



AiDitron

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# AiDitron Guide



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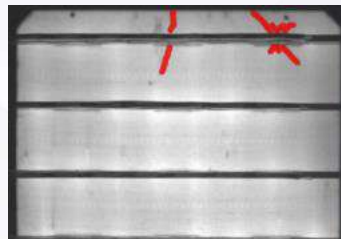
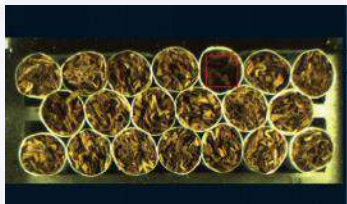
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01

# About AiDitron

**AiDitron is an artificial intelligence software based on neural network algorithm, aiming at locating and recognizing target objects or defects.**

**The software is easy to use. It provides three fundamental functions: “Location” , “Segment” and “Classify” . You can use one of these functions or combine them to meet your demands.**



**OCR**

**Location**

**Defect recognizing**

**Classification**

## System requirements

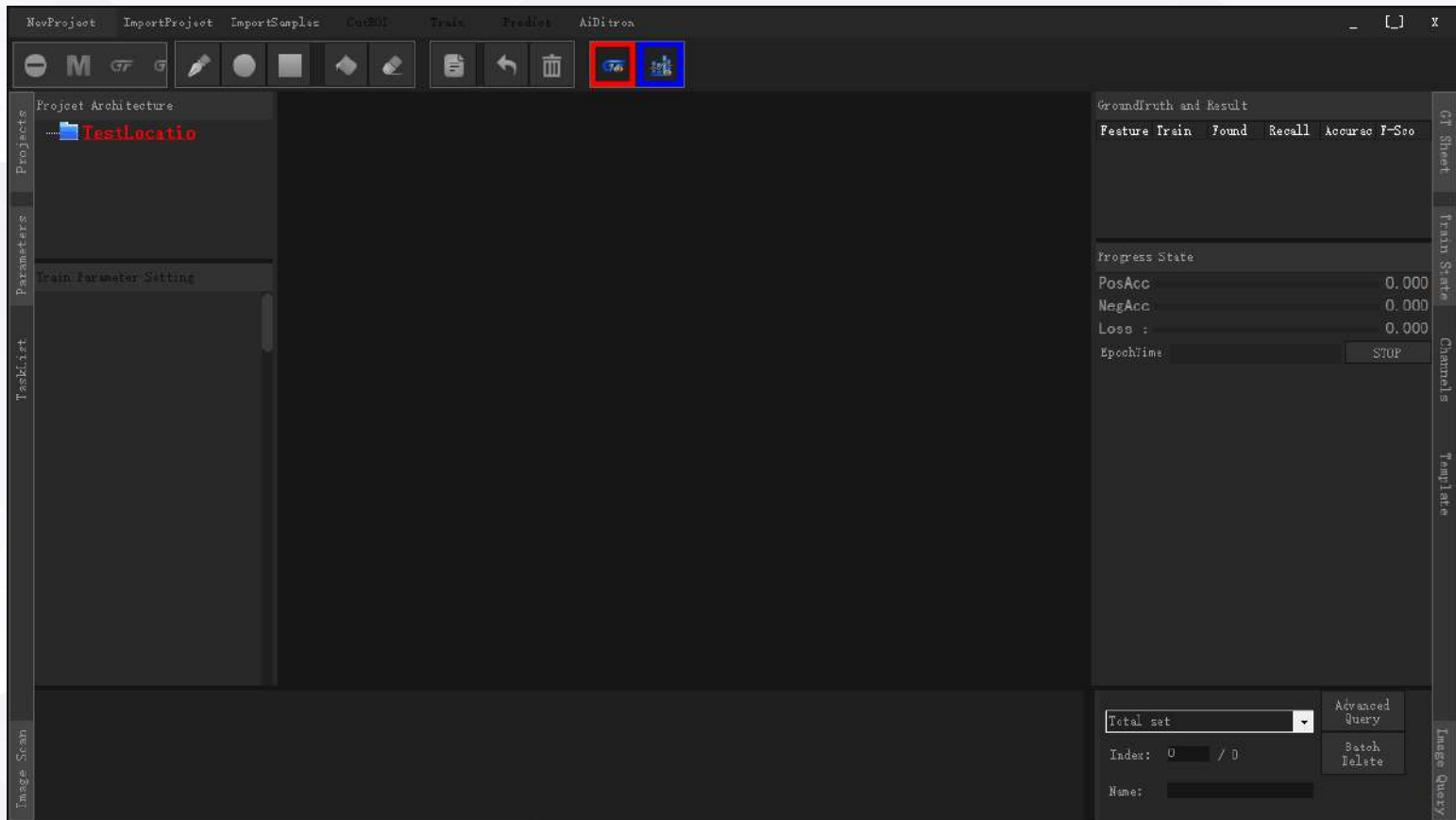
1. CPU: Intel Core i5 (minimum), Intel Core i7/Xeon (recommend)
2. GPU: Nvidia Graphic Card (CUDA compute capability $\geq$ 3.0)  
Recommend GPU: GTX1060-1070-1080, GTX TITAN or above (with more than 6GB RAM)
3. RAM: At least 8GB
4. OS: Windows7/10-64

Image format supported: .PNG .BMP .TIFF .JPEG

## Functions

- 1. Location:** Locate objects on the image. Excellent at locating and classifying objects, this function is suitable for locating and classifying objects with fixed shape, especially OCR.
- 2. Segment:** This function can perform examine of pixel level, suitable for examining objects of irregular shape, usually used for finding defects or small objects.
- 3. Classify:** Classify the scene of the image. With strong classifying ability, this function is suitable to distinguish image of different categories that require high recognition rate.

# Software interface



The screenshot displays the AiDitron software interface. The top menu bar includes options: NewProject, ImportProject, ImportSamples, CutROI, Train, Predict, and AiDitron. The toolbar contains icons for file operations and training. The main workspace is divided into several panels:

- Project Architecture:** Shows a folder named "TestLocatio".
- Parameters:** Contains a "Train Parameter Setting" section.
- Tasklist:** A vertical list of tasks.
- Image Scan:** A section at the bottom left.
- Groundtruth and Result:** A panel on the right showing training metrics: Feature Train, Found, Recall, Accurse, F-Sco.
- Progress State:** A table showing training progress:

Progress State	
PosAcc	0.000
NegAcc	0.000
Loss :	0.000
Epochtime	STOP

- Image Query:** A panel at the bottom right with a "Total set" dropdown, "Advanced Query" button, "Index: 0 / 0", "Name:" field, and "Batch Delete" button.

