

# **Software Engineering**

## **User Guide**

### **Project – 24**

## **Microstructure-Segmentation**

## 1. Steps to run the project:

1. Install the following packages using pip OR create a conda environment and install the following

- python 3.6 (Note: Please do **not** use python version 3.8 as the torch binaries are broken for this version)
- torch 1.2.0
- torchvision 0.2.2

```
pip install torch==1.2.0+cpu torchvision==0.2.2.post3 -f  
https://download.pytorch.org/whl/torch\_stable.html
```

- scikit-image 0.15.0
- pillow 6.0.0
- numpy 1.16.3
- matplotlib 3.1.0
- opencv

```
pip install opencv-python
```

- matplotlib

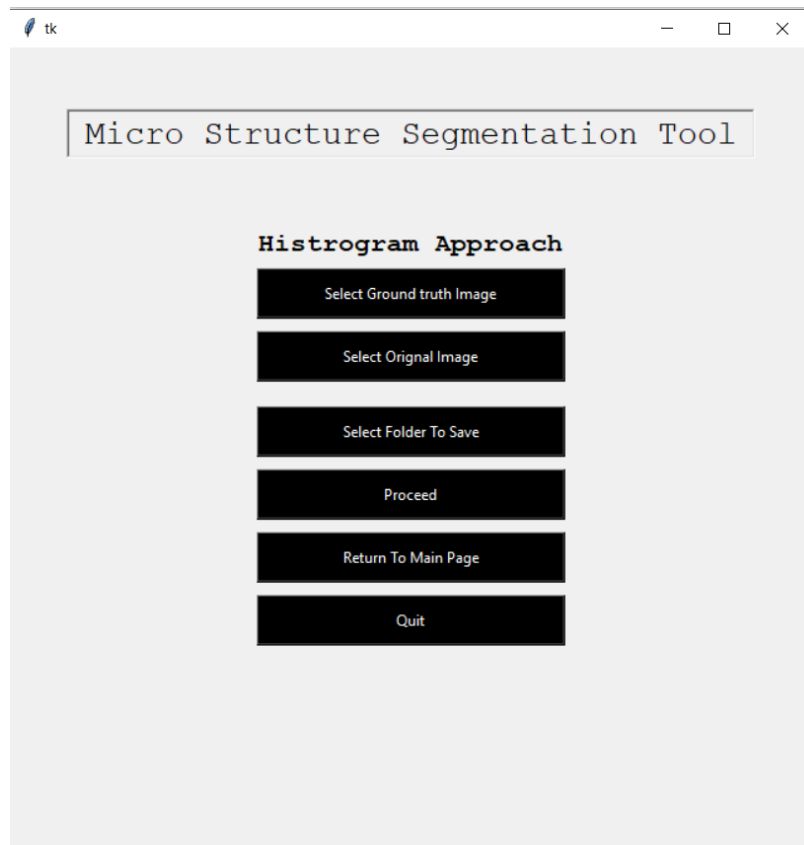
```
pip install matplotlib
```

2. Navigate to the project folder
3. Launch the command prompt OR the conda environment (if you have created any)
4. Run the script `Microstructure_segmentation.py` using the command:  
**`python Microstructure_segmentation.py`** .

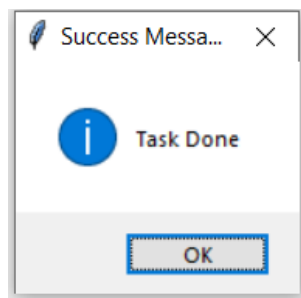


## 2. How to use the Microstructure -Segmentation tool

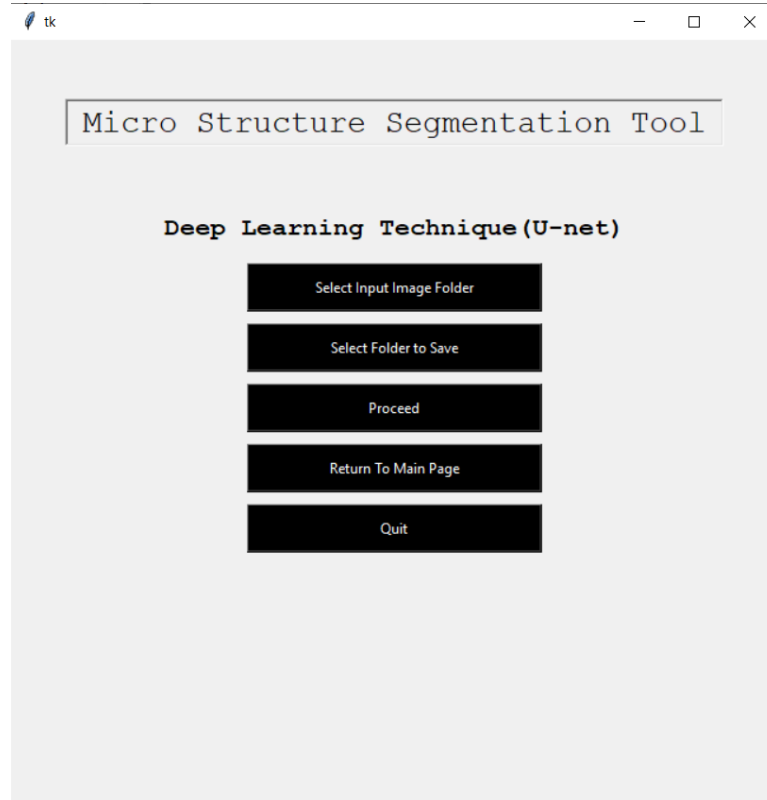
### 1. Image Processing Technique (Histogram approach):



