

OCR Robot Manual

MUCH2020

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Main Function

1. Camera OCR Software, for users can make OCR project independently and flexibly;
2. Opening code to other hardware brand, step by step to make this software standardize ;
3. Opening to print letters of industry and hand letters for civil, target is to cover several popular languages;

Computer and Camera Configuration

Operating System: Windows 10 x64 recommended; Windows 7 x64 minimum;

Processor: minimum Intel Core i3 2xxx;

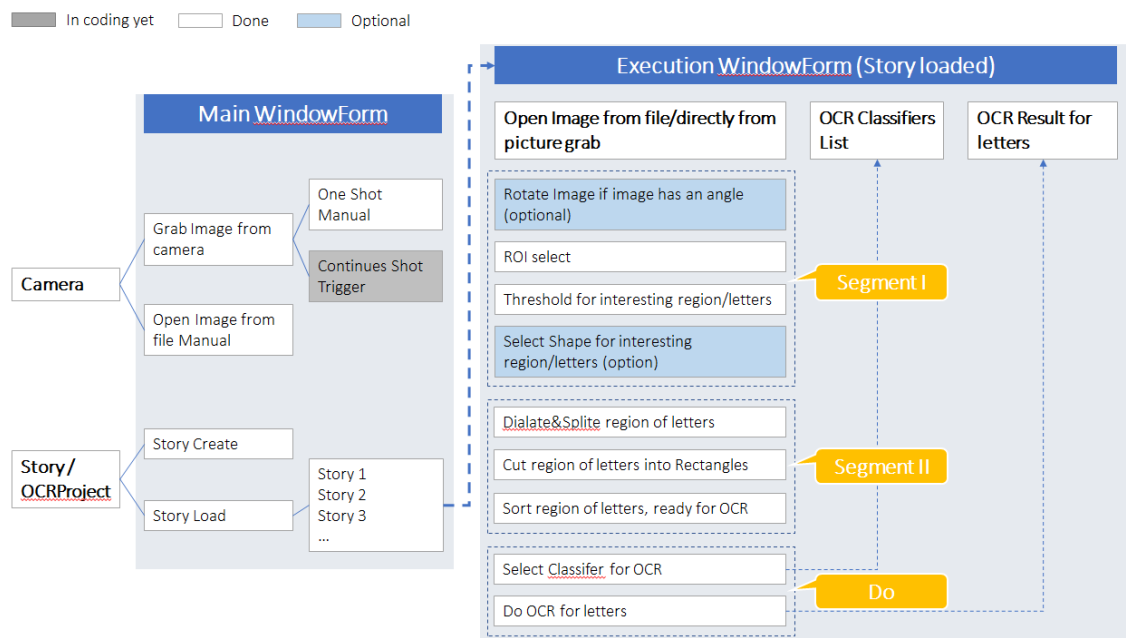
Memory: 4 GB or more;

Storage: 250 GB internal hard drive;

Display: LCD monitor

Camera: 2D, 300m pixel minimum;

Software Architecture for Operation



Folder Structure for each project

Debug > Proj > PLettSh		
名称		修改日期
Code		2020/2/16 ...
Image		2020/2/16 ...
OCRHandle		2020/2/16 ...

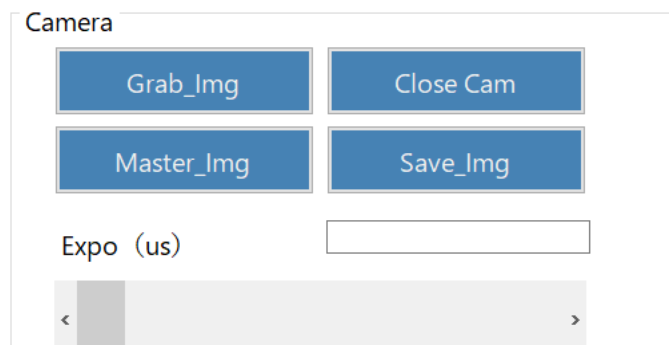


User Interface (UI)

Main WindowForm



Camera



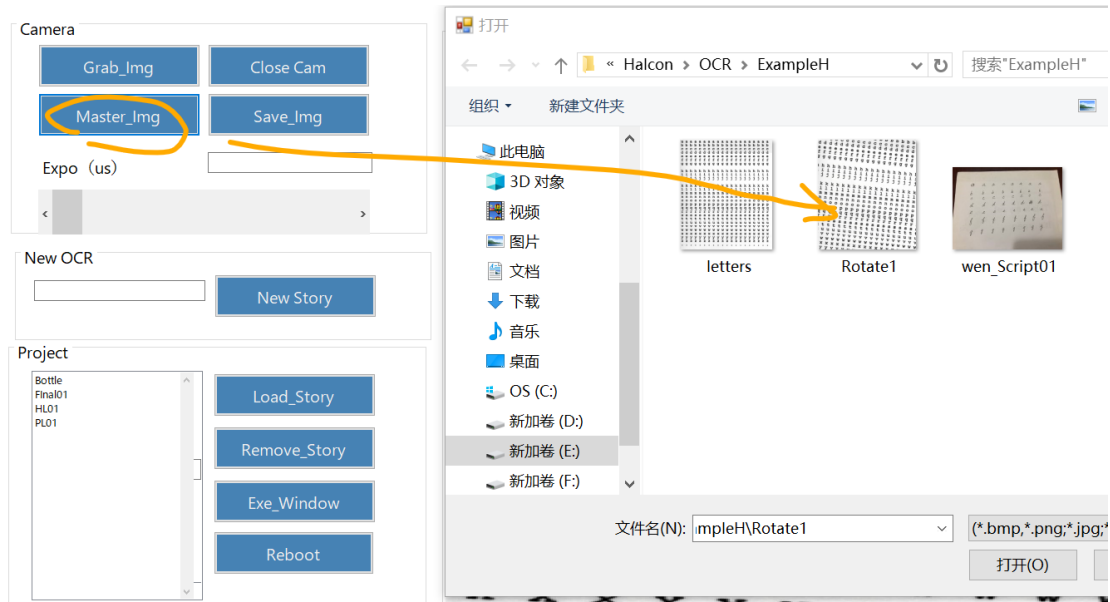
Camera can take one shot or continuing shot for products or papers. And open or save image into hard disk.

