

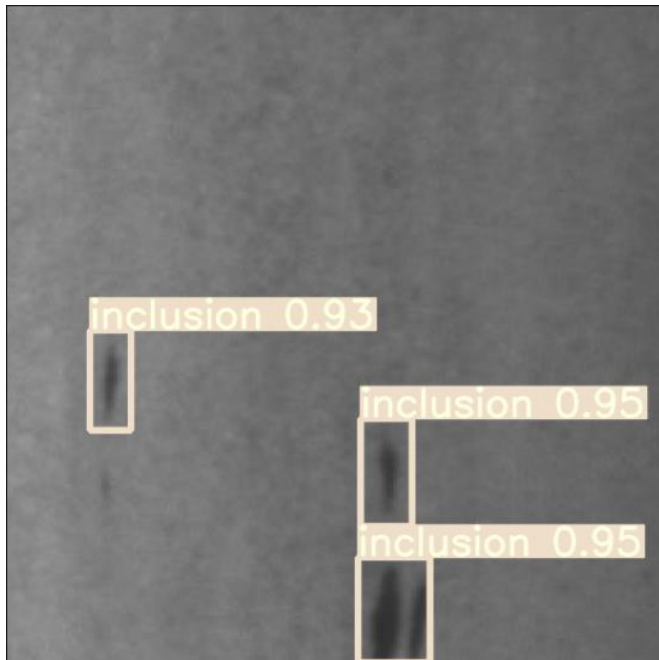
# YOLOv7

The most powerful object detection algorithm in the year 2022.

Version 20230223

# Applications

YOLOv7 can be applied to factory defect detection, medical image analysis, biological image analysis, industrial security image analysis, mask image analysis, etc.



# How to use

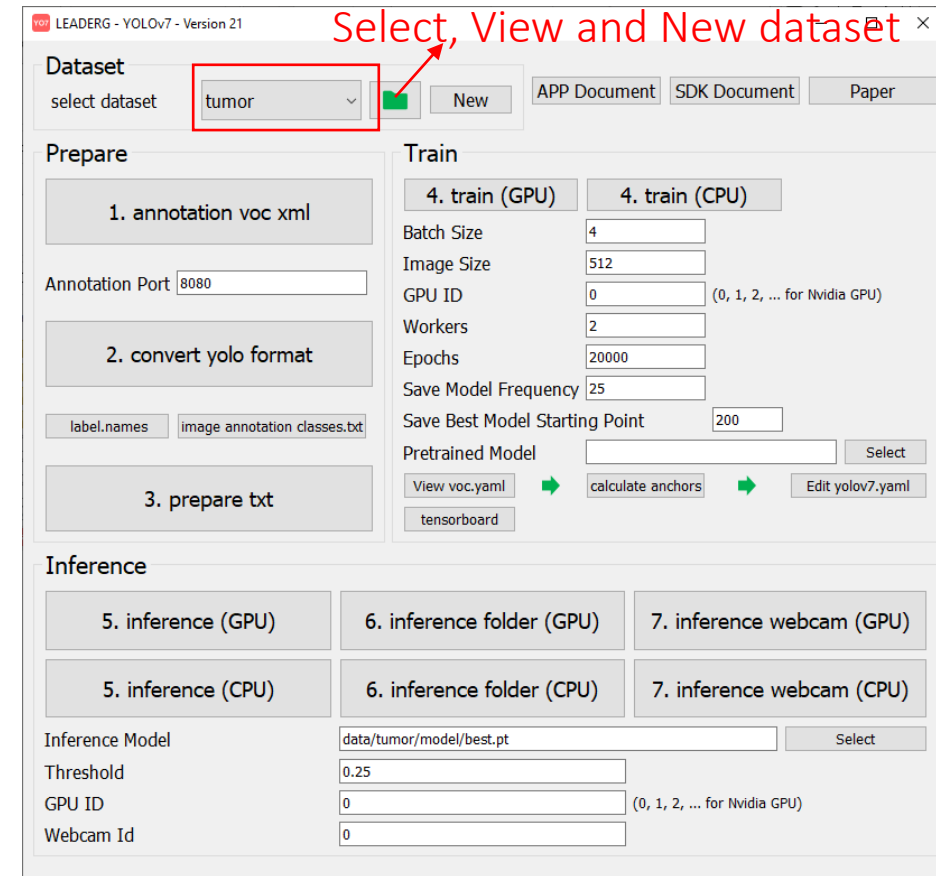
The main process is:

Select dataset -> preprocessing (prepare images, labels, set training parameters) -> training -> inference images

# Select dataset

Select the dataset for training or inference.

