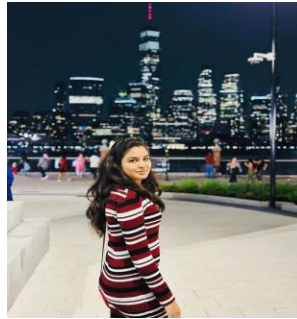# Plant Disease Detection using Convolutional Neural Network
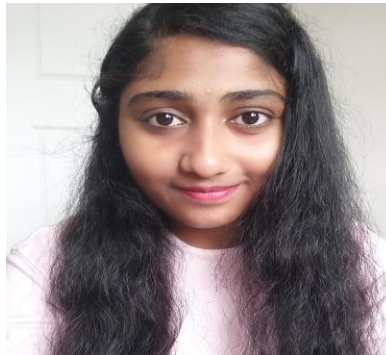
Team Members

Karhik Sura
(Developer)

Katikam Priyanka
(Model Architect)

Shiva Sai
(Data Acquisition and preprocessing)

Tejeshwar Reddy
(Developer)

Neelima Marepalli
(Scrum Master & Quality Analyst)

Tulasi Sherla
(Model trainer and Validator)

Improvements made from professor feedback

So, from the sprint 1 we received the feedback from the professor about personas format and regarding team members roles. So accordingly, we made some changes that you can see in further slides.

Changes we made

- We changed roles and responsibility(we removed the slide that we kept our team members bio.
- We changed person's format.
- We kept feedback slide that professor asked.
- Professor asked about that to keep Burndown chart correctly. So, we implemented correct one.

Introduction

● Since the past days and in the present too, farmers usually detect the crop diseases with their naked eye which makes them take tough decisions on which fertilizers to use.

● It requires detailed knowledge the types of diseases and lot of experience needed to make sure the actual disease detection.

● Some of the diseases look almost similar to farmers often leaves them confused.

Crop diseases -->Tomato Leaf .