Expo (us) is to adjust lights.

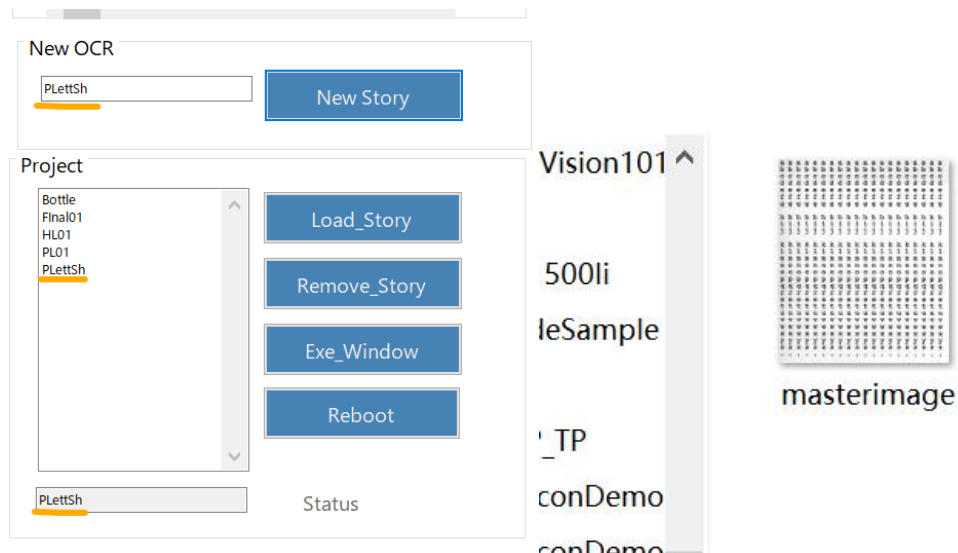
Story

Create new OCR Story

Open one picture from local file, or grab one image from camera



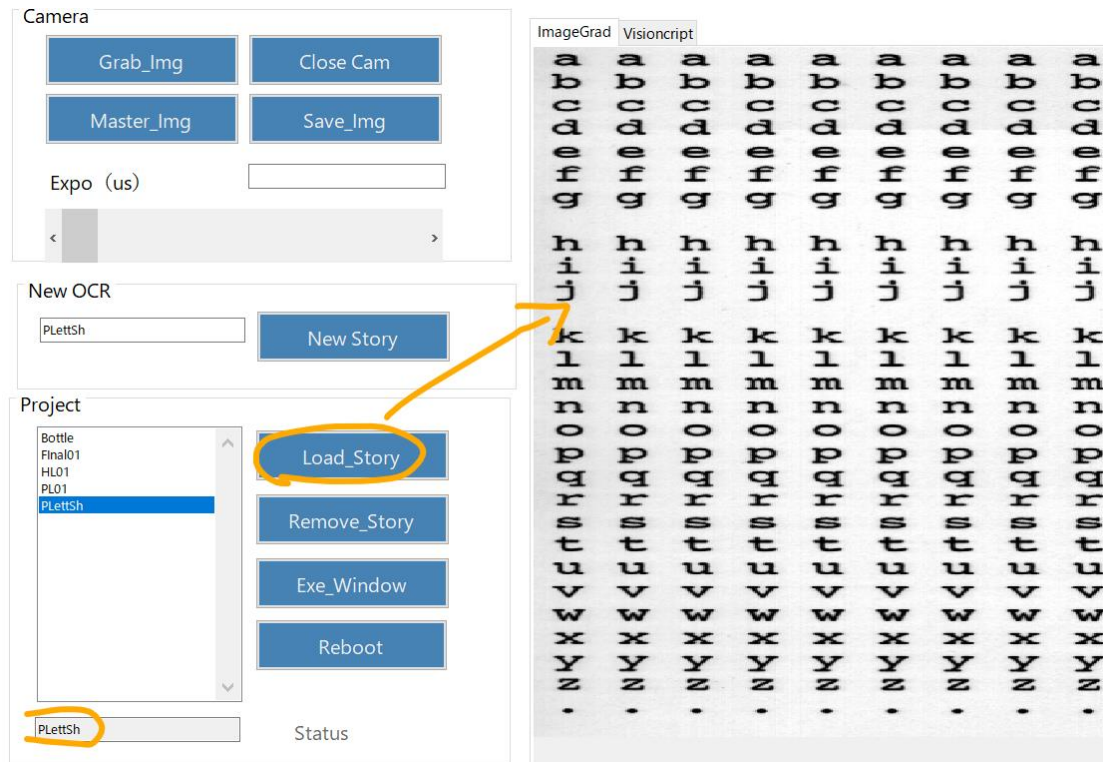
Then go to **"New OCR"** and put a name, click **"New Story"**, then the image will be saved into the new story created as **"masterimage"**.