- The “Folder” icon button next to the pull-down menu can open the data folder location, which is convenient for users to confirm and modify.
- If you want to create a new dataset by yourself, please press the "New" button, enter the dataset name in the pop-up window (only English and numbers can be used as the dataset name), and press "OK" to complete the creation, that is The name you just entered can be found in the pull-down menu.



# Prepare images

- After pressing the “folder” icon button, click the name of the dataset to be used, and put the images you want to train and infer in the images folder of the train, val, and test folders. The images in the train folder must be at least 9.
- Please add "name to be marked-XXX file name" in front of the training, validation and test image files you put in, such as "inclusion-1.png".
- It is recommended to zoom or crop the training and validation image files to a square image of approximately 512 x 512 size. The zoomed and cropped part of the image can be zoomed and cropped on the annotation page opened by "1.annotation voc xml".

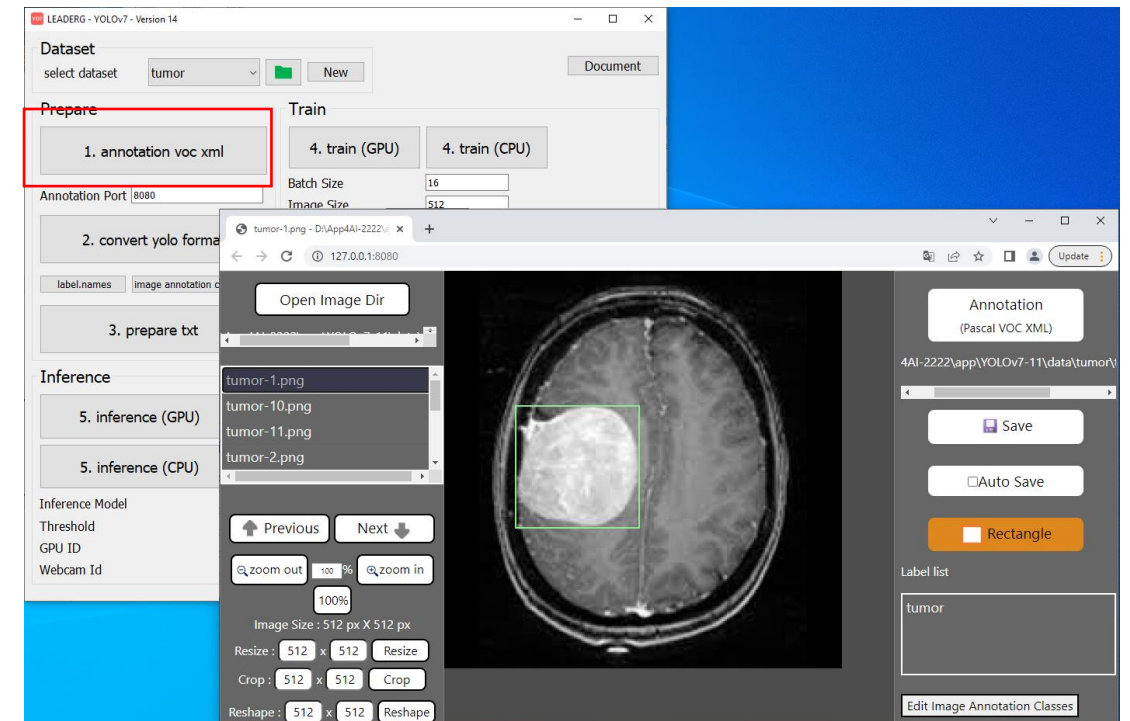
# 1. Annotation voc xml

After running, it will open the annotation webpage for image annotation. Currently, only image formats with file extension .jpeg or .jpg or .png are supported, and images can be cropped, resized, and labeled.