## Labels& result statistics:

Feature	Train	Found	Recall	Accuracy	F-Sco
Defect1	2780193	0			
Defect2	3962605	0			

**Feature:** Category of object;

**Train:** Number of objects to be trained

(Location function: objects labeled;

Segment function: number of pixels of labeled area;

Classify function: number of images labeled)

**Found:** Objects found after training, same unit as Train;

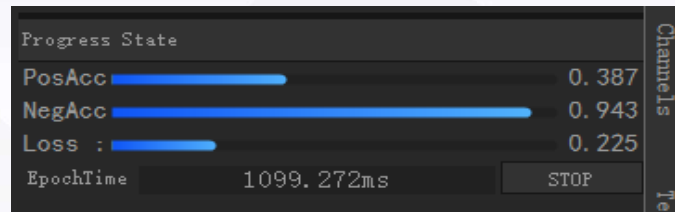
**Recall:** Recall rate, correctly recognized objects/ Objects to be trained (Train) ;

**Precis:** Recall accuracy, correctly recognized objects/ Objects Found(Found);

**F-Sco:**  $F\text{-score} = (2 * \text{precision} * \text{recall}) / (\text{precision} + \text{recall})$

## Progress State:

Real time data during training.



**PosAcc:** Positive accuracy, measures recognition accuracy of object. Range from 0 to 1. The higher the training is better.

**NegAcc:** Neagtive accuracy, measures recognition accuracy of background objects. The higher is better.

**Loss:** Measure the difference between recognition result and label. The lower is better.






## Obtain and use software:

**Phase 1:** Check if the pc system meets the requirements of the software.

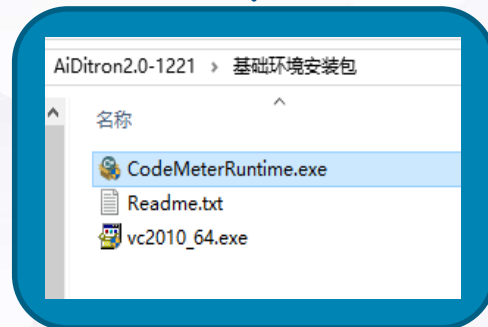
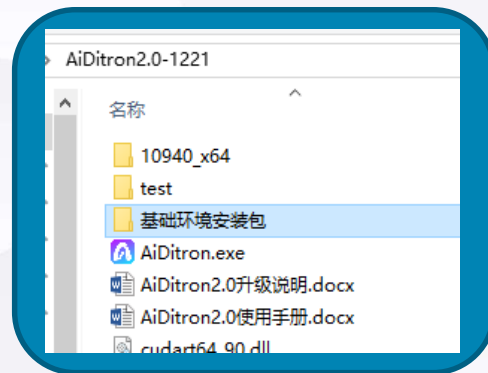
**Phase 2:** Extract AiDitron2.0-20190613.RAR, then install vc2015\_x64\_14.0.24215.exe and CodeMeterRuntime.exe from “Base environment installation packages” (基础环境安装包) folder (link provided by seller or related staff)

**Phase 3:** Log in software:

1) Online trial user: double click  AiDitron.exe to open the software to see the following login page. Input user name& password and submit to login.



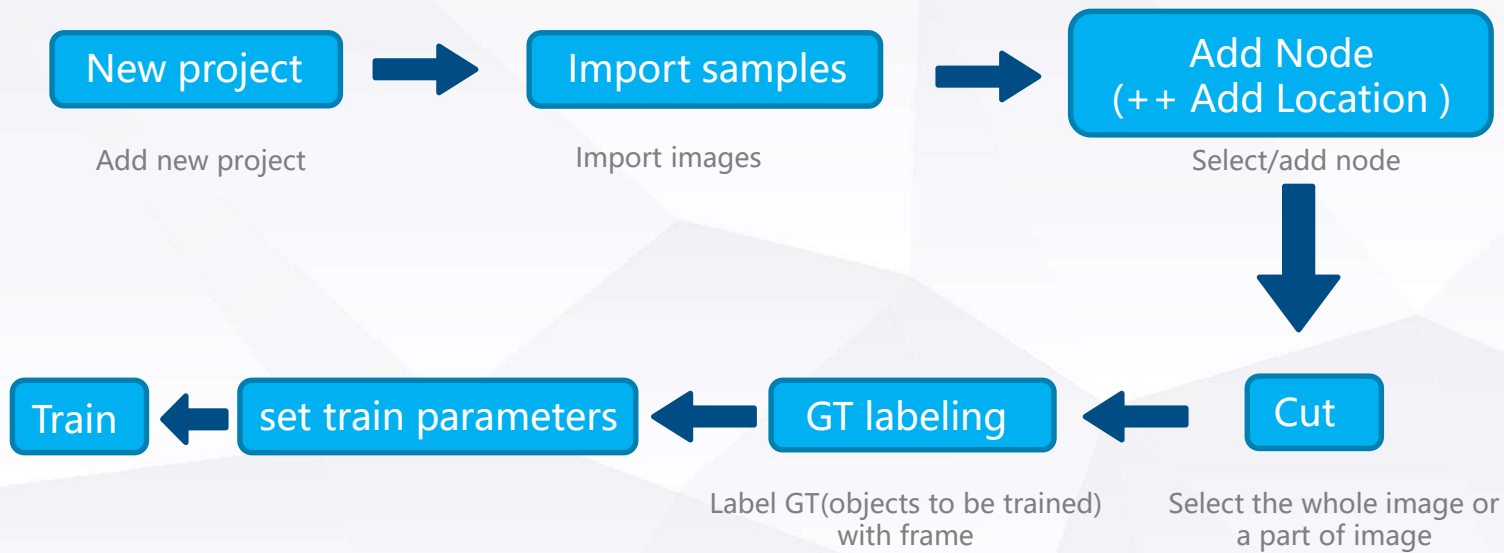
2) Those with dongle: Plug in the dongle and double click to open the software and automatically login.



## 02

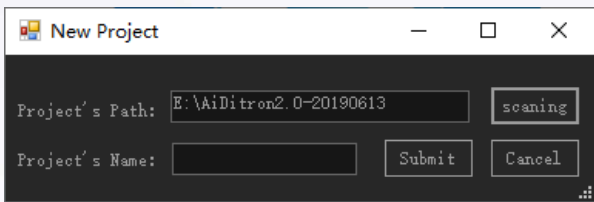
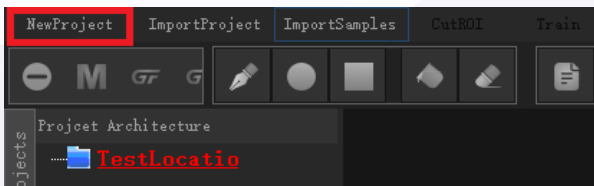
# Location Function

Operation procedure:

