Manual Datasheet

The main folder includes three python files, raw dataset file "*.pkl" that include the processed data in sim-data folder, and pretrained dataset ".h5".

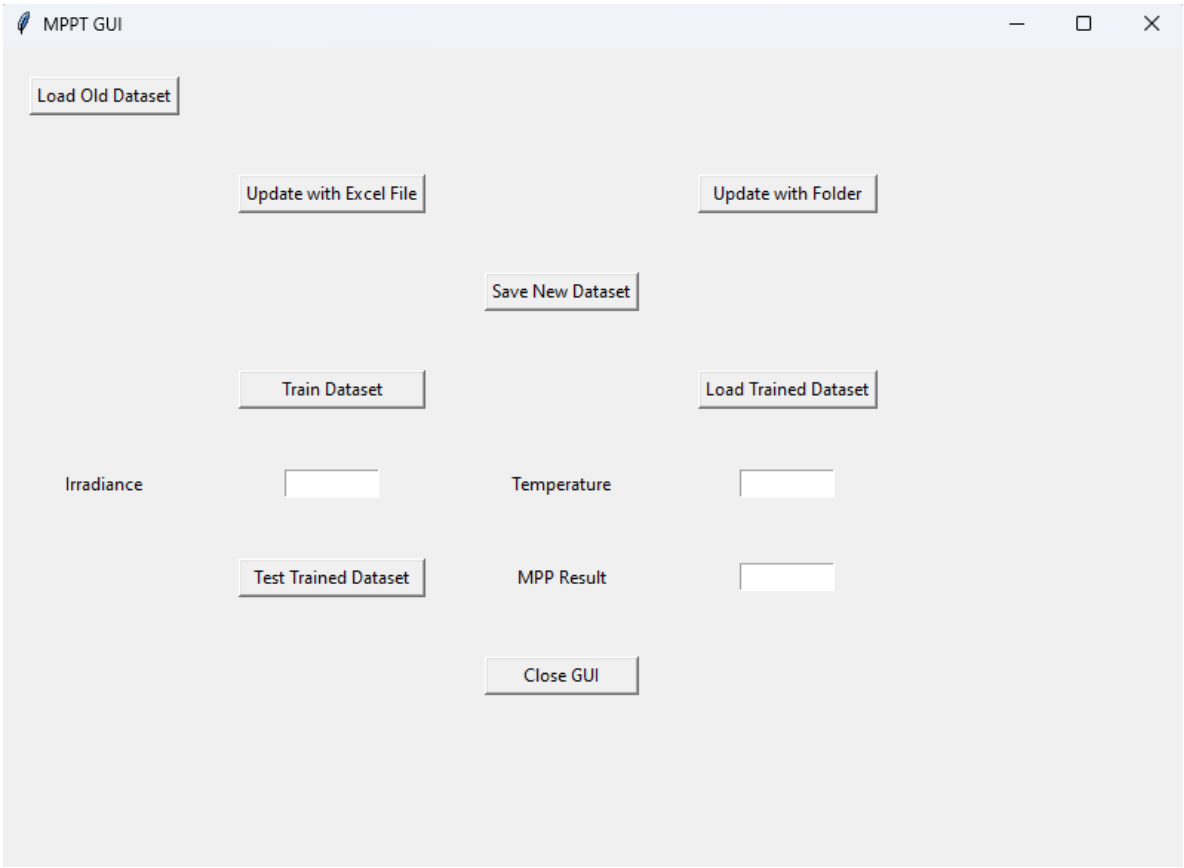
Sim-data: folder that includes all excel files for data.

The three python files are:

Main2.py: It is the main file that also handles the GUI components.

