

USER MANUAL FOR TRAFFIC SIGN RECOGNITION TOOL

Environment requirement prerequisite:

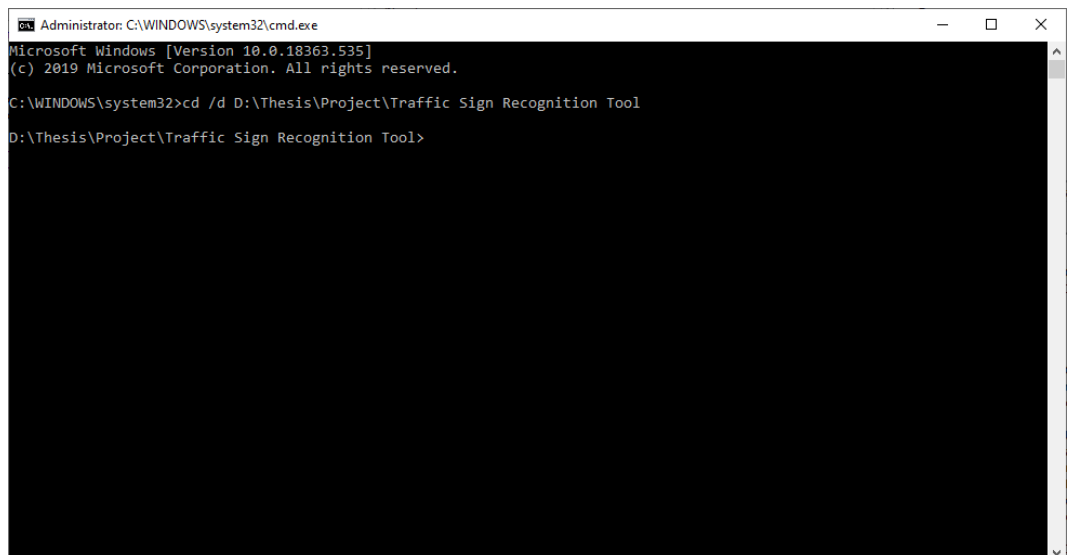
- Windows 10 (x64)
- Available disk space: ~ 500 MB
- RAM: 8 GB (recommendation)
- Anaconda Navigator 1.9.7, Jupyter Notebook 6.0.2, Spyder environment 4.0.0 and Python 3.7.5.
- Modules: TensorFlow 2.0.0, OpenCV 4.1.2, NumPy 1.17.4, Pandas 0.25.3, Matplotlib 3.1.2, Keras 2.3.1 and ski-learn 0.21.3.

There are 2 main parts:

- Train model
- Recognize traffic sign

1. Train model

- Step 1: Open Jupyter Notebook. Go to Command Prompt (cmd), enter < source code directory > in command: “cd /d <source code directory>”



```
Administrator: C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.18363.535]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd /d D:\Thesis\Project\Traffic Sign Recognition Tool
D:\Thesis\Project\Traffic Sign Recognition Tool>
```

