

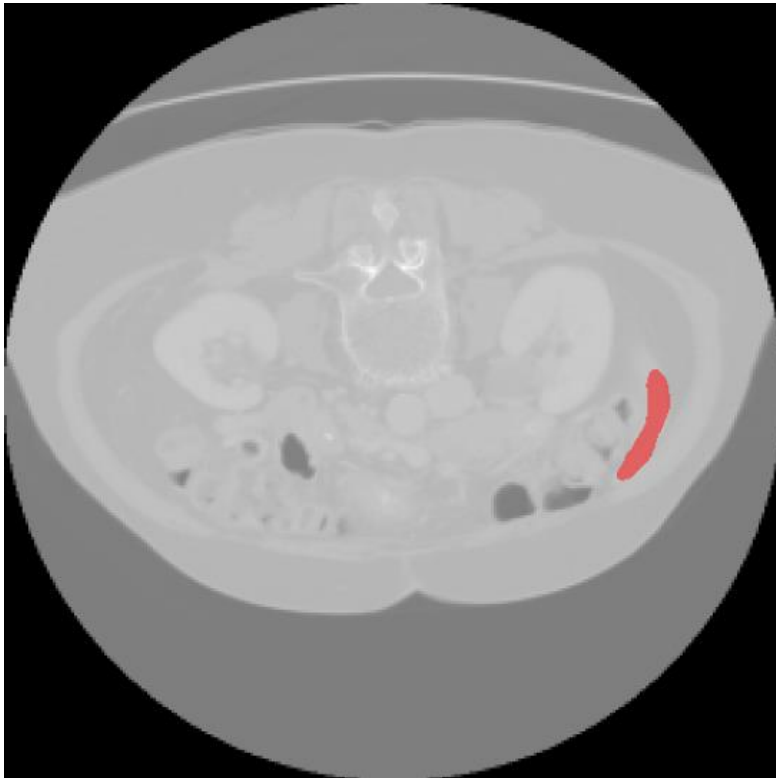
# UNet2

Use UNet to segment the image. It can be applied to medical image analysis, defect image analysis, etc.

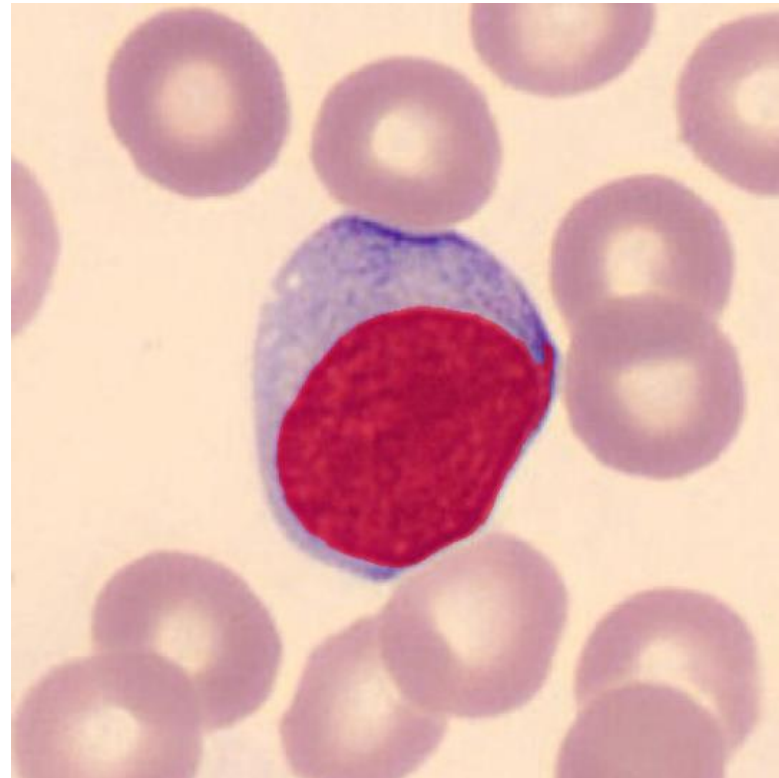
Version 20230103

# Applications

- It can be applied to medical image analysis, defect image analysis, etc.