Load OCR Story

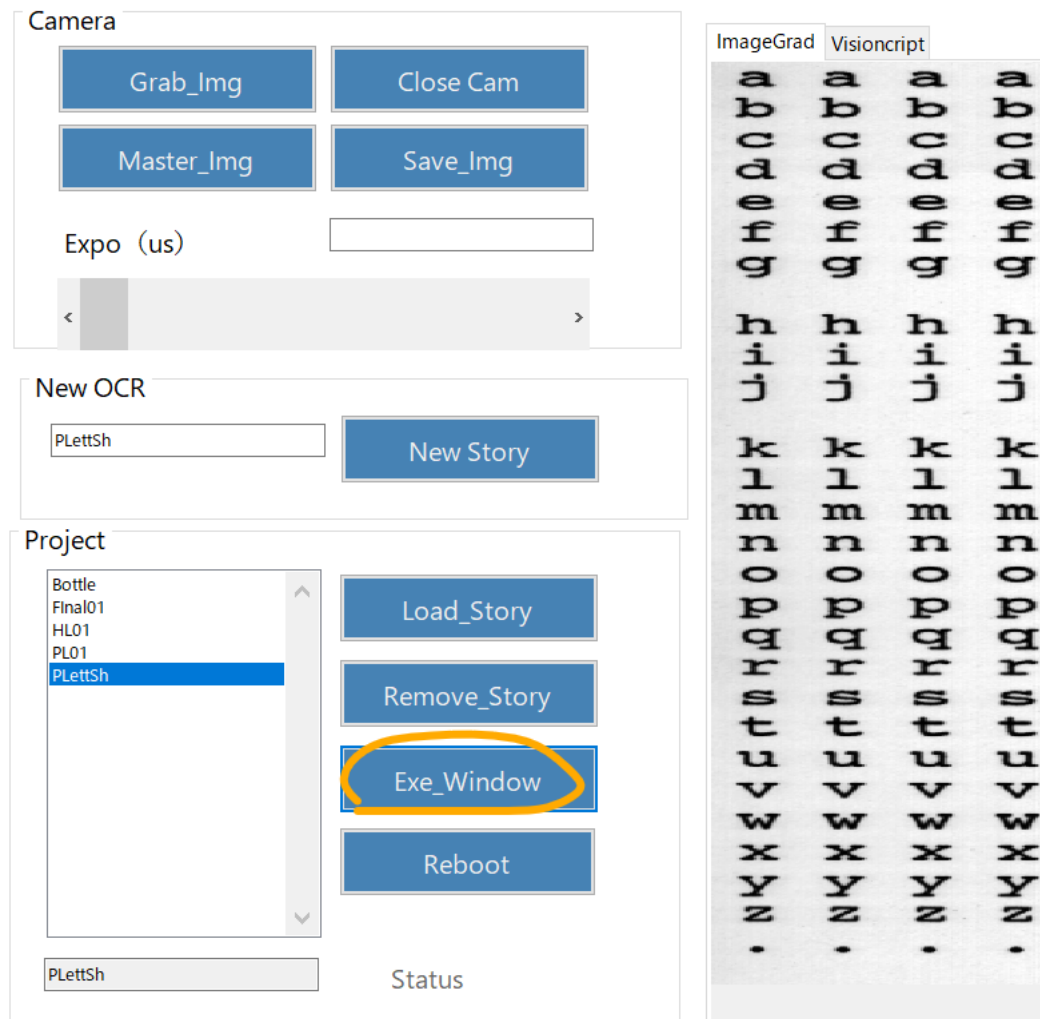
Select **Story** name in the Project list form, and click **“Load_Story”**, then the story will be automatically loaded. And also the **“masterimage”** will be loaded for user to check which kind of picture or letter this story can match for OCR job.

The next step is to set up OCR classifier, and when next time load the story again, the OCR classifier will also be loaded together with this story.



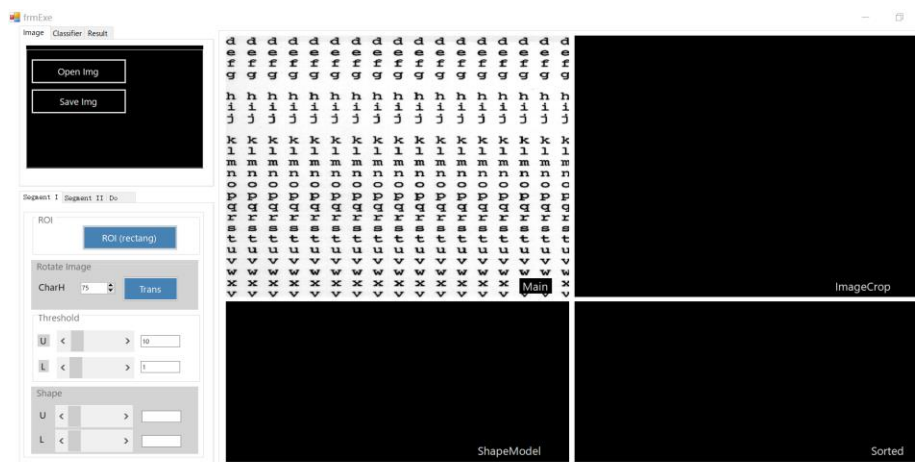
EXE WindowForm

Right mouse click to go to detail OCR job to open the execution window.