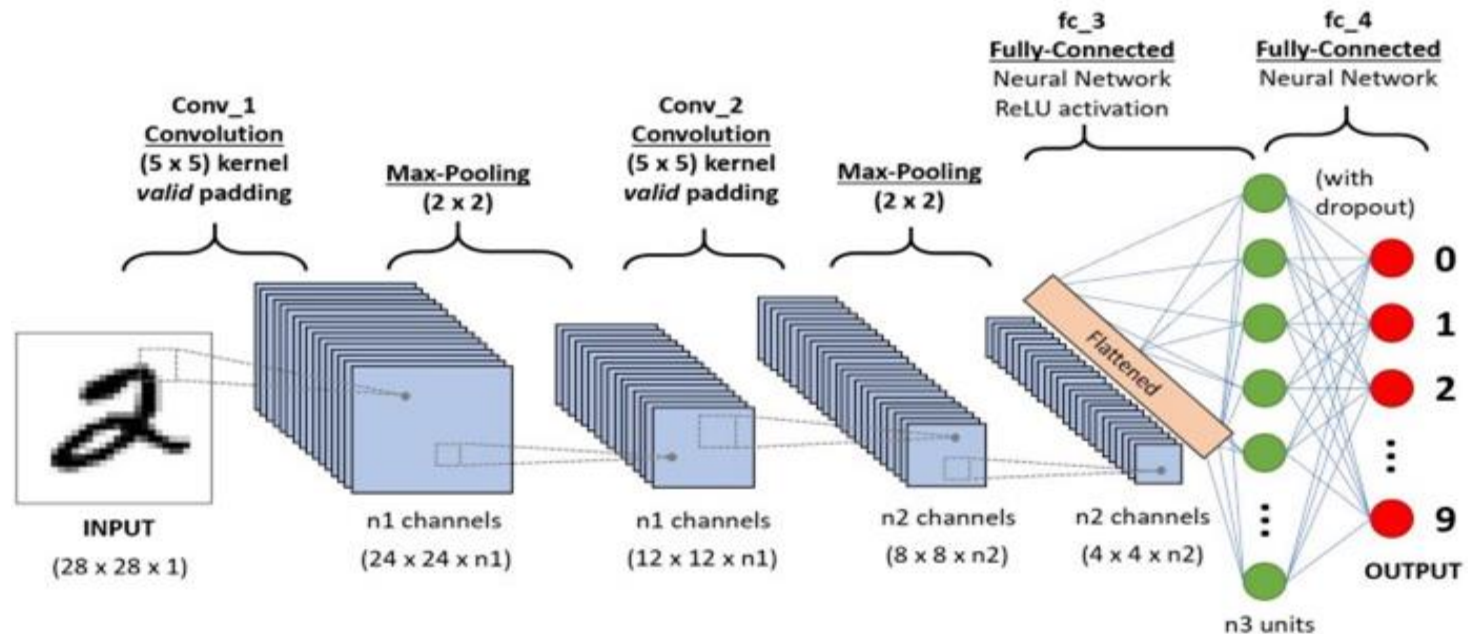| Bacterial Leaf spot | Late Blight | Early Blight |
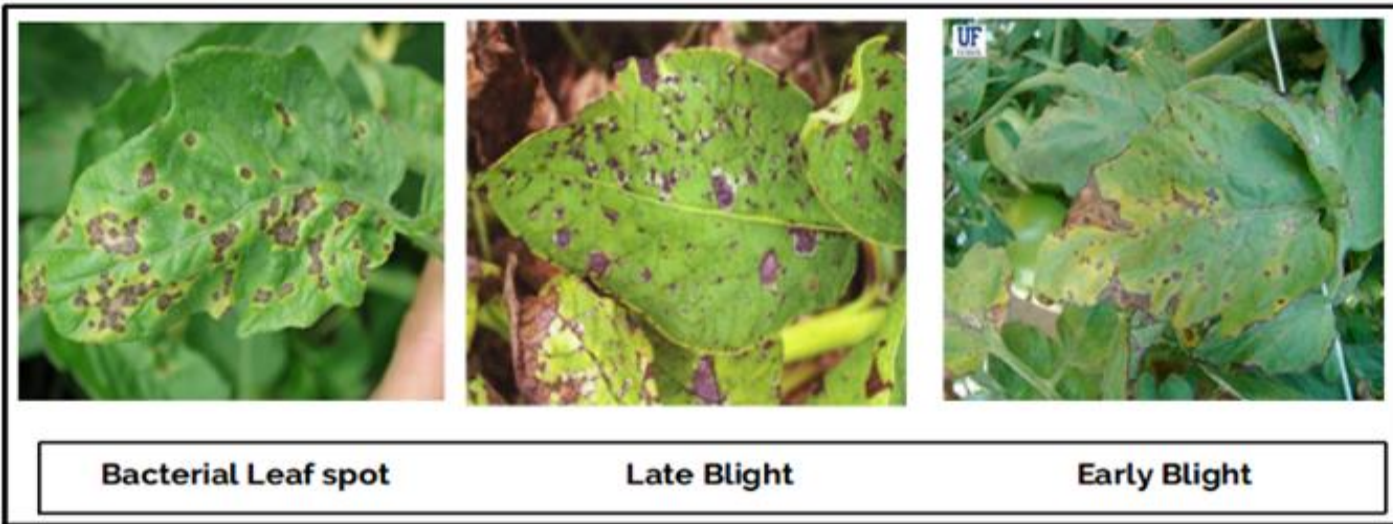
- They look the same and almost similar. In case the farmer makes wrong predictions and uses the wrong fertilizers or more than the normal dose (or) threshold or Limit (every plant has some threshold fertilizers spraying to be followed), it will mess up the whole plant (or) soil and cause enough damage to plant and fields.