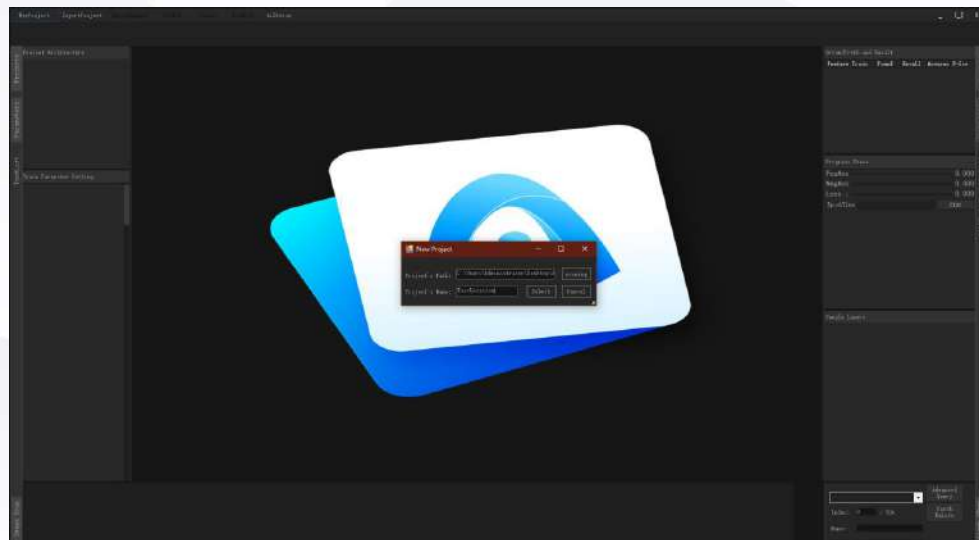


## 1.New project:

Click New Project on toolbar and you will see the following pop-up dialog, then select project path(where the project to be saved) and input project name.

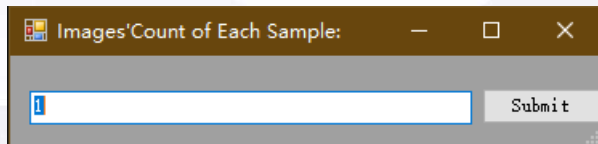


project name

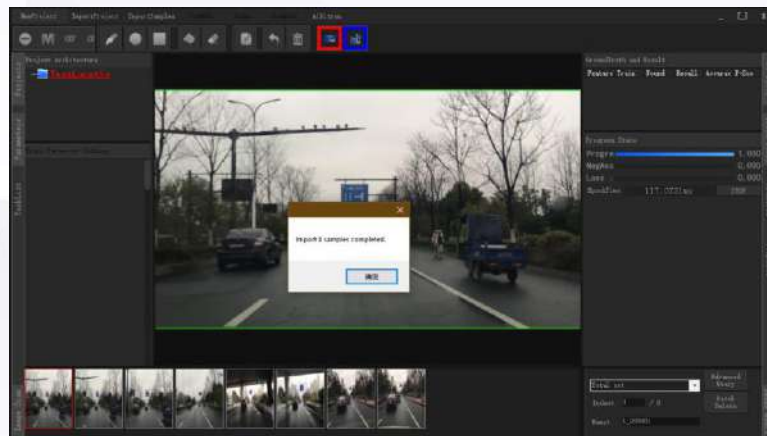
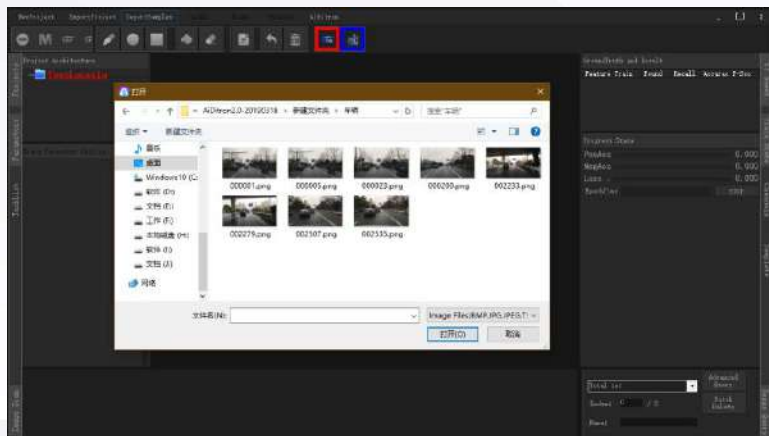


## 2.Import Sample:

Select your project and then click Import Sample on the toolbar to see the following pop-up dialog. The default is 1 and there no need to change it.



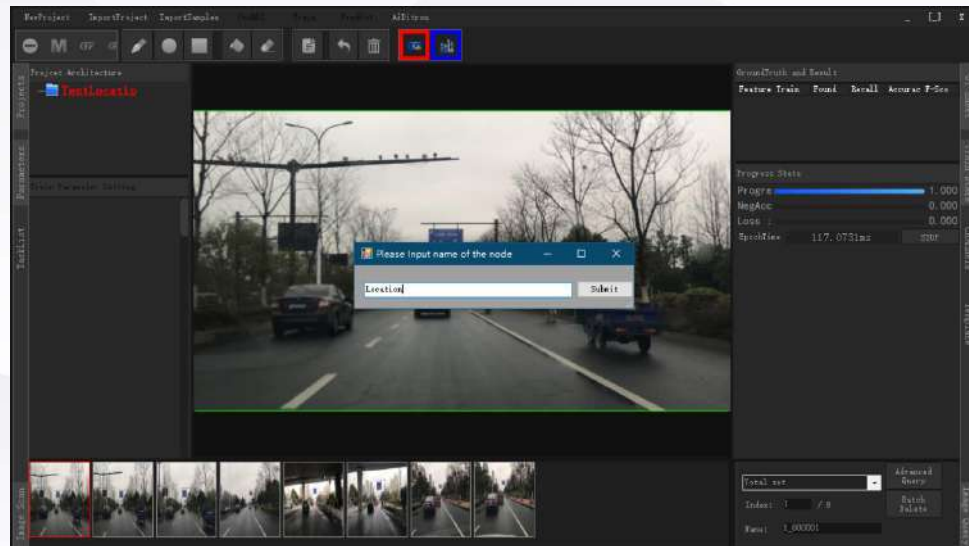
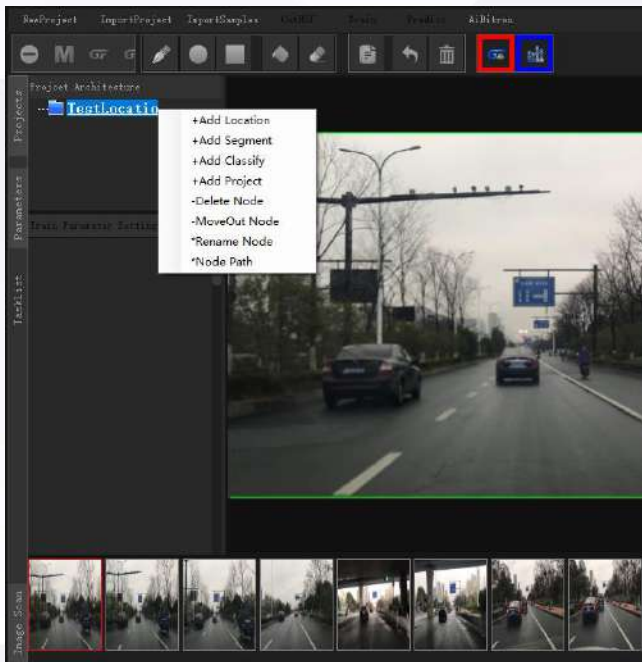
Click Submit to select a folder from the following pop-up dialog. Select and click Open to import images you want to train.



