**A logo with a flower

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**SafePlant+ User Manual**

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**1. Introduction**

* 1. About the Application

Hello! Welcome to SafePlant+.

SafePlant+ is an AI-powered application designed to assist users in identifying and diagnosing plant diseases through image analysis. SafePlant+ is more than just a disease identifier, it is designed to be a comprehensive plant health companion. You can scan your plants, and with our powerful Computer Vision Model, Flora, to assist you, we are confident you will have a seamless, powerful, and intuitive user-friendly experience with the application to identify any possible plant diseases.

SafePlant+ now comes with GPT4 Model, enhancing powerful capabilities. We believe it can make a difference in how plants are being taken care of! We are thrilled to have you join us on this journey! Happy Growing!

Regards,

SafePlant+ Team

1.2 System Requirements

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| OS | Processor | RAM | Storage | IDE | Dependencies |
| Windows | Intel Core i5 or more  (i7 preferred) | 8GB | 500MB disk remaining | Any Python IDE (Visual Studio Code Preferred) | 1. PyQT6 2. TensorFlow 3. Spacy & Spacy en\_web\_code 4. Appdirs 5. OpenAI 6. OpenCV 7. NumPy 8. Python 3.11 |
| MacOS | Intel Core i5 or more |  Apple Silicon | 8GB |

**2. Opening the App Guide**

2.1 Setting up and using SafePlant+

1. Download Visual Studio Code (Recommended IDE).
2. If this is your first time using Visual Studio Code, make sure Python3.10 is installed and the Python Extension is installed in Visual Studio Code.
3. Open “Final\_Folder” in Visual Studio Code, where you shall see the model extension “final\_model.keras” an image folder with three images from every class, and two files “SafePlant\_cred.py” & “extra\_SafePlant.py”.
4. You should also see “projectvenv” folder in the folder, this is the virtual environment where all the packages are included, SafePlant+ has to be run in this virtual environment. Therefore to select it, press **Shift + Control + P**[Windows] | **Shift + Command + P**[MacOS] and select/search “**Python: Select Interpreter**”.
5. Scroll down and search for “**projectvenv**” in the list of interpreters, once you found it, select it.
6. If Step 4 and 5 does not work, there will be a “**requirements.txt”**, type “**pip install -r requirements.txt”** and all the dependencies will be downloaded.
7. **NOTE:** You might see a yellow squiggly line underneath the tensorflow import line indicating possible errors, but you can ignore it for now.
8. Finally, run “**SafePlant\_cred.py”.** The application might take some time to load, but subsequent reopens should not take so much time!

**3. Getting Started**

3.1 Login & Sign-Up

* Enter your username and password to log in.
* If you’re a new user, click "Sign Up" and create an account.

A screenshot of a login screen

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* If you forget your password, use the "Forgot Password" feature.

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* Proceed to key in your username, and if it matches you are allowed to change your password.

3.2 Dashboard Overview

After logging in, you will see:

* View History: Access past scans.
* ChatGPT Chatbot: Chat with AI for plant disease insights.
* Quick Scan: Upload and process images for diagnosis.
* Drag & Drop Area: Upload images quickly.

A screenshot of a chatbot

Description automatically generated

**4. Features**

4.1 Uploading & Scanning Images

* Drag & drop images into the upload area or select from files.
* Click "Quick Scan" to analyse plant diseases.
* View results with Flora Insights.

A screenshot of a chatbot

Description automatically generated

4.2 Managing Scan History

* Individual Scans: Press the “View History” Button to view Individual scans.A screenshot of a computer

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* You have the option to “Save”, “Delete” or “View the Results” of the image which you sent for quick scanning.
* Picture names and an additional description can be added/changed to the image.

4.3 Getting Flora’s Insights

* After scanning the image, users can click on the “View Results” Button to get the predicted disease by our AI model, Flora.A screenshot of a computer

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* Pressing on that button will bring users to a new window where along with the predicted label, the confidence score of the model can also be seen:

A screenshot of a computer screen

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Flora's Insights

* Users can then choose to go back to history or utilise GPT for more analysis.

4.4 Chatbot Integration

* GPT4 comes in built into SafePlant.
* To access GPT4, users can press on the “ChatGPT Chatbot” button at the top right corner of the application:

A screenshot of a computer

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* You can choose to “Continue”, “Rename” or “Delete” the chat.

A screenshot of a chat history

Description automatically generated

* If users press on the “Continue” button or the “Start New Chat” button, they are greeted with a plain window where they can send messages to GPT.