1-Feb-21

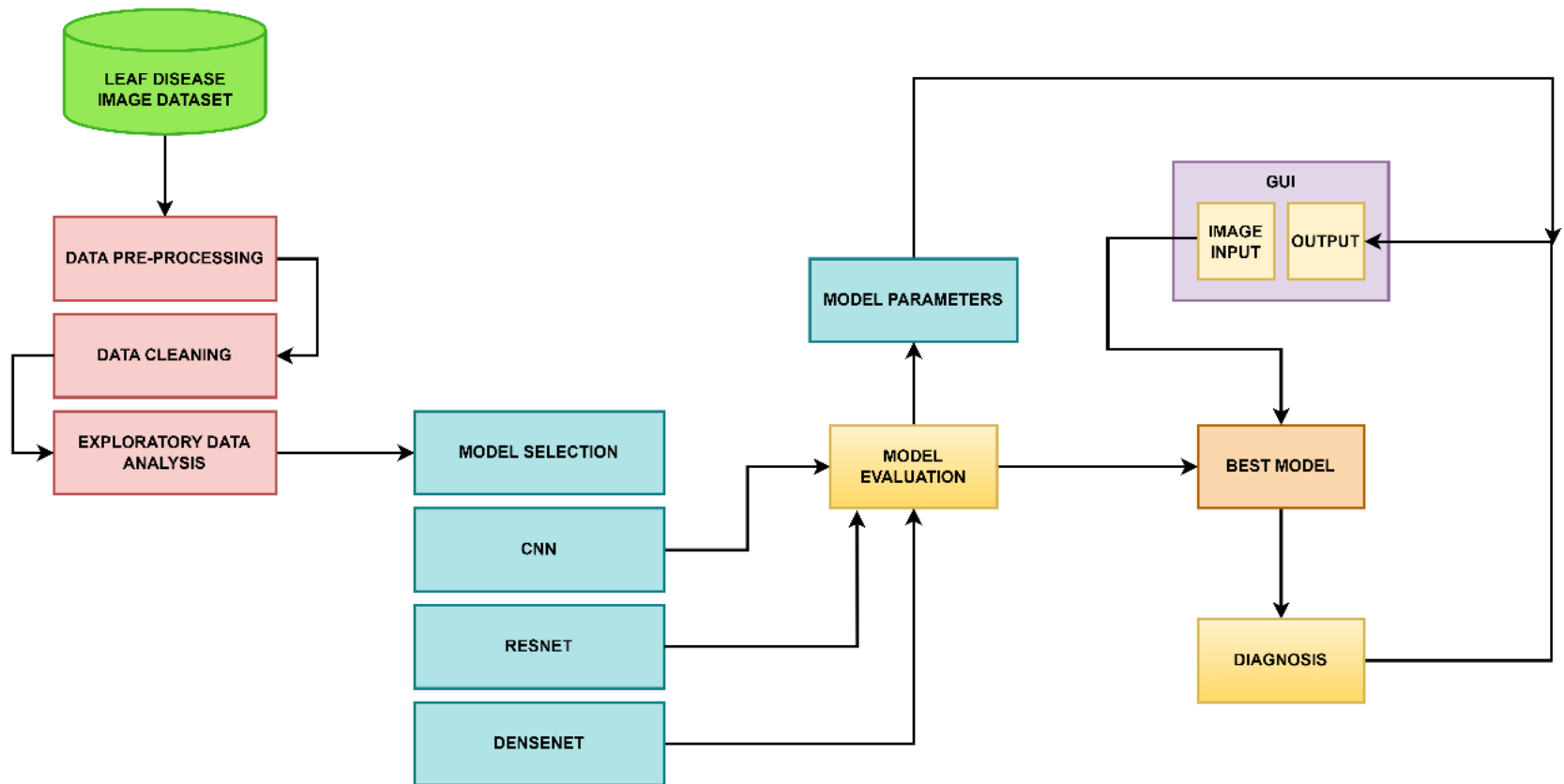# So, How to prevent this from happening?

- To prevent this situation, we need better and perfect guidance on which fertilizers to use, to make the correct identification of diseases, and the ability to distinguish between two or more similar types of diseases in visuals.