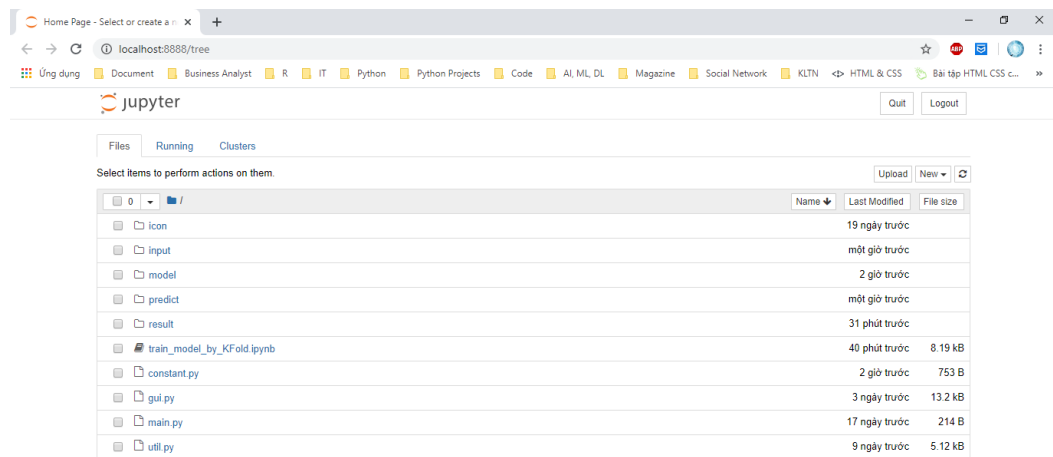
- Step 2: Enter “jupyter notebook” then press “Enter”. The Jupyter Notebook UI appears.

```
Administrator: C:\WINDOWS\system32\cmd.exe - jupyter notebook
Microsoft Windows [Version 10.0.18363.535]
(c) 2019 Microsoft Corporation. All rights reserved.

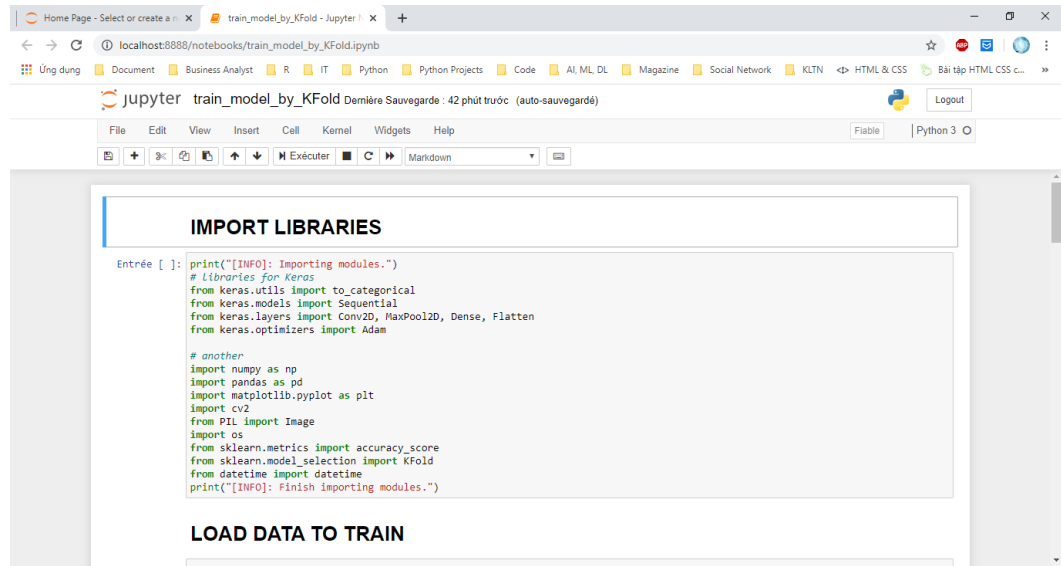
C:\WINDOWS\system32>cd /d D:\Thesis\Project\Traffic Sign Recognition Tool

D:\Thesis\Project\Traffic Sign Recognition Tool>jupyter notebook
[I 05:48:49.558 NotebookApp] JupyterLab extension loaded from D:\App\Anaconda3\lib\site-packages\jupyterlab
[I 05:48:49.558 NotebookApp] JupyterLab application directory is D:\App\Anaconda3\share\jupyter\lab
[I 05:48:49.573 NotebookApp] Serving notebooks from local directory: D:\Thesis\Project\Traffic Sign Recognition Tool
[I 05:48:49.573 NotebookApp] The Jupyter Notebook is running at:
[I 05:48:49.573 NotebookApp] http://localhost:8888/?token=8faeeaf8d4b2cdea33109fc49c99c941b1895f10c98db6d5
[I 05:48:49.573 NotebookApp] or http://127.0.0.1:8888/?token=8faeeaf8d4b2cdea33109fc49c99c941b1895f10c98db6d5
[I 05:48:49.573 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 05:48:49.652 NotebookApp]

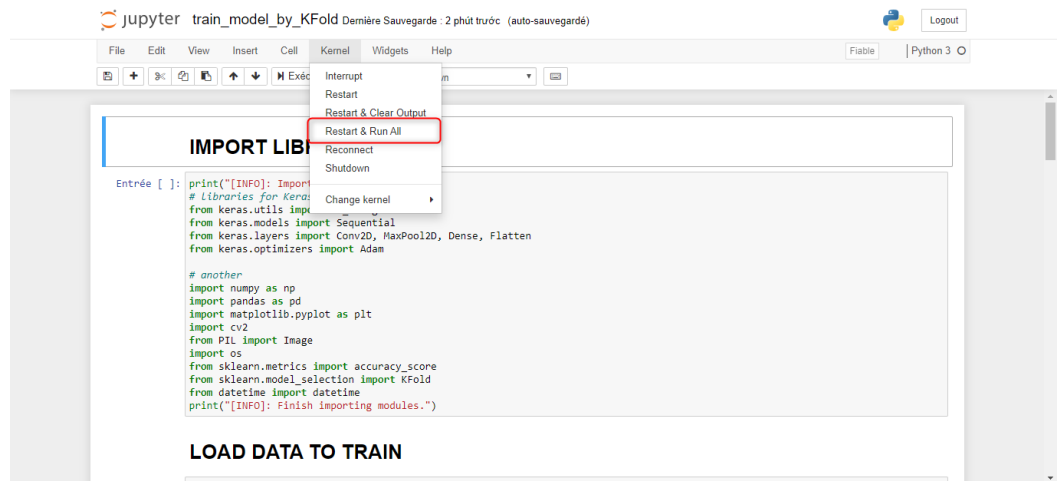
To access the notebook, open this file in a browser:
file:///C:/Users/Nhan/AppData/Roaming/jupyter/runtime/nbserver-13648-open.html
Or copy and paste one of these URLs:
http://localhost:8888/?token=8faeeaf8d4b2cdea33109fc49c99c941b1895f10c98db6d5
or http://127.0.0.1:8888/?token=8faeeaf8d4b2cdea33109fc49c99c941b1895f10c98db6d5
```