Execution window show up.

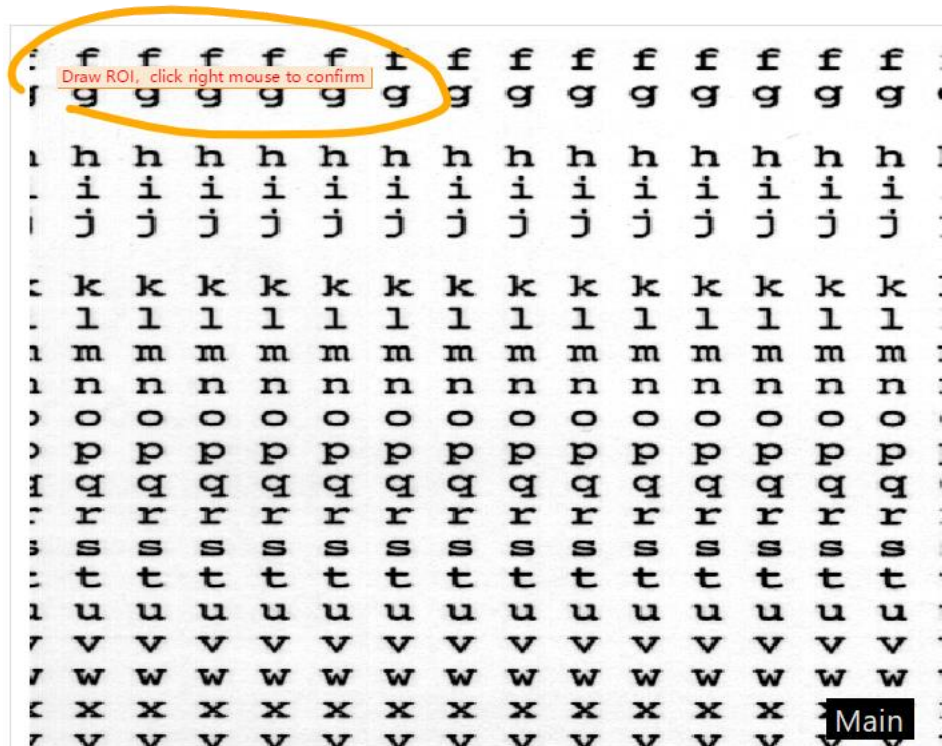
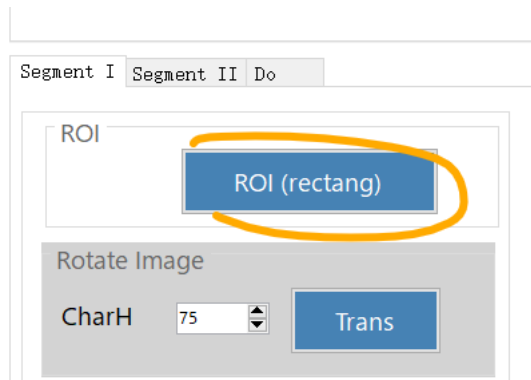
The **masterimage** will also be shown in the Main window form. Hereby we can use this **masterimage** as example to practice OCR, or can also open another image from file.