- This is where **Convolution Neural Networks** comes handy. In short CNN
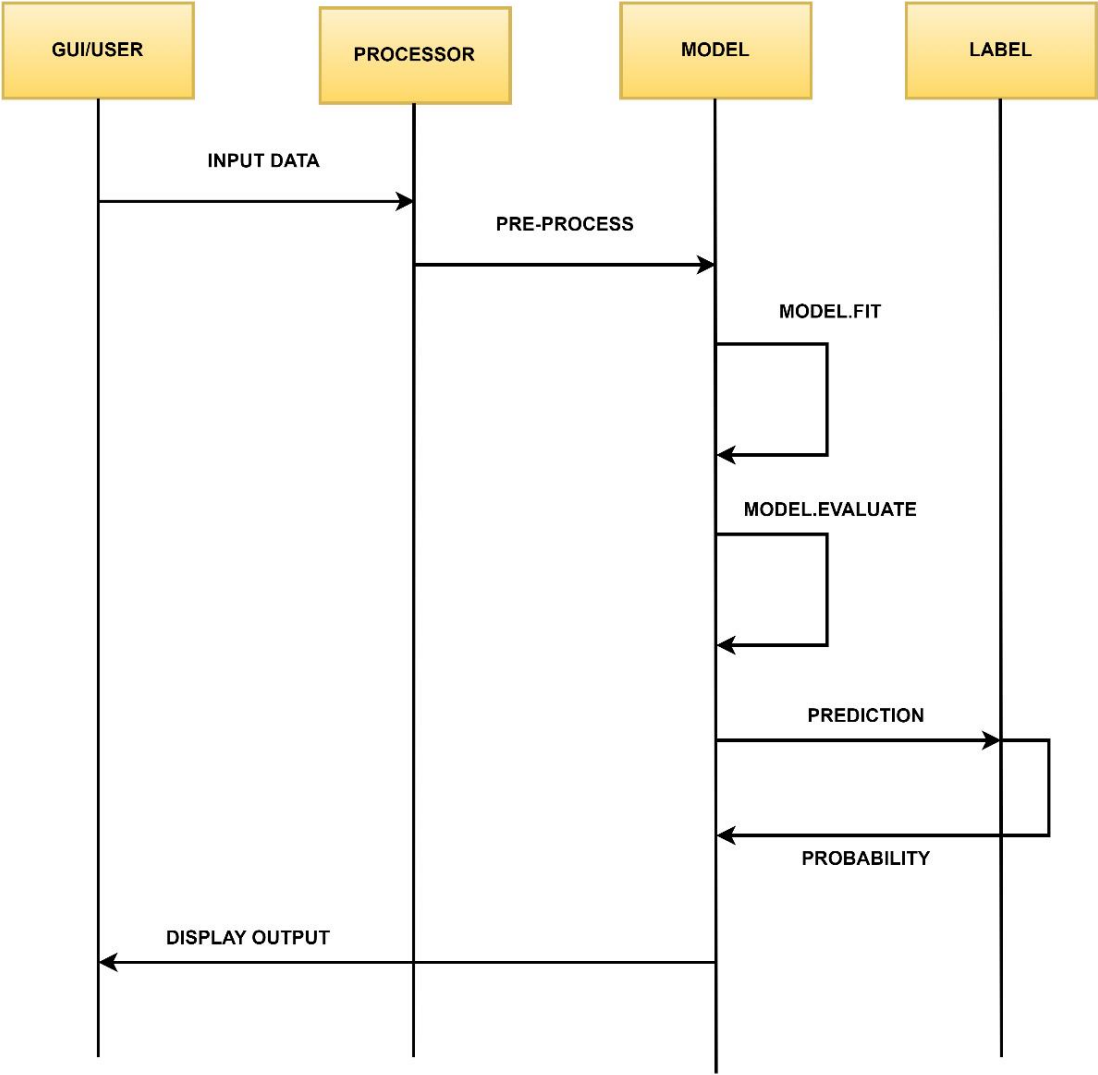
Convolution Neural Network

● In deep learning, a convolutional neural network is a class of deep neural networks, most commonly applied to analyzing visual imagery. They are also known as shift invariant or space invariant artificial neural networks, based on their shared-weights architecture and translation invariance characteristics.