After the image being imported, click Confirm(确定)

### 3. Add node:

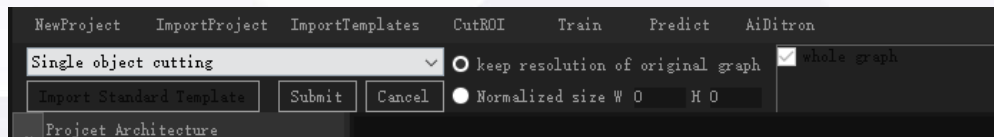
Select Project Architecture from the left sidebar to find your project, right click and select "+Add Location" to add a project node.



Input node name in pop-up dialog (Only English characters ) and submit.

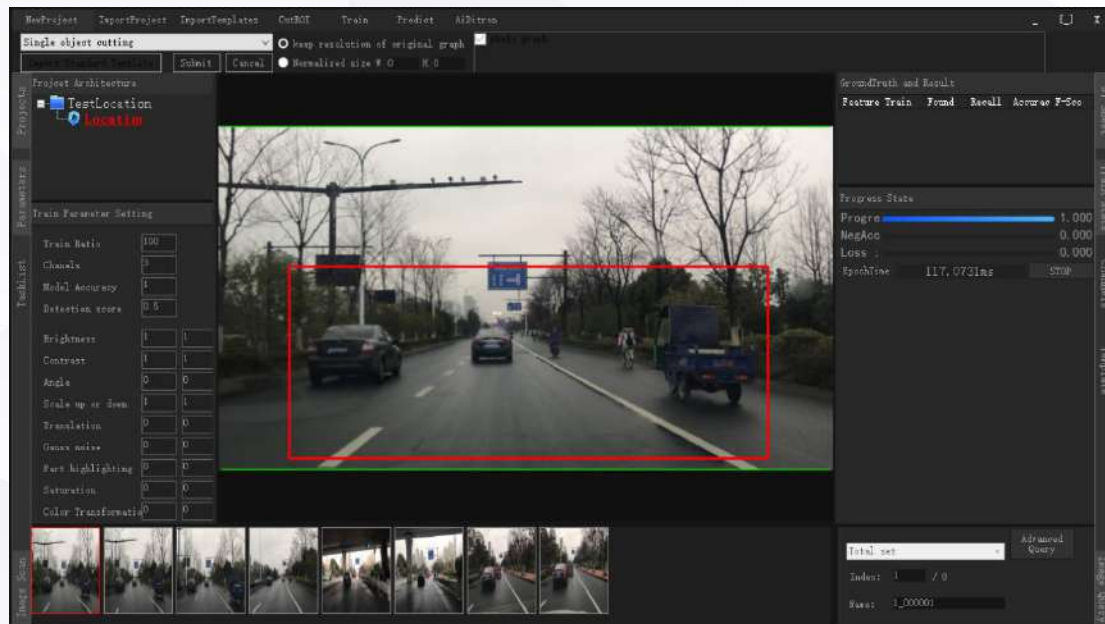
## 4. CutROI

Select the node you added from Project Architecture, then click CutROI on toolbar to adjust the image size.



1)By selecting “keep resolution of original graph” , you can use Shift+ mouse wheel (Width) and Alt+ mouse wheel (height) to adjust the size of ROI. You can also click and hold mouse to adjust the size. If no adjustment is performed, the whole image will be preserved.

2)By using “Normalized Size” , you can assign specific resolution; you can also click and hold mouse to adjust the size. After the adjust process, press Submit to apply the cut procedure.



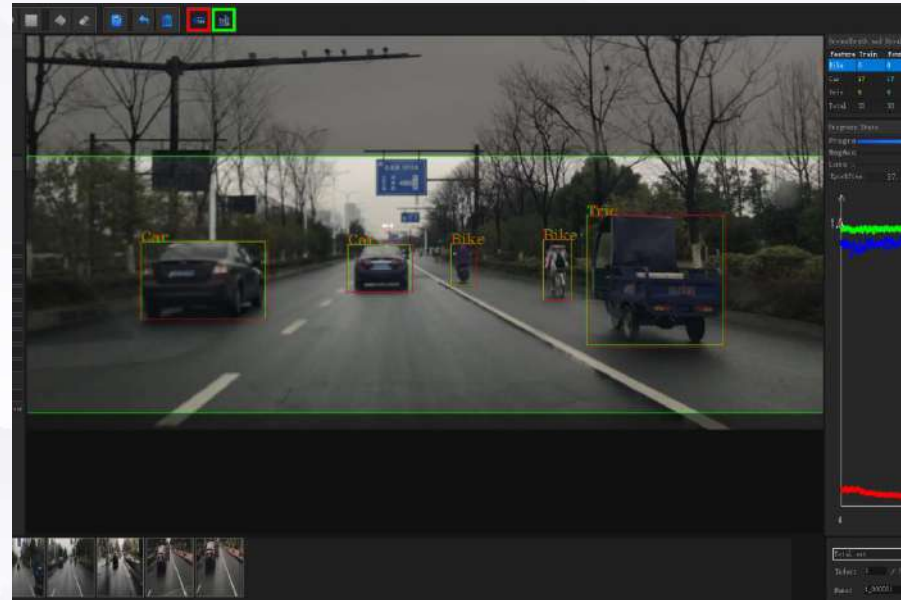
## 5. GT labeling ( “Location” function labels an object by drawing frame around it):

1) If the object is too small, use mouse wheel to zoom in or zoom out

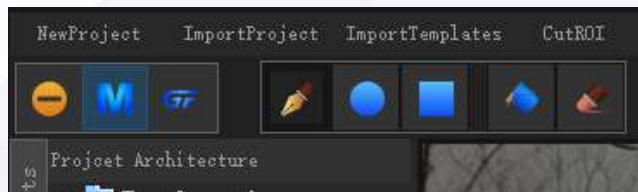
2) Labeling frame can be divided into two types, nesting type and dragging type. Nesting Type is used for objects of fixed size, and dragging type is used for objects of uncertain size.

When labeling for the first time, default type is dragging type. After the CutROI Procedure, hold and drag mouse to draw a red frame. The frame shouldn't be too large, and should just cover the object. Then input the name of object, i.e., the “Feature” . Then move mouse and the frame will follow, when move to the next object (Object of same type), right click to label. In terms of different objects, use Shift+ wheel and Alt+ wheel to adjust frame size and input object name. Dragging type can also get the same effect.