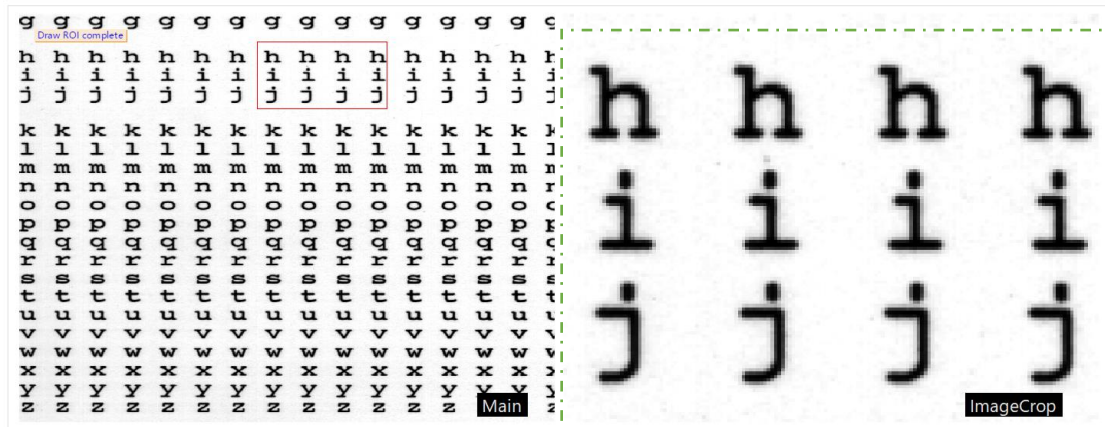


Segment I

ROI

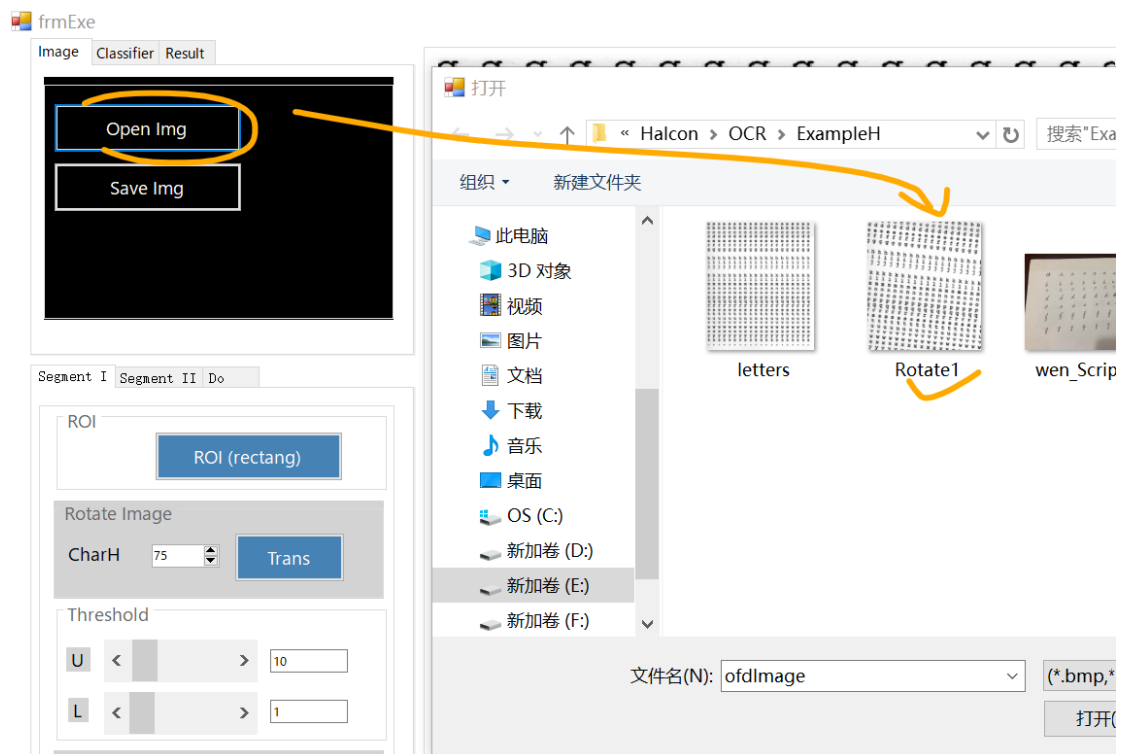
ROI to select region in rectangular to work



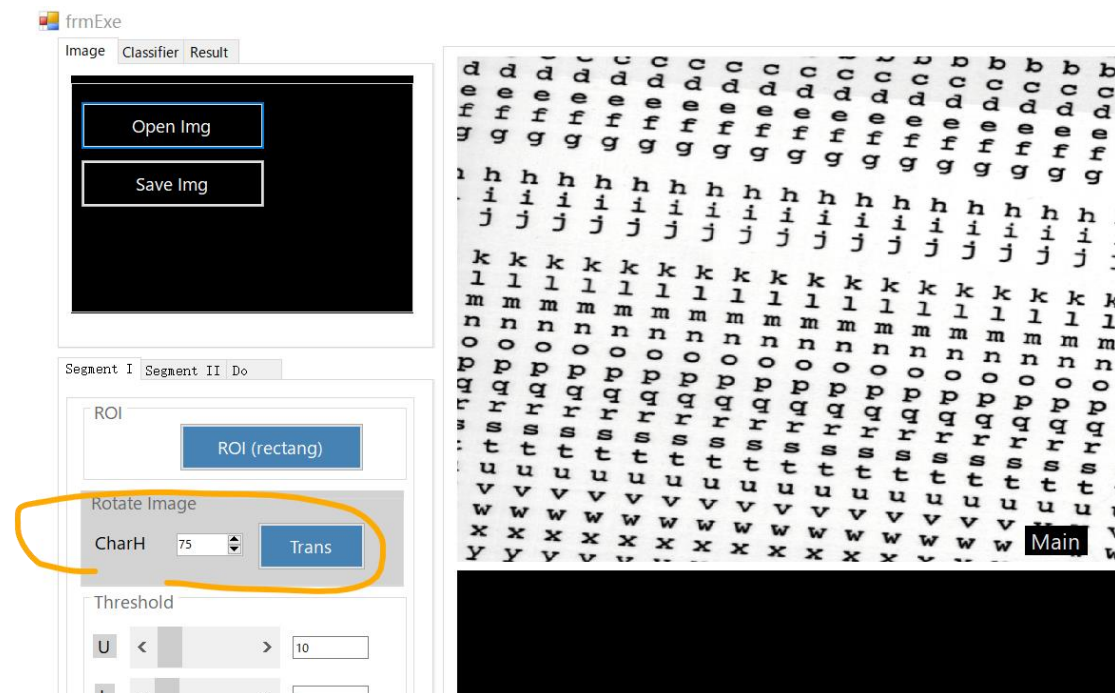


Re-adjust Image

When image has an angle, we can adjust it to 0 degree.