ARCHITECTURE

SEQUENCE DIAGRAM

GUI/USER	PROCESSOR	MODEL	LABEL

INPUT DATA

PRE-PROCESS

MODEL.FIT

MODEL.EVALUATE

PREDICTION
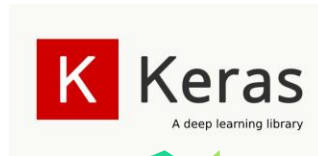
PROBABILITY

DISPLAY OUTPUT

Tools Used

1. Flask

2. Keras

3. Pycharm

4. Jupyter Notebook

5. Opencv-python

6. Python

7. Tensorflow-gpu

MVP: Minimum Valuable Product

Some of the Features in our MVP of the Project are:

➢ Creation of user interface for user authentication using login option

➢ After successful authentication it will redirect to HOME Page

➢ Creation of Menu option:

  o HOME

  o DETECTOR

  o PDF REPROT

➢ Option to upload images for disease detection.

➢ Option to logout from the application.

Personas

Bio: Maria is a small-scale farmer who grows crops such as tomatoes, potatoes, and peppers.

Goals:

- To improve her family's livelihood

- To find out better farming, crop planting.

Motivation: Maria is motivated to increase her crop yield and profitability by identifying and treating plant diseases early.

Name: Maria
Age : 35
Home life: married
Livelihood: Farming

persona

Bio: John works as an agricultural extension officer in a rural area, providing advice and support to local farmers.

Goals:

- John needs a tool that can assist him in identifying plant diseases accurately during his visits to farms.
- He also requires access to educational resources and recommendations for disease management practices.

Motivation: John is motivated to help farmers improve their crop health and productivity, ultimately contributing to food security in the region.

Name: John
Age: 40
Married
The Agriculture extension officer

personas

Bio: Dr. Patel is a plant pathologist conducting research on crop diseases.

Goals:

- Dr. Patel requires a platform that can analyze large datasets of plant images to identify trends in disease prevalence and monitor the spread of new pathogens.

- Access to advanced analytics tools and the ability to collaborate with other researchers are also important.

Motivation: Dr. Patel is motivated to advance scientific knowledge about plant diseases and develop effective strategies for disease management and control.

Name: Dr. Patel
Age : 39
Married
The researcher

personas

Bio: Sarah is an entrepreneur who runs a startup company focused on developing agricultural technology solutions.

Goals:

- Sarah needs a plant disease detection system that can be integrated into mobile applications or IoT devices for widespread adoption by farmers.
- She also requires access to APIs or SDKs to customize the system and integrate it with other agricultural technologies.

Motivation: Sarah is motivated to create innovative solutions that address real-world challenges in agriculture while building a successful business.

Name: Sarah
Age : 37
Married
The Agri-Tech Entrepreneur

PRODUCT BACKLOG

▾ Backlog (15 issues)

- SCRUM-1 As a Team we should involve in team work, individual contribution to the project, follow the rules and regulations.
- SCRUM-2 As a Team we should assign the work to all the team members for smooth project completion.
- SCRUM-3 As a team we should understand project requirements and develop the technical skills to complete the same.
- SCRUM-4 As a Team we should create a project plan and timelines to complete the same.
- SCRUM-5 As a User I should have website URL to open the application in the browser.
- SCRUM-6 As a User I should be able to see the login page of the application.
- SCRUM-7 As a User I should be able to see the welcome or home page after successful login to the application.
- SCRUM-8 As a User I should be able to see all the Menu options in the application.
- SCRUM-9 As a User I should be able access the EDA menu to see the data analysis of the project.
- SCRUM-10 As a User I should be able to access the model parameter menu to see the various parameters used in the project development.
- SCRUM-11 As a User I should be able to access the Detector menu.
- SCRUM-12 As a User I should be able to see the image uploader browsing option under detector menu.
- SCRUM-13 As a User I should be able to browse the images from the local drive and submit for the disease detection.
- SCRUM-14 As a User I should be able to see the result of the image with suitable description.
- SCRUM-15 As a User I should be able to logout from the application.

