



# E C O S C A N

Plant Disease Detection System

# AGENDA

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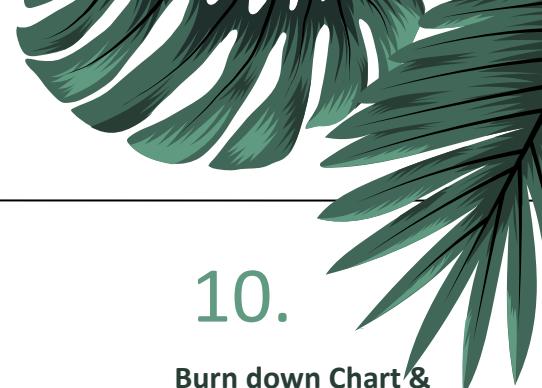
User Stories & Acceptance Criteria

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Test Cases & Sprint backlog

12.

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# Our Team



Rudra Chobe  
Scrum Master / Developer



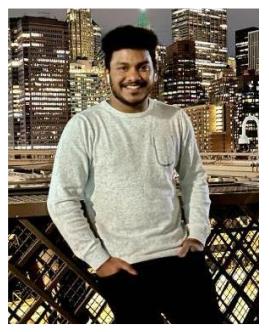
Omkar Gurav  
Developer



Shriya Haral  
ML Developer



Ritika Chougala  
Developer



Lokeshwar Anchuri  
Developer



Niyati Ghagada  
Developer



Uma Maheswari Addala  
Developer /Tester



Mukesh Suddala  
Developer/Quality Assurance



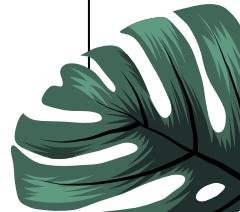
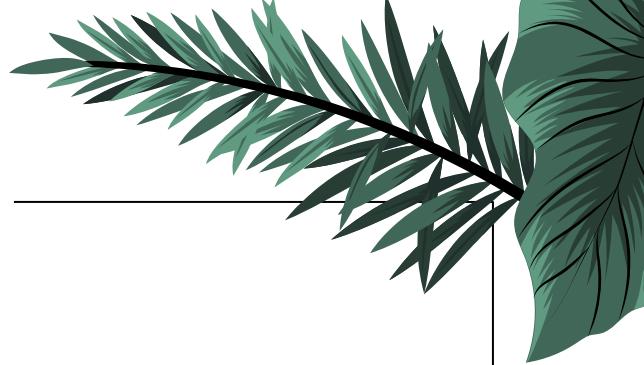
## IMPROVEMENTS MADE FROM PROFESSOR'S FEEDBACK

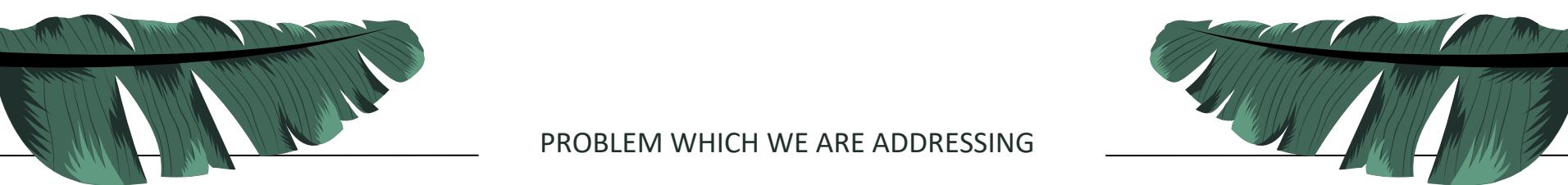
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- Made changes in Sprint Recap
- Updated the Product Backlog Slide
- Fixed the User Stories and Story Points
- Updated the Acceptance criteria's
- Fixed Test cases along with user story ID and
- Corrected the metrics
- Included demo in the Presentation



This indicates the  
changes made





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## PROBLEM WHICH WE ARE ADDRESSING

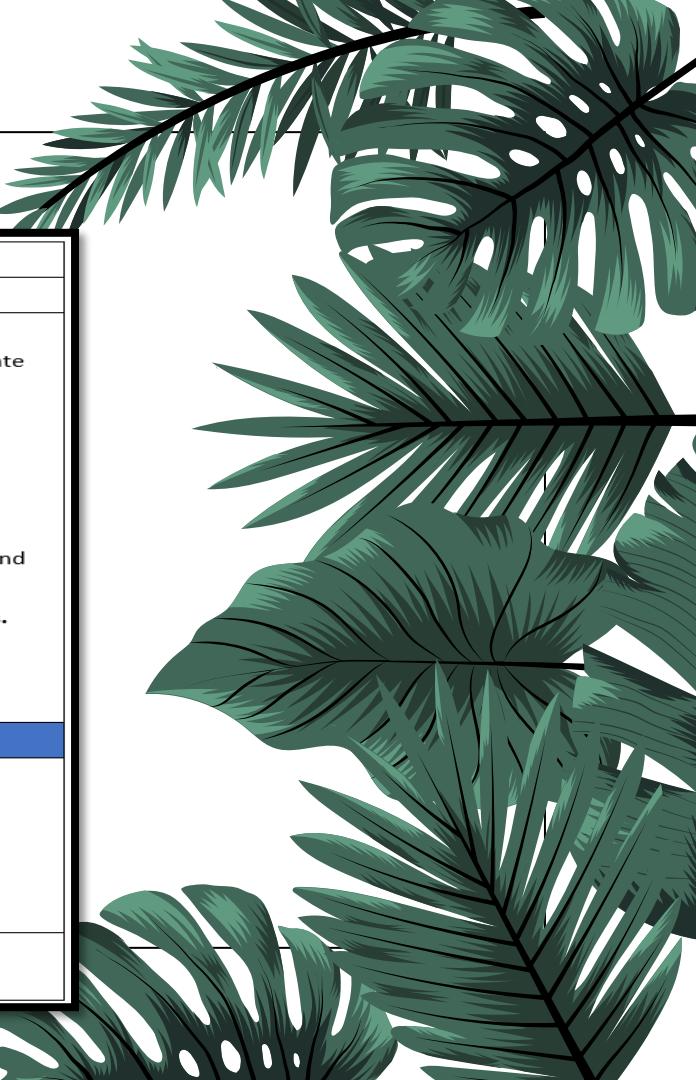
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## Project Description

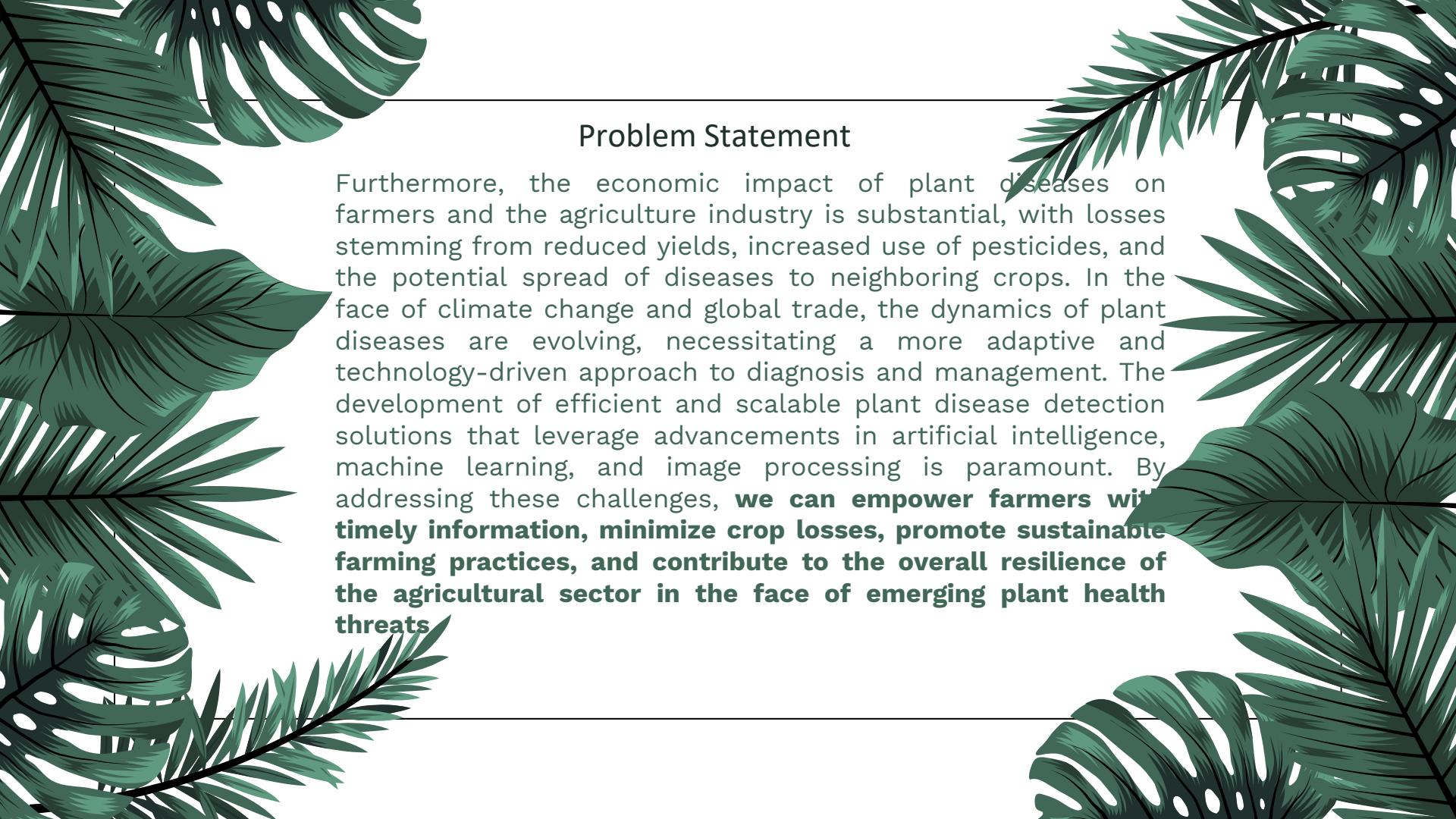
<b>Project Name:</b>	<b>Eco Scan</b>
<b>Team:</b>	<b>Algo-Avengers</b>
<b>Project Description:</b>	<p><b>"Eco Scan"</b> is a pioneering project leveraging Convolutional Neural Networks (CNN) and image processing techniques for rapid and accurate plant disease detection.</p> <p><b>For</b> farmers</p> <p><b>Who</b> uploads an images</p> <p><b>the</b> Eco Scan</p> <p><b>is a</b> deep neural Network model application</p> <p><b>that</b> provides rapid and accurate plant disease detection in real time and free of cost</p> <p><b>rather than</b> subscribing to highly paid applications with less accuracies.</p> <p><b>Our application</b> will help the user with CNN algorithms to analyze and identify potential diseases swiftly.</p>
<b>Benefit Outcomes:</b>	<b>Aims to:</b> optimize crop health monitoring, minimize losses promote sustainable farming practices.
<b>GitHub Link:</b>	<a href="https://github.com/htmw/2024S-AlgoAvengers.git">https://github.com/htmw/2024S-AlgoAvengers.git</a>



# Problem Statement

The agriculture sector plays a crucial role in sustaining global food security, and plant diseases pose a significant threat to crop yield and quality. Identifying and managing these diseases in a timely and accurate manner is essential for ensuring food production. However, the current methods of plant disease detection often rely on visual inspection by experts, leading to delays in diagnosis and sometimes inaccurate assessments. Additionally, the increasing complexity and variability of plant diseases make it challenging for traditional methods to keep pace with emerging threats. There is a pressing need for advanced and automated plant disease detection systems that can provide rapid, reliable, and precise identification of diseases, enabling farmers to take proactive measures to protect their crops and enhance overall agricultural productivity.





## Problem Statement

Furthermore, the economic impact of plant diseases on farmers and the agriculture industry is substantial, with losses stemming from reduced yields, increased use of pesticides, and the potential spread of diseases to neighboring crops. In the face of climate change and global trade, the dynamics of plant diseases are evolving, necessitating a more adaptive and technology-driven approach to diagnosis and management. The development of efficient and scalable plant disease detection solutions that leverage advancements in artificial intelligence, machine learning, and image processing is paramount. By addressing these challenges, **we can empower farmers with timely information, minimize crop losses, promote sustainable farming practices, and contribute to the overall resilience of the agricultural sector in the face of emerging plant health threats**

# TEAM AGREEMENT

## Team Agreement

### **Participation and Work Division**

- All the team members are expected to attend the meeting promptly and involve in discussions. Absence of team member will affect teams' performance and efficiency.
- If team member is not able to attend the meeting, he/she should let the team know earlier.
- The entire project should be divided into equal parts and equal responsibilities should be given to all team members.
- Each team member should complete their respective work before the deadline. If they are unable to complete the work on time, that hinders the performance of entire team. If in case any team member is facing issue at any point, they can share it with other team members so they can help each other and get the work completed before deadline.

### **Communication**

- The team will communicate through WhatsApp Group and for weekly meetings Teams will be used.
- Jira software will be used to track the assigned tasks.
- Task management, bugs, sprint planning and meetings minutes will be tracked in Jira.
- Google docs will be used to share the final deliverable where all team members will be able to edit the document.

### **Meetings**

- All team members will meet virtually on Teams everyday. All the team members must be present, as attendance is mandatory unless there is an emergency.
- The team member is responsible for sending meeting details and conducting the meeting.
- A meeting track or meeting minutes reports would be listed after every meeting to keep track of the project and its progress.
- Every team member is expected to come up with ideas, participate in the discussions and give update on their progress for their part of the work.

<b>Team Members</b>	<b>Email Id's</b>
Rudra Chobe	rc81960n@pace.edu
Omkar Gurav	og52887n@pace.edu
Shriya Haral	sh94716n@pace.edu
Ritika Chougala	rc93170n@pace.edu
Lokeshwar Anchuri	la58264n@pace.edu
Niyati Ghagada	ng59819n@pace.edu
Uma Maheswari Aishwarya Addala	ua26809n@pace.edu
Mukesh Suddala	ms67865n@pace.edu



# PERSONAS



# PERSONAS

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**Ava**, the progressive farmer is deep-rooted in the rhythm of the seasons, guiding her farm through cycles of growth and harvest. Yet, she's no stranger to the harsh realities of plant disease and its impact on yield and sustainability. Faced with the complexities of organic farming, she's seeking innovative solutions to protect her crops without resorting to chemical interventions.

## Interests

- Aside from her passion for sustainable farming, Ava is interested in the latest agricultural technologies that can help optimize organic farming practices.

## Frustration

- The unpredictability of plant diseases and the limited effectiveness of conventional organic methods in rapid detection and management are her main obstacles.

## Goals

- Ava is determined to integrate cutting-edge technology into her farming practices to boost productivity while adhering to organic principles.



**Name:** Ava

**Age:** 28

**Location:** Ames, Iowa

**Occupation:** Owner and operator of an organic farm

**Income:** \$66,000/annually

**Family:** Married

# PERSONAS

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**Raj** is a visionary in his field, constantly coding and testing the limits of artificial intelligence to serve the earth's farmers. He sees the potential in every line of code to revolutionize traditional farming practices. However, he struggles to find real-world test beds for his algorithms, which are necessary to refine and tailor his solutions to the nuanced needs of agriculture.

## Interests

- Participating in Hackathons, Coding contests etc.
- Practicing yoga and mindfulness
- Emerging tech in AI.

## Frustration

- Access to diverse agricultural data and the hesitancy of the farming community to adopt new technologies are his primary challenges.

## Goals

- To develop a robust platform that can adapt to various agricultural contexts and improve farm resilience against diseases.



**Name:** Raj

**Age:** 30

**Location:** New York City, NY

**Occupation:** AI Software Engineer in Agri-Tech

**Income:** \$120,000/annually

**Family:** Single

# PERSONAS

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**Claire** is a bridge between the agrarian world and the halls of legislation, tirelessly working to shape policies that promote ecological stewardship and technological innovation in farming. She understands the urgency of sustainable agriculture in the face of climate change but is often met with resistance from policymakers reluctant to prioritize or fund these initiatives.

## Interests

- Enjoys reading about global economic trends.
- Organizes educational workshops on sustainability.
- Enjoying weekend family outings

## Frustration

- Her challenge is to navigate the complex political and economic landscapes to secure support and funding for agricultural technology initiatives

## Goals

- To influence the adoption of sustainable agriculture policies that support and encourage the use of advanced technologies like "Eco Scan."