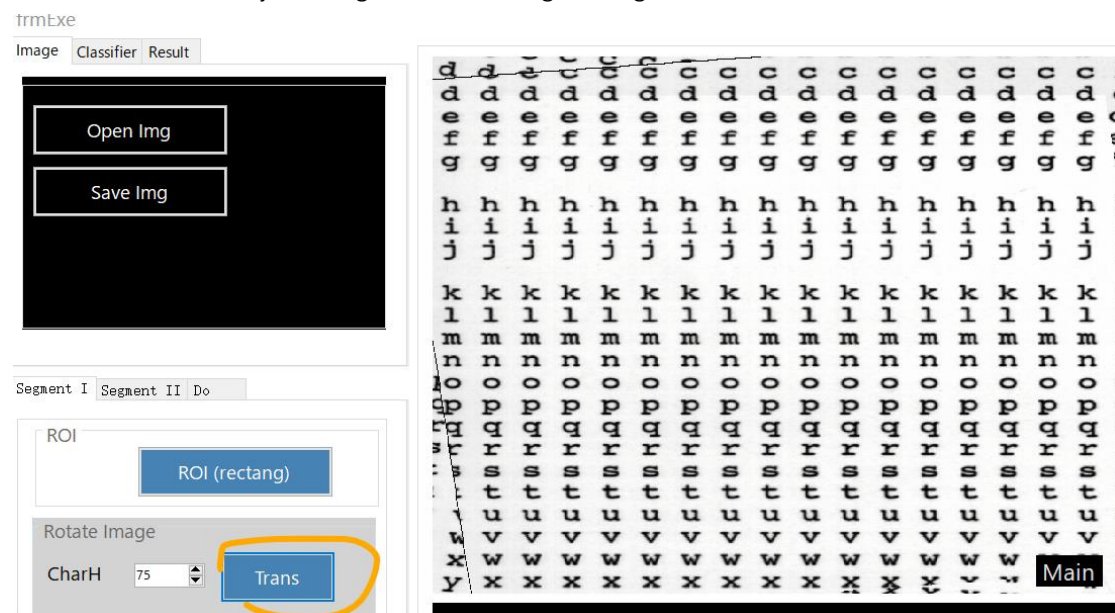


Go to “**Ratate Image**”

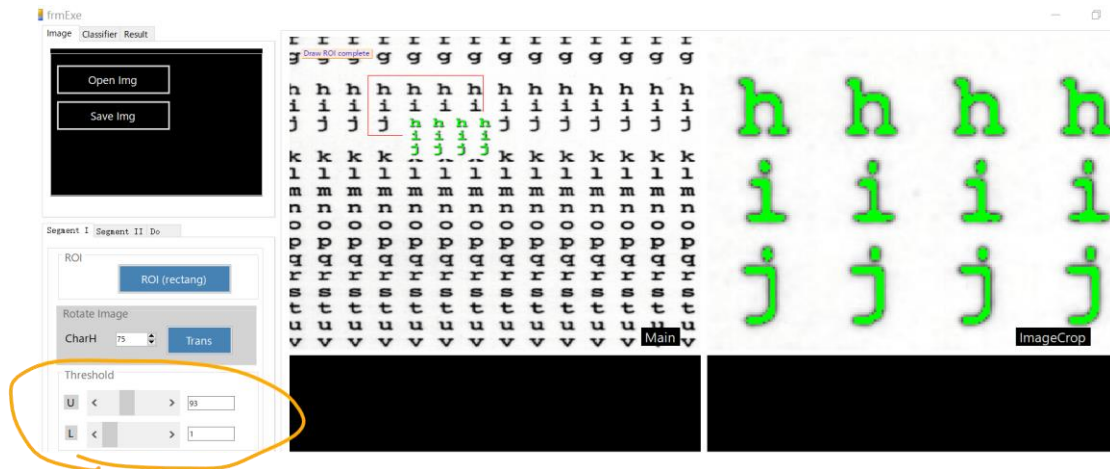


CharHeight (“**CharH**”) specifies the approximately height of the existing text lines in the region Region. It's assumed, that the text lines are darker than the background.

Click “**Trans**” to readjust image into **zero** degree angle.



Threshold



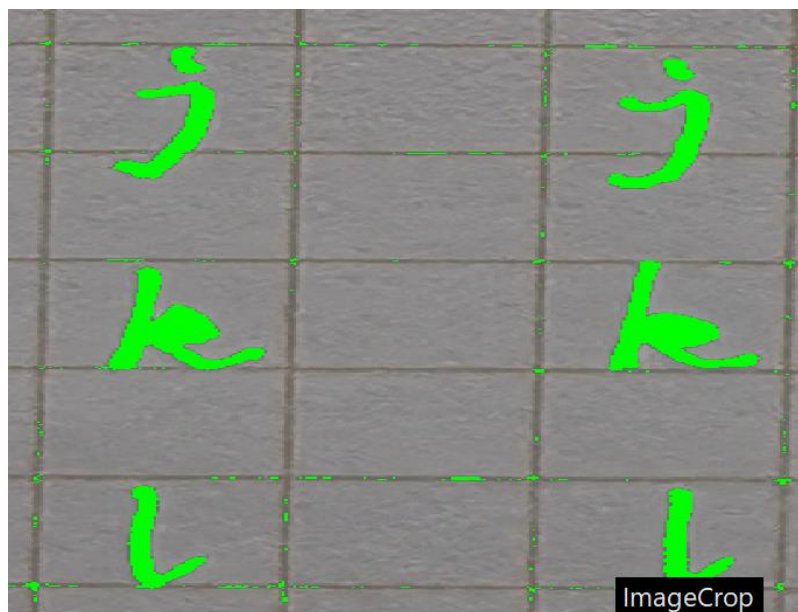
Threshold the **sliding button** to segment the right letters