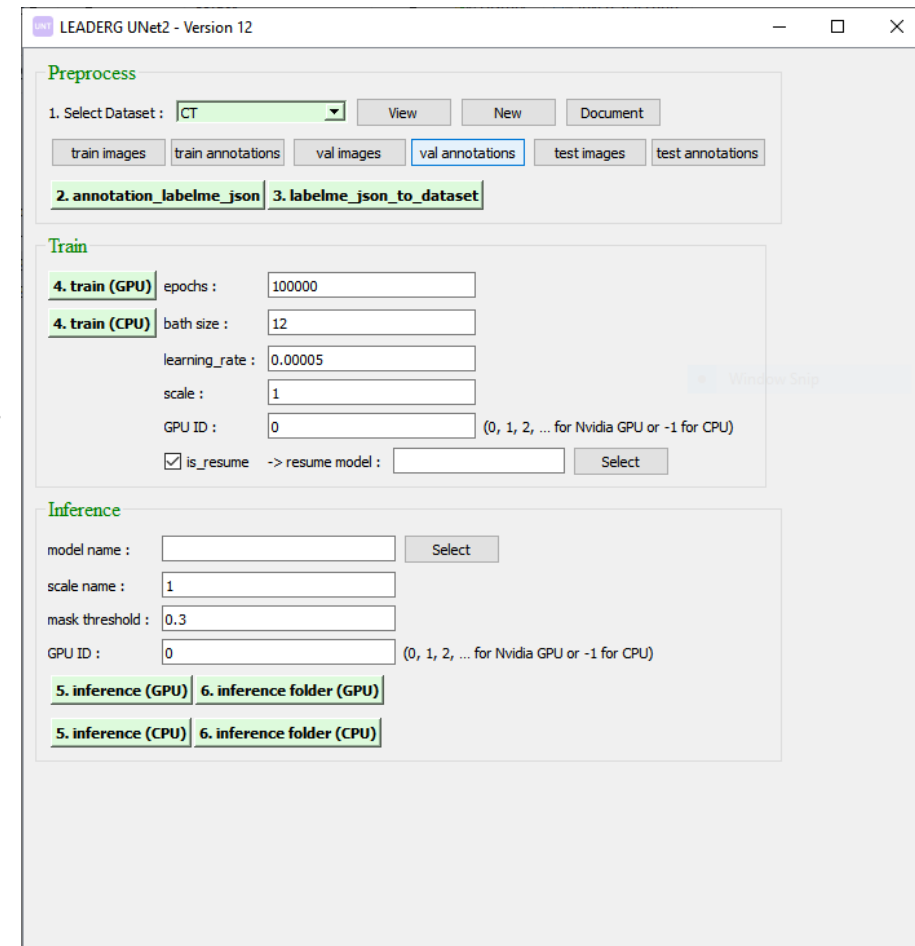
liver, count=970



nucleus, count=22292

# Process

- Preprocessing
  - Data preparation (1. Select Dataset).
  - Annotate images (2. annotation\_labelme\_json).
  - Convert file format (3. labelme\_json\_to\_dataset).
- Train (4. train).
- Inference
  - Infer a single image (5. inference).
  - Inference folder (6. inference\_folder).