Note:

Both training and validation images need to be annotated. To switch to annotated validation images, please press "Open Image Dir" at the top left to select "your own dataset/val/images", then press "SELECT", then press Under "Annotation" in the upper right, select "Pascal VOC XML" and then select "own dataset/val/annotations" and then press "SELECT".

See Annotation.pdf for how to use annotation pages.

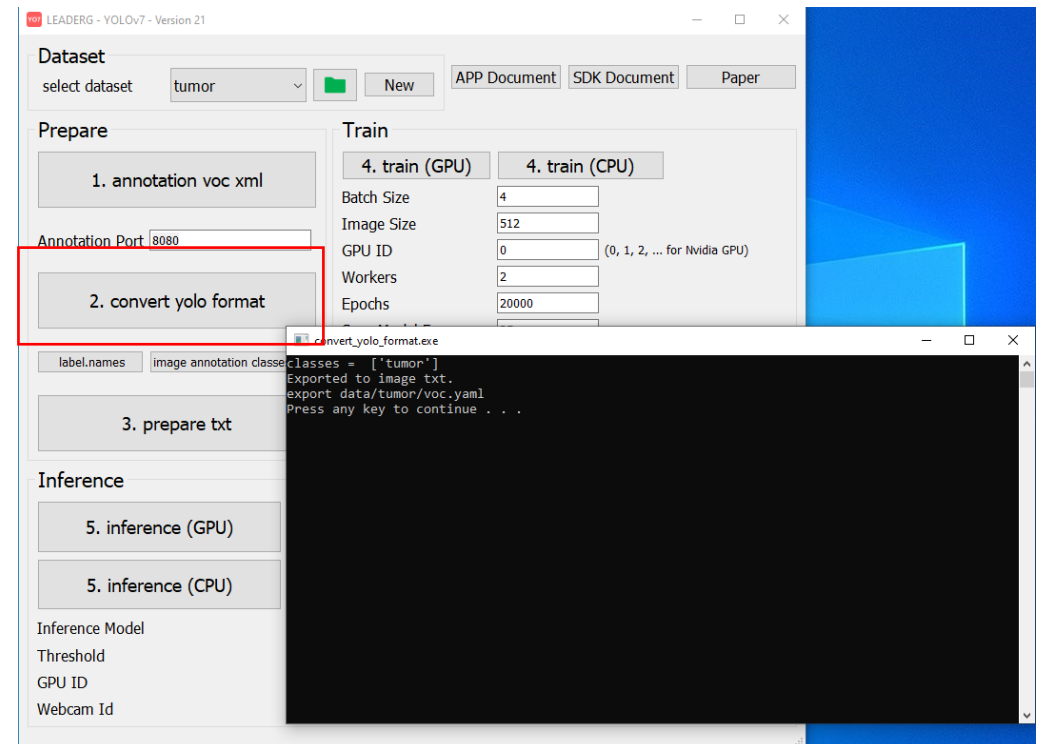


## 2.convert yolo format

After confirming that the category names in the label.names file are correct, you can press the button to convert the voc xml tag file to yolo format.