Shape Select

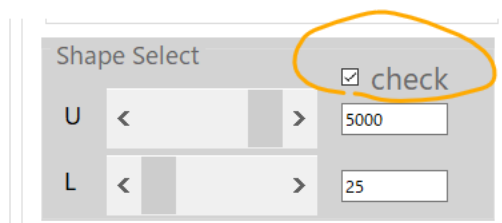
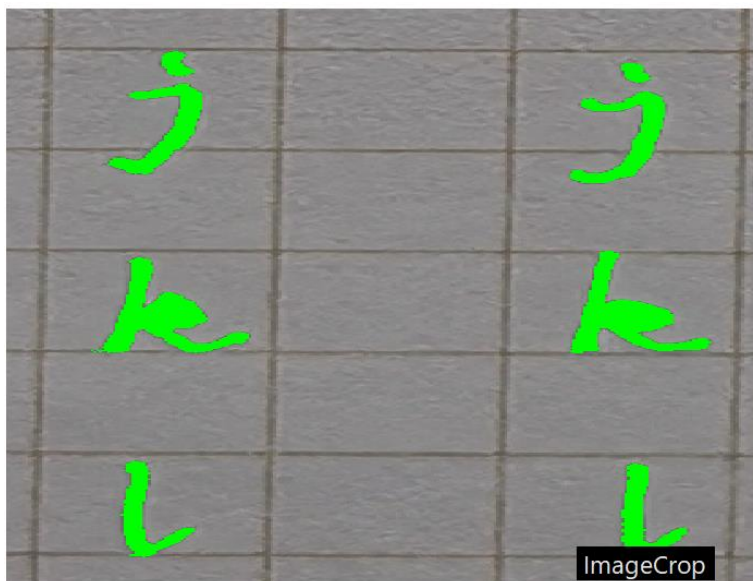
After **threshold** letters, maybe we still have noises onto the picture, then we can further use "ShapeSelect" to wipe out noises and get final perfect region of letters.



After threshold, if you have noises like:



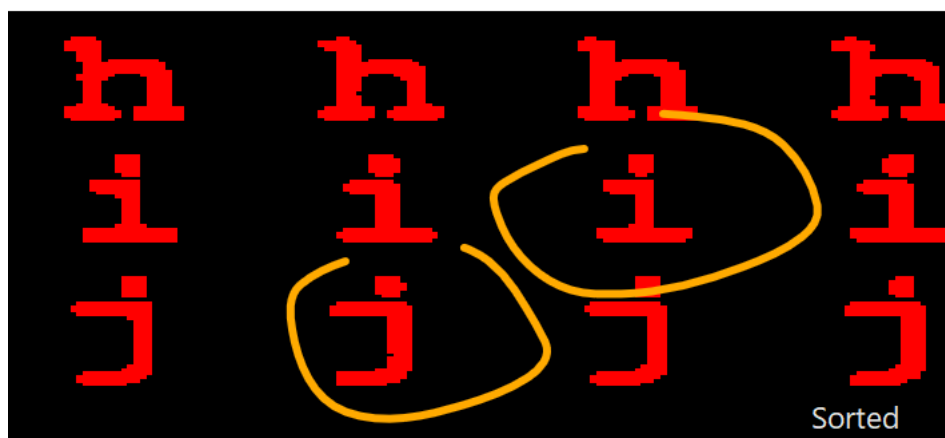
Then you can use ShapeSelect



Important: if you will use ShapeSelect region for further OCR work, you need click **check-box**. If not, the software will still choose threshold region for further OCR work.

Segment II

Dilate



In this case we need to dilate the letter “i” and “j” into one area, as these letters has a separate “dot”.