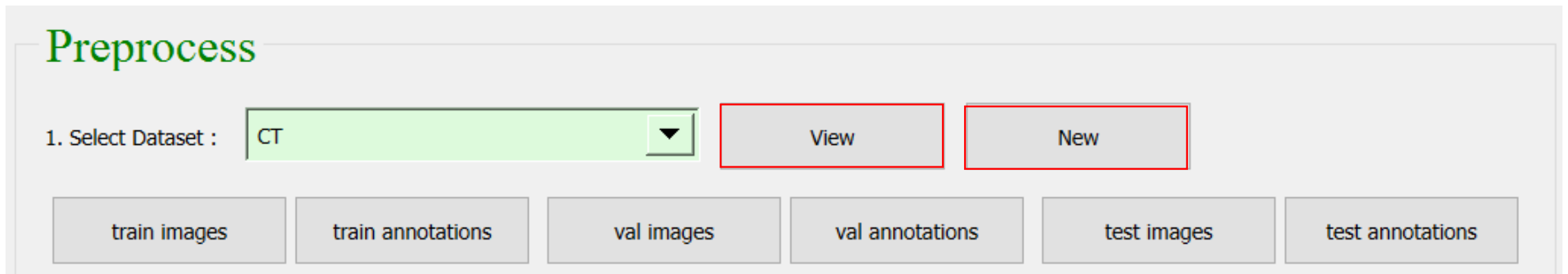


# Dataset

- Select or create a new dataset.

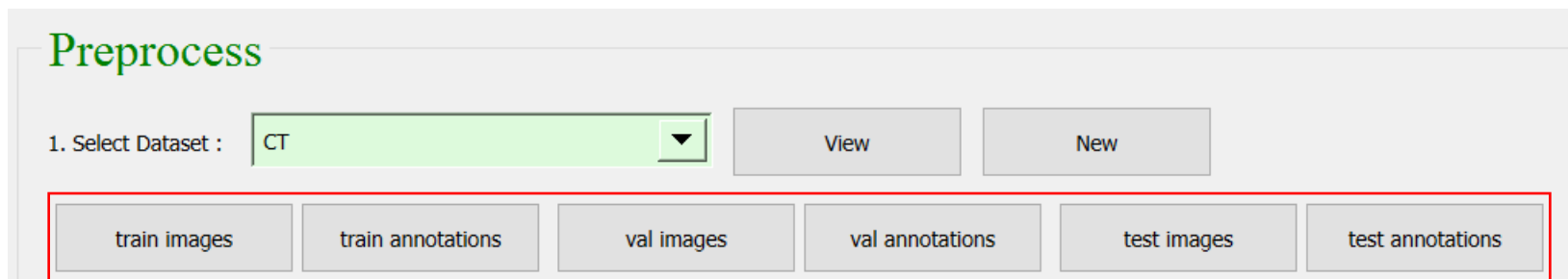
**Preprocess**

1. Select Dataset :



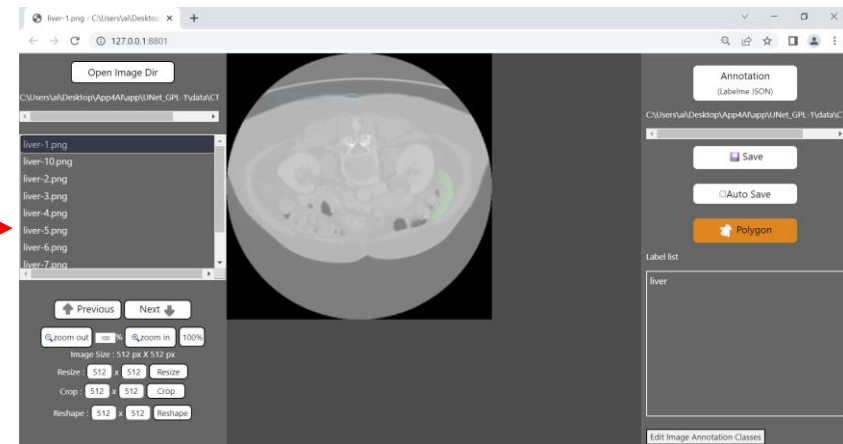
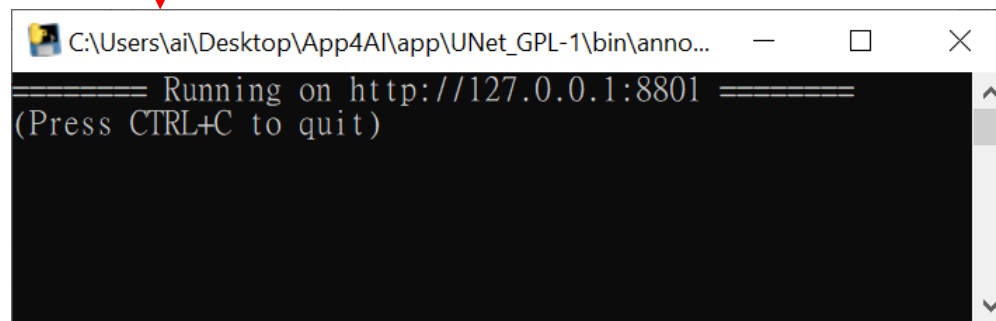
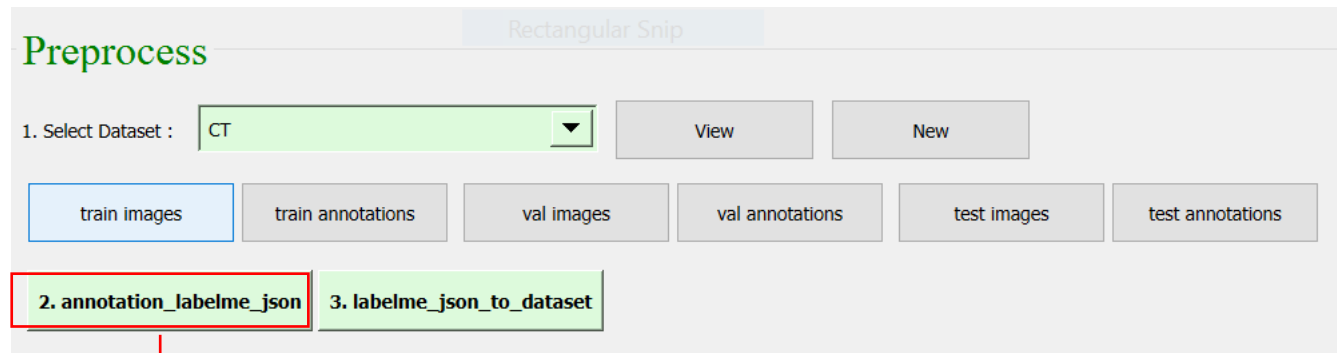
# Dataset