- Step 3: Choose “train_model_by_KFold.ipynb” file.



- Step 4: Click on “Kernel” menu and choose “Restart & Run All”.

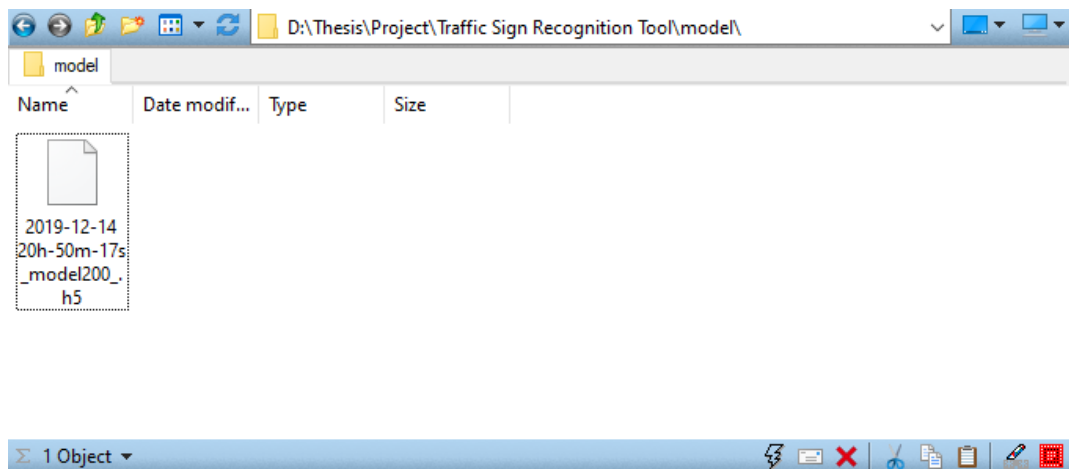
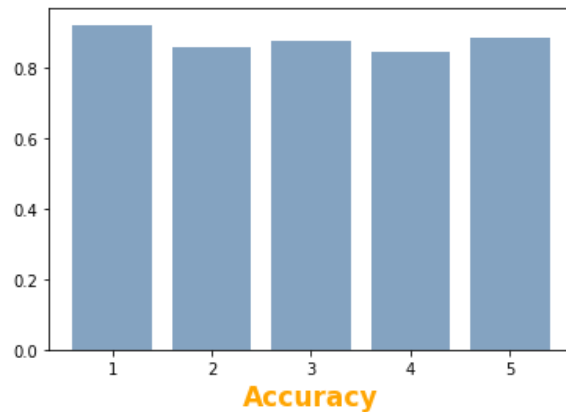


