Software Engineering

User Guide

Project – 24
Microstructure-Segmentation

1. Link to GitHub project:

https://github.com/hamza422/MicrostructureSegmentation

2. Steps to run the project:

1. Install the following packages using pip OR create a conda environment (**recommended**) and install the following

   - python 3.6

     Note: Please do not use python version 3.7 or 3.8 as the torch binaries are broken for this version. **Add the python path to environment variable and check the version of python installed on the system using command prompt.**

     python --version

   - Make sure to add the pip path in environment variable
   - torch 1.2.0 and 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

     pip install pillow==6 OR **conda install --channel conda-forge pillow=6**

   - numpy 1.16.3
   - matplotlib 3.1.0

     pip install matplotlib

   - opencv

     pip install opencv-python

3. Navigate to the project folder

4. Launch the command prompt OR the anaconda prompt to activate the conda environment (if you have created any)
5. Run the script Microstructure_segmentation.py using the command: **python Microstructure_segmentation.py** .

3. 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
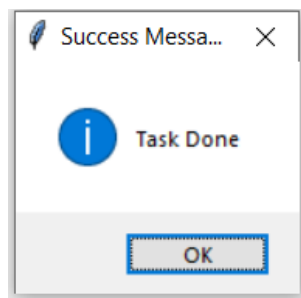


2. **Deep Learning Technique (UNET approach):**
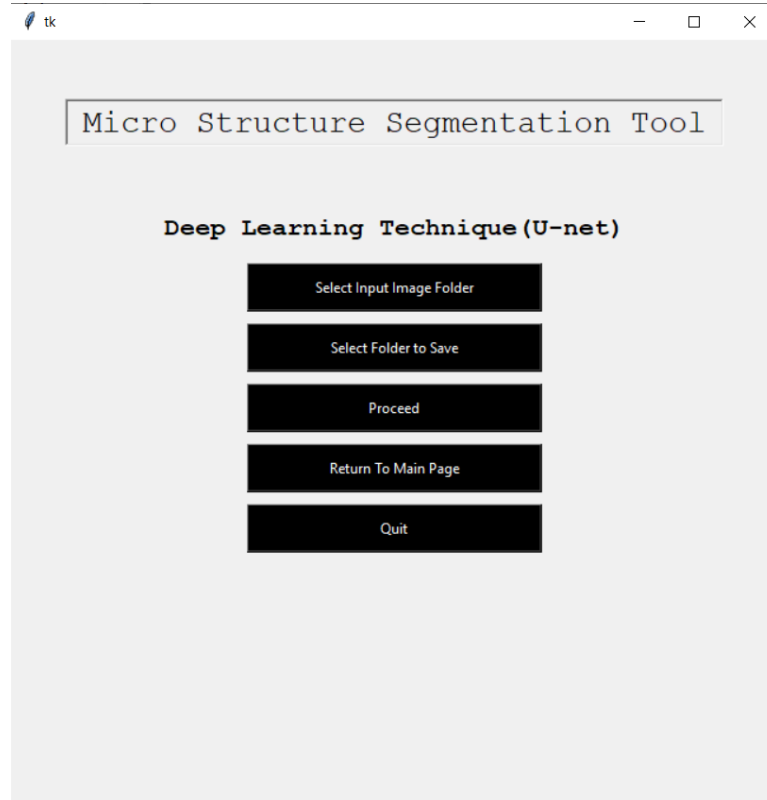
- Click on Select Input Image Folder to select the folder containing all the image files for segmentation.

(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

- After completion, the application provides a notification that the task is done
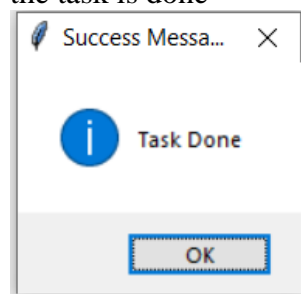
3. **Make samples from image:**
   Owing to data confidentiality, we cannot provide the main image that was used to create sub-images. However, you can check the working of this module by selecting **.tif** image.

4. Click "Quit" to close the application

4. Steps to generate executable

1. Open an anaconda prompt

2. Activate the environment **conda activate <your-env>**

3. Now, navigate to the folder which contains your **Microstructure-segmentation** project using **cd**

4. Make sure the main project script executes without any errors in the env using **python Microstructure_segmentation.py**

5. Install the missing dependencies if any

6. After successfully executing the project using the script, we can now generate the executable using the command
pyinstaller Microstructure_segmentation.py -p <path-to-the-site-packages-of-the-pyinstaller-environment-on-your-system> --hidden-import torch –hidden-import torchvision –hidden-import numpy

path-to-the-site-packages-of-the-pyinstaller-environment-on-your-system - In my system it looks like this
(C:\Users\Jyothsna\Anaconda3\envs\pyinstaller\Lib\site-packages)
The above command generates two folders **build** and **dist**.
The executable can be found inside project folder in dist. Copy the models folder from project folder into the same location as the exe

Double click on executable to run the application