**Name:** Claire

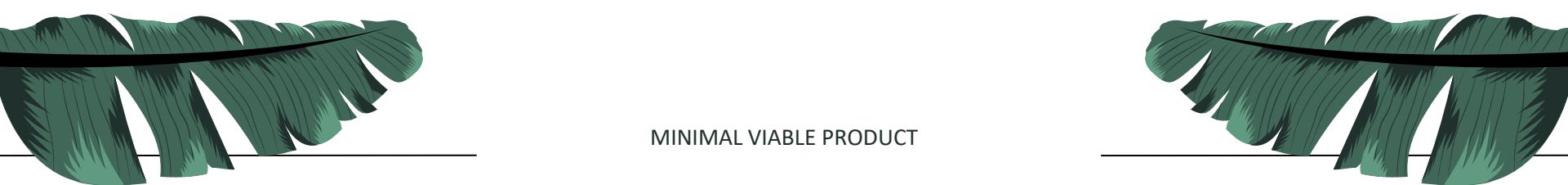
**Age:** 52

**Location:** Brussels, Belgium

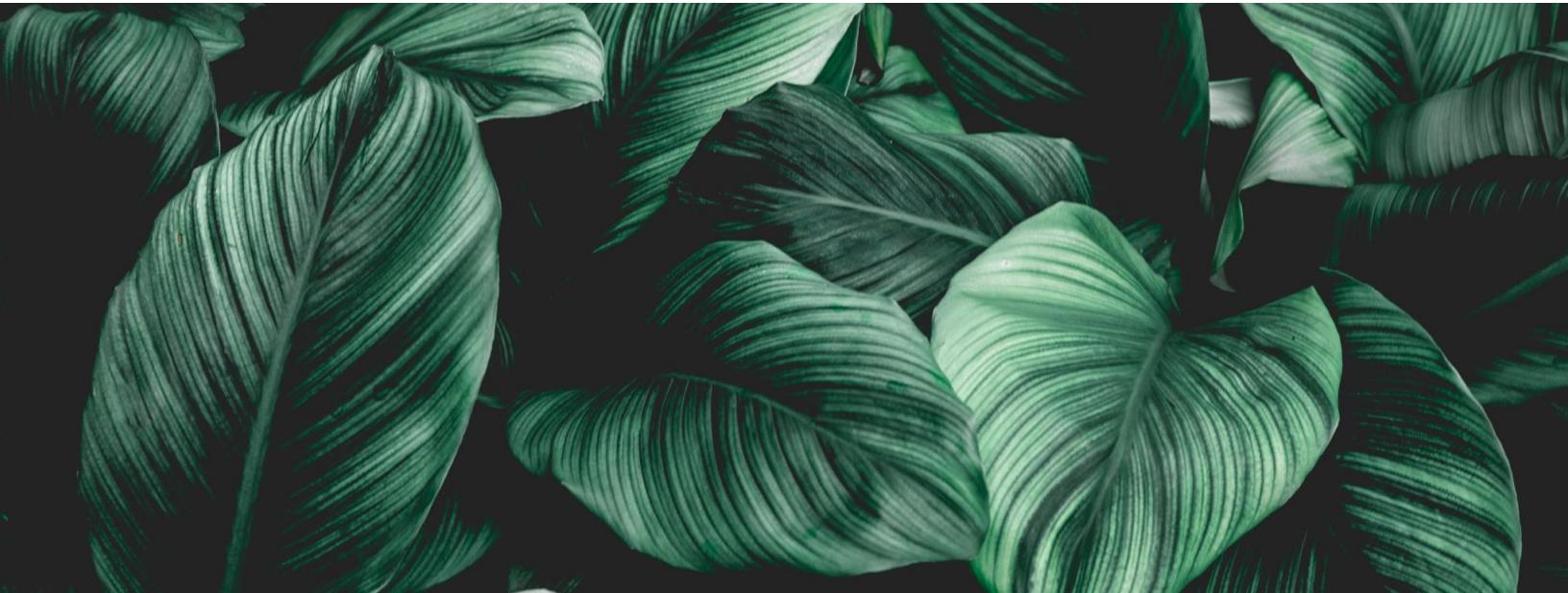
**Occupation:** Environment Policy Advisor

**Income:** \$70,000/annually

**Family:** Married



MINIMAL VISIBLE PRODUCT



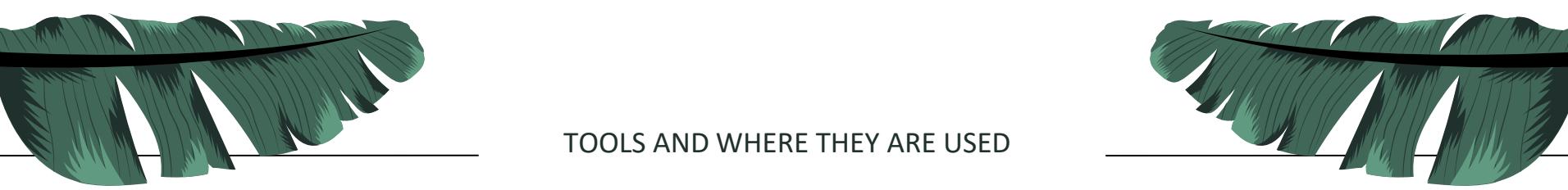
# MVP

## DISEASE DETECTION PAGE

- A user-friendly interface allowing users to upload images of plant leaves for disease detection, promoting ease of use and accessibility.
- Presentation of detected disease name, stage, description, precautions, and recommended supplements based on the uploaded image.
- An informative section explaining the importance of detecting diseases in plants. This could include preventing crop loss, maintaining agricultural productivity, and ensuring overall plant health.
- Clear and concise steps outlined to prevent plant diseases. This may include practices such as regular inspection, timely treatment, and maintaining optimal growing conditions.
- Know Why is it necessary to detect disease in plant ?
- Check Prevent Plant Disease steps.

The screenshot displays the MVP of a Plant Disease Detection application. At the top, there's a header bar with a home icon, a search bar containing 'PLANT DISEASE DETECTION', and a user profile icon. Below the header is a large image of a hand holding a small green seedling. The main content area is divided into several sections:

- Why is it necessary to detect disease in plant ?**: A section explaining that plant diseases affect growth and can be identified from which to obtain greater transparency for detecting diseases in plants, even before symptoms appear. Proper diagnosis is one of the most important aspects of a plant pathologist's training. Without proper identification of the disease, it can be difficult to implement effective control measures, which can be a waste of time and money and can lead to further plant losses. Proper disease diagnosis is necessary.
- Choose File**: A button to upload a plant leaf image, currently showing '1.JPG'.
- Prevent Plant Disease follow below steps:** A list of 7 steps:
  1. Follow Good Sanitation Practices.
  2. Practice Crop Rotation.
  3. Inspect Plants for Diseases Before You Bring Them Home.
  4. Allow Plants to Warm Before Planting.
  5. Ensure a Healthy Vegetable Garden By Rotating Crops.
  6. Provide Good Air Circulation.
  7. Remove Diseased Stems and Foliage.
- Plant Disease Prediction**: A card showing the predicted plant class as 'Peach: Bacterial Spot (Stage: I)'. It includes details about the disease, symptoms (small, circular, dark lesions), and precautions (fungal infections). It also lists potential supplements like 'SCORE FUNGICIDE'.



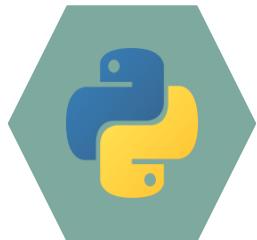
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## TOOLS AND WHERE THEY ARE USED

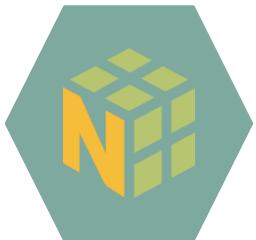
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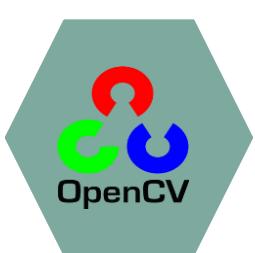
## TOOLS AND LANGUAGES



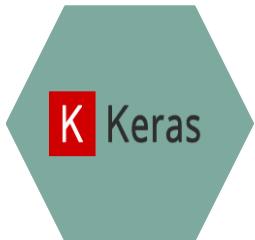
Python



Numpy



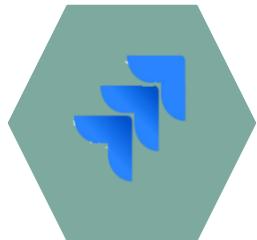
OpenCV



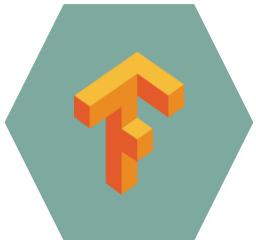
Keras



CSS



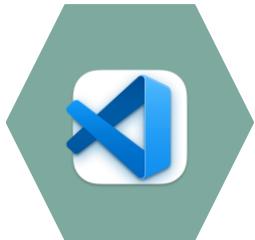
JIRA



TensorFlow



HTML



Visual  
Studio



GIT

## WHERE ARE THEY USED?



### Front End

HTML, CSS: Used for building our website  
Visual Studio: For Front end coding

Figma: Used for Designing (Design Interface)



### Back End

Keras, Numpy , Tensorflow:  
ML Libraries used for model building

Python: Used for programming  
ML Models

Open CV: For object detection  
Django : To connect with  
Front end



### Management

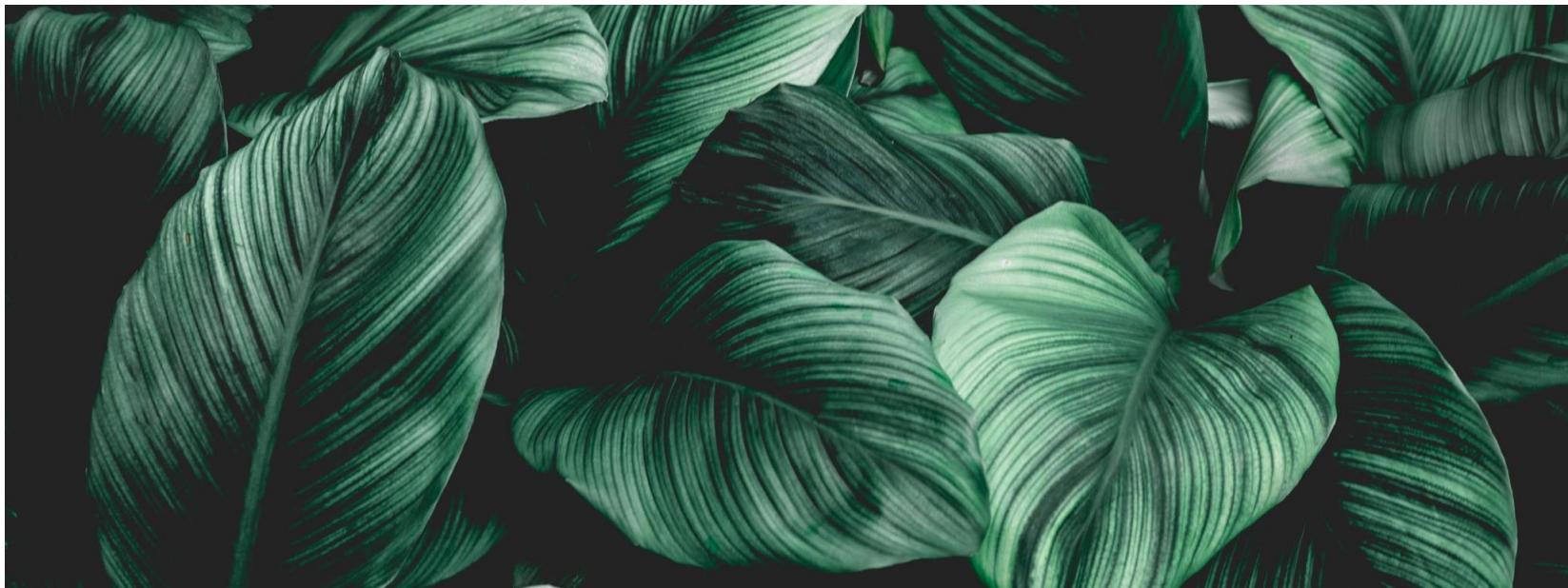
JIRA : Planning and workflow

Teams : Daily meetings

WhatsApp : Daily communications

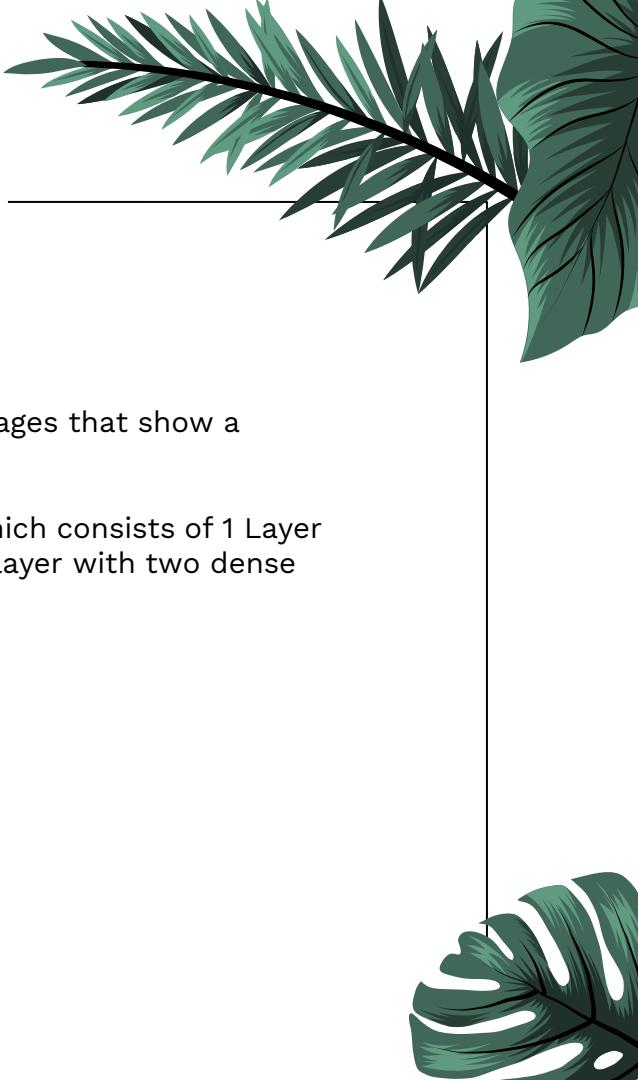
Git : For Source code  
management

# Machine Learning Algorithm



# MACHINE LEARNING ALGORITHM

- **Database:** **Plant Village** which contains **84K RBG images**
  - **Training Data: 70 %**
  - **Testing Data: 30%**
  - **Plant types: 14**
  - **No. of Classes:** 38 (while excluding healthy leaves, 26 types of images that show a particular disease in a particular plant).
- **Model:** **Vision Transformer model**, it is good for image classification which consists of 1 Layer of ViT(Vision transformer) with one flatten layer, 2 batch normalization layer with two dense layer. Total 6 layers.
- **Metrics:** Accuracy and losses
- For backend we are using Django framework to connect with front end.



# Dataset

GT -> Cassava\_\_mosaic\_disease



GT -> Corn\_\_common\_rust



GT -> Cassava\_\_bacterial\_blight



GT -> Squash\_\_powdery\_mildew



GT -> Squash\_\_powdery\_mildew



GT -> Soybean\_\_healthy



GT -> Squash\_\_powdery\_mildew



GT -> Soybean\_\_healthy



GT -> Cassava\_\_mosaic\_disease



GT -> Squash\_\_powdery\_mildew



GT -> Tomato\_\_bacterial\_spot



GT -> Cassava\_\_green\_mottle



GT -> Cassava\_\_healthy



GT -> Apple\_\_healthy



GT -> Tomato\_\_leaf\_curl



GT -> Soybean\_\_healthy



GT -> Potato\_\_early\_blight



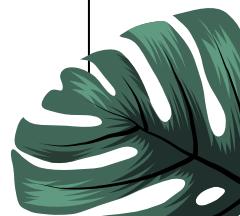
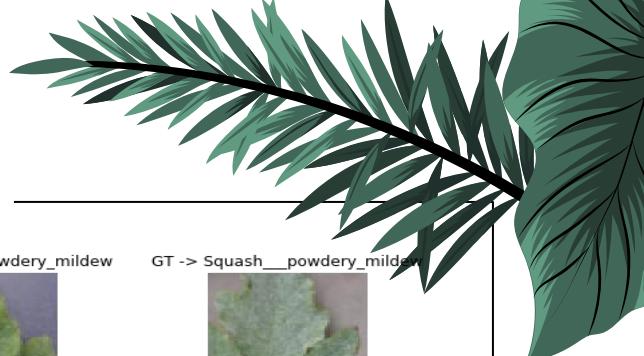
GT -> Cassava\_\_mosaic\_disease