After finishing training, you will have the summary and model saved in “model” folder in source code directory as below:

```
[INFO]: SUMMARY:  
[INFO]: Model 1 accuracy: 0.920665083135392  
[INFO]: Model 2 accuracy: 0.8573238321456849  
[INFO]: Model 3 accuracy: 0.8729216152019003  
[INFO]: Model 4 accuracy: 0.8453681710213776  
[INFO]: Model 5 accuracy: 0.8832937450514647
```

```
-----  
[INFO]: Average accuracy: 0.8759144893111639  
[INFO]: Highest accuracy: 0.920665083135392
```

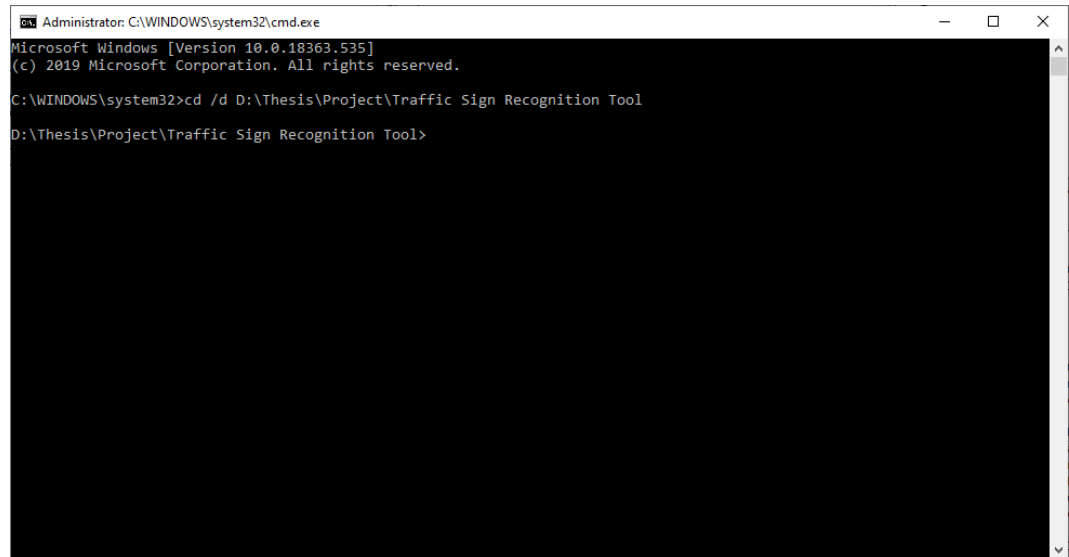
```
Text(0.5, 0, 'Accuracy')
```



2. Recognize traffic sign

Note: Please use the images from the “input” folder or “predict” folder placed in the source code directory for more accuracy.