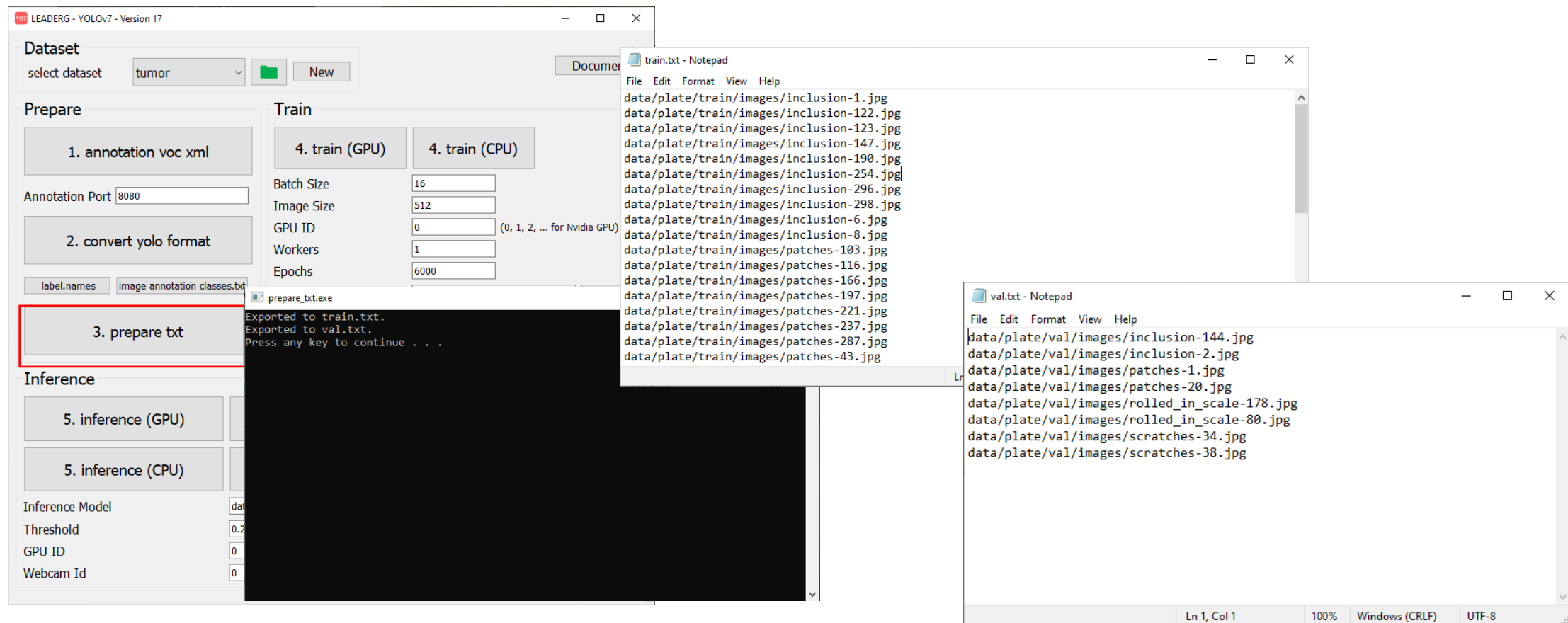
You can press [label.names] to edit the category names. The format uses a newline to distinguish multiple categories.

[image annotation classes.txt] is the category name used when the annotation webpage.



# 3.prepare txt

Generate training image path files “train.txt” and “val.txt”.





# Set yolov7.yaml parameters

Press [calculate anchors] to calculate the anchor point value suitable for your dataset. Before running, please confirm [label.names] and whether the category filled in the content is correct. Then press [edit yolov7.yaml] to set the number of categories and anchor points. The number of categories must be the same as voc.yaml. The value of the anchor point is a group of six numbers. Divide into three groups and fill in the 18 numbers in the red box into the anchors in parentheses.

The screenshot displays the YOLOv7 training interface (LEADERG - YOLOv7 - Version 21) and a Notepad editor showing the `yolov7.yaml` file.

**YOLOv7 Interface:**

- Dataset:** select dataset: tumor
- Prepare:** 1. annotation voc xml, 2. convert yolo format, 3. prepare txt
- Train:** 4. train (GPU), 4. train (CPU)
- Batch Size:** 4
- Image Size:** 512
- GPU ID:** 0
- Workers:** 2
- Epochs:** 20000
- Save Model Frequency:** 25
- Save Best Model Starting Point:** 200
- Pretrained Model:** (empty)
- Buttons:** View voc.yaml, calculate anchors, Edit yolov7.yaml, tensorboard

**Notepad Editor (yolov7.yaml):**

```
# parameters
nc: 4 # number of classes
depth_multiple: 1.0 # model depth multiple
width_multiple: 1.0 # layer channel multiple

# anchors
anchors:
  - [12,16, 19,36, 40,28] # P3/8
  - [36,75, 76,55, 72,146] # P4/16
  - [142,110, 192,243, 459,401] # P5/32

# yolov7 backbone
backbone:
  # [from, number, module, args]
  [[-1, 1, Conv, [32, 3, 1]], # 0

  [-1, 1, Conv, [64, 3, 2]], # 1-P1/2
  [-1, 1, Conv, [64, 3, 1]],
```