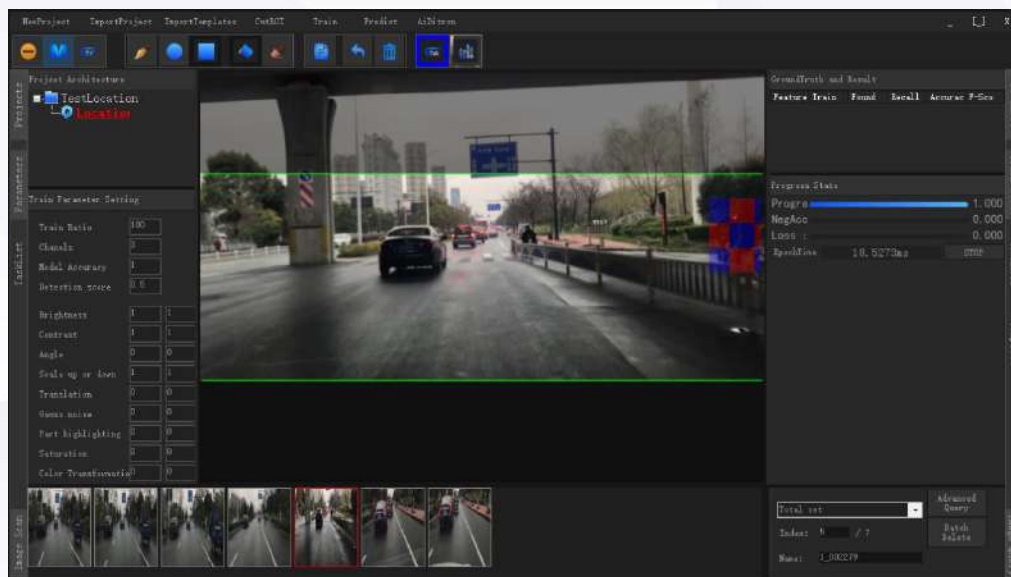
Then repeat the previous procedure to label all the objects, the following image is an example. The objects to be labeled are “Car” , “Bike” and “Tric” . (When labeling, the frame shouldn't be too large and just cover the object, a too large frame will decrease recognizing accuracy. Object name shouldn't contain Chinese character or special symbols)



In terms of those parts you don't want to attend training (For example, there are too many objects in one image), use the “M” on the left of toolbar mask.



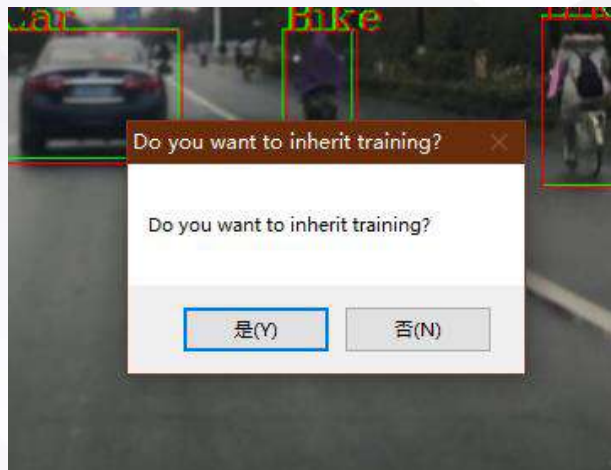
Then use “Brush” “Circle” or “Square” to label, and right click to confirm.





\*This process is performed when Phase7 train is over and you need to label more objects.

In terms of imported samples, some of the images and be unlabeled for test. After training, those unlabeled images will go through test. If object is incorrectly recognized, you can continue the labeling procedure.(If you only want to label incorrect objects, please MASK correct objects, otherwise all the objects should be labeled), and then train again. Then there will appear the following pop-up dialog.



If the train parameter isn't changed, select "Yes" (是); if the parameter changed, select "No" (否). Also you can perform Phase2 & Phase4 again to test newly imported image when all the objects are labeled, and Phase 7 performed.



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## 6. After all the samples are labeled, set train parameters.

Train parameters includes:

Train Ratio, Channels, Model Accuracy, Detection score, Brightness, Contrast, Angle, Scale up or down, etc. Move mouse to each to check out its function.

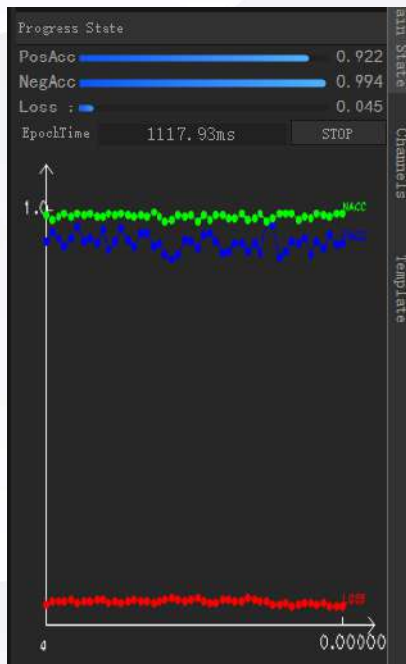
If you have wrongly recognized or missed objects, try changing parameters.

We are also willing to help you if you have any question about parameters.

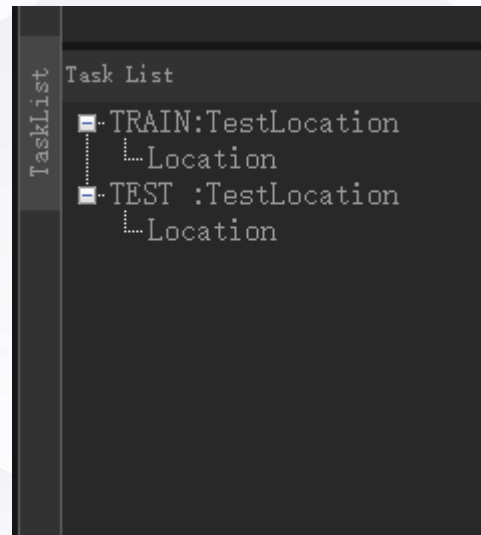
Parameters		Train Parameter Setting	
TaskList	Train Ratio	<input type="text" value="100"/>	
	Channels	<input type="text" value="3"/>	
	Model Accuracy	<input type="text" value="1"/>	
	Detection score	<input type="text" value="0.5"/>	
	Brightness	<input type="text" value="1"/>	<input type="text" value="1"/>
	Contrast	<input type="text" value="1"/>	<input type="text" value="1"/>
	Angle	<input type="text" value="0"/>	<input type="text" value="0"/>
	Scale up or down	<input type="text" value="1"/>	<input type="text" value="1"/>
	Translation	<input type="text" value="0"/>	<input type="text" value="0"/>
	Gauss noise	<input type="text" value="0"/>	<input type="text" value="0"/>
	Part highlighting	<input type="text" value="0"/>	<input type="text" value="0"/>
	Saturation	<input type="text" value="0"/>	<input type="text" value="0"/>
	Color Transformation	<input type="text" value="0"/>	<input type="text" value="0"/>
	Salt-Pepper noise	<input type="text" value="0"/>	
Clarity	<input type="text" value="0"/>	<input type="text" value="0"/>	
	<input type="checkbox"/> FlipVertical	<input type="checkbox"/> FlipHorizor	