- Prepare training, testing, and validation images and place them in corresponding folders.
  - train images \ annotations : Training image path and annotation file path.
  - val images \ annotations : Validate image paths and annotation file paths
  - test images \ annotations : Test image path and annotation file path.
- The recommended image size is 512\*512.



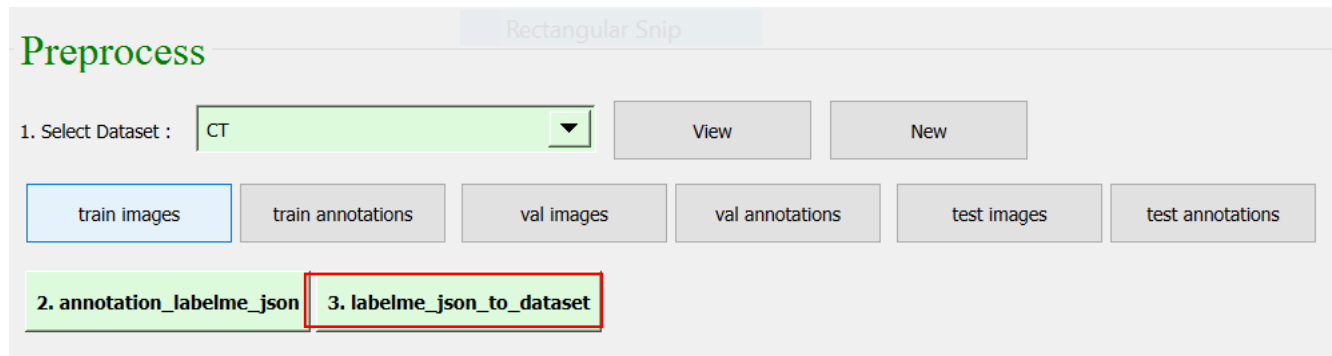
## 2. annotation\_labelme\_json

- Click the 2. annotation\_labelme\_json button to open the annotation tool.