**Terminal Output:**

```
anchors = 40,30, 51,57, 75,45, 67,80, 91,86, 83,117, 120,114, 128,152, 159,157
Press any key to continue . . .
```

**Annotations:**

- Blue arrow pointing to `nc: 4` in the Notepad editor: Fill in the number of categories
- Blue arrow pointing to the terminal output: Fill in the value displayed by CMD

# 4. train (GPU)

# 4. train (CPU)

Start training.

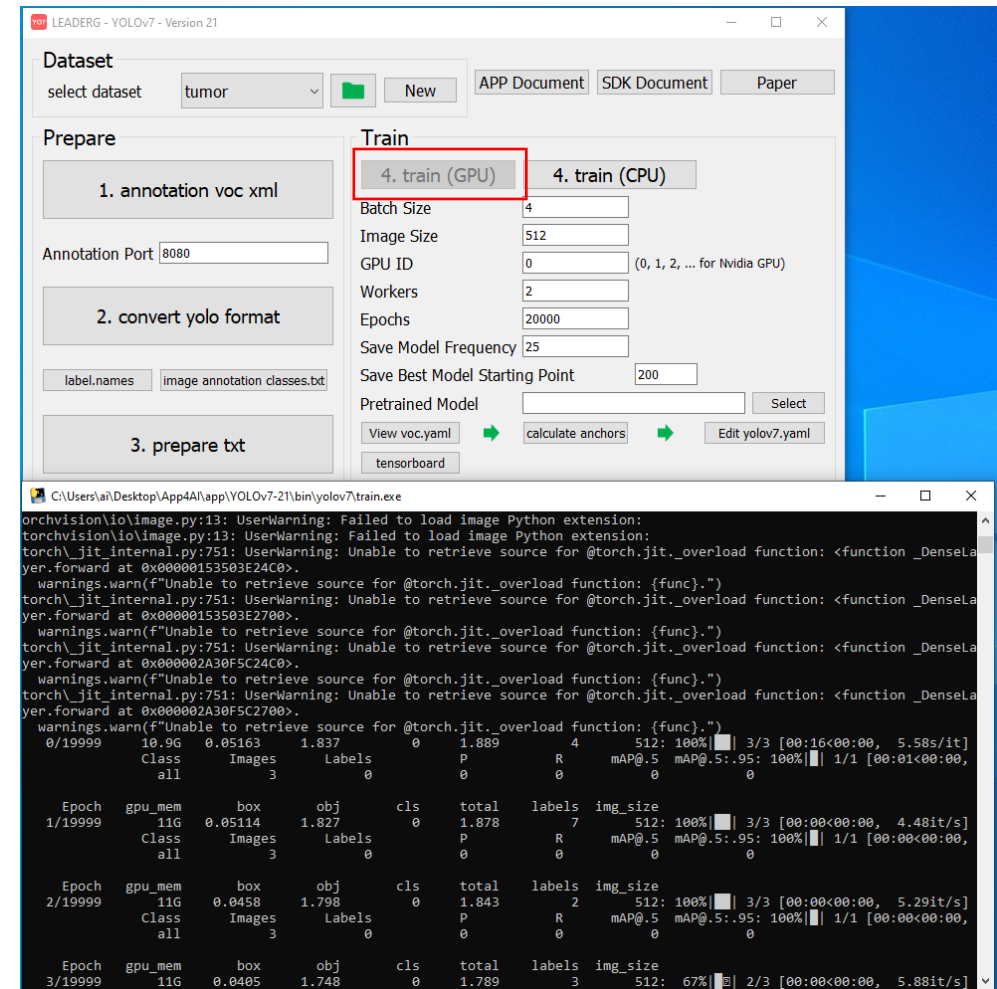
Note:

Pretrained Model is the pretrained model path used, None means not to use the pretrained model for training.

