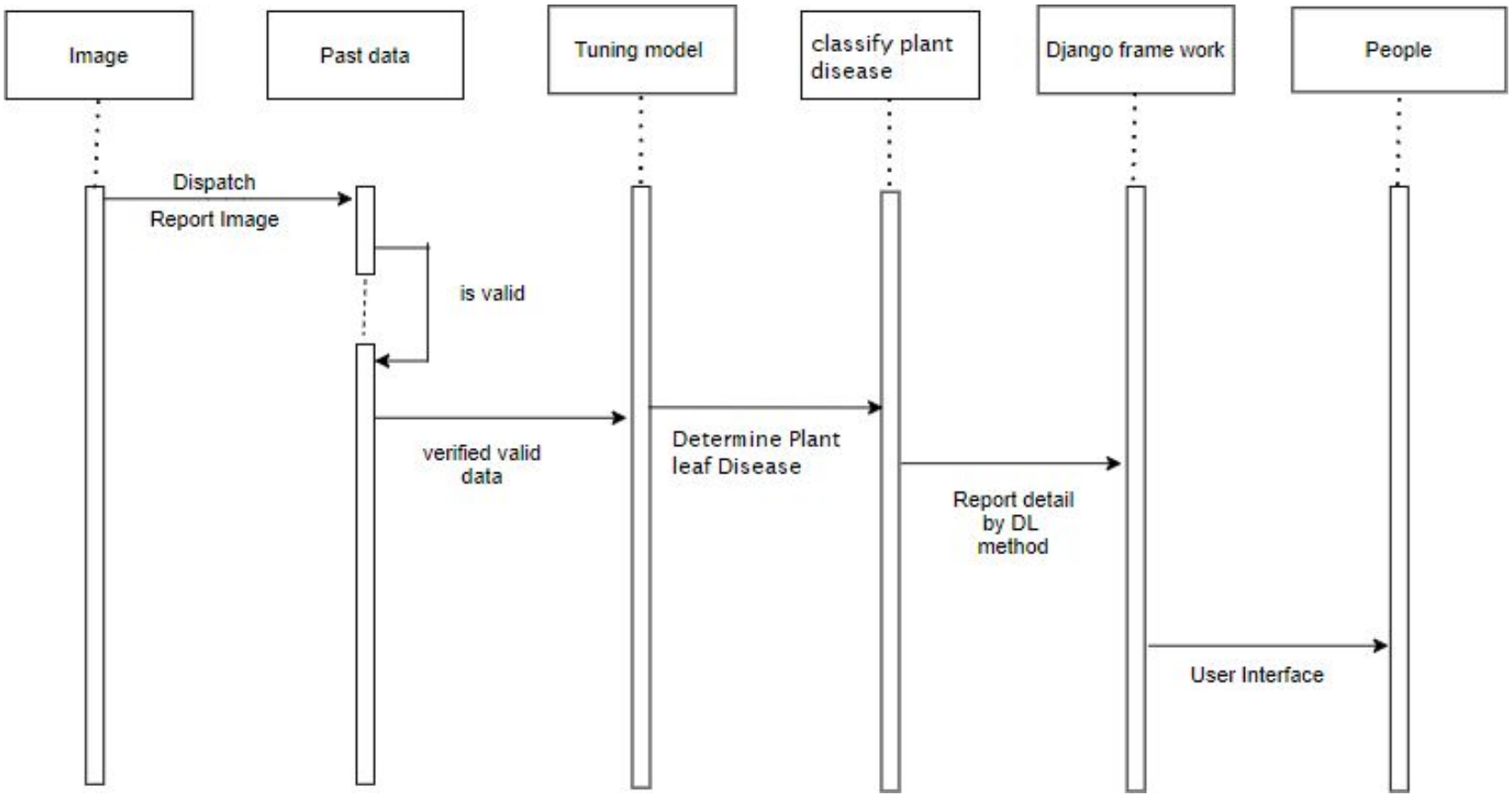
CLASS DIAGRAM



Activity Diagram



Sequence Diagram



FUTURE ENHANCEMENT

- Developing this module for all crops and production monitoring and health platform.
- Data loss results in increase of farming budget.
- Furthermore, there are still issues with deep learning models' interpretability. These models' intrinsic complexity may impede their transparency, making it difficult for stakeholders to comprehend and accept the system's suggestions.
- High level of automation in disease detection.
- Improving lag in website by increasing the budget.

System Implementation

Data Collection: The initial step in the process of anomaly emotion detection involves pre-processing the audio data to eliminate undesirable elements, such as noise and unwanted signals.

Data Pre-processing: To enhance the quality of the audio signal, pre- processing encompasses the utilization of techniques such as anomaly enhancement and normalization.

Data Cleaning: Data cleanliness is imperative for this project to run smoothly, and a key aspect of this is ensuring the dataset is devoid of any missing values that could potentially trigger runtime errors.

Data Modelling: Data modeling is the pivotal process in machine learning where a model is constructed to make predictions or classifications by leveraging patterns within the data.

Data Analysis: Data analysis stands as a pivotal process in machine learning, encompassing the meticulous examination, purification, transformation, and modeling of data .

RESULT & DISCUSSION

- The application is capable of detecting plant leaf diseases with great accuracy.
- Conventional approaches to disease detection and control frequently fail to provide prompt responses, resulting in significant crop losses and negative environmental effects.
- The repeated predictions are 95.8% accurate on an average
- The application is lightweight
- The objectives are achieved with accuracy.
- Loss function is validating the outputs and the optimizers have been optimally used.

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