Sprint 2 Backlog(Stories completed)

Sprint 2 13 Mar – 27 Mar (5 issues)

SCRUM-23 As a User I should be able to see the image uploader browsing option under detector...

SCRUM-24 As a User I should be able to see the image uploader browsing option under detector...

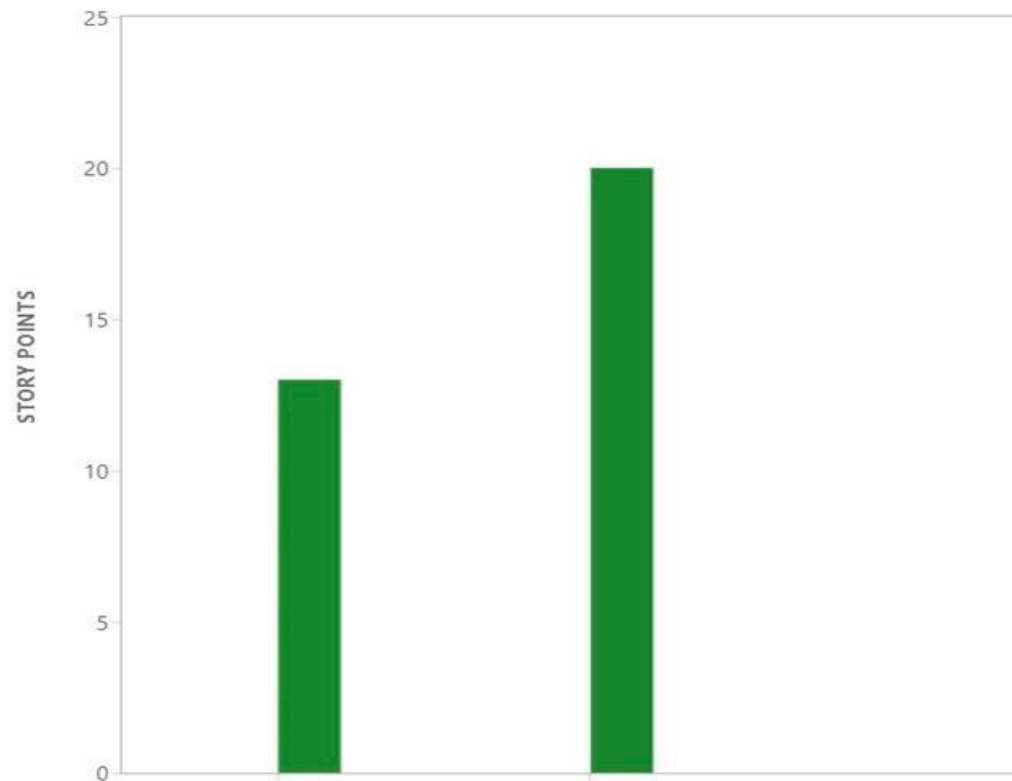SCRUM-25 As a User I should be able to browse the images from the local drive and submit for t...

SCRUM-26 As a User I should be able to see the result of the image with suitable description.

SCRUM-27 As a User I should be able to logout from the application.

Metrics

Burndown chart

Sprint 3 Backlog

⌄ **Sprint 3**   ✏ **Add dates**   (4 issues)

🔖 SCRUM-28 As a User I should be able to browse the images from th...

🔖 SCRUM-29 As a user I Should be able to get the result of the plant dise...

🔖 SCRUM-30 As a user, I should be able to download the result in PDF...

🔖 SCRUM-31 As a User I should be able to logout from the application.