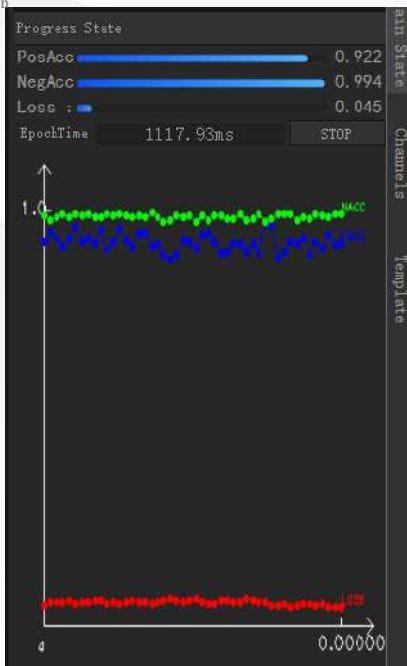
## 7. Train and test



After all the previous procedure are performed, click the “Train” button to start training, and progress state will display training statistics.

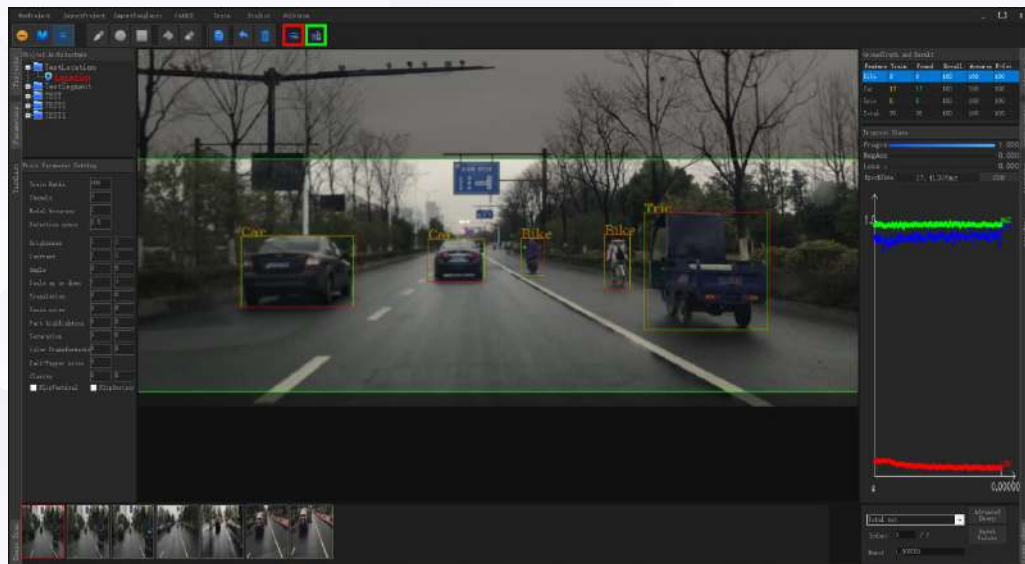


“TaskList” displays current task and tasks remain to be done.

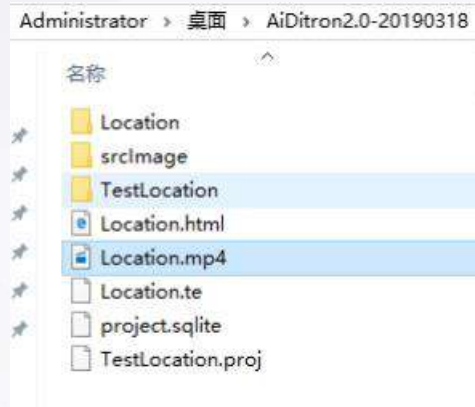




When PosAcc and NegAcc stabilize at over 90% (higher is better, 10+ continuous over 90%), click stop and "Test" in "TaskList" will be automatically performed. In the following image, the green frames coincide with red label frames are test results. You can use "Ctrl+Space" and "Space" to hide or show label and test result (Right click  and  button on the toolbar can also get the same effect. Left click to change color.)



After test, test report will be save in the program folder as `***.html` and `***.MP4`. You can open the folder by right click "Program Name" -> "path" to open



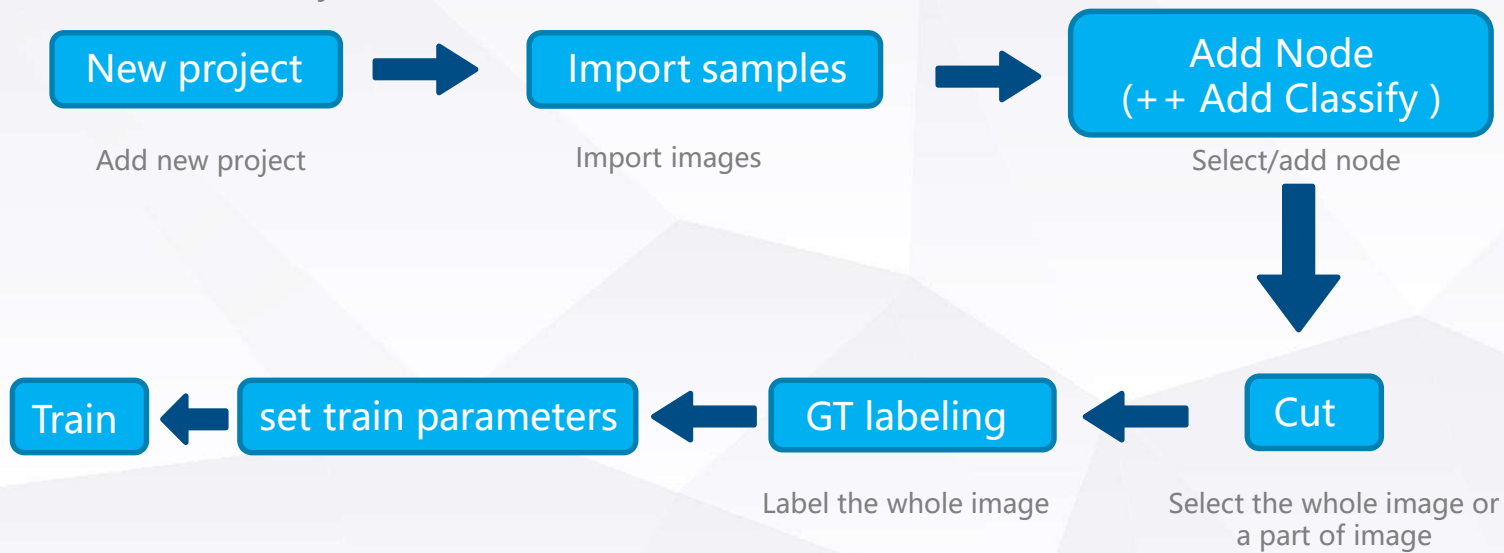
Double click to open the report or just send it to customer.