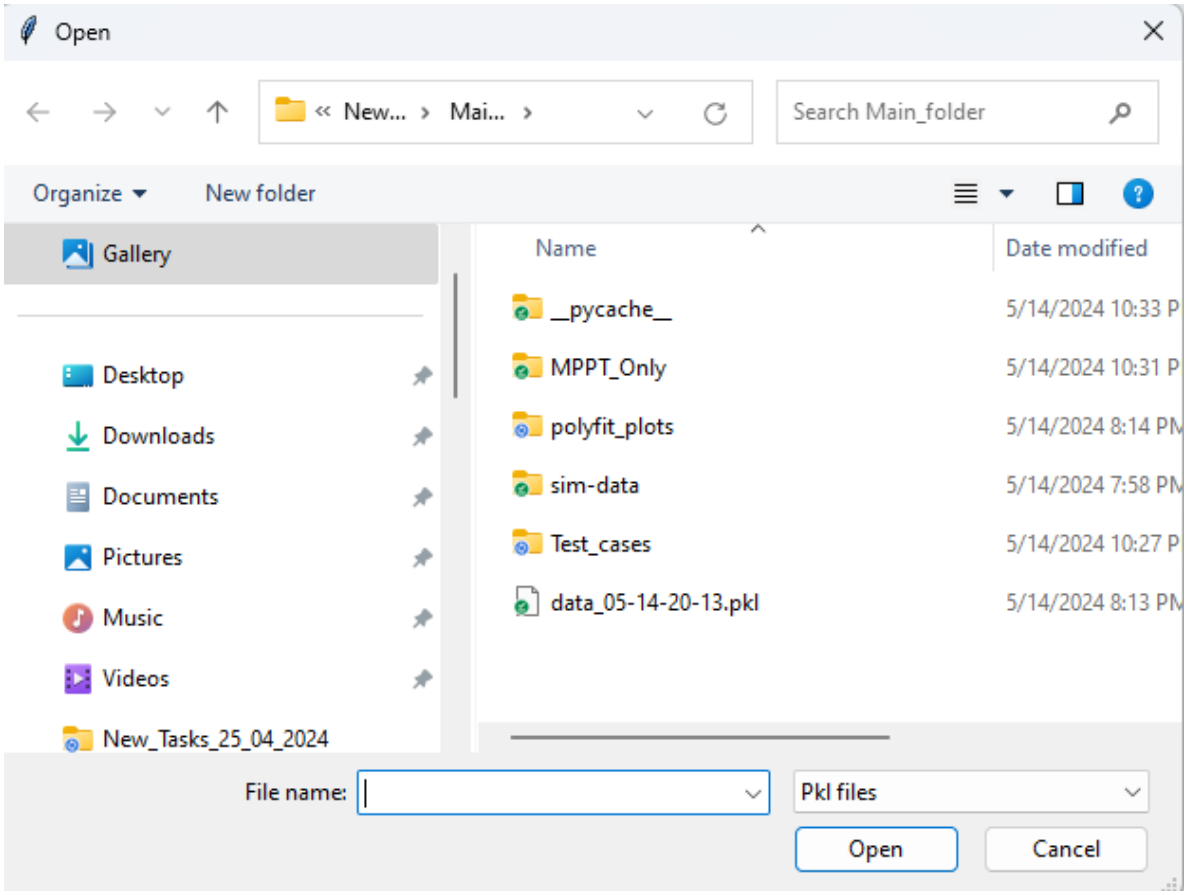
read_data4.py: Concerned with data reading, cleaning, and processing.

model_training_keras3.py: Deals with model training using Karas.

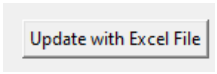


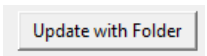
Buttons and Cells

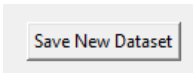
- **Load old Dataset**: It loads *.pkl files that were generated previously as processed and cleaned data of the excel files.



- We can update this dataset by one of the two options, with organizing, preprocessing, and cleaning:
  1- **Update with excel file**: It opens a window to select the only required excel file.
  2- **Update with folder**: It opens a window to select the required folder that contains many excel files. It organizes these files and selects the data and annotates them by their irradiance and temperature.

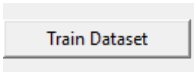




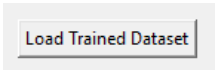


- **Save New Dataset:** After updating the dataset, we can save it using this push button.

- **Train Dataset**: It is used to train dataset with linear regression approach with Adam optimizer. We can tune the parameters as we prefer. It will also save the trained dataset with "*.h5" format with the date and time.