Epochs is the number of training epochs.

Save Model Frequency is the model saves the model every few epochs.

Save Best Model Starting Point is the number of epochs, when the model is the current best model, save the current model.

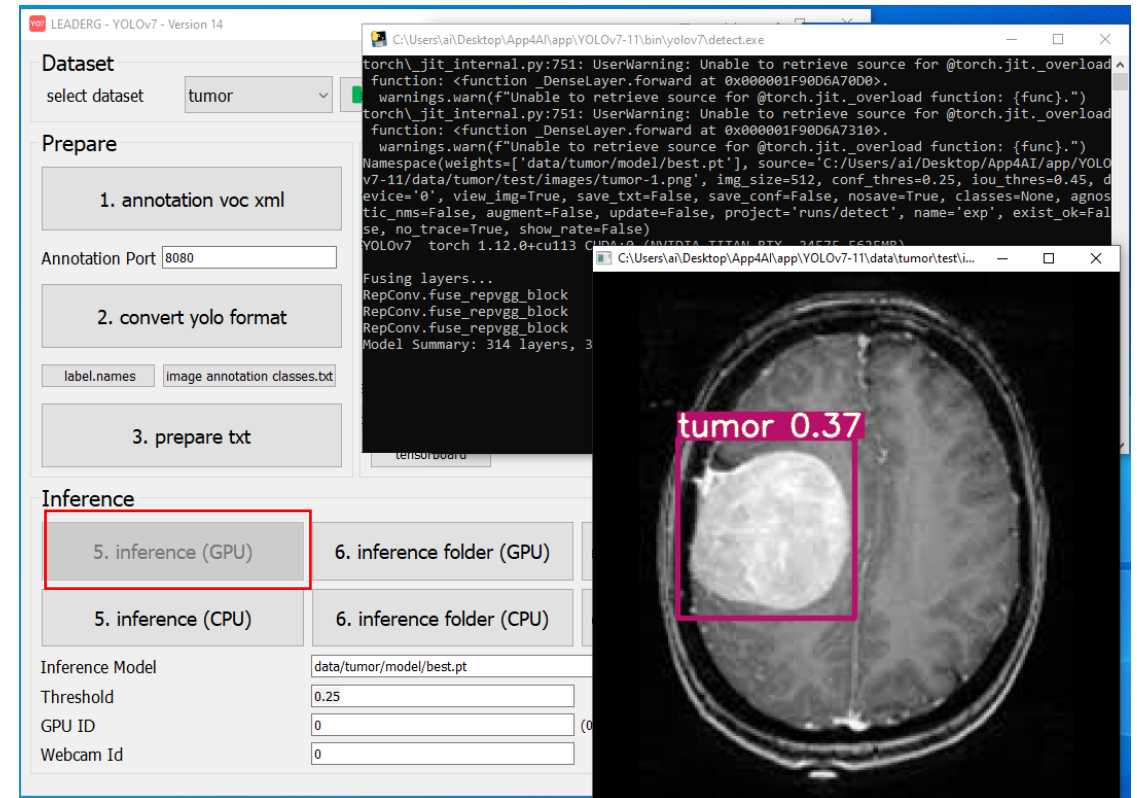


# 5. inference (GPU)

# 5. inference (CPU)

Infer a single image.

Choose the Inference Model yourself.