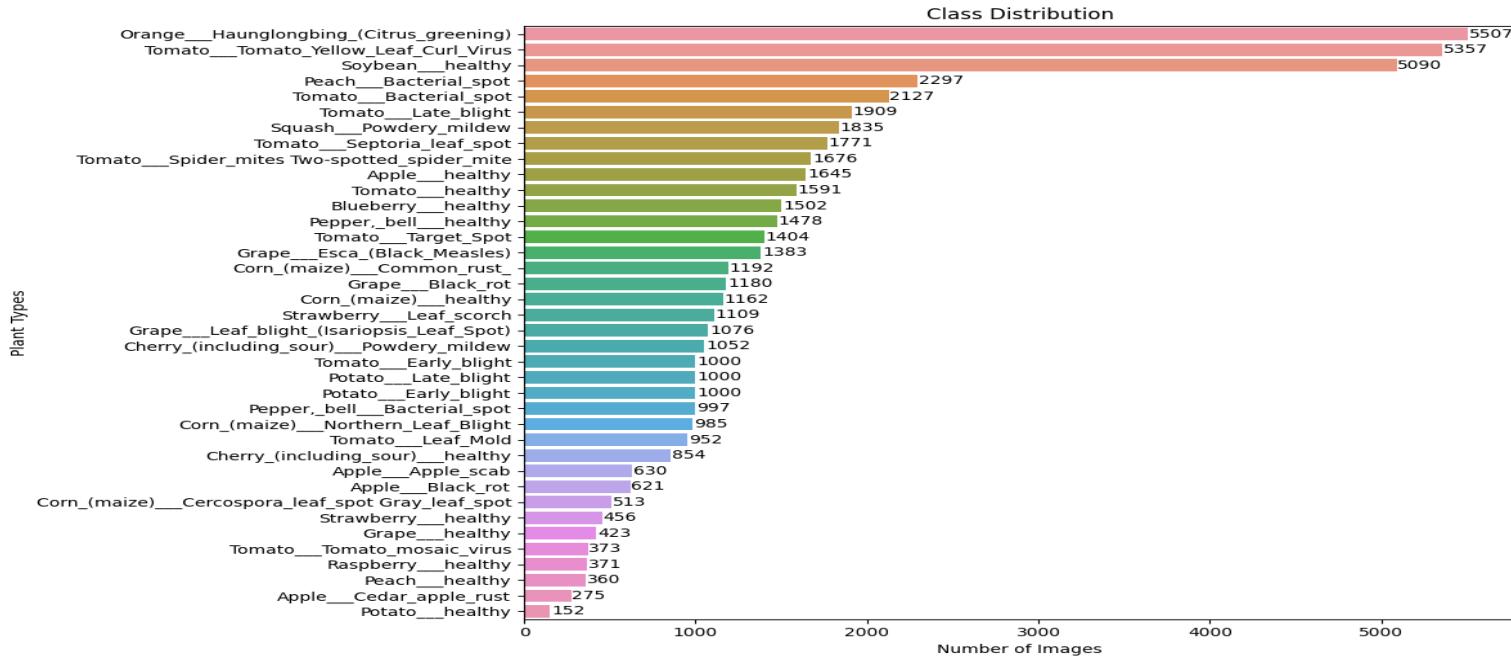
GT -> Tomato\_\_leaf\_curl



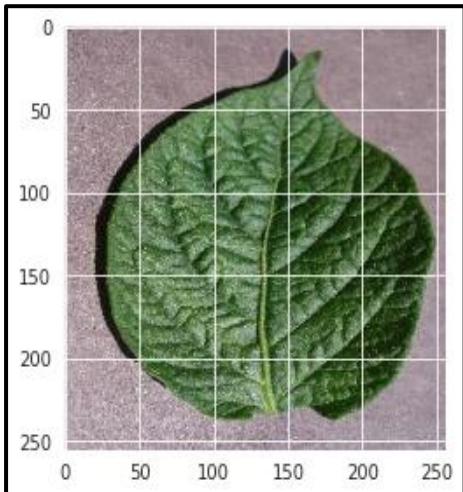
GT -> Tomato\_\_leaf\_curl



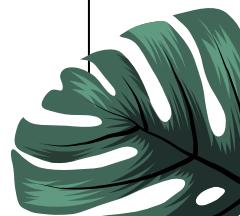
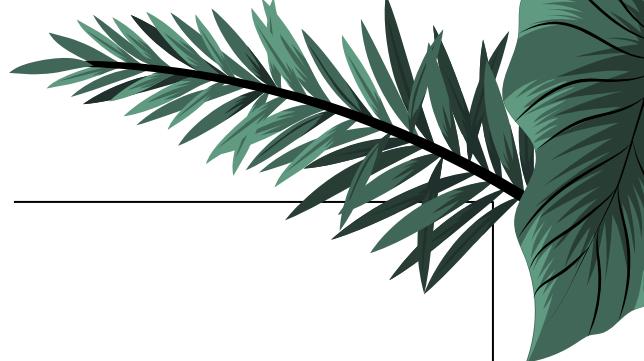
# Data Class distribution:



# Data Augmentation:



- **Training dataset:** 70% of the images from over 50,000 expertly curated images on healthy and infected leaves of crop plants, available on the PlantVillage platform.
- **Testing dataset:** 30% of the images, also sourced from the PlantVillage platform.
- **Standardization:** Resizing all images to 100x100 pixels to ensure uniformity across the dataset.
- **Transformation:** Gray scaling all images to simplify the data and remove color variation, aiding in the efficiency of machine learning algorithms.



# Model Architecture :

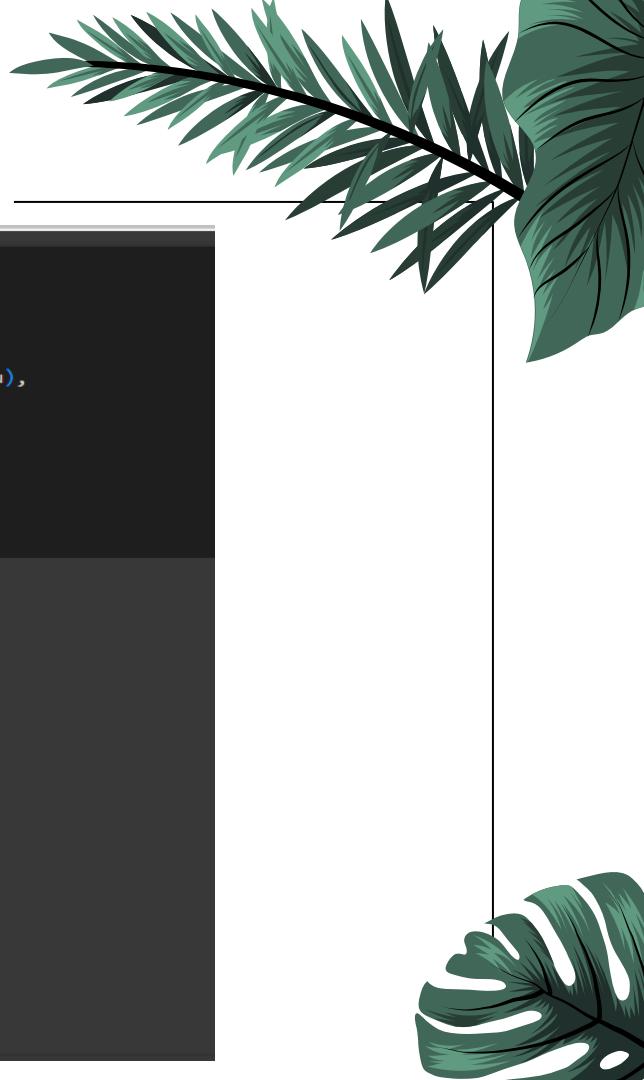
```
▶ model = tf.keras.Sequential([
    vit_model,
    tf.keras.layers.Flatten(),
    tf.keras.layers.BatchNormalization(),
    tf.keras.layers.Dense(50, activation = tfa.activations.gelu),
    tf.keras.layers.BatchNormalization(),
    tf.keras.layers.Dense(38, 'softmax')
],
name = 'vision_transformer')

model.summary()
```

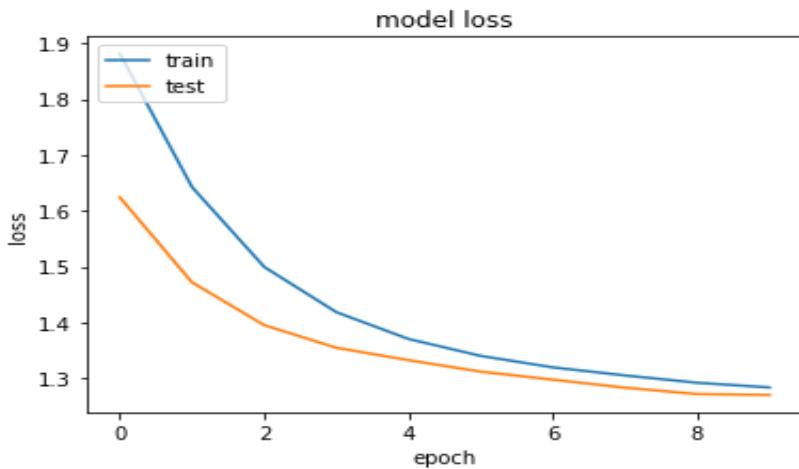
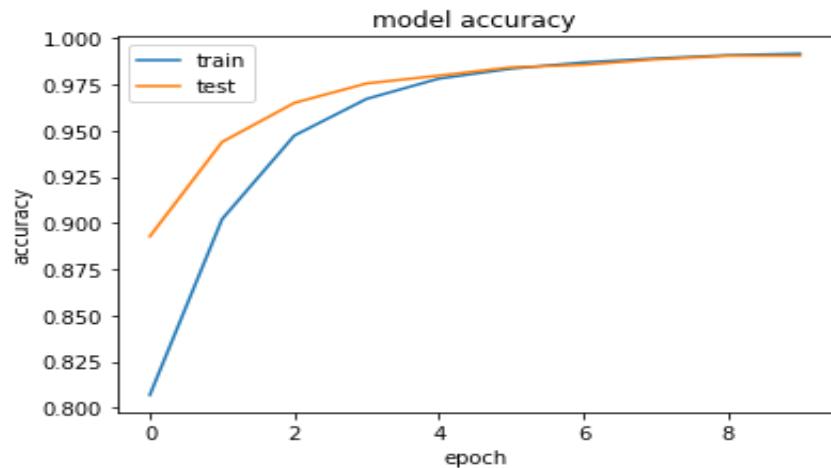
Model: "vision\_transformer"

Layer (type)	Output Shape	Param #
vit-b32 (Functional)	(None, 768)	87455232
flatten (Flatten)	(None, 768)	0
batch_normalization (BatchNo	(None, 768)	3072
dense (Dense)	(None, 50)	38450
batch_normalization_1 (Batch	(None, 50)	200
dense_1 (Dense)	(None, 38)	1938

Total params: 87,498,892  
Trainable params: 87,497,256  
Non-trainable params: 1,636



# Model Accuracy and losses graph :

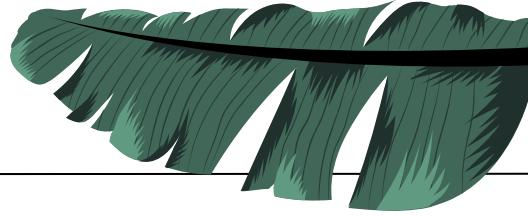
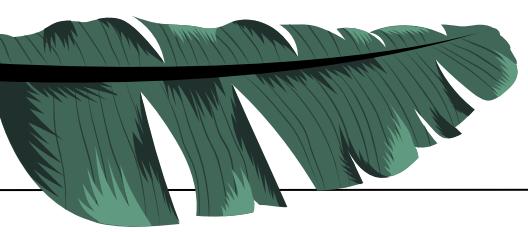


Training accuracy: 98.2%

Validation Accuracy: 96.8%

# CODE SNIPPET

## Training code



```
test.py 9+ | train.ipynb X
train.ipynb > INPUT_SHAPE = (224,224)
+ Code + Markdown | Run All | Clear All Outputs | Outline ... | Select Kernel
```

```
Click here to ask Blackbox to help you code faster
data_gen_train = ImageDataGenerator(rescale = 1/255.0,featurewise_center=False, # set input mean to 0 over the dataset
samplewise_center=False, # set each sample mean to 0
featurewise_std_normalization=False, # divide inputs by std of the dataset
samplewise_std_normalization=False, # divide each input by its std
zca_whitening=False, # apply ZCA whitening
rotation_range = 30, # randomly rotate images in the range (degrees, 0 to 180)
zoom_range = 0.2, # Randomly zoom image
width_shift_range=0.1, # randomly shift images horizontally (fraction of total width)
height_shift_range=0.1, # randomly shift images vertically (fraction of total height)
horizontal_flip = True, # randomly flip images
vertical_flip=False,
validation_split=0.3)
data_gen_test = ImageDataGenerator(rescale = 1/255.0)
```

Python

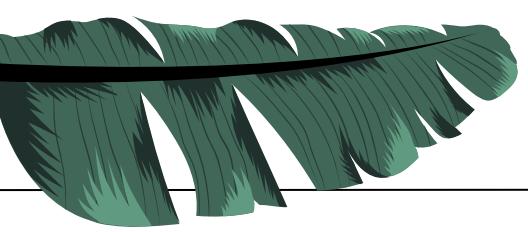
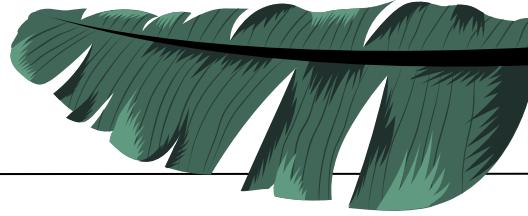
```
Click here to ask Blackbox to help you code faster
x_train = data_gen_train.flow_from_directory(train_path,
                                             batch_size=BATCH_SIZE,
                                             class_mode='categorical',
                                             target_size=INPUT_SHAPE,subset='training')

x_test = data_gen_train.flow_from_directory(train_path,
                                             batch_size=BATCH_SIZE,
                                             class_mode='categorical',
                                             target_size=INPUT_SHAPE,subset='validation')
```

Python

... Found 38029 images belonging to 38 classes.  
Found 16276 images belonging to 38 classes.

## Testing code

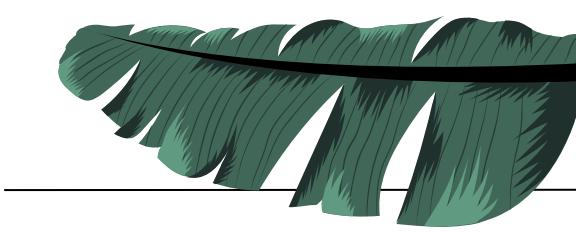
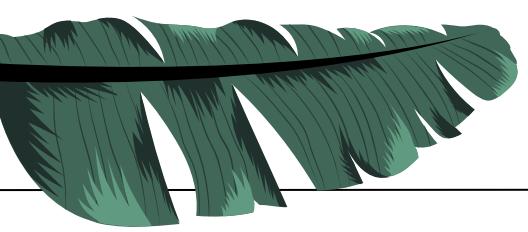


```
test.py 9+ X | train.ipynb
test.py ...
+ Code + Markdown | Run All | Clear All Outputs | Outline ... | Select Kernel
```

```
def load_image(img_path, show=False):
    img = cv2.imread(img_path)
    img = cv2.resize(img,(224,224))
    img = img.reshape(1,224,224,3)
    return img

def predict(image_path):
    i = load_img(image_path, target_size=(224,224))
    i = img_to_array(i)
    i = i.reshape(1, 224,224,3)

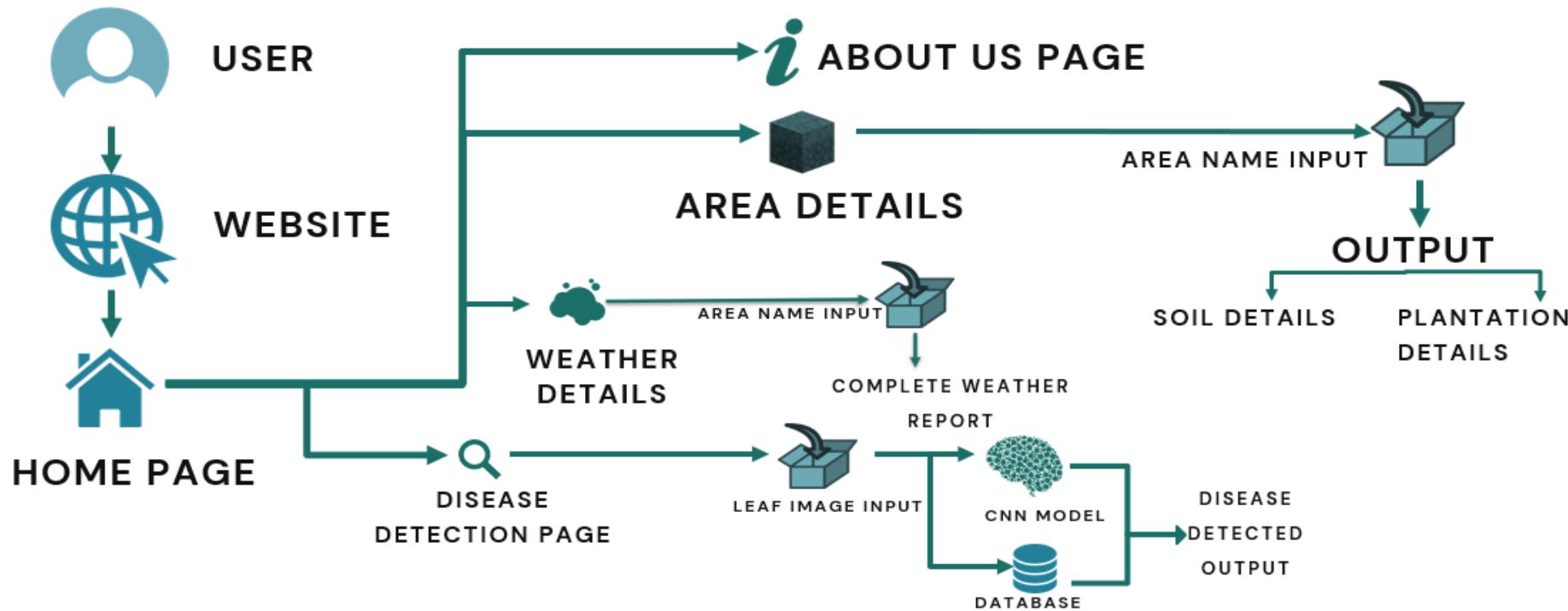
    out = model.predict(i)[0]
    pred = out.argmax()
    pr = out[pred]*100
    title = disease_info['disease_name'][pred]
    if pred==75:
        title+= " (Stage III)"
    elif pred<75 and pred>50:
        title+= " (Stage II)"
    elif pred<=50:
        title+= " (Stage I)"
    description =disease_info['description'][pred]
    symptoms = disease_info['symptoms'][pred]
    prevent = disease_info['precautions'][pred]
    image_url = disease_info['image url'][pred]
    supplement_name = supplement_info['supplement name'][pred]
    supplement_image_url = supplement_info['supplement image'][pred]
    supplement_buy_link = supplement_info['buy link'][pred]
    return title,description,symptoms,prevent,supplement_name
    print(predict("leaf.jpg"))
```