# 3. labelme\_json\_to\_dataset

- Click the 3. labelme\_json\_to\_dataset button to convert the labeled files into the files required for training.



```
C:\Users\ai\Desktop\App4AI\app\UNet_GPL-1\bin\labelme_json_to_dataset_python.exe
single image dataset.
[WARNING] json_to_dataset:main:19 - It won't handle multiple JSON files to generate a real-use dataset.
[INFO ] json_to_dataset:main:77 - Saved to: data\CT\train\dataset\liver-7
C:\Users\ai\Desktop\App4AI\app\UNet_GPL-1\bin
labelme_json_to_dataset_python.py
"bin/labelme_json_to_dataset" "data\CT\train\label\liver-8.json" -o "data\CT\train\dataset\liver-8"
[WARNING] json_to_dataset:main:15 - This script is aimed to demonstrate how to convert the JSON file to a
single image dataset.
[WARNING] json_to_dataset:main:19 - It won't handle multiple JSON files to generate a real-use dataset.
[INFO ] json_to_dataset:main:77 - Saved to: data\CT\train\dataset\liver-8
C:\Users\ai\Desktop\App4AI\app\UNet_GPL-1\bin
labelme_json_to_dataset_python.py
"bin/labelme_json_to_dataset" "data\CT\train\label\liver-9.json" -o "data\CT\train\dataset\liver-9"
[WARNING] json_to_dataset:main:15 - This script is aimed to demonstrate how to convert the JSON file to a
single image dataset.
[WARNING] json_to_dataset:main:19 - It won't handle multiple JSON files to generate a real-use dataset.
[INFO ] json_to_dataset:main:77 - Saved to: data\CT\train\dataset\liver-9
Completed
Press any key to continue . . .
```

```
C:\Users\ai\Desktop\App4AI\app\UNet_GPL-1\bin\labelme_json_to_dataset_python.exe
"bin/labelme_json_to_dataset" "data\CT\val\label\liver-8.json" -o "data\CT\val\dataset\liver-8"
[WARNING] json_to_dataset:main:15 - This script is aimed to demonstrate how to convert the JSON fil
e to a single image dataset.
[WARNING] json_to_dataset:main:19 - It won't handle multiple JSON files to generate a real-use data
set.
[INFO ] json_to_dataset:main:77 - Saved to: data\CT\val\dataset\liver-8
C:\Users\ai\Desktop\App4AI\app\UNet_GPL-1\bin
labelme_json_to_dataset_python.py
"bin/labelme_json_to_dataset" "data\CT\val\label\liver-9.json" -o "data\CT\val\dataset\liver-9"
[WARNING] json_to_dataset:main:15 - This script is aimed to demonstrate how to convert the JSON fil
e to a single image dataset.
[WARNING] json_to_dataset:main:19 - It won't handle multiple JSON files to generate a real-use data
set.
[INFO ] json_to_dataset:main:77 - Saved to: data\CT\val\dataset\liver-9
Completed
Press any key to continue . . .
```

# 4. train

- Click the 4. train button to start training.
- The model path of the training output is in the model folder of the dataset.

**Train** Parameter setting

<b>4. train (GPU)</b>	epochs :	<input type="text" value="100000"/>	<ul style="list-style-type: none"><li>• epochs.</li><li>• bath_size.</li><li>• learning_rate : learning rate.</li><li>• scale : training image size scaling.</li><li>• is_resume : whether to continue training.</li><li>• resume_model : model for continuous training.</li></ul>
<b>4. train (CPU)</b>	bath size :	<input type="text" value="12"/>	
	learning_rate :	<input type="text" value="0.00005"/>	
	scale :	<input type="text" value="1"/>	
	GPU ID :	<input type="text" value="0"/> (0, 1, 2, ... for Nvidia GPU or -1 for CPU)	
<input checked="" type="checkbox"/> is_resume	-> resume model :	<input type="text"/>	



# 5. inference

- Select model => click 5. inference => select an image => get the inference results for a single image.
- Select model => click 6. inference folder => select folder => get inference results for all images in a folder.