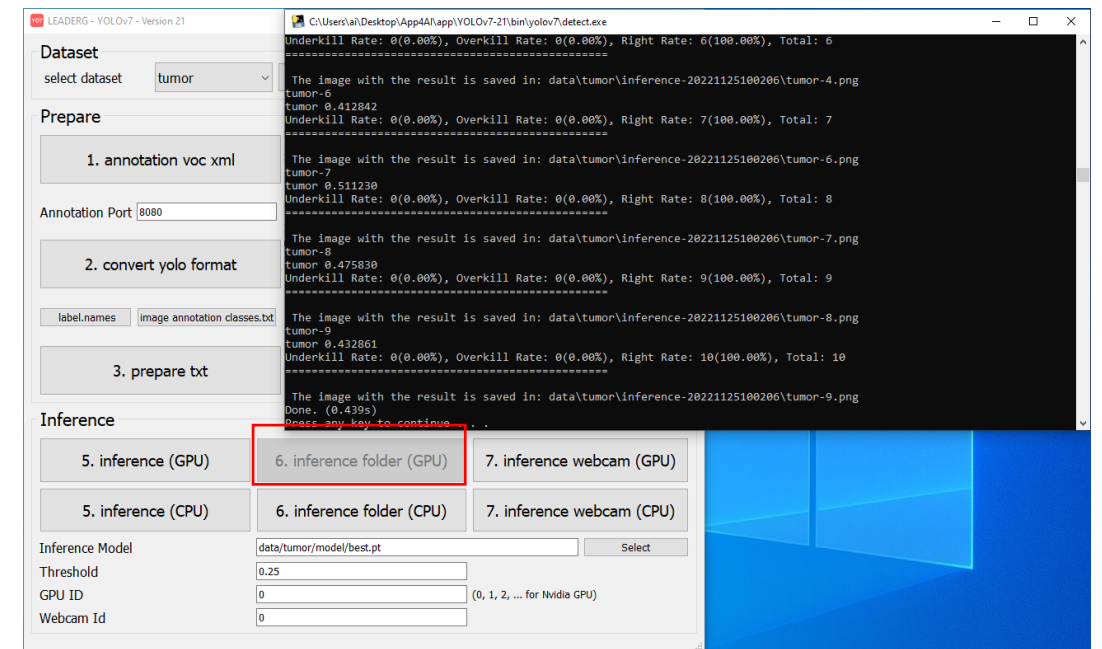
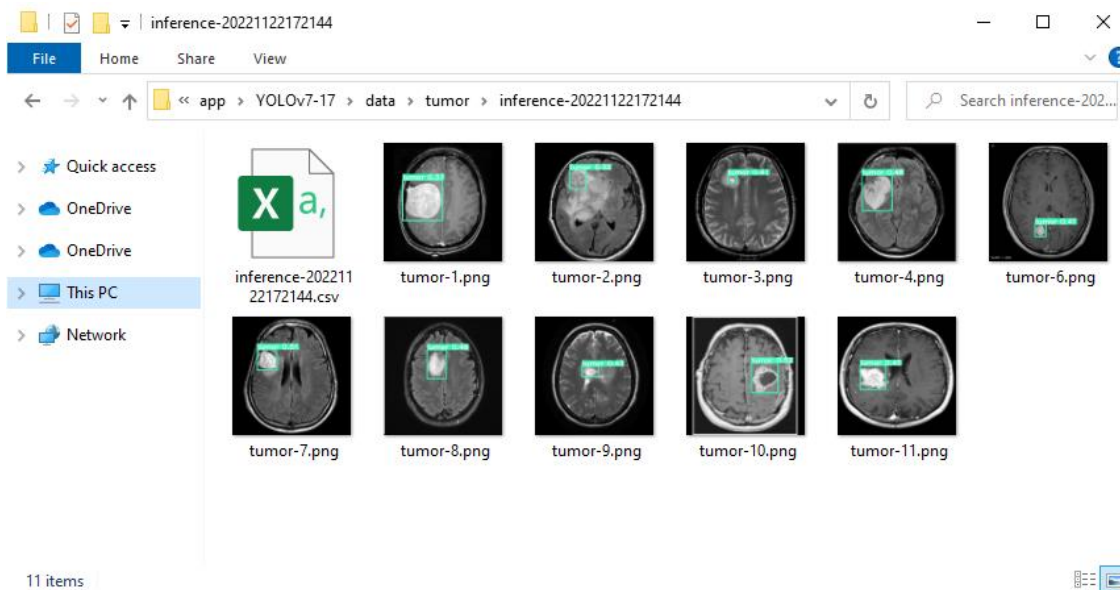
# 6. inference folder (GPU)

# 6. inference folder (CPU)

Infer all images in the folder.

Choose the Inference Model yourself.

Coordinate information and image results are stored in the "inference-XXX" folder.