STORIES

Issue Type	ID	Summary	Place
Acceptance Criteria	1	**As a User** **I should** have website URL to open the application in the browser. **Scenario:** User type the URL in the web Browser **Given** I'm a user of the application **When** I try to access the application in the browser **Then** I should be able to access the application	Web Browser
Acceptance Criteria	2	**As a User** **I should** be able to see the login page of the application. **Scenario:** User type username and password **Given** I'm a user of the application **When** I try to login to the application **Then** I should be able to login	Login Page
Acceptance Criteria	3	**As a User** **I should** be able to see the welcome or home page after successful login to the application. **Scenario:** Try to Access the Home Page **Given** I'm a user of the application **When** I try to access the home page **Then** I should be able to see that	Home Page

Issue Type	ID	Summary	Place
Acceptance Criteria	4	**As a User** **I should** be able to see all the Menu options in the application. **Scenario:** To See the Menu Option **Given** I'm a user of the application **When** I try to access the menu option **Then** I should be able to access the same	Home Page
Acceptance Criteria	5	**As a User** **I should** be able access the EDA menu to see the data analysis of the project. **Scenario:** To Access the EDA Menu Option **Given** I'm a user of the application **When** I try to access the EDA Menu **Then** I should be able to access the same	Home Page
Acceptance Criteria	6	**As a User** **I should** be able to access the model parameter menu to see the various parameters used in the project development. **Scenario:** To access model parameters menu **Given** I'm a user of the application **When** I try to access the model parameters menus **Then** I should be able to access the same	Home Page

Issue Type	ID	Summary	Place
Acceptance Criteria	7	**As a User** **I should** be able to access the Detector menu. **Scenario:** To access detector menu **Given** I'm a user of the application **When** I try to access the detector menu **Then** I should be able to access the same	Home Page
Acceptance Criteria	8	**As a User** **I should** be able to see the image uploader browsing option under detector menu. **Scenario:** To upload image to application **Given** I'm a user of the application **When** I try to upload the images **Then** I should be able to access the images	Detector Page
Acceptance Criteria	9	**As a User** **I should** be able to browse the images from the local drive and submit for the disease detection. **Scenario:** To submit images for disease detection **Given** I'm a user of the application **When** I try to submit the images **Then** I should be able to submit for the disease detection	Detector Page

Issue Type	ID	Summary	Place
Acceptance Criteria	**10**	**As a User** **I should** be able to see the result of the image with suitable description. **Scenario:** To see leaf disease result **Given** I'm a user of the application **When** I try to see the result of the leaf image **Then** I should be able to see the result of the leaf image with description.	Detector Page
Acceptance Criteria	**11**	**As a User** **I should** be able to logout from the application. **Scenario:** Logout from the application **Given** I'm a user of the application **When** I try to logout from the application **Then** I should be able to logout.	Home Page

TEST CASES

ID	Unit of Test	Scenario	Test Data	Steps to be Expected	Expected Result
1	Login	Successful Login	Email – example@example.com, Password – test123	Homepage -> Login	User should be successfully logged in and redirected to the relevant page or dashboard.
1	Login	Invalid Email ID	invalid email, Password: test123	Homepage -> Login	User should see an error message indicating that the email ID is invalid and should be prompted to enter a valid email ID.
1	Login	Invalid Password	example@example.com, Password – invalid password	Homepage -> Login	User should see an error message indicating that the password is incorrect and should be prompted to enter the correct password.
1	Login	Forgot Password	Click on "Forgot Password" link	Homepage -> Login	User should be redirected to the password reset page where they can enter their registered email ID to reset their password.
1	Login	Logout	Click on "Logout" or "Sign Out" option	Homepage -> Login	User should be successfully logged out of their account and redirected to the login page.