## 03

# Classify Function

## Operation procedure:

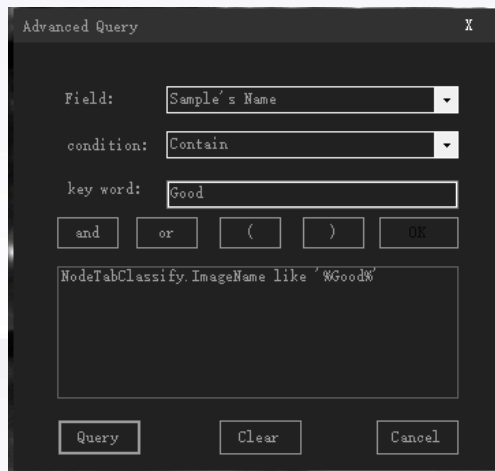
Phase 1, 2, 4, 6, 7 are same as "Locate Object", in Phase 3 select "+Add Classify"



## 5. GT labeling (whole image as object, i.e., label the image):

1) Single image labeling: When previewing the image, you can input label of the current image.

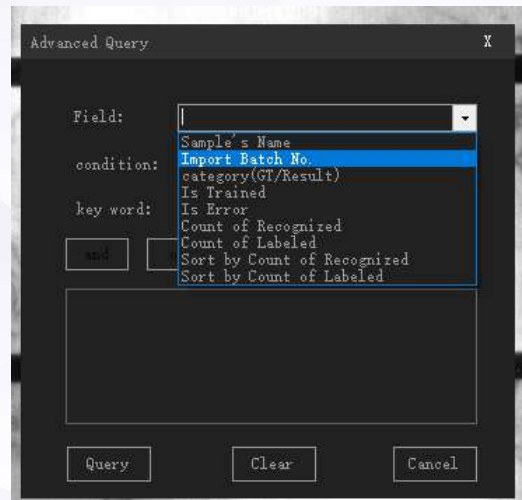
2) Batch labeling: Batch label several images (of same type). If the file name are alike, for example Good001.bmp, Good002.bmp...; Bad001.bmp, Bad002.bmp ..., you can use "Advanced Query" in the right sidebar to query certain images. For example, in the following image, select "Field" "condition" and "key word" to query image contain the word "Good" .



After query, click "Batch Label" to label all the images selected.

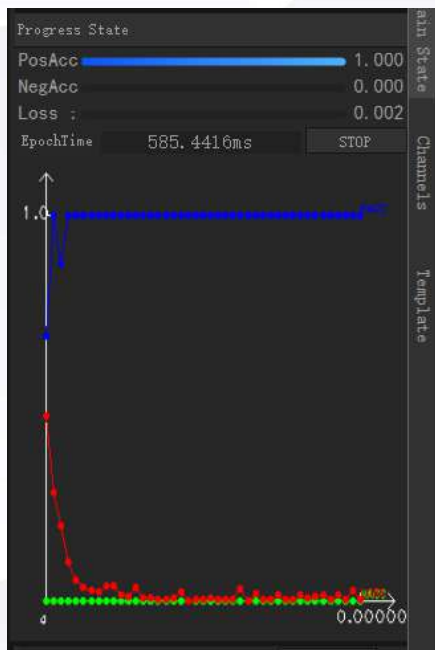


You can also query and label by Batch No.

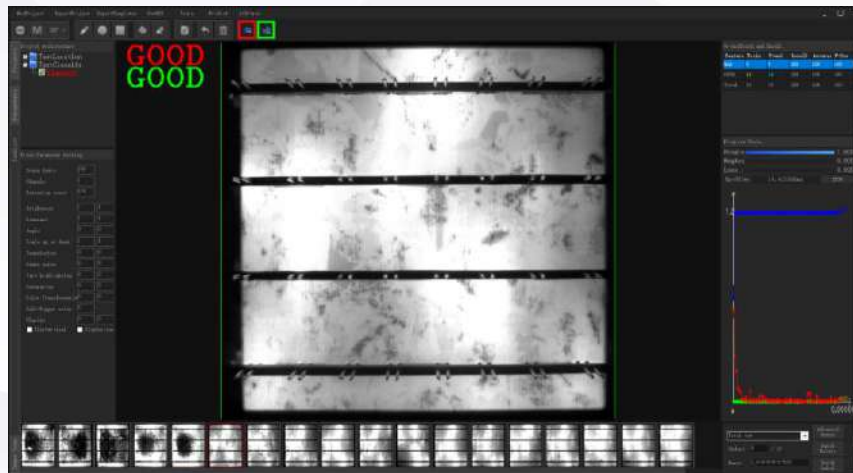


## 7. Train and test

After all the previous procedures are performed, click the “Train” button to start training, and progress state will be real-time displayed.



When PosAcc stabilize at over 90% (higher is better) click “stop” and “Test” in “TaskList” will be automatically performed, like in the following image



Label and test result are displayed on the upper left corner. Like in the “Locate Project” , you can hide or show label and result and change the color.

You can also check out project report the same way as in “Location” .