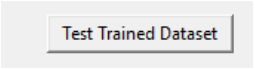


- **Load Trained Dataset:** It is used to load the pre-train dataset if exists to be used only "*.h5" files.

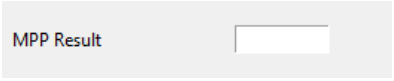


- **Irradiance & Temperature Cells:** These two cells are used as tested inputs to predict the output based on the pretrained "*.h5" dataset.

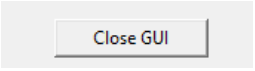
- **Test Trained Dataset:** It is used to test the pre-train dataset (For guarantee, it should direct you to select the pretrained dataset).



- **MPP cell:** This cell is an output cell to present the result of MPPT based on tested inputs and the pretrained "*.h5" dataset.



- **Close GUI:** It is used to stop the code and close GUI.



The outputs for this code are mainly:

"*.pkl": Dataset of organized, cleaned and processed data with the class structure with data of

1.1 Irradiance: List to store irradiance values.
1.2 Temperature: List to store temperature values.
1.3 MPP: List to store Maximum Power Point (MPP) values.

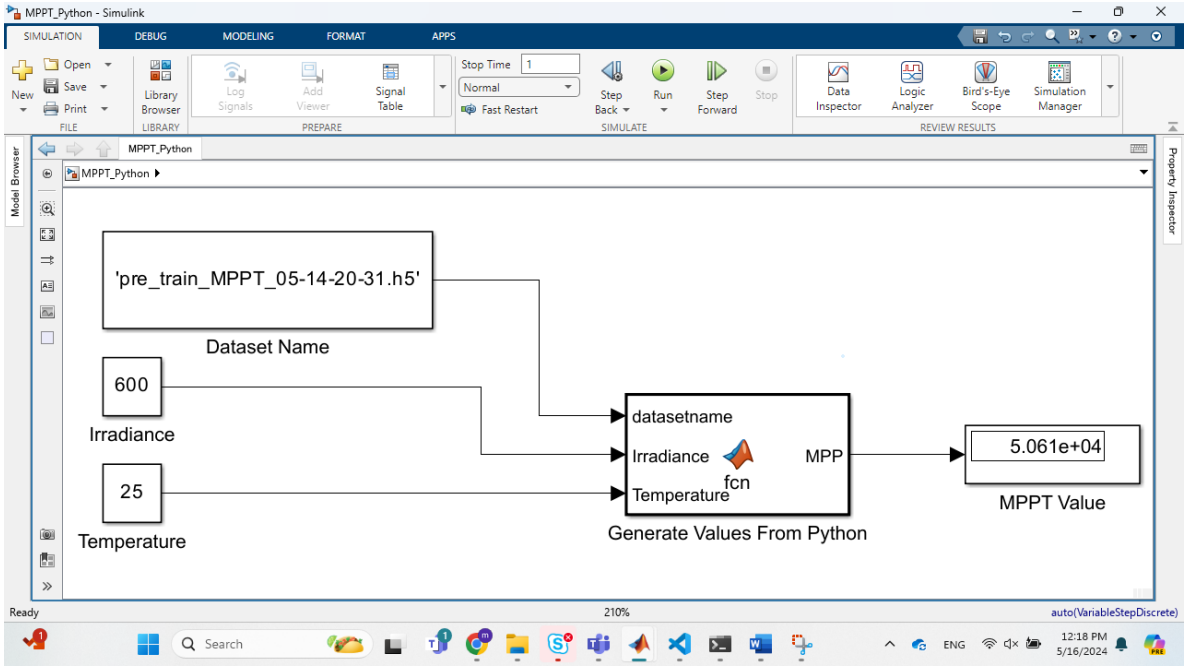
1.4 Voltage: List to store voltage readings.
1.5 Current: List to store current readings.
1.6 Power: List to store Power Values.

“*.h5”: pretrained model for the input dataset with inputs as irradiance, temperature and outputs as MPPT.

Note: I have another version that the output includes the coefficients of the equation between voltage and current.

Simulink Part

For the Simulink part, the model looks as followed:



The three inputs are:

1- **Pretrained Dataset Name**
2- **Irradiance Value**
3- **Temperature Value.**