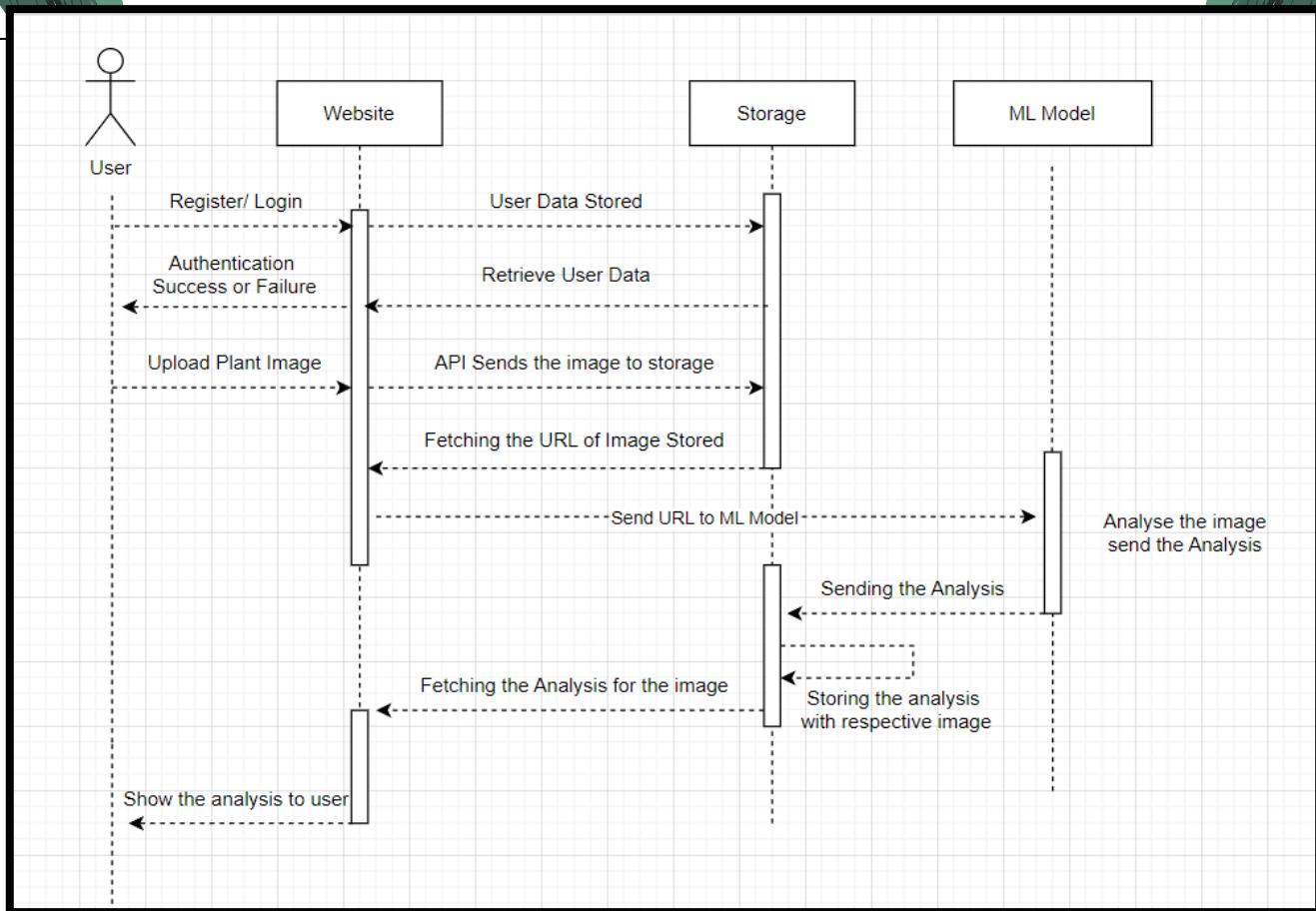
## Diagrams



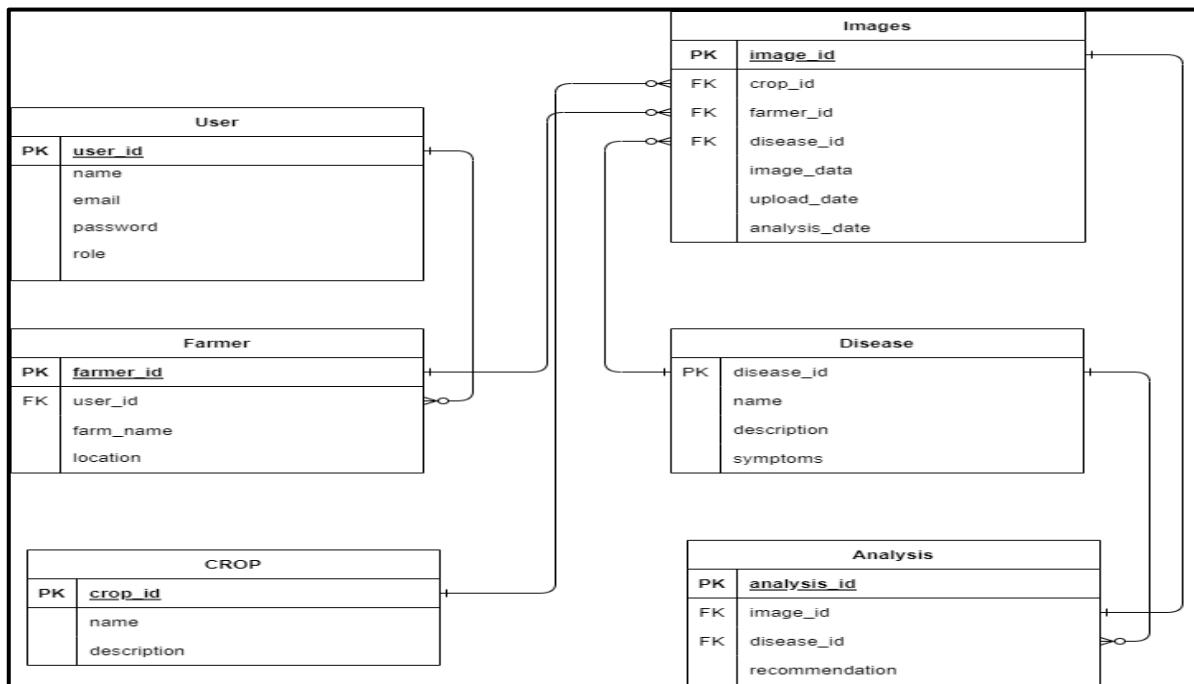
## CONCEPTUAL DIAGRAM



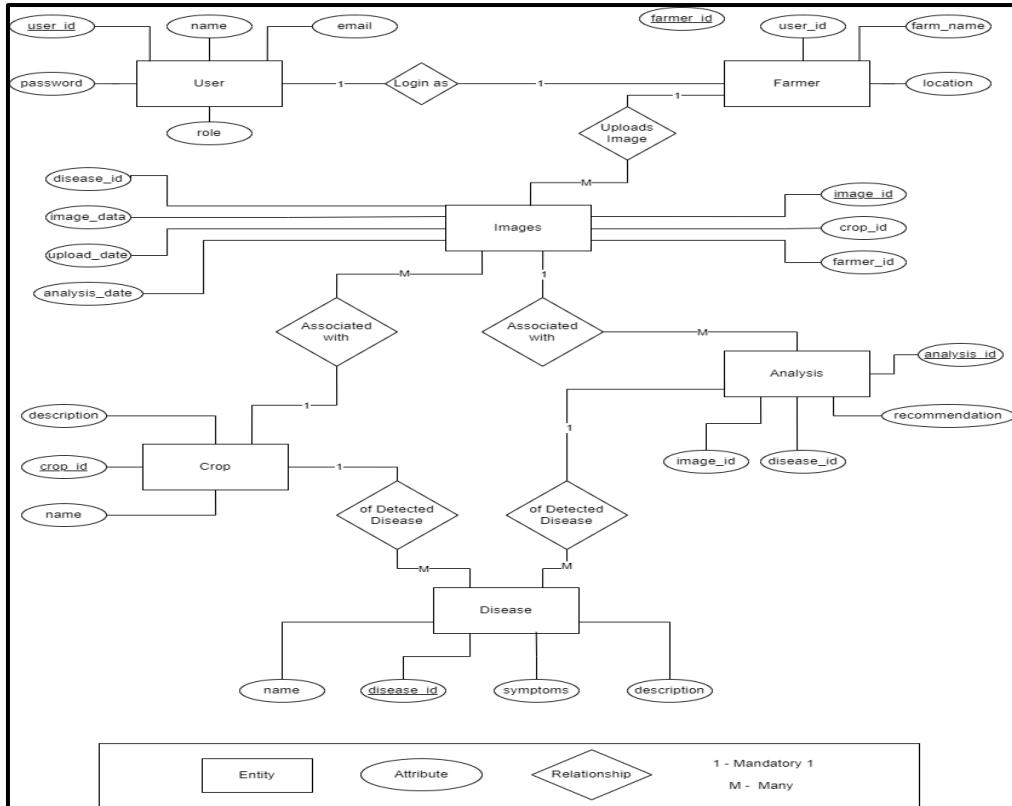
# SEQUENCE DIAGRAM



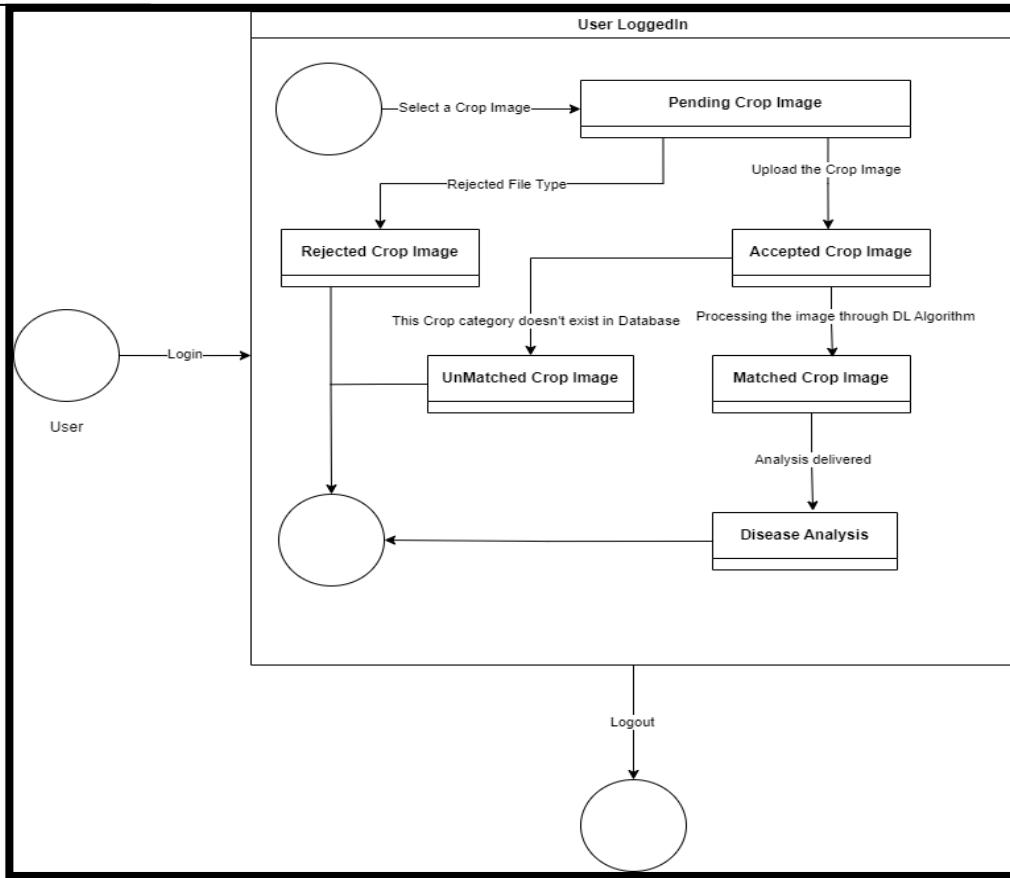
# Class Diagram



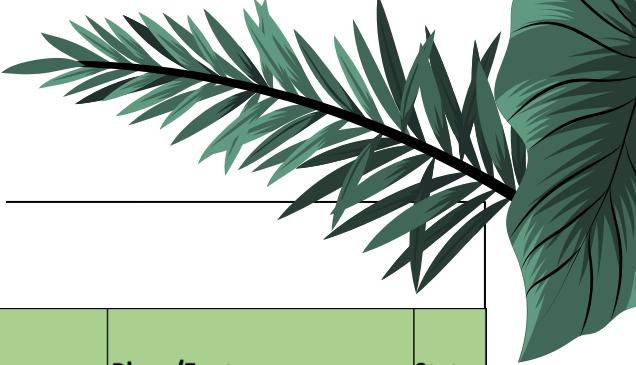
# ER Diagram



# State Diagram



# Sprint -3 Recap



Story points	User Story ID	As a	I want	so that	Place/Feature	Status
5	PD-05	User	to see the stages of the detected disease.	I can understand the severity of it.	Disease Detection	Done
3	PD-06	User	to verify if the image is right	I can get results accurately.	User Interface	Done
3	PD-07	User	to receive a prompt if the image is not in correct format	I can re upload the image in correct format.	User Interface	Done
5	PD-08	User	to know if this crop is available in database	I can check the crop availability in the database	Database	Done
8	PD-09	User	crops and growth conditions for my area.	I can be well prepared for my crop cultivation or plant health.	Agriculture Details	Done

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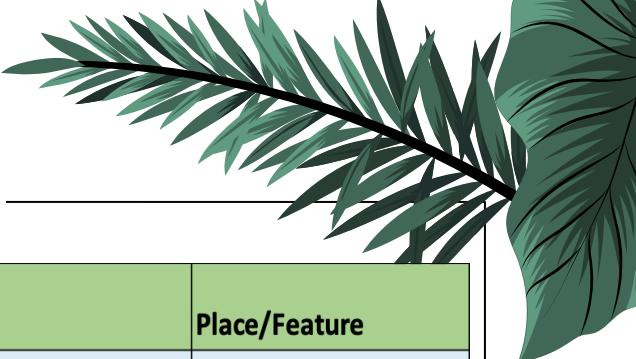
## PRODUCT BACKLOG

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# Product Backlog – Sprint 2

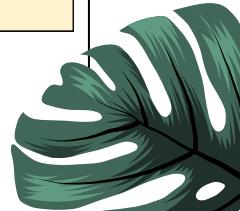


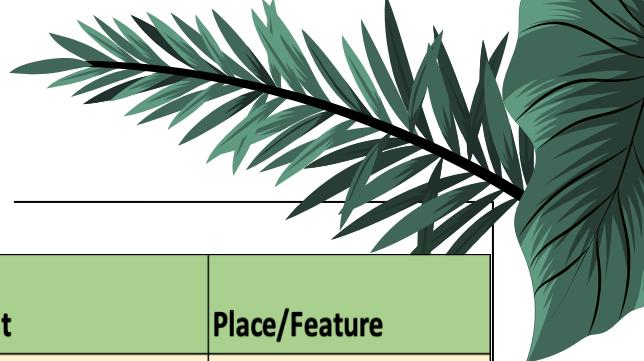
Story points	User Story ID	As a	I want	so that	Place/Feature
3	PD-01	User	to upload an image of a plant leaf to detect diseases.	I can view the diagnosis of the plant.	Disease Detection
3	PD-02	User	to receive detailed information about the detected plant disease.	I can find the cure to the disease.	Disease Detection
5	PD-03	User	to view prescriptions and suggested supplements for the detected disease.	I can take those steps to treat my plant or crop.	Disease Detection
5	PD-04	User	to know the various cures and preventive measures for the detected disease.	I can take necessary preventive measures from the disease.	Disease Detection
5	PD-05	User	to see the stages of the detected disease.	I can understand the severity of it.	Disease Detection
3	PD-06	User	to verify if the image is right	I can get results accurately.	User Interface

Sprint 2

Sprint 3

Sprint 4





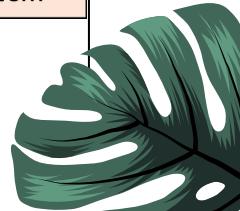
# Product Backlog – Sprint 3

Story points	User Story ID	As a	I want	so that	Place/Feature
3	PD-07	User	to receive a prompt if the image is not in correct format	I can re upload the image in correct format.	User Interface
5	PD-08	User	to know if this crop is available in database	I can check the crop availability in the database	Database
8	PD-09	User	information about suitable crops and growth conditions for my area.	I can be well prepared for my crop cultivation or plant health.	Agriculture Details
5	PD-10	User	to see the latest news related to agriculture and farming practices.	I can get knowledge or information about agriculture practices.	Agriculture News
3	PD-11	User	to receive notifications or updates about my uploaded plant reports.	I can be informed about the updates as soon as possible.	Notification System

Sprint 2

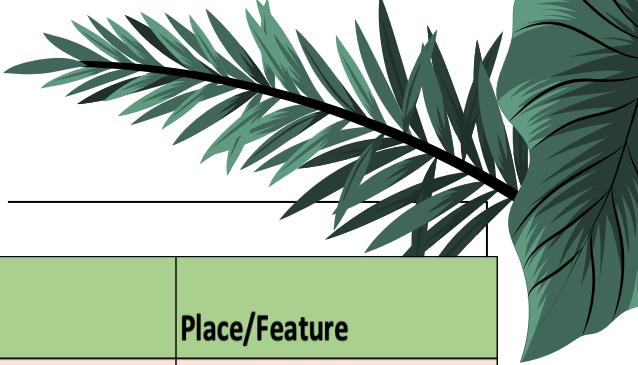
Sprint 3

Sprint 4





# Product Backlog – Sprint 4

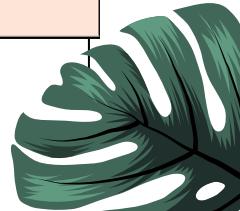


Story points	User Story ID	As a	I want	so that	Place/Feature
5	PD-12	User	to explore and learn about new farming technologies and practices.	I can keep myself up to date with the latest technologies in agriculture.	Agriculture Information
5	PD-13	User	to see the latest weather reports related to my area	I can get knowledge or information about weather.	Weather
5	PD-14	User	to create an account on the website	I can keep my account private and login using email/phone and password	Login and Authentication
3	PD-15	User	to login to the website	to store my information.	Login
2	PD-16	User	to logout	my information and reports are secure.	Logout

Sprint 2

Sprint 3

Sprint 4



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## User Stories / Acceptance Criteria