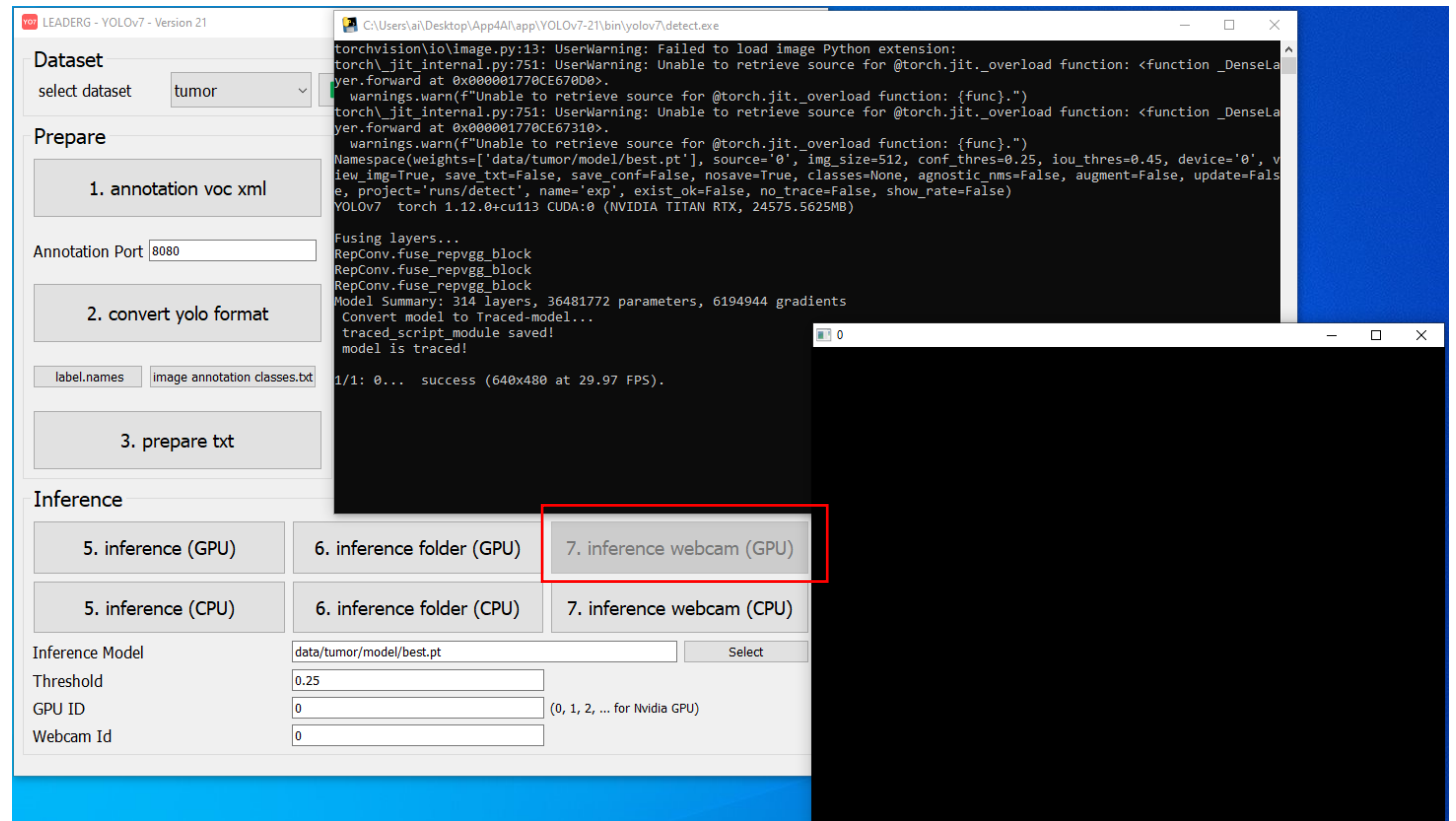
# 7. inference webcam (GPU)

# 7. inference webcam (CPU)

Infer the image of the webcam.

The Webcam Id parameter below can set the specified webcam.

Choose the Inference Model yourself.



# Reference

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