- To run this, one must first execute step 3 to generate sub-images of size 256x256.
- We have provided 5 sample images in the **HistogramInput** folder.
- Select one ground truth image from **HistogramInput/GroundTruthImages** folder.
- Select one corresponding id original image from **HistogramInput/OrignalImages** folder.
- Select the folder where you want to save the output image.
- Click on proceed Button
- After completion, the application provides a notification that the task is done



## 2. Deep Learning Technique (UNET approach):



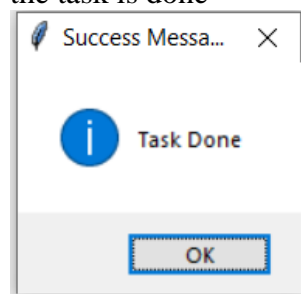
- Click on Select Input Image Folder to select the folder containing all the image files for segmentation.

( Note: This technique is designed to perform segmentation on multiple images at once. Hence, the folder containing the image file/files must be provided as input. This technique reads all images present in the input folder. The images must be of size 256x256 ) We have provided 5 sample images in the **UnetInput** folder.

- Click on Select Folder to Save to browse through your computer and specify the folder where the segmented images can be stored.
- Next, hit Proceed to start the segmentation process.
- You may refer to the log showing the number of input images processed. This is displayed on command prompt for the application

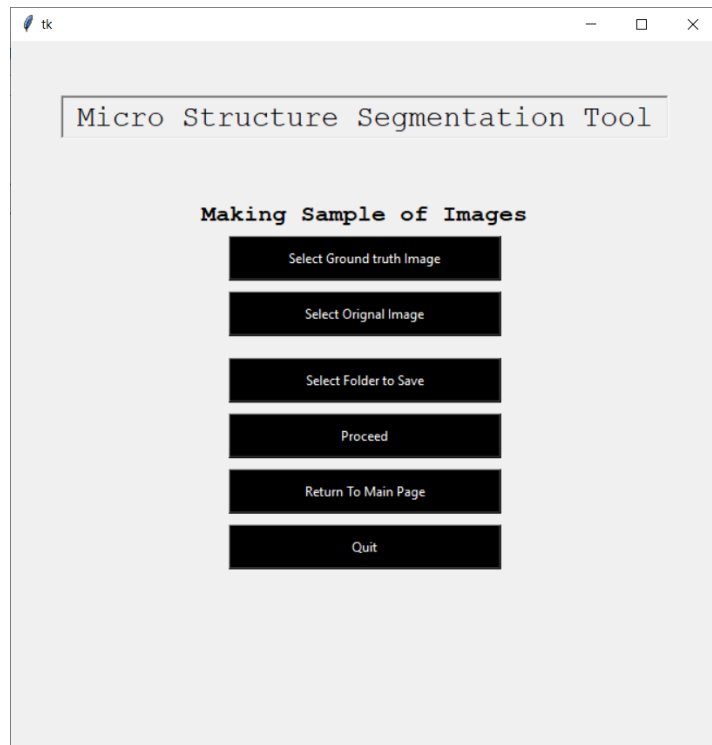
```
Unet Implementation for user input
Segmenting image 1/11
Segmenting image 2/11
Segmenting image 3/11
Segmenting image 4/11
Segmenting image 5/11
Segmenting image 6/11
Segmenting image 7/11
Segmenting image 8/11
Segmenting image 9/11
Segmenting image 10/11
Segmenting image 11/11
```

- After completion, the application provides a notification that the task is done



### 3. Make samples from image:

Owing to data confidentiality, we cannot provide the main image that was used to create sub-images. However, you can check the working of this module by selecting **.tif** image.



4. Click "Quit" to close the application