A screenshot of a chat

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* Users can also get tailored insights for their plants through GPT. This feature only works in the Results Window where our Model tell you the predicted label.
* Users can press the “Ask GPT” button and ChatGPT will provide insights based on the predicted label and much more information.

**NOTE:** It might take some time for GPT to return with the information, we apologise for the waiting time, and we are striving to improve it!

A screenshot of a computer screen

AI-generated content may be incorrect.**A screenshot of a chat

AI-generated content may be incorrect.**

**5. Troubleshooting**

* Application does not start.
* Check your system requirements, and make sure the Python Interpreter in your IDE is set to “projectvenv”. If it is and you still cannot open the app, then make sure all the dependencies are downloaded inside your IDE.
* Cannot log in.
* Reset password or check username credentials.
* You can also click forget password to reset it.
* ChatGPT AI model not responding.
* An active internet connection is needed to communicate with GPT.
* Make sure you have the openai system version set to 0.28.0, read above for more details.
* If the application does not start and you see multiple import warnings:

1. **Optional but recommended:** Create a Virtual Environment, If you do not wish to, skip to Step 4. [python -m venv <venv\_name>]
2. **From Step 3:** Activate the Virtual Environment [**Windows:** ./Scripts/activate/<venv\_name> | **MacOS:** source <venv\_name>/bin/activate]
3. You should see that the virtual environment is activated in your terminal.
4. Download the dependencies by keying each of the following prompts in the terminal:
5. Pip install **PyQt6**
6. Pip install **Tensorflow**
7. Pip install **Spacy**
8. Python -m spacy download en\_core\_web\_sm
9. Pip install appdirs
10. Pip install openai==0.28.0 (if this does not work, try **pip install openai** followed by **pip install openai==0.28.0**)
11. Pip install **opencv-python**
12. Pip install **numpy pandas**
13. After installing all the packages, simply run “SafePlant\_cred.py”. App boot up might take north of a minute for the first time, but subsequent times will be shorter.

**6. FAQs**

**Q1: What image formats are supported?**

Answer: SafePlant+ supports JPG, PNG, and BMP formats, we are working towards expanding to more formats.

**Q2: Can I use SafePlant+ offline?**

Answer: SafePlant+ can be used offline only for plant-disease analysis, but an active internet connection is required to access ChatGPT.

**Q3: How accurate is the AI model?**

Answer: Flora achieves a remarkable 99% accuracy on our sets and an average of 85% on unseen data! Do report to us if it is misclassified and we will work on it!

**Q4: Do I need to pay for GPT?**

Answer: Absolutely Not! GPT comes for free with the application!

**Q5: What are some of the classes the model can detect:**

Answer: Here are the 12 classes Flora can detect:

* + 1. Cherry (including sour) healthy,
    2. Corn(maize) Northern Leaf Blight,
    3. Corn(maize) healthy,
    4. Grape Black rot,
    5. Grape Esca (Black Measles),
    6. Peach Bacterial spot,
    7. Pepper bell Bacterial spot,
    8. Strawberry healthy,
    9. Tomato Early blight,
    10. Tomato Late blight,
    11. Tomato Leaf Mold,
    12. Tomato Target Spot

We are actively working towards including more classes, do be patient with us!

**Q6: What is the maximum size of the image?**

Answer: We recommend the image be lesser than 5MB for fast image processing.

**Q7: What if the model gives “ERROR” as the predicted label?**

Answer: If you get “ERROR” as the label, do make sure the following criteria is met:

1. Make sure the image is not blurry and is clear & focused.
2. Make sure that the plant part (leaf not stem) is the dominant trait in the picture.
3. Consider sending the picture into the model again.

If you still get “ERROR”, it is highly likely that the model has not been trained on the disease that you are trying to classify. We apologise for the inconvenience as we work on training more disease classes to Flora.

**Q8: Can I export my results?**

Answer: No, currently the results are stored within Flora, future updates will include exporting results in PDF and CSV format.

**Q9: Is SafePlant+ on Mobile Devices?**

Answer: Not yet, we are actively working on building a dedicated mobile application where more features like real time camera detection and more through OpenCV and webcam!

**7. Contact Support**

Thank you for reading through the Manual! Do let us know if there is anything we can do for you, any feedback is welcome!

Contact our support team:

Email: [232594Y@mymail.nyp.edu.sg](mailto:232594Y@mymail.nyp.edu.sg)