---



# Sprint 2

User Story ID	Scenario	Summary		Criteria	Feature
PD-01		So that, I want to upload an image of a plant leaf to detect diseases.			
PD-01	A user wants to upload an leaf image	when I go to the EcoScan website, I should be able to find an upload button. When I click on it and choose an image, the app should save the picture so that it can be processed.	EcoScan website will store the image for processing	Disease Detection	
PD-02		So that, I want to receive detailed information about the detected plant disease.			
PD-02	A user wants to know the detailed information	Given I am a, user when I upload the image I should be able to get detailed information about the disease detected	EcoScan website will store the information about the disease.	Disease Detection	
PD-03		So that, I want to view prescriptions and suggested supplements for the detected disease.			
PD-03	A user wants to view prescriptions and supplements.	I want to view the prescriptions and supplements suggested for the disease being detected.	EcoScan website will store the information about the disease.	Disease Detection	
PD-04		So that, I want to know the various cures and preventive measures for the detected disease.			
PD-04	A user wants to know preventive measures.	Given that I am a user, I want to know the steps to be taken to cure and prevent detected disease.	EcoScan website will provide diagnosis for the disease.	Disease Detection	

# Sprint 3

User Story ID	Scenario	Summary	Criteria	Feature
PD-05	A user wants to look at the disease stages being detected.	I want to about all the stages detected for the particular disease.  So that, I want to see the stages of the detected disease for better understanding.	EcoScan website will provide diagnosis for the disease.	Disease Detection
PD-06	A user wants to check if he uploaded the right image format.	I want to know if the image being uploaded is in right format  So that, A user want to check if image uploaded is in right format.	EcoScan website will check the image and its formatUser Interface	User Interface
PD-07	A user wants know if the image uploaded is correct or not.	Given that I am a user, I want to receive the prompt/notification knowing if the image format is correct or no.  So that, I want to receive information if the image is in incorrect format	EcoScan website will check the image and its format	User Interface
PD-08	A user wants to check crop type exist or not.	I want to know if the crop I have selected is available in the dataset.  So that, A user want to know about image of the crop selected is available in the dataset.	EcoScan website will check if particular crop is present in datasetAgriculture Information	Image Checking in Database
PD-09	A user wants to know about growth conditions for his area	I want to know which crop will be suitable for my area and how its growth will be.  So that, I want information about suitable crops and growth conditions for my area.	EcoScan website will give information on crop suitability.	Agriculture Information

# Sprint 4

User Story ID	Scenario	Summary		Criteria	Feature
PD-10		So that, I want to see the latest news related to agriculture and farming practices.			
	A user wants latest news related to agriculture.	I want to know about the latest news that are related to agriculture and farming.	EcoScan website will provide latest news based on agriculture.	Agriculture Information	
PD-11		So that, I want to receive notifications or updates about my uploaded plant reports.			
	A user wants to receive notification about his plants.	Given that I am user, I want to get notified about the reports of my plant being uploaded.	EcoScan website will send notifications related to uploads.	Notification System	
PD-12		So that, I want to explore and learn about new farming technologies and practices.			
	A user want to explore and learn about farming technologies.	I want to know and explore about new farming techniques and practices.	EcoScan website gives information on farming techniques.	Agriculture Information	
PD-13		So that, I want to see the latest weather reports related to my area so that I can get knowledge			
	A user want to see the latest weather reports related to his area.	I want to know information about weather reports in my area.	EcoScan website will provide information about weather reports related to his area.	Weather	

# Sprint 4

User Story ID	Scenario	Summary	Criteria	Feature
PD-14	So that, I want to create an account on the website so that I can keep my account private and login using email/phone and password  A user wants to create an account and login using his details.	I want to create an account and keep my account private with my login credentials.	EcoScan website will be able to create login credentials.	Home Page
PD-15	A user wants to login to the website to store the information.	So that, I want to login to the website to store any information.  I want to login to the website using my login details to store any information.	EcoScan website will log you in and store the information given.	Log In
PD-16	A user want to logout and secure the information.	So that, I want to logout so that my information and reports are secure.  I want to logout from my account to secure my information.	EcoScan website will log you out by securing your information.	Log Out

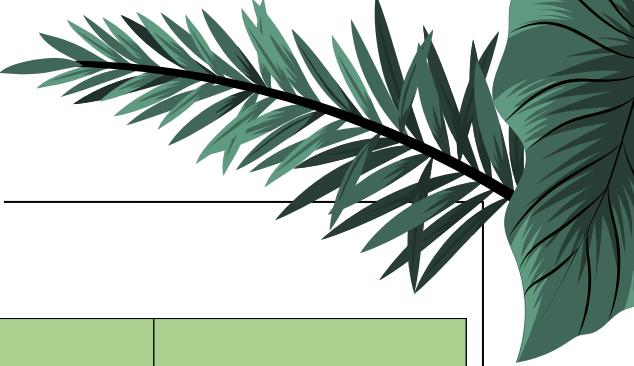
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## Sprint Summary

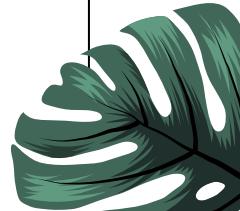
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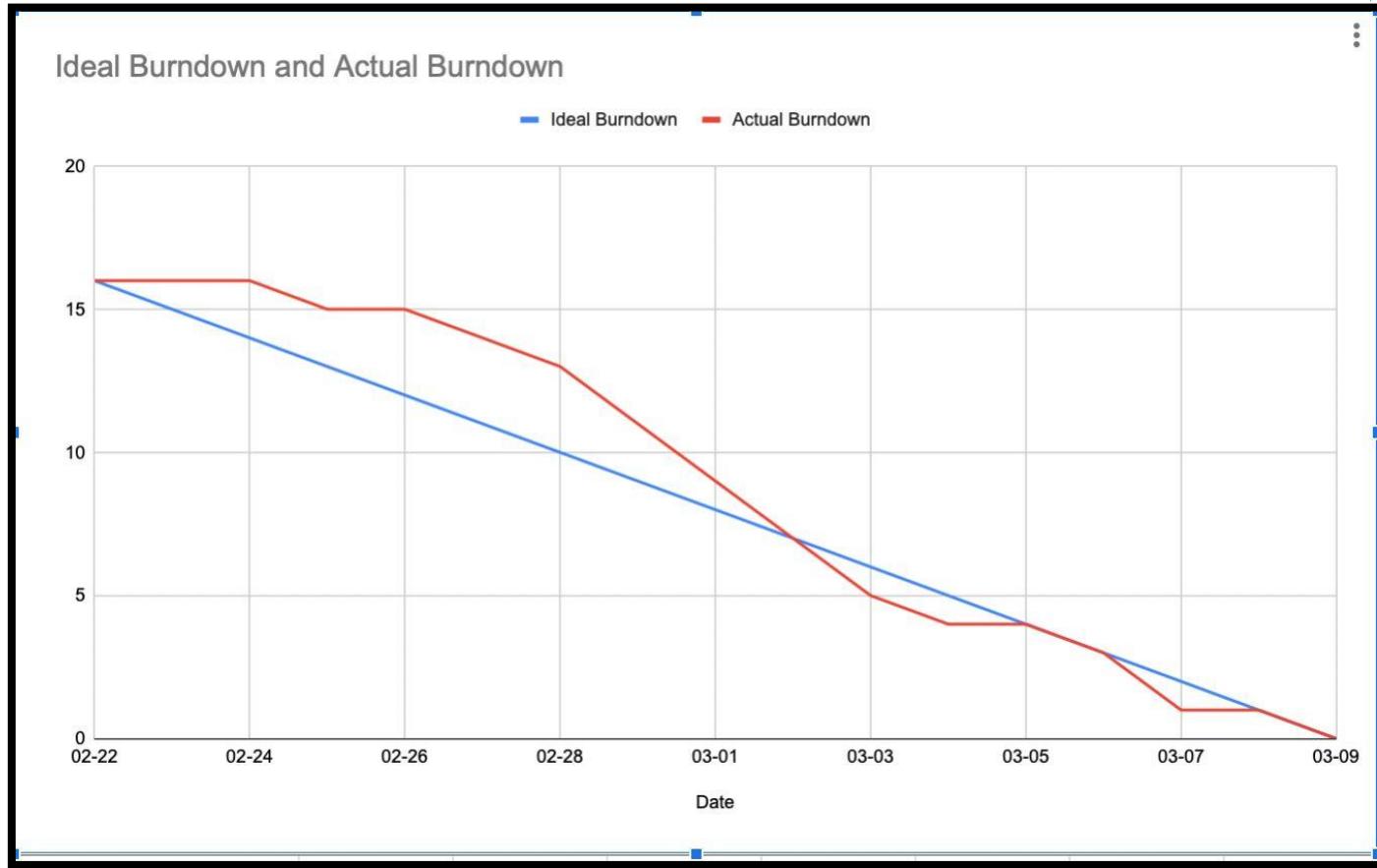
# Sprint 2



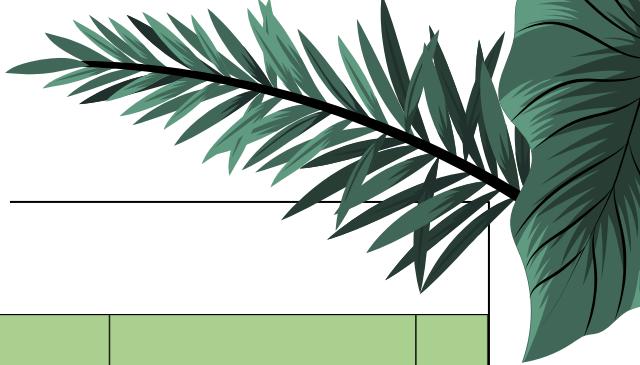
Story points	User Story ID	As a	I want	so that	Place/Feature
3	PD-01	User	to upload an image of a plant leaf to detect diseases.	I can view the diagnosis of the plant.	Disease Detection
3	PD-02	User	to receive detailed information about the detected plant disease.	I can find the cure to the disease.	Disease Detection
5	PD-03	User	to view prescriptions and suggested supplements for the detected disease.	I can take those steps to treat my plant or crop.	Disease Detection
5	PD-04	User	to know the various cures and preventive measures for the detected disease.	I can take necessary preventive measures from the disease.	Disease Detection



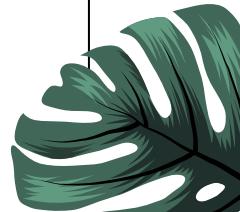
# Burn down Chart for Sprint 2



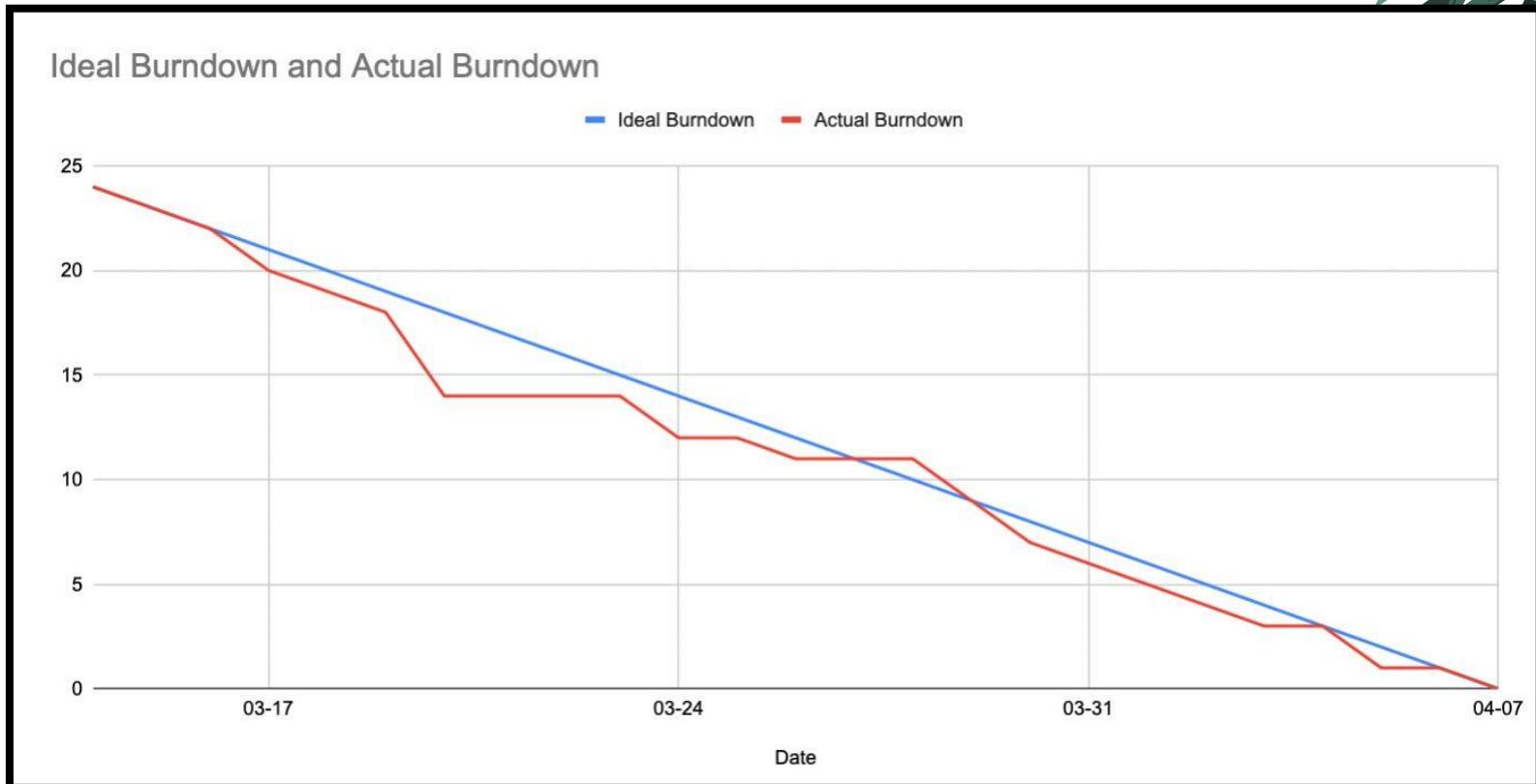
# Sprint 3



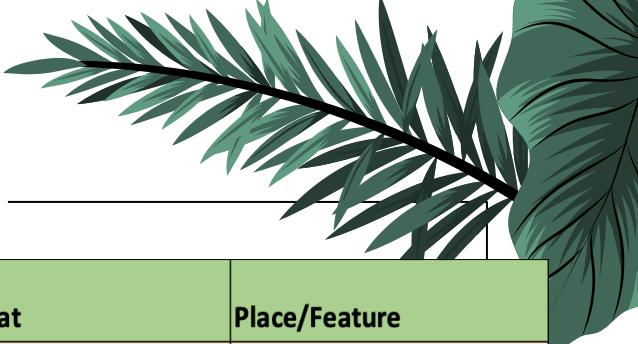
Story points	User Story	As a	I want	so that	Place/Feature	Status
ID						
5	PD-05	User	to see the stages of the detected disease.	I can understand the severity of it.	Disease Detection	Done
3	PD-06	User	to verify if the image is right	I can get results accurately.	User Interface	Done
3	PD-07	User	to receive a prompt if the image is not in correct format	I can re upload the image in correct format.	User Interface	Done
5	PD-08	User	to know if this crop is available in database	I can check the crop availability in the database	Database	Done
8	PD-09	User	crops and growth conditions for my area.	I can be well prepared for my crop cultivation or plant health.	Agriculture Details	Done



# Burn down Chart for Sprint 3



# Sprint 4 Backlog



Story points	User Story ID	As a	I want	so that	Place/Feature
5	PD-10	User	to see the latest news related to agriculture and farming practices.	I can get knowledge or information about agriculture practices.	Agriculture News
3	PD-11	User	to receive notifications or updates about my uploaded plant reports.	I can be informed about the updates as soon as possible.	Notification System
5	PD-12	User	to explore and learn about new farming technologies and practices.	I can keep myself up to date with the latest technologies in agriculture.	Agriculture Information
5	PD-13	User	to see the latest weather reports related to my area	I can get knowledge or information about weather.	Weather
5	PD-14	User	to create an account on the website	I can keep my account private and login using email/phone and password	Login and Authentication
3	PD-15	User	to login to the website	to store my information.	Login
2	PD-16	User	to logout	my information and reports are secure.	Logout



# Sprint 4 Stories and Acceptance Criteria

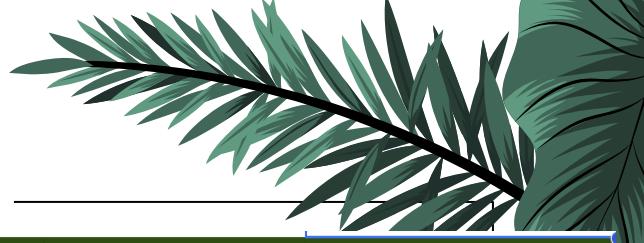
PD-10	So that, I want to see the latest news related to agriculture and farming practices.			
	A user wants latest news related to agriculture.	I want to know about the latest news that are related to agriculture and farming.	EcoScan website will provide latest news based on agriculture.	Agriculture Information
PD-11	So that, I want to receive notifications or updates about my uploaded plant reports.			
	A user wants to receive notification about his plants.	Given that I am user, I want to get notified about the reports of my plant being uploaded.	EcoScan website will send notifications related to uploads.	Notification System
PD-12	So that, I want to explore and learn about new farming technologies and practices.			
	A user want to explore and learn about farming technologies.	I want to know and explore about new farming techniques and practices.	EcoScan website gives information on farming techniques.	Agriculture Information
PD-13	So that, I want to see the latest weather reports related to my area so that I can get knowlegde			
	A user want to see the latest weather reports related to his area.	I want to know information about weather reports in my area.	EcoScan website will provide information about weather reports related to his area.	Weather

## Sprint 4 Stories and Acceptance Criteria

	So that, I want to create an account on the website so that I can keep my account private and login using email/phone and password			
PD-14	A user wants to create an account and login using his details.	I want to create an account and keep my account private with my login credentials.	EcoScan website will be able to create login credentials.	Home Page
	So that, I want to login to the website to store any information.			
PD-15	A user wants to login to the website to store the information.	I want to login to the website using my login details to store any information.	EcoScan website will log you in and store the information given.	Log In
	So that, I want to logout so that my information and reports are secure.			
PD-16	A user want to logout and secure the information.	I want to logout from my account to secure my information.	EcoScan website will log you out by securing your information.	Log Out