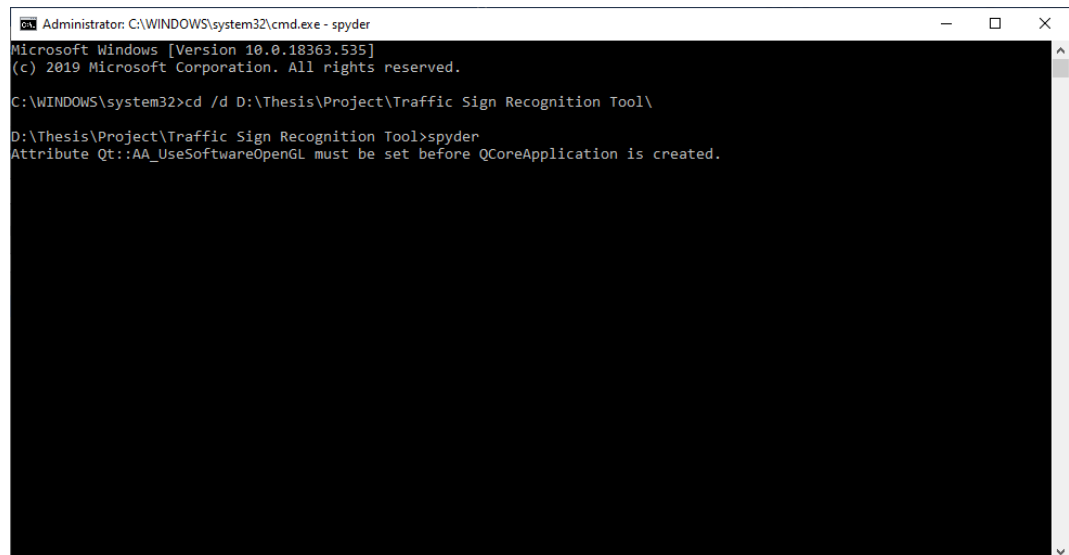
- Step 1: Open Jupyter Notebook. Go to Command Prompt (cmd), enter < source code directory > in command: “cd /d <source code directory>”



```
Administrator: C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.18363.535]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd /d D:\Thesis\Project\Traffic Sign Recognition Tool
D:\Thesis\Project\Traffic Sign Recognition Tool>
```

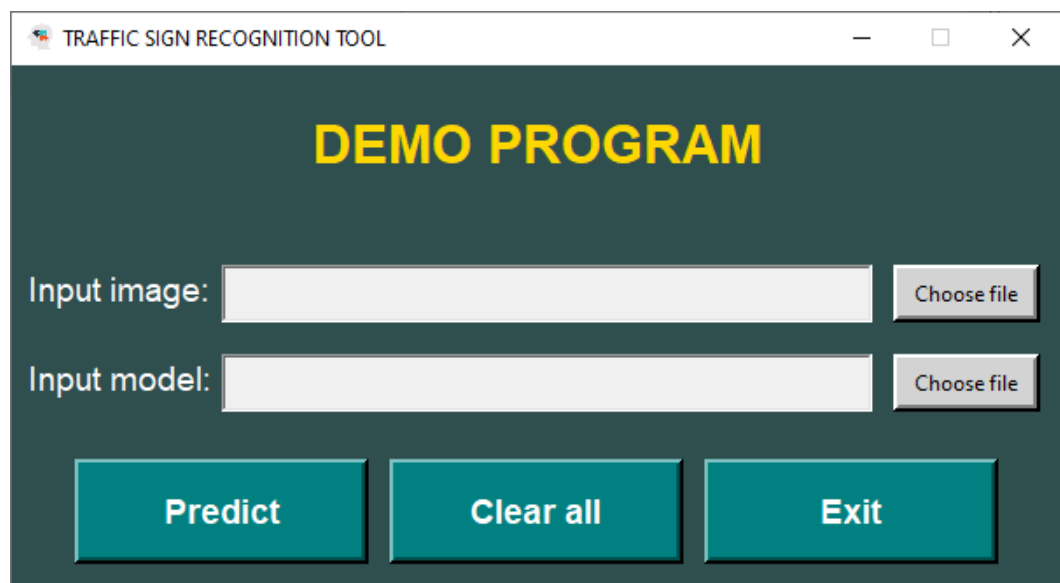
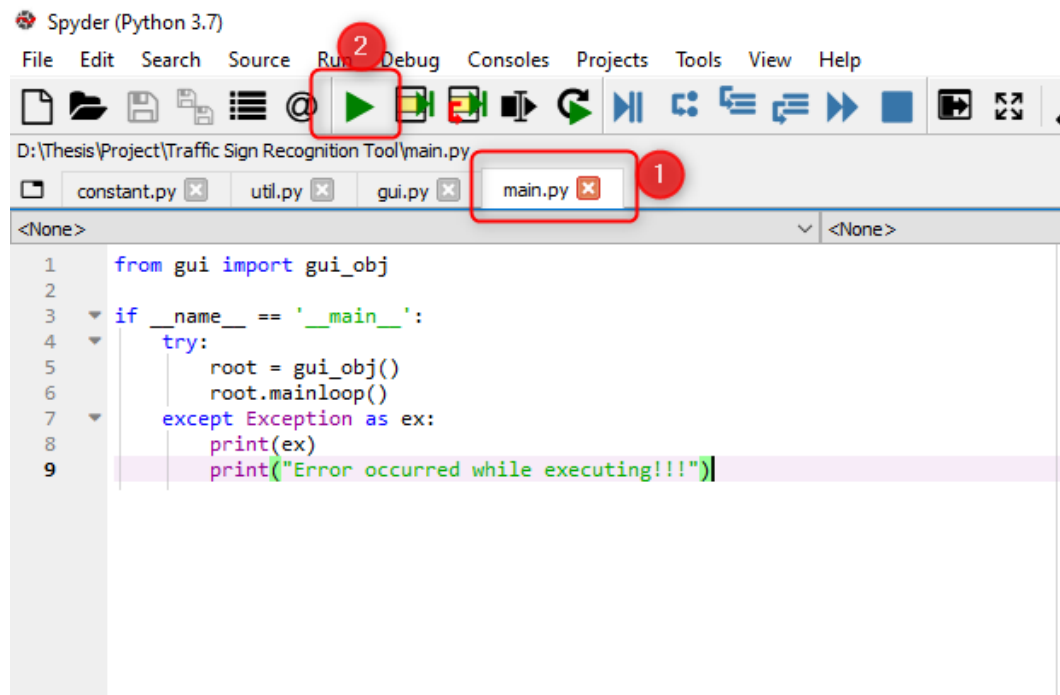
- Step 2: Enter “spyder” then press “Enter”. The Spyder UI appears.