ID	Unit of Test	Scenario	Test Data	Steps to be Expected	Expected Result
1	Home page	Open the home page	Verify that all features listed in the home page are visible and displayed correctly.	Login-> Home page	All features listed in the home page should be visible and displayed correctly.
1	Home page	Click on each feature listed in the home page.	Verify that each feature is accessible and functional.	Login->Home page	All features listed in the home page should be accessible and functional.
1	Home page	Open the home page on a mobile device.	Verify that the home page is responsive and optimized for the mobile device	Login->Home page	The home page should be responsive and optimized for the mobile device.
1	Home Page	Verify that the upload menu is visible.	Open the Web page and navigate to a page. Verify that the upload option is visible.	Login-> Home Page	The upload option is visible and clearly labeled.
1	Home Page	User should be able to upload image from the local drive	Open the Web page and click on the upload option and should navigate to local drive	Login-> Home Page	Click on the upload option should navigate to local drive

Working Agreement

Team Working Agreement: Plant Disease Detection

Project Overview

Our project aims to address the lack of local plant disease expertise by providing immediate diagnosis through image recognition. We'll leverage a combination of unsupervised learning and supervised learning techniques to detect plant diseases from publicly available images.

Team Members & Roles and Responsibilities

- Karthik Sura (Developer)
- Katikam Priyanka (Model Architect)
- Tejeshwar Reddy (Developer)
- Shiva Sai (Data Acquisition and Preprocessing Specialist)
- Tulasi Sherla (Model Trainer and Validator)
- Neelima Marepalli (Documentation and Presentation)

Project Goals

1. Create an image recognition system that identifies plant diseases.
2. Provide accurate and timely diagnoses to farmers and extension officers.

Communication Guidelines

- **Regular Meetings**: We'll hold weekly team meetings to discuss progress, challenges, and next steps.
- **Slack Channel**: We'll use Slack for day-to-day communication and quick updates.
- **Email**: For formal communication or sharing important documents.
- **Respectful Communication**: We'll maintain a positive and respectful tone in all interactions.

Decision-Making Process

- **Consensus**: Major decisions will be made by consensus.
- **Voting**: If consensus isn't reached, we'll vote (majority wins).
- **Project Manager**: In case of a tie, the Project Manager will make the final call.

Work Schedule

- **Weekly Sprints**: We'll follow a two-week sprint cycle.
- **Task Allocation**: Each team member will take ownership of specific tasks.
- **Deadlines**: We'll adhere to agreed-upon deadlines.

Code of Conduct

- **Professionalism**: Treat team members with respect and professionalism.
- **Timeliness**: Be punctual for meetings and deliverables.
- **Collaboration**: Collaborate openly and share knowledge.

Version Control

- **GitHub**: We'll use GitHub for version control and collaboration.
- **Branching Strategy**: Follow a feature-based branching strategy.

Documentation

- **ReadMe**: Maintain an updated ReadMe file with project details.
- **Code Comments**: Document code thoroughly.
- **Meeting Minutes**: Record meeting minutes for reference.

Retrospective

What went well?

- We as a team have planned to keep our objective simple to finish and produce what was expected.

- Team had good time working together.

- Active response from team to get involved in tasks with clear thoughts.

- The key was participation and motivation to complete task in time and every member knew what they had to do.

- We had several discussion sessions.

- Overall, every meeting session is effectively used to gain progress and complete sprint on time.

What Could Be Improved?

- We frequently try to communicate to discuss about project and advancements even after the sprintcompletion.

- Setting up time limit for the tasks and learning from previous semester student's sprintsperformance to make improvements and where can we be better.

What we plan to commit for next sprint?

- Maintain consistency in performance, improvement is key.

- Previous students sprint retro can be helpful for improving team balance in which areas team islacking, where we can work according to that.

- Previous retro stats can be helpful in filling the gaps of next sprint

PROJECT DEMO SPRINT 2

API

WIKI Page

https://github.com/surakarthi/Group-2-Cs-691/wiki/Welcome-to-the-Group%E2%80%902%E2%80%90Cs%E2%80%906 91-wiki!

PLANT DISEASE DETECTION USING CONVOLUTIONAL NEURAL NETWORK

Thank You