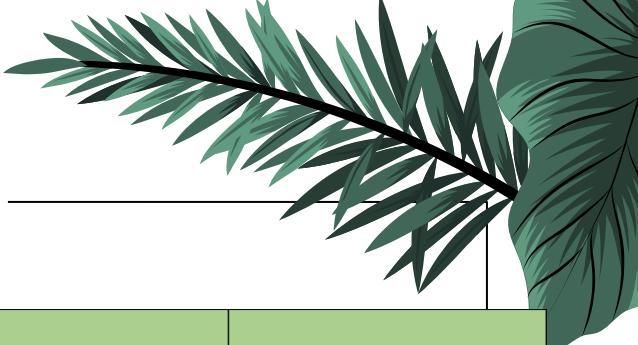


# Test Cases



Test Case Id	User Story Id	Functionality to Test	Test Cases	Expected Results	Actual Results	Pass/Fail
TC-10	PD-10	Agriculture News	As a user when I want to see the latest news related to agriculture and farming practices then I can get knowledge or information about agriculture practices.	As a user when I want to see the latest news related to agriculture and farming practices then I was able to get knowledge or information about agriculture practices.	user is able to see the latest news related to agriculture and farming practices	Pass
TC-11	PD-11	Notification System	As a user when I want to receive notifications or updates about my uploaded plant reports then I can be informed about the updates as soon as possible.	As a user when I want to receive notifications or updates about my uploaded plant reports then I was informed about the updates as soon as possible.	user is able to receive notifications or updates about my uploaded plant reports	Pass
TC-12	PD-12	Agriculture Information	As a user when I want to explore and learn about new farming technologies and practices then I can keep myself up to date with the latest technologies in agriculture.	As a user when I want to explore and learn about new farming technologies and practices then I was able to keep myself up to date with the latest technologies in agriculture.	user is able to explore and learn about new farming technologies and practices	Pass
TC-13	PD-13	Weather	As a user when I want to see the latest weather reports related to my area then I can get knowledge or information about weather.	As a user when I want to see the latest weather reports related to my area then I was able to get knowledge or information about weather.	user is able to see the latest weather reports related to my area	Pass
TC-14	PD-14	Login and Authentication	As a user when I want to create an account on the website then I can keep my account private and login using email/phone and password	As a user when I want to create an account on the website then I was able to keep my account private and login using email/phone and password	user is able to create an account on the website and able to keep the account private and login using email/phone and password	Pass
TC-15	PD-15	Login	As a user when I want to login to the website then I should be able to store my information.	As a user when I want to login to the website then I was able to store my information.	user is able to login to the website.	Pass
TC-16	PD-16	Logout	As a user when I want to logout then my information and reports should be secured.	As a user when I want to logout then my information and reports were secured.	user is able to logout and secured the information and reports.	Pass

# Stories Completed Sprint 4



Story points	User Story ID	As a	I want	so that	Place/Feature
5	PD-10	User	to see the latest news related to agriculture and farming practices.	I can get knowledge or information about agriculture practices.	Agriculture News
3	PD-11	User	to receive notifications or updates about my uploaded plant reports.	I can be informed about the updates as soon as possible.	Notification System
5	PD-12	User	to explore and learn about new farming technologies and practices.	I can keep myself up to date with the latest technologies in agriculture.	Agriculture Information
5	PD-13	User	to see the latest weather reports related to my area	I can get knowledge or information about weather.	Weather
5	PD-14	User	to create an account on the website	I can keep my account private and login using email/phone and password	Login and Authentication
3	PD-15	User	to login to the website	to store my information.	Login
2	PD-16	User	to logout	my information and reports are secure.	Logout

Story points	User Story ID	As a	I want	so that	Place/Feature	Status
3	PD-01	User	to upload an image of a plant leaf to detect diseases.	I can view the diagnosis of the plant.	Disease Detection	Done
3	PD-02	User	to receive detailed information about the detected plant disease.	I can find the cure to the disease.	Disease Detection	Done
5	PD-03	User	to view prescriptions and suggested supplements for the detected disease.	I can take those steps to treat my plant or crop.	Disease Detection	Done
5	PD-04	User	to know the various cures and preventive measures for the detected disease.	I can take necessary preventive measures from the disease.	Disease Detection	Done
5	PD-05	User	to see the stages of the detected disease.	I can understand the severity of it.	Disease Detection	Done
3	PD-06	User	to verify if the image is right	I can get results accurately.	User Interface	Done
3	PD-07	User	to receive a prompt if the image is not in correct format	I can re upload the image in correct format.	User Interface	Done
5	PD-08	User	to know if this crop is available in database	I can check the crop availability in the database	Database	Done
8	PD-09	User	information about suitable crops and growth conditions for my area.	I can be well prepared for my crop cultivation or plant health.	Agriculture Details	Done
5	PD-10	User	to see the latest news related to agriculture and farming practices.	I can get knowledge or information about agriculture practices.	Agriculture News	Done
3	PD-11	User	to receive notifications or updates about my uploaded plant reports.	I can be informed about the updates as soon as possible.	Notification System	Done
5	PD-12	User	to explore and learn about new farming technologies and practices.	I can keep myself up to date with the latest technologies in agriculture.	Agriculture Information	Done
5	PD-13	User	to see the latest weather reports related to my area	I can get knowledge or information about weather.	Weather	Done
5	PD-14	User	to create an account on the website	I can keep my account private and login using email/phone and password	Login and Authentication	Done
3	PD-15	User	to login to the website	to store my information.	Login	Done
2	PD-16	User	to logout	my information and reports are secure.	Logout	Done



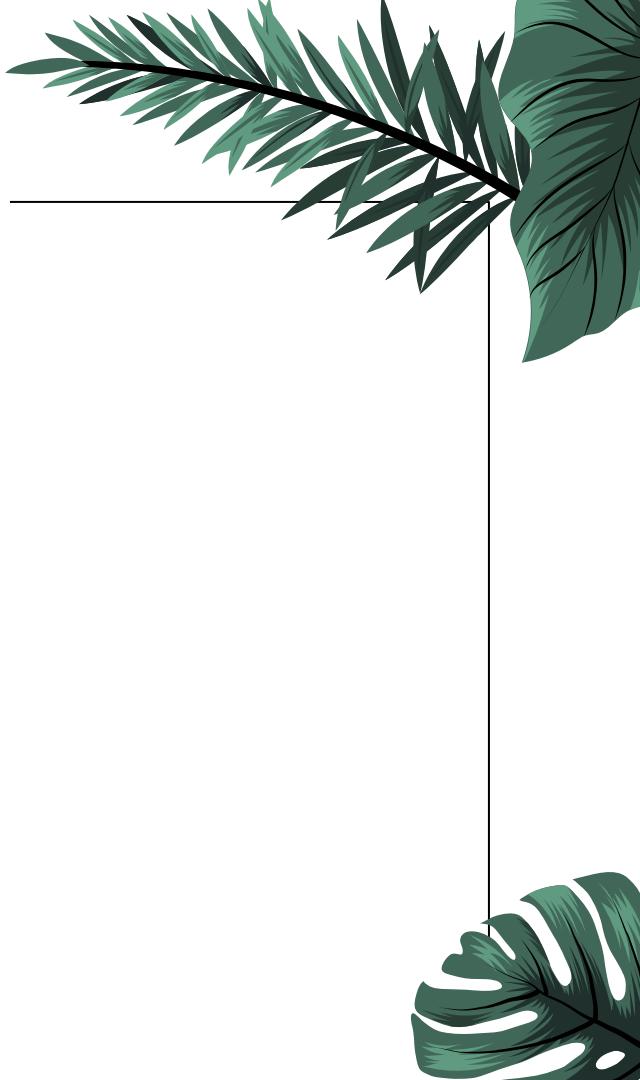
# Metrics





## Team Velocity – Sprint 4

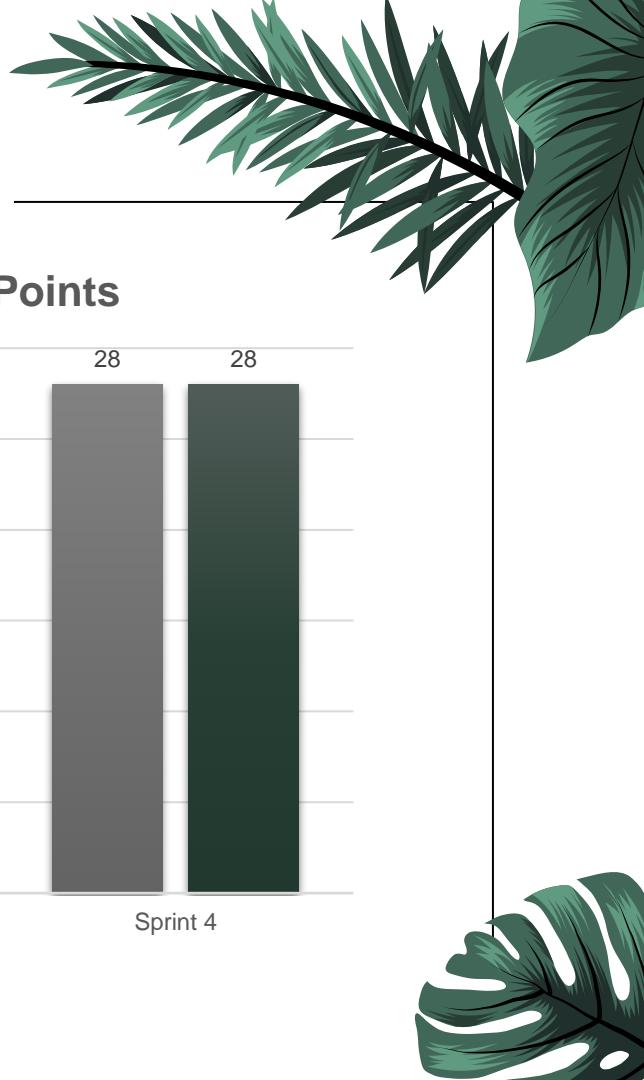
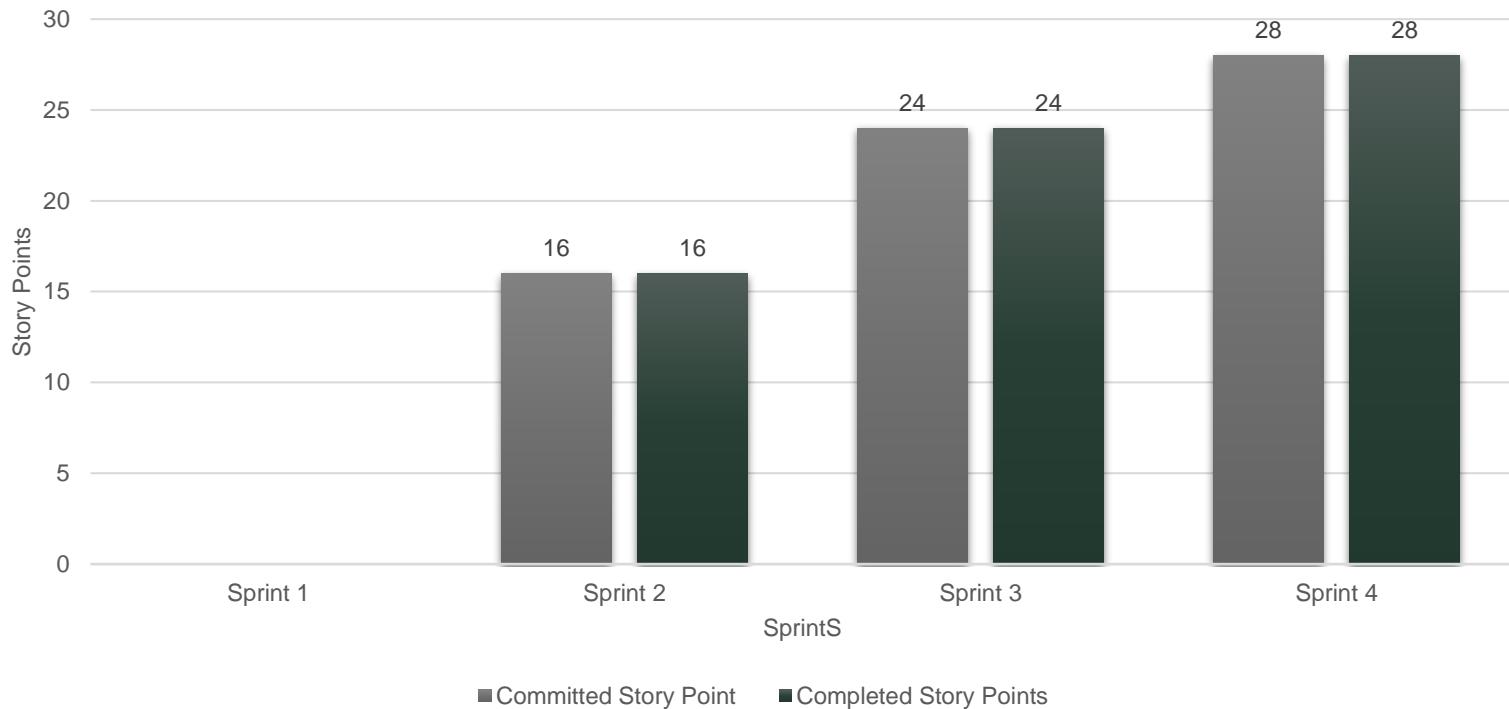
**Story Points: 28**



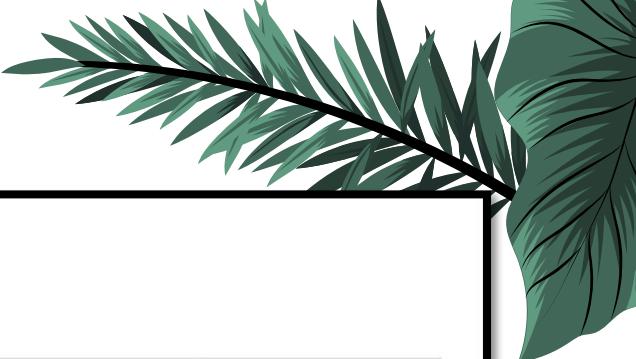


# Team's Historical Average

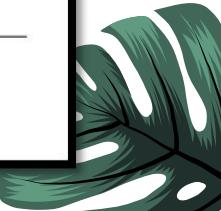
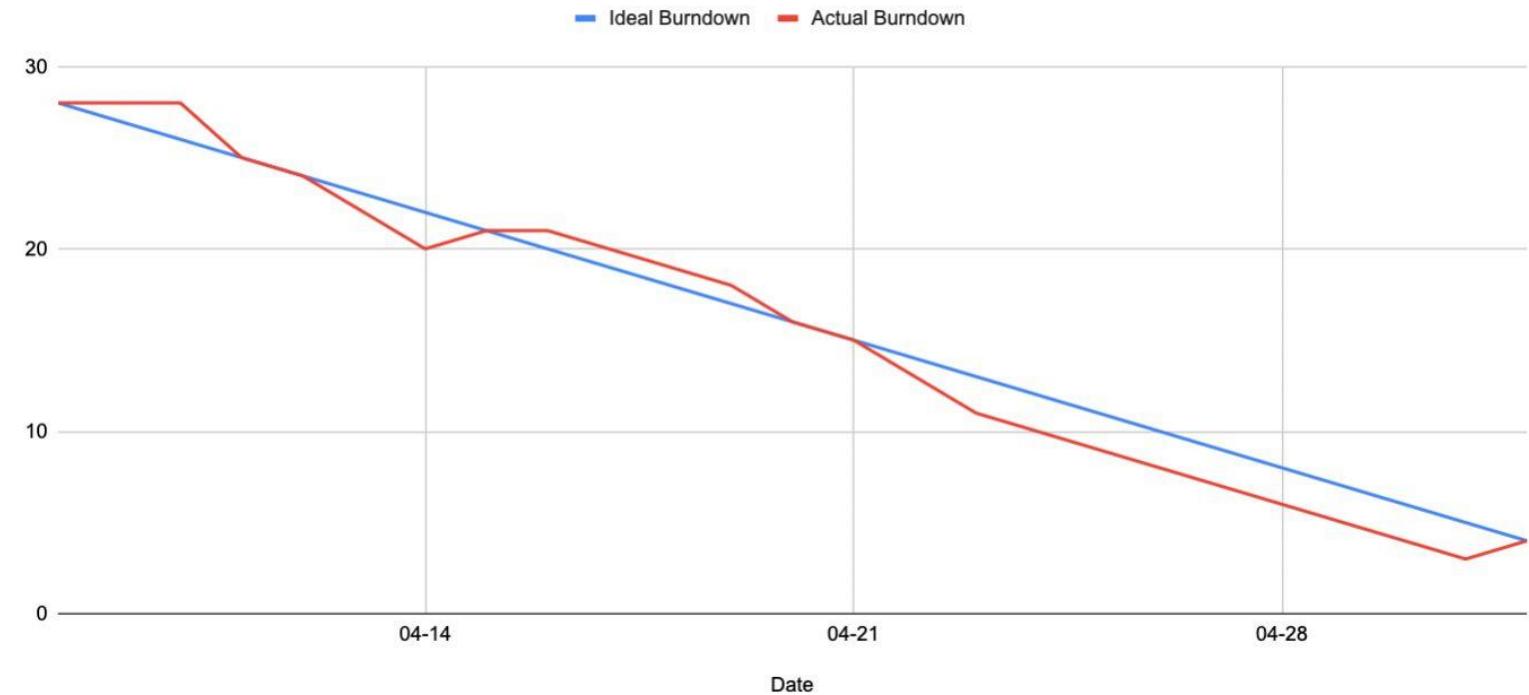
Committed Story Point and Completed Story Points