**Inference**

model name :

scale name :

mask threshold :

GPU ID :  (0, 1, 2, ... for Nvidia GPU or -1 for CPU)

<b>5. inference (GPU)</b>	<b>6. inference folder (GPU)</b>
<b>5. inference (CPU)</b>	<b>6. inference folder (CPU)</b>

## Parameter setting

- model\_name : model filename for inference.
- scale : the size scaling ratio of the inferred image, it is recommended to be the same as the train setting.
- mask\_threshold : used for inferences with only a single class, only detected when the score is greater than this threshold.

# 5. inference

- Result :

**Inference**

model name :

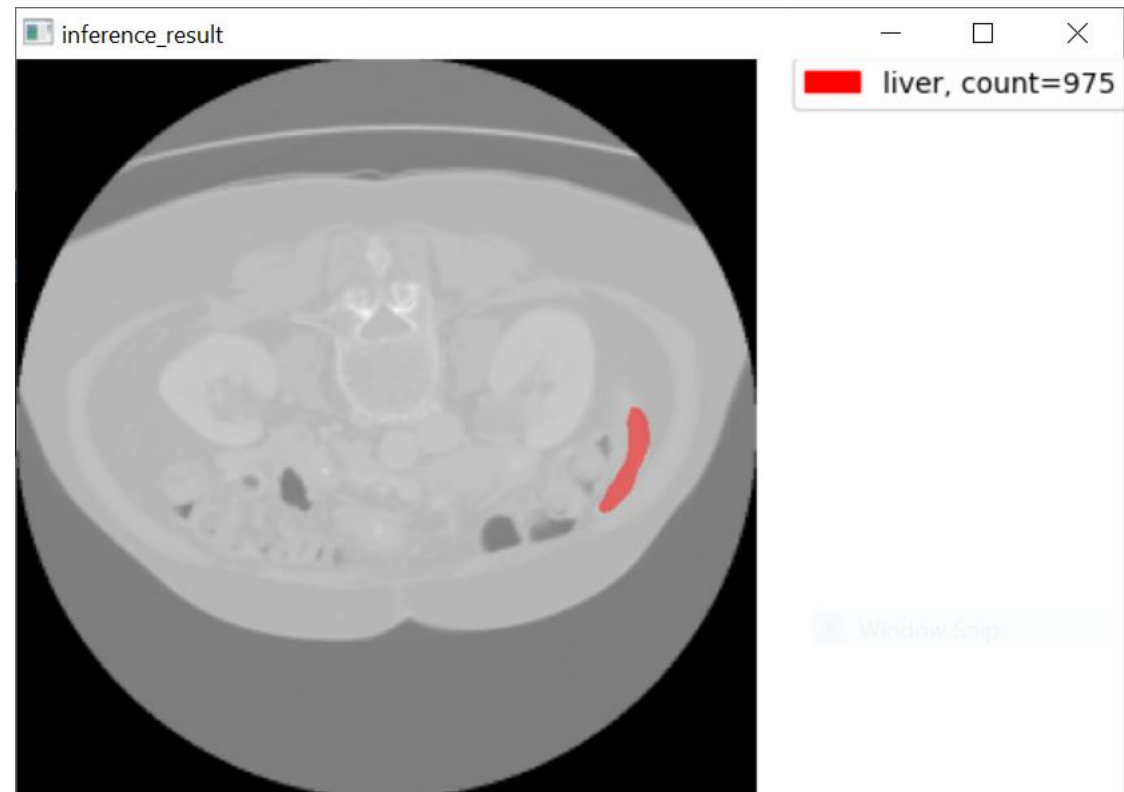
scale name :

mask threshold :

GPU ID :  (0, 1, 2, ... for Nvidia GPU or -1 for CPU)

<b>5. inference (GPU)</b>	<b>6. inference folder (GPU)</b>
<b>5. inference (CPU)</b>	<b>6. inference folder (CPU)</b>

```
C:\Users\ai\Desktop\App4AI\app\UNet_GPL-1\bin\predict.exe  
ion: {func}.")  
C:/Users/ai/Desktop/App4AI/app/UNet_GPL-1/data/CT/train/image/liver-1.png  
liver pixel count = 975
```



# Reference

- Please refer to the readme.txt in the APP folder.
- LEADERG AppsForAI : <https://www.leaderg.com/appsforai-windows>
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