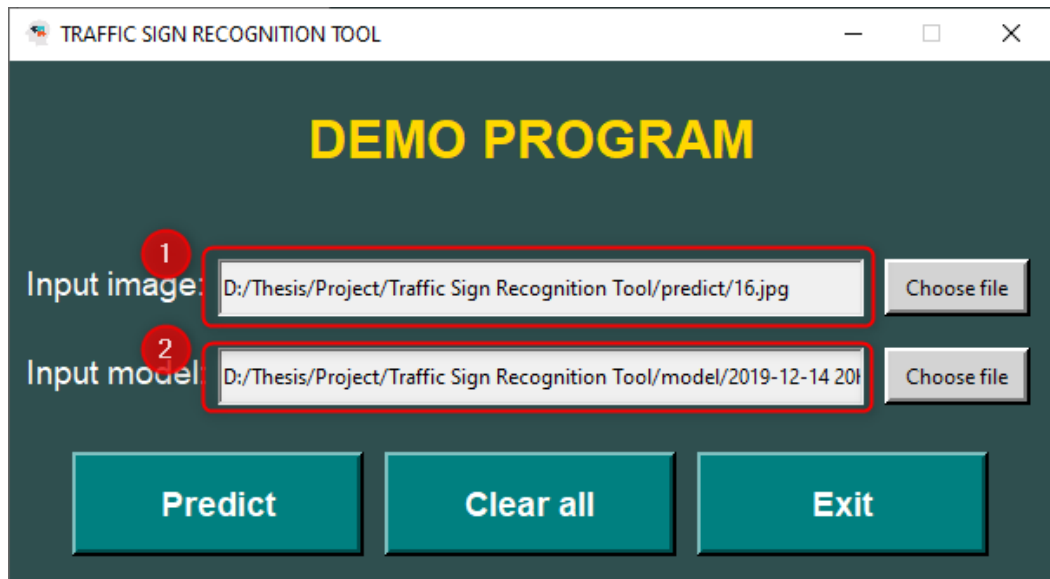
```
Administrator: C:\WINDOWS\system32\cmd.exe - spyder
Microsoft Windows [Version 10.0.18363.535]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd /d D:\Thesis\Project\Traffic Sign Recognition Tool\
D:\Thesis\Project\Traffic Sign Recognition Tool>spyder
Attribute Qt::AA_UseSoftwareOpenGL must be set before QCoreApplication is created.
```

- Step 3: Run main.py file. The Traffic Sign Recognition Tool UI appears.



- Step 4: Choose input image and input model.



- Step 5: Click on “Predict” button. The result will be shown on the screen. You can check the “result” folder in the source code directory for more information.