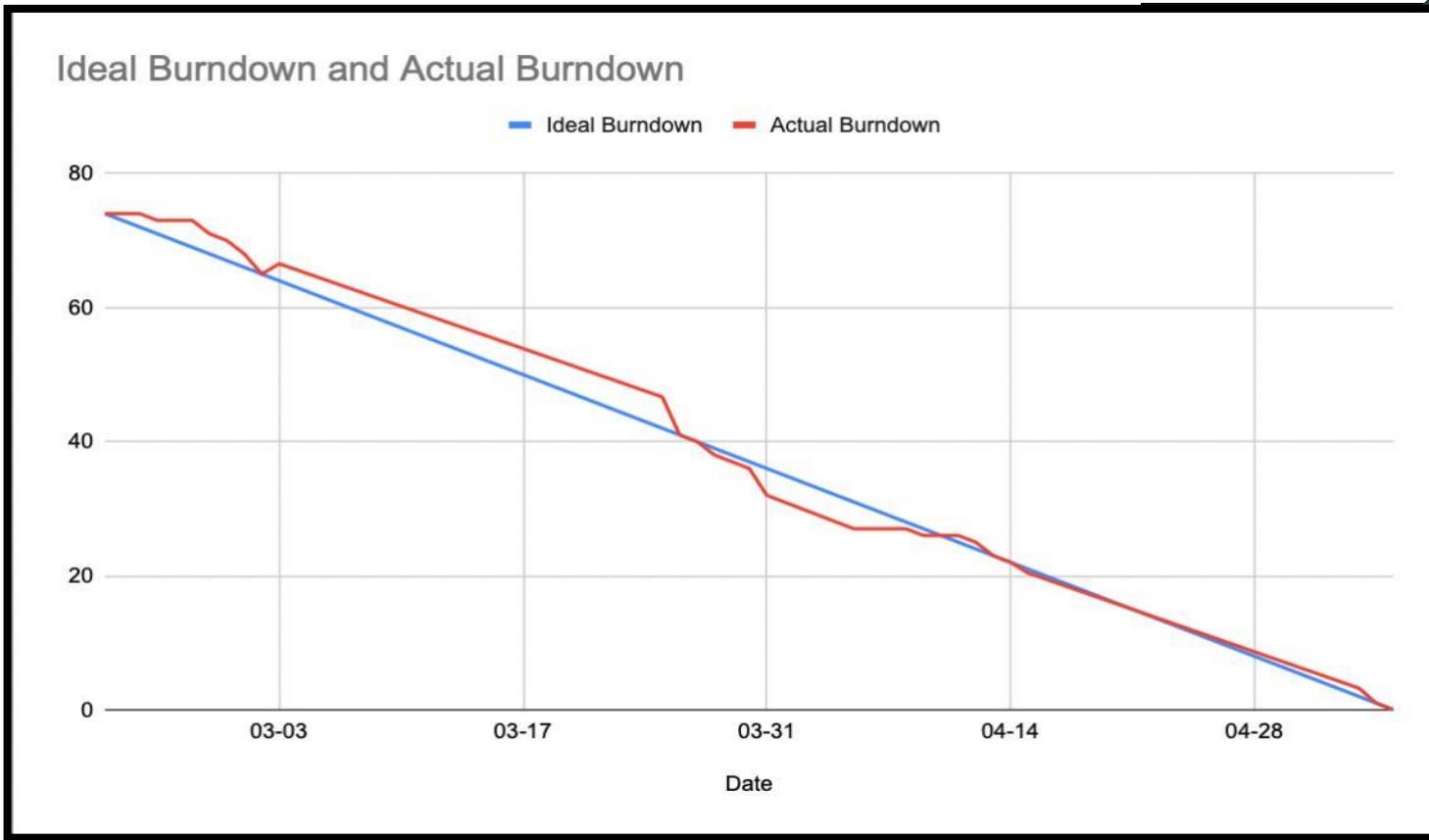
# Burn down Chart for Sprint 4



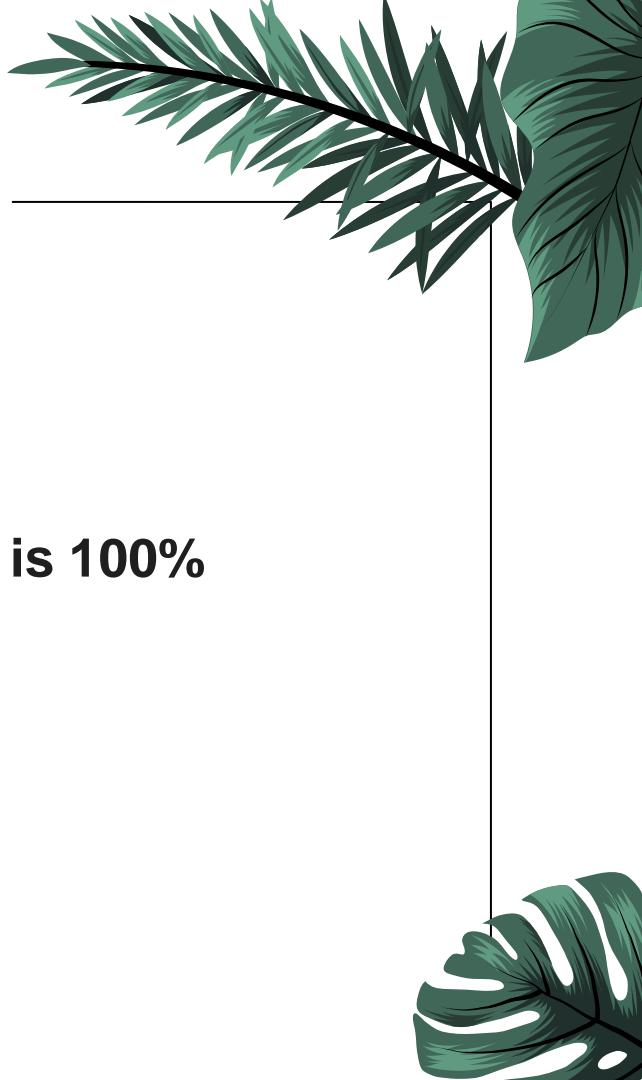
Ideal Burndown and Actual Burndown



# Average Burn Down Chart



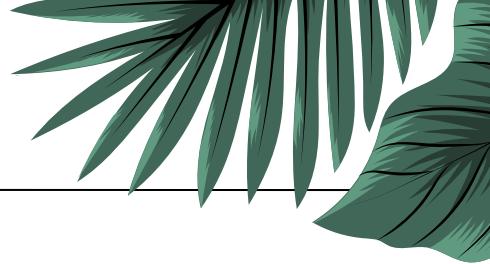
## Completed Ratio Sprint 4



**completed/committed ratio = 28/28, which is 100%**

# RETROSPECTIVE

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# IDEA BOARD

Export | Login

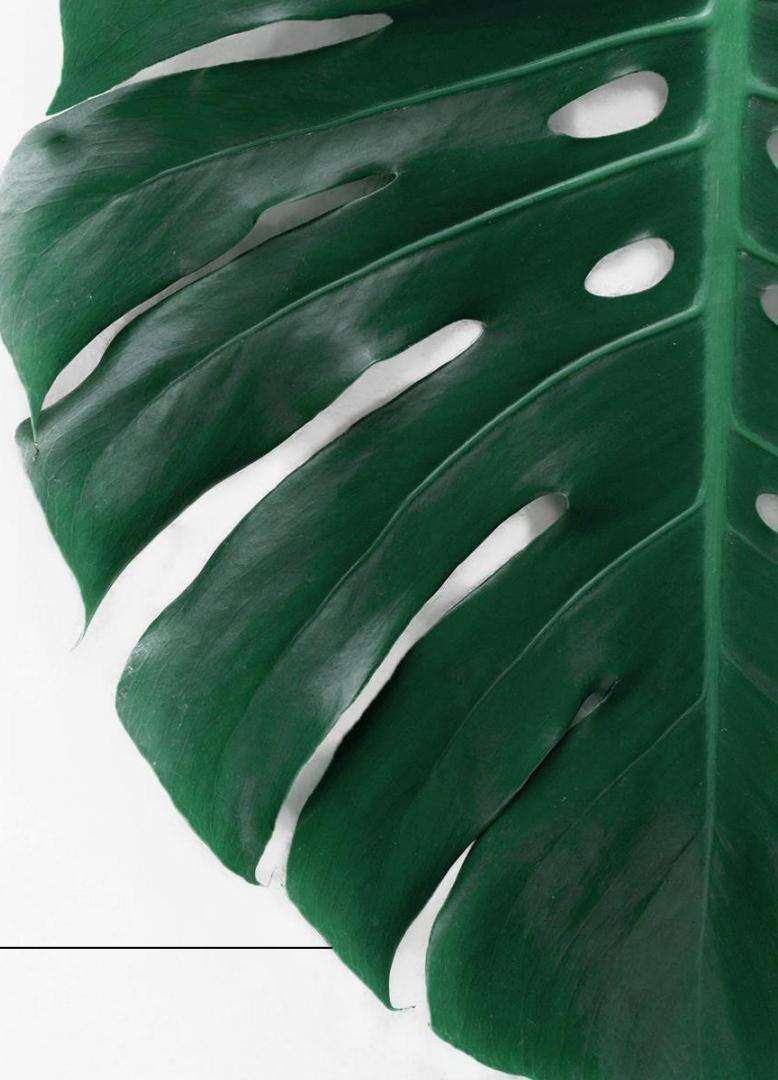
**AlgoAvengers Sprint 4**

What went well <span style="color: green;">+</span>			What can be improved <span style="color: green;">+</span>			Action Items <span style="color: green;">+</span>		
achieving our goal and getting the desired result + 5	Jira updates + 5	Completing tasks on time both front end and back end + 4	Early Sprint planning + 6	More research on Algorithm that is used + 5	Communication can be improved for upcoming projects + 3	appreciate each others efforts and as a team we achieved it + 3	Boozee + 0	Celebrate + 0
Worked well on the constructive feedback given by professor + 4	Updating code on Github + 3	Team Collaboration + 2	assign responsibilities well + 3	More functions and a Mobile app + 2	learning to work with git better in future + 2	Partyy!!!! + 0	Enjoy !!! + 0	
Daily 15 min standup + 2	Collective work to resolve the obstructions + 1	Successfully completed the action items from sprint 3 + 1	add more features to update the project in a better way + 2	Adding more features and continuously updating it + 1	Clear guidelines and flow of the work + 1			
Sprint goals were achieved + 1	Updating the technical Paper + 1	Deployment manual got completed + 1	Re-checking the final submissions by everyone + 1	Deployment for the project + 0	checking on one anothers work before final submission + 0			
Collaboration between multiple SubTeams + 0	Team Collaboration for completing project + 0	Helping other team members when stuck + 0	Checking all the presentation slides and finalizing before submission + 0	more ideas from everyone on tech or algos + 0				
Feature support for the model + 0	Pair programming + 0	All the user stories for sprint 4 were completed + 0						
Understanding the backlog and planning well + 0	All were able to complete their respective task on time + 0	created deployment file + 0						
Team efforts to set timelines according to everyone's time + 0	Final MVP looks good + 0							

## What went well?

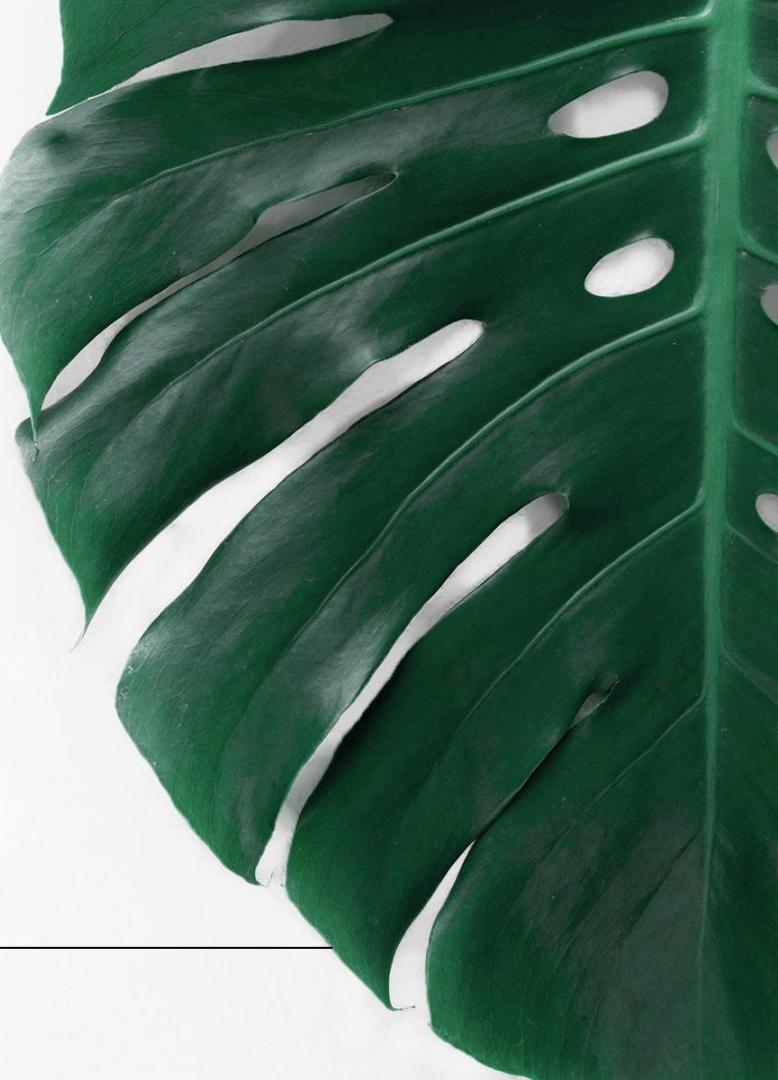
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- Achieving our goal and getting the desired result.
- Jira and Git updates.
- Completing tasks on time both front end and back end.
- Worked well on the constructive feedback given by professor



What can be improved? \_\_\_\_\_

- Early Sprint planning.
- More research on Algorithm that is used.
- Communication can be improved for upcoming projects.
- assign responsibilities well.



## Action Items?

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- Appreciate each other efforts and as a team we achieved it.
- Celebrate.
- Party!





# PROJECT DEMO





# Demo

[https://www.youtube.com/watch?v=JHux9wG7uYs&ab\\_channel=niyatighagada](https://www.youtube.com/watch?v=JHux9wG7uYs&ab_channel=niyatighagada)

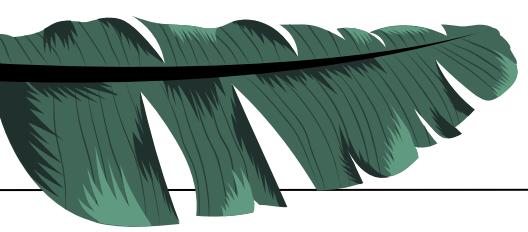




## App screenshots



# APPLICATION SCREENSHOT



login/?next=/

## Login

Username:

Password:

**Login**

Not registered yet? [Register here](#)



gister/

## Register

Username:

Required. 150 characters or fewer. Letters, digits and @/./+/~/\_ only.

Password:

- Your password can't be too similar to your other personal information.
- Your password must contain at least 8 characters.
- Your password can't be a commonly used password.
- Your password can't be entirely numeric.

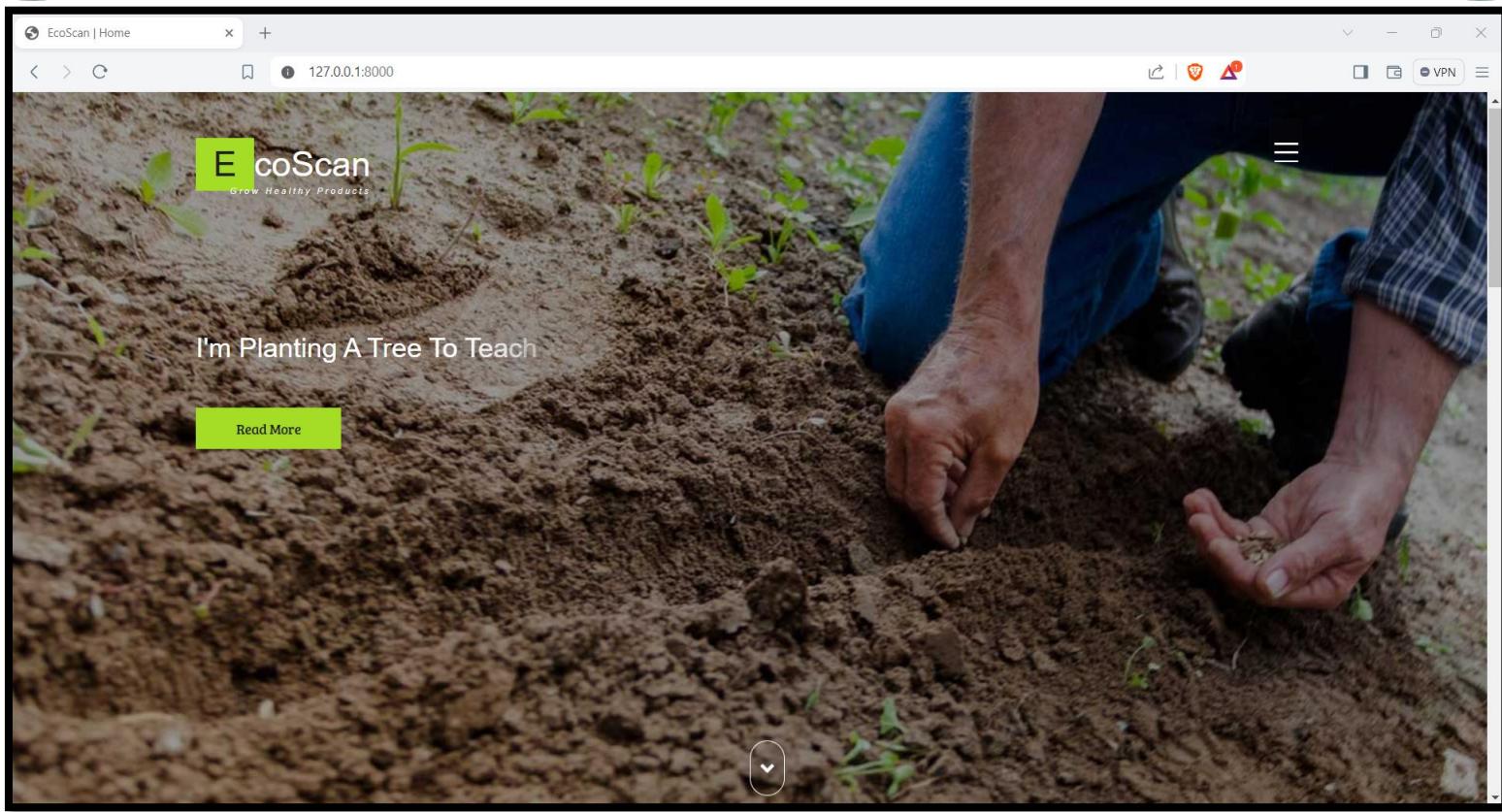
Password confirmation:  Enter the same

password as before, for verification.