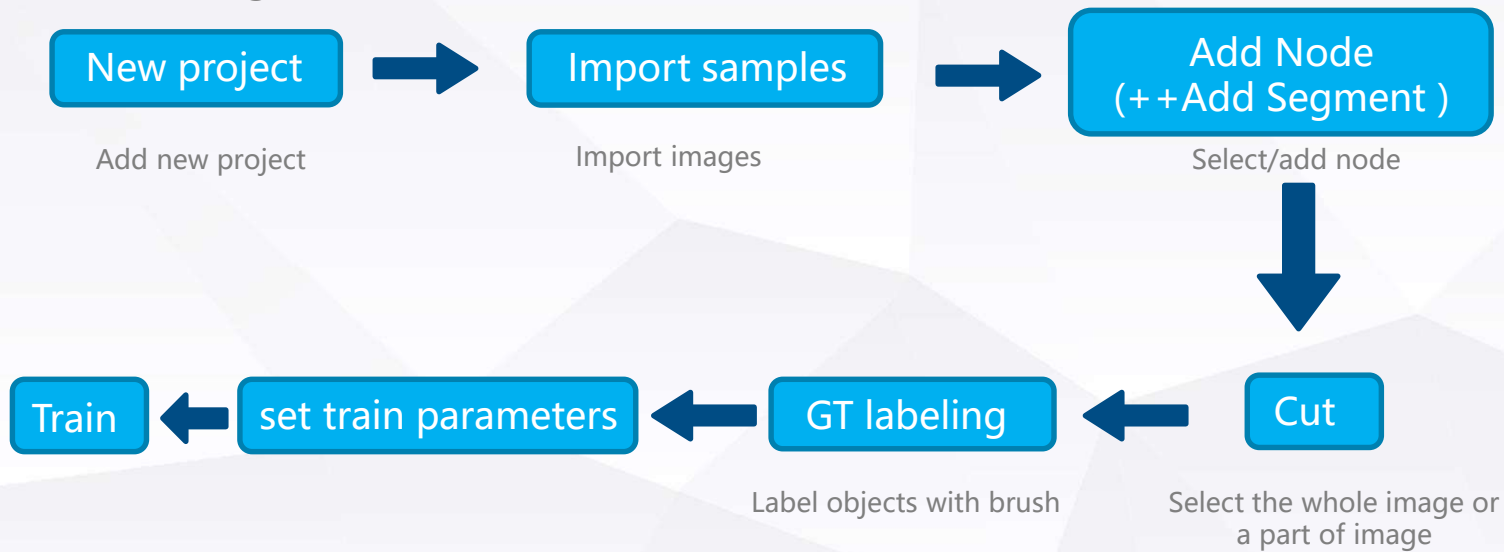


## 04


# Segment Function

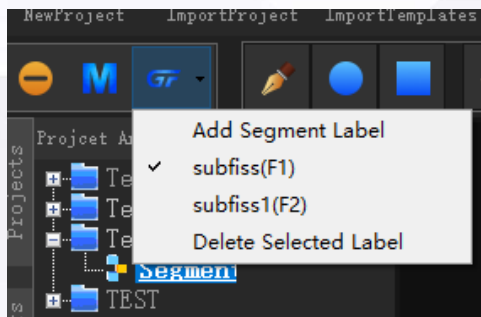
## Operation procedure:

Phase 1, 2, 4, 6, 7 are same as "Locate Object", in Phase 3 select "+Add Segment"



## 5. GT labeling (label objects with brush) :

Click  on toolbar, then select "Add Segment Label" (multi labels are supported)



Input object name in pop-up dialog and submit



Choose brush tool in toolbar to label (Hold and drag mouse to smear, and use Ctrl+ wheel to control brush thickness, confirm with right click after labeling) green circle indicates the size of FeatureSize.

When labeling several different kinds of objects, set different colors to indicate different defect category. Select in "GroundTruth and Result" to change color.

GroundTruth and Result						GT Sheet
Feature	Train	Found	Recall	Accurac	F-Sco	
subfiss	1882	2739	97.72	67.14	79.59	Train St
subfiss1	3151					
<b>Total</b>	<b>5033</b>	<b>2739</b>	<b>36.54</b>	<b>67.14</b>	<b>47.32</b>	

Then set color of results and labels the same way as in "Location" .

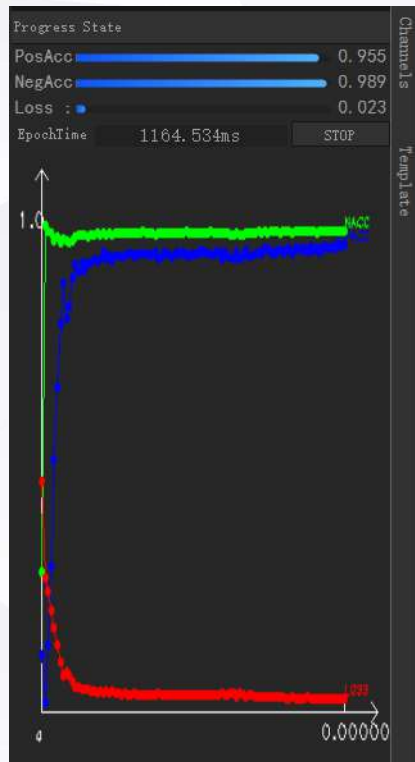


## 7. Train and test

er all the previous procedures are performed, click the "Train" button to start training, and progress state will be real-time displayed.

When PosAcc and NegAcc stabilize at over 90% (PosAcc and NegAcc higher is better, Loss lower is better) click stop and "Test" in "TaskList" will be automatically performed. In the following image, the green frames coincide with red label frames are test results. You can use.

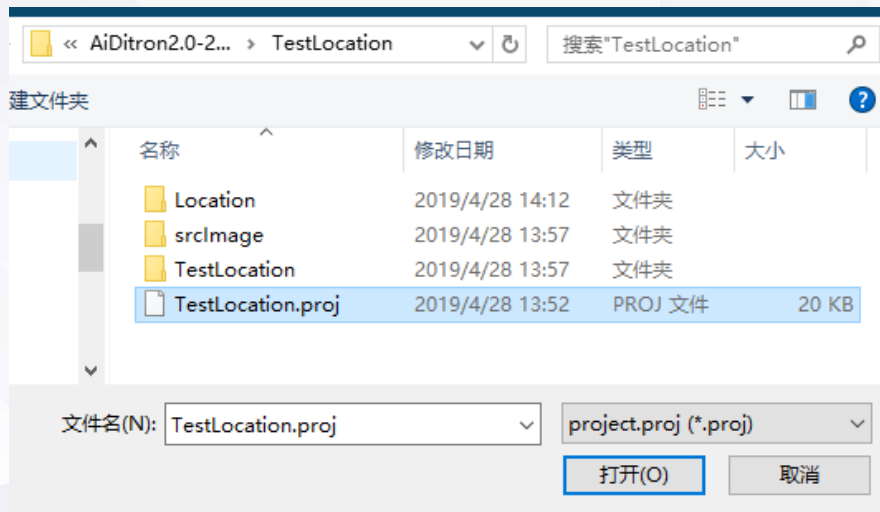
You can also check out project report the same way as in "Locate Project" .



# Others

## Project import:

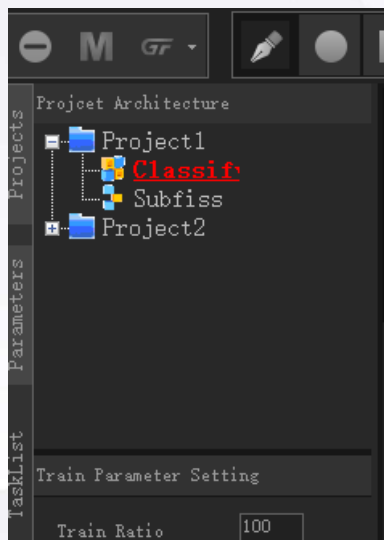
Click "ImportProject" on toolbar, find "\*\*\*\*.proj" file in pop-up dialog and open.



After import, select note from "Project Architecture" to check test result. You can also import new images to test, label and train.

## Combine different functions:

You can add nodes in one project, by combining different nodes you can use different together of one function in different ways to meet your demands.



For example, some image are completely different from each other but contain similar objects, you need to classify them. In this case, Classify may not work well. You can use Location node to find objects and then classify them.

# Thanks for reading

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