**Register**

Already a user? [Login here](#)

# APPLICATION SCREENSHOT



# APPLICATION SCREENSHOT

The screenshot displays the EcoScan application interface. At the top, a browser window shows the URL `127.0.0.1:8000`. The main content area features a large banner image of soil. Below it, the text "Welcome To EcoScan" is centered above a decorative green plant icon. A horizontal green bar contains five circular images of fruits: Pomegranates, Lemon, Kiwi Fruits (highlighted in a larger circle), Apples, and Strawberry. Navigation arrows (<> <>) are positioned between the first four images. Below the images, the text "Kiwi Fruits" is displayed, followed by a series of small circular dots. The bottom of the page has a dark footer bar.

EcoScan | Home

127.0.0.1:8000

Welcome To EcoScan

Pomegranates

Lemon

Kiwi Fruits

Apples

Strawberry

...

# APPLICATION SCREENSHOT

The screenshot displays the EcoScan application interface. At the top left, there's a header bar with the title "EcoScan | Home" and a URL "127.0.0.1:8000". On the right side of the header are standard browser control icons.

The main content area features a large green banner with the text "WE WORK Hard And Make Our Country Greenery". Below this banner are four data cards, each containing an icon and a numerical value:

- Tractor icon:** - 23,536
- Milk bottles icon:** - 53,234
- Cow icon:** - 43,568
- Strawberries and corn icon:** - 12,432

To the right of these cards is a large image of a hand holding a small plant seedling growing out of soil, with the text "Plantation For Future Growth" overlaid in green.

Below this section, the text "Latest News From Plantation" is displayed, followed by two news thumbnail images:

- A thumbnail featuring a man in a field with a tractor in the background.
- A thumbnail featuring a woman wearing a headscarf.

On the far right, there is a sidebar with a removed item message: "1970-01-01T00:00:00Z [Removed]". A circular arrow icon is located at the bottom right corner of the sidebar.

# APPLICATION SCREENSHOT

The screenshot shows a web browser window titled "EcoScan | About Us" with the URL "127.0.0.1:8000/about/". The page has a header with "About Us" and navigation links for "HOME" and "ABOUT". The main content features a section titled "Why Choose Us" with a decorative plant icon. Below this, a paragraph explains the project's focus on convolutional neural networks for plant disease detection. To the right, there are four progress bars: "Seeds" at 78%, "Growth" at 54%, "Economy" at 76%, and "Planting" at 80%.

EcoScan | About Us

127.0.0.1:8000/about/

HOME / ABOUT

## About Us

### Why Choose Us

"Eco Scan" Is A Pioneering Project Leveraging Convolutional Neural Networks (CNN) and image processing techniques for rapid and accurate plant disease detection. Using high-resolution images of plants, the system employs advanced CNN algorithms to analyze and identify potential diseases swiftly. The project's primary objective is to provide a user-friendly interface for farmers, allowing them to upload crop images and receive real-time analyses, enabling early disease detection and informed decision-making. By integrating state-of-the-art technology into agriculture, Eco Scan aims to optimize crop health monitoring, minimize losses, and promote sustainable farming practices.

Category	Progress (%)
Seeds	78%
Growth	54%
Economy	76%
Planting	80%

# APPLICATION SCREENSHOT

The screenshot displays a web browser window with a light gray header bar containing the title "EcoScan | About Us" and a URL field showing "127.0.0.1:8000/area-details/". The main content area is divided into two sections. The top section is titled "Sandy Soil" and contains a detailed description of sandy soils. To the right of the text is a close-up photograph of sandy soil. The bottom section is titled "Potatoes" and contains a description of potatoes growing in sandy soil, accompanied by a photograph of several potatoes.

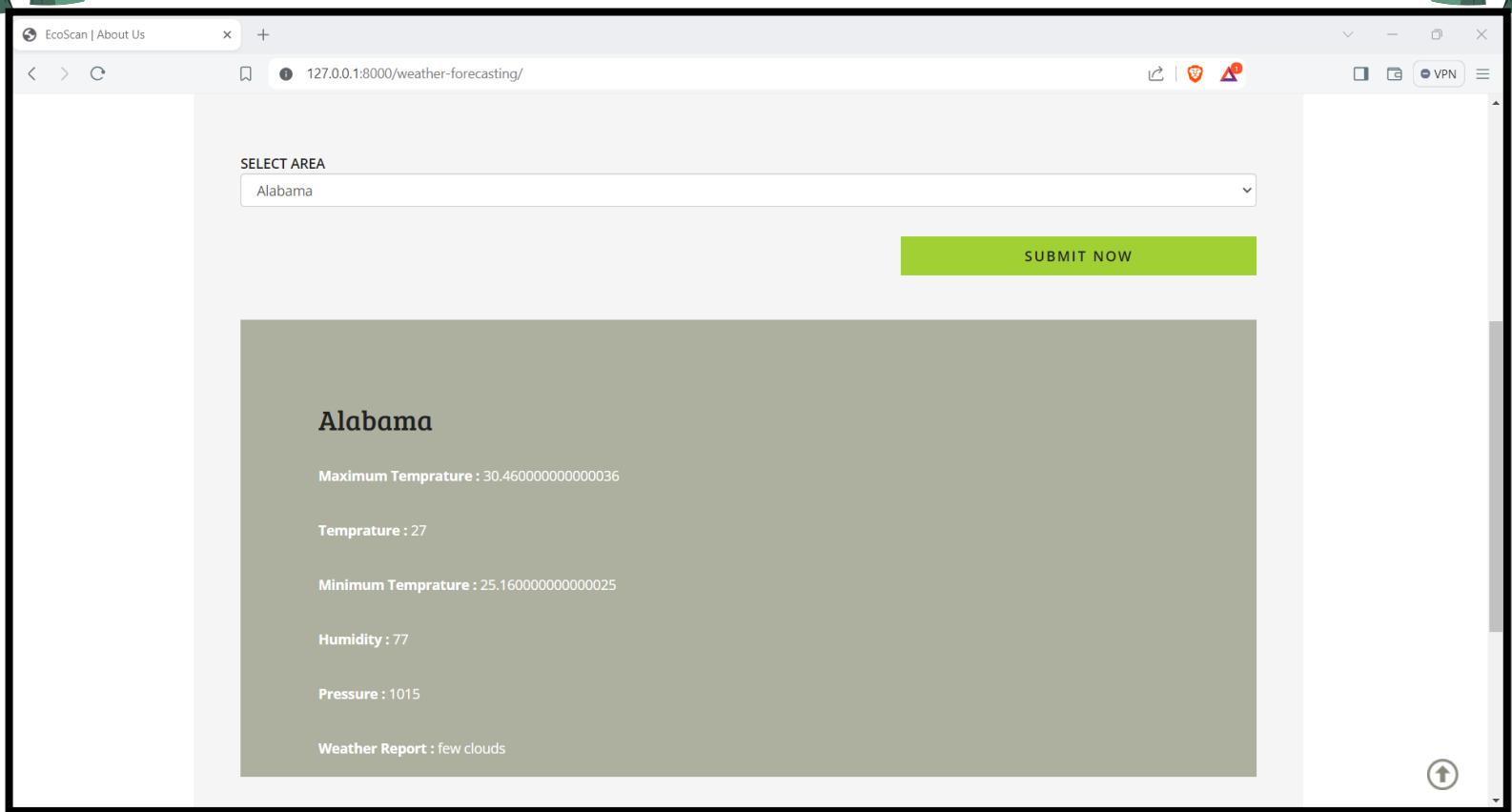
## Sandy Soil

Sandy soils are characterized by large particles and low organic matter content. They have excellent drainage but poor nutrient retention. Plants suited to sandy soils typically have shallow roots and tolerate drought well. Sandy soils warm up quickly in spring and are easy to work with, but they require frequent irrigation and fertilization.

## Potatoes

Sandy soils are well-drained and nutrient-poor. Potatoes thrive in these conditions and produce good yields and quality tubers. They prefer loose soil for tuber development. Potatoes typically yield around 20 tons per acre in sandy soil with proper irrigation and fertilization.

# APPLICATION SCREENSHOT



# APPLICATION SCREENSHOT

EcoScan | About Us

127.0.0.1:8000/training-model/

## Plant Disease Prediction

**Predicted Plant Class :** Peach : Bacterial Spot (Stage I)

**Details :** Bacterial spot is an important disease of peaches, nectarines, apricots, and plums caused by *Xanthomonas campestris* pv. *pruni*. Symptoms of this disease include fruit spots, leaf spots, and twig cankers. Fruit symptoms include pitting, cracking, gumming, and water-soaked tissue, which can make the fruit more susceptible to brown rot, rhizopus, and other fungal infections. Severe leaf spot infections can cause early defoliation. Severe defoliation can result in reduced fruit size, sunburn and cracking of fruit. Early defoliated trees are reduced in vigor and winter hardiness.

**Symptoms :** Small, circular, dark lesions appear on the fruit, leaves and twigs, which eventually lead to rotting and dropping of the fruit.

**Precautions :** Fruit symptoms of bacterial spot may be confused with peach scab, caused by the fungus *Cladosporium carpophyllum*, however scab spots are more circular, have a dark brown/greenish, fuzzy appearance, and do not pit the fruit surface, although skin cracking can occur. Scab does not cause leaf symptoms but can cause spots on twigs. Initial fruit spots of bacterial spot may be superficial but develop into craters.

**Supplements :** SCORE FUNGICIDE

# APPLICATION SCREENSHOT

Disease Name	Description	Symptoms	Prevent	Supplement Name	Image	Date
Peach : Bacterial Spot (Stage I)	Bacterial spot is an important disease of peaches, nectarines, apricots, and plums caused by <i>Xanthomonas campestris</i> pv. <i>pruni</i> . Symptoms of this disease include fruit spots, leaf spots, and twig cankers. Fruit symptoms include pitting, cracking, gumming, and watersoaked tissue, which can make the fruit more susceptible to brown rot, rhizopus, and other fungal infections. Severe leaf spot infections can cause early defoliation. Severe defoliation can result in reduced fruit size, and sunburn and cracking of fruit. Early defoliated trees are reduced in vigor and winter hardiness.	Small, circular, dark lesions appear on the fruit, leaves and twigs, which eventually lead to rotting and dropping of the fruit.	Fruit symptoms of bacterial spot may be confused with peach scab, caused by the fungus <i>Cladosporium carpophyllum</i> , however scab spots are more circular, have a dark brown/greenish, fuzzy appearance, and do not pit the fruit surface, although skin cracking can occur. Scab does not cause leaf symptoms but can cause spots on twigs. Initial fruit spots of bacterial spot may be superficial but develop into craters.	SCORE FUNGICIDE	O:\Pace University MS CS Courses\Capstone Project\Deliverable 4\ECOSCAN//processed/leaf_4905521733.jpg	May 6, 2024, 1:10 a.m.
Corn : Cercospora Leaf Spot   Gray Leaf Spot (Stage I)	Gray leaf spot on corn, caused by the fungus <i>Cercospora zeae-maydis</i> , is a perennial and economically damaging disease in the United States. Since the mid-1990s, the disease has increased in importance in Indiana, and now is the one of the most important foliar diseases of corn in the state. Gray leaf spot disease is caused by the fungus <i>Pyricularia grisea</i> , also referred to as <i>Magnaporthe grisea</i> . The	tan or gray lesions with purple or brown margins on leaves; can cause leaves to yellow	Irrigate deeply, but infrequently. Avoid using post-emergent weed killers on the lawn while the disease is active. Avoid medium to high nitrogen fertilizer levels. Improve air circulation and light levels on lawns. Mow at the proper height.	ANTRACOL FUNGICIDE	O:\Pace University MS CS Courses\Capstone Project\Deliverable 4\ECOSCAN//processed/leaf_9475596463.jpg	May 6, 2024, 1:10 a.m.



# Slides for API

## Agriculture News API

**Purpose:** Keeps users informed with the latest developments in agriculture.

**Features:** Real-time news updates. Comprehensive coverage of agricultural trends, technology, and markets.

**Benefits:** Supports informed decision-making for farmers and agribusinesses. Encourages continuous learning and industry awareness.

## Weather Forecasting API

**Purpose:** Provides accurate and timely weather forecasts.

**Features:** Localized weather predictions. Alerts for severe weather conditions.

**Benefits:** Aids in planning agricultural activities. Minimizes weather-related risks and losses.

## Authorization Page API

**Purpose:** Secures user access and enhances website security.

**Features:** User authentication and authorization. Role-based access control.

**Benefits:** Protects sensitive user data. Ensures a safe and trustworthy platform for users.

## GitHub Link

**<https://github.com/htmw/2024S-AlgoAvengers>**

# Technical Paper

## Leaf Disease Detection System Using Convolutional Neural Networks and Image Processing

Omkar Gurav<sup>1</sup>, Rudra Chobe<sup>2</sup>, Shriya Harai<sup>3</sup>, Ritika Chougala<sup>4</sup>, Lokeshwar Anchuri<sup>5</sup>, Niyati Ghagada<sup>6</sup>, Uma Maheshwari Addala<sup>7</sup>, Mukesh Sudha<sup>8</sup>

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Pace University – New York.

**Abstract**— Plant diseases pose a significant threat to crop health and yield, necessitating timely and accurate detection methods. Traditional manual inspection by experts can be time-consuming and error prone. This paper presents Eco Scan, an innovative leaf disease detection system leveraging convolutional neural networks (CNNs) and image processing techniques. Eco Scan aims to provide farmers with a user-friendly interface for uploading crop images and receiving real-time disease analysis. By integrating advanced technology into agriculture, the system seeks to optimize crop health monitoring, minimize losses, and promote sustainable farming practices. The paper outlines the system architecture, key features, and performance evaluation. Eco Scan demonstrates promising results in accurately identifying various plant diseases, offering the potential to revolutionize disease management in agriculture.

**Keywords**— *Food additives, preservatives, optical character recognition, image processing, food packaging*

of plant leaves and receiving real-time disease analysis. By leveraging state-of-the-art technology,

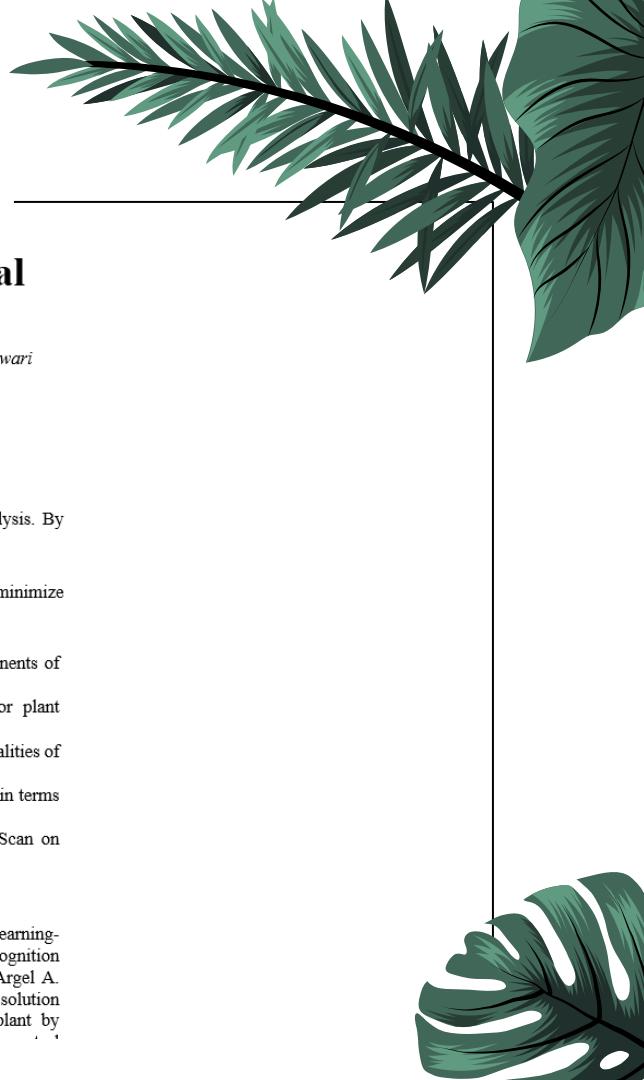
the system seeks to optimize crop health monitoring, minimize losses, and promote sustainable farming practices.

The main objectives of this paper are as follows:

1. To present the architecture and key components of the Eco Scan system.
2. To discuss the CNN model employed for plant disease detection and its training process.
3. To showcase the user interface and functionalities of the Eco Scan web application.
4. To evaluate the performance of the system in terms of accuracy and efficiency.
5. To highlight the potential impact of Eco Scan on agriculture and its prospects.

### II. LITERATURE STUDY

1. Automated Image Capturing System for Deep Learning-based Tomato Plant Leaf Disease Detection and Recognition [1] Author: Robert G. de Luna, Elmer P. Dadios, Argel A. Bandala [1]. This research aims to elaborate a novel solution to quickly diagnose disease wellness in tomato plant by





**THANK YOU**