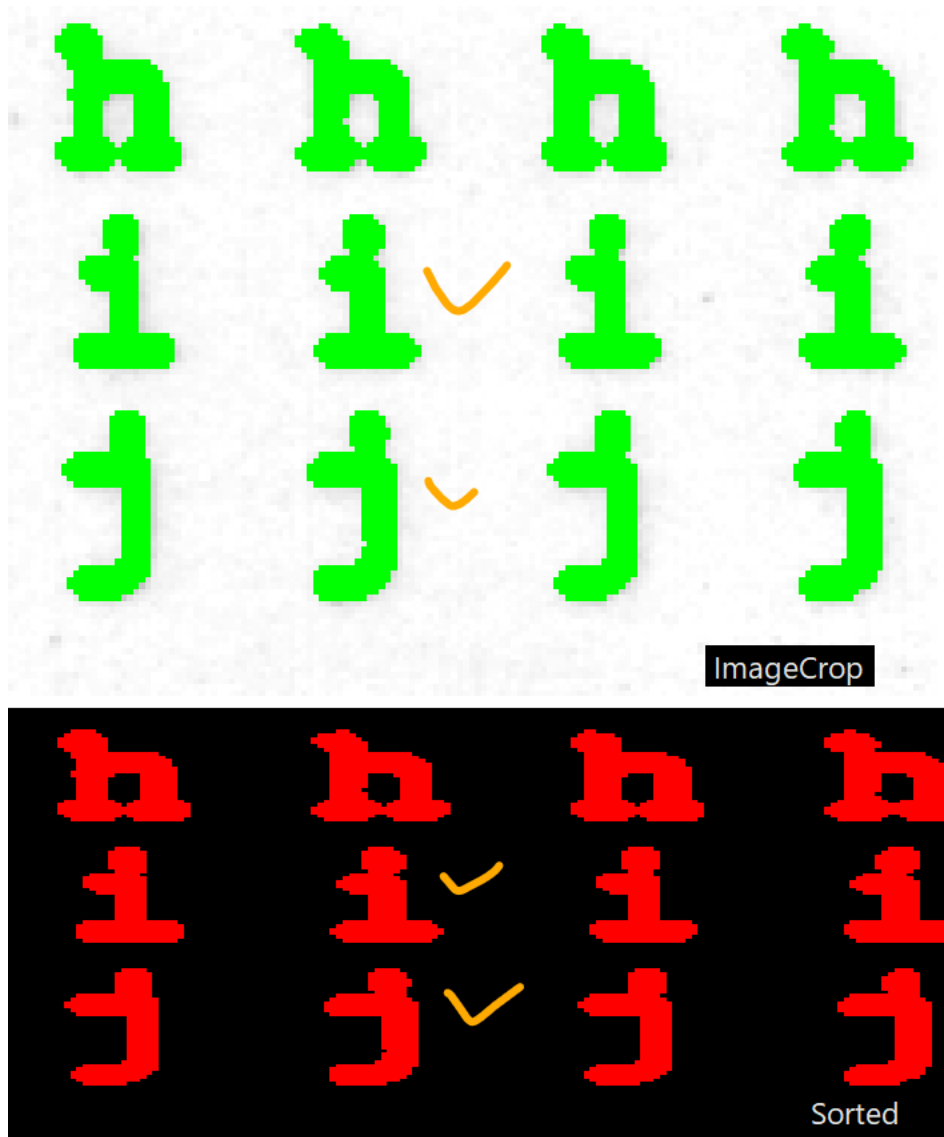
Segment I Segment II Do

Dilate

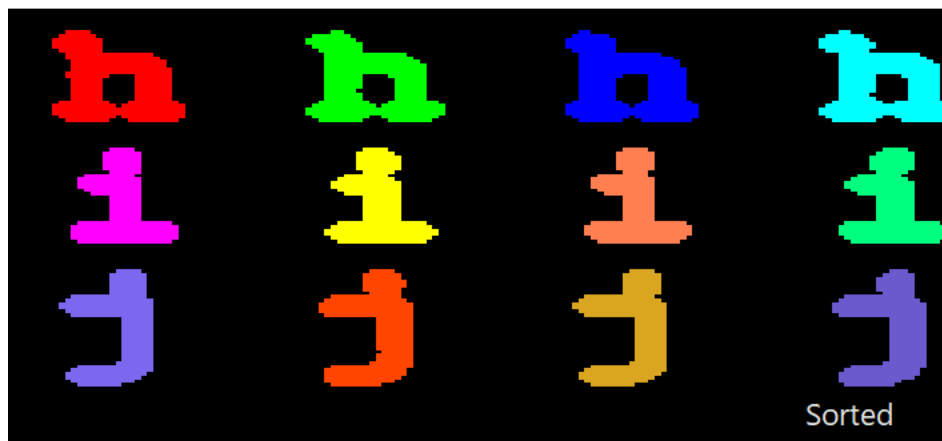
1.50

Split

To expand the letters till separate dots combine with letter regions.



Then click “[Split](#)”

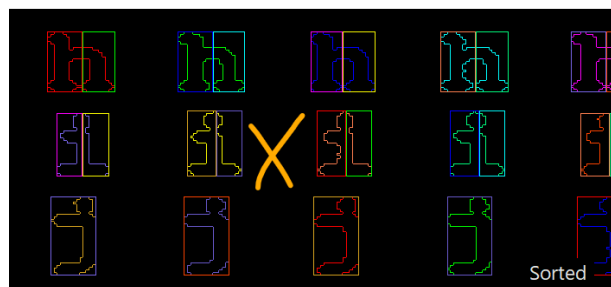
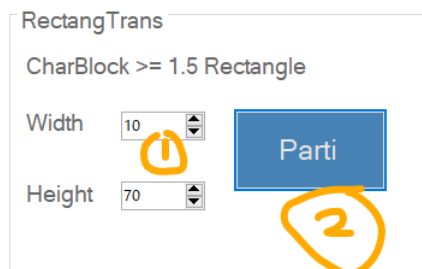


Right now we have separated the letters successfully
This is very important for further good OCR performance.

Rectangle Trans

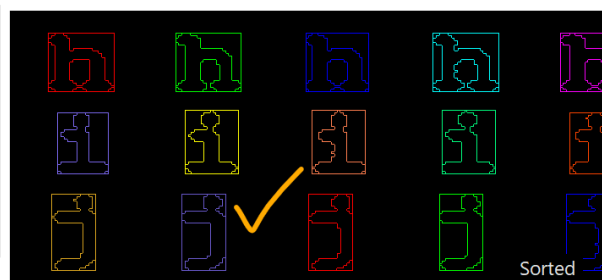
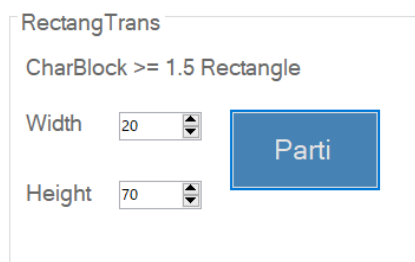
Then we can transfer shape for each letter region into rectangles.

Step 1: adjust Width and Height for rectangle, this is evaluation process.



Step 2:

Right mouse Click to see the size of rectangle for each letter is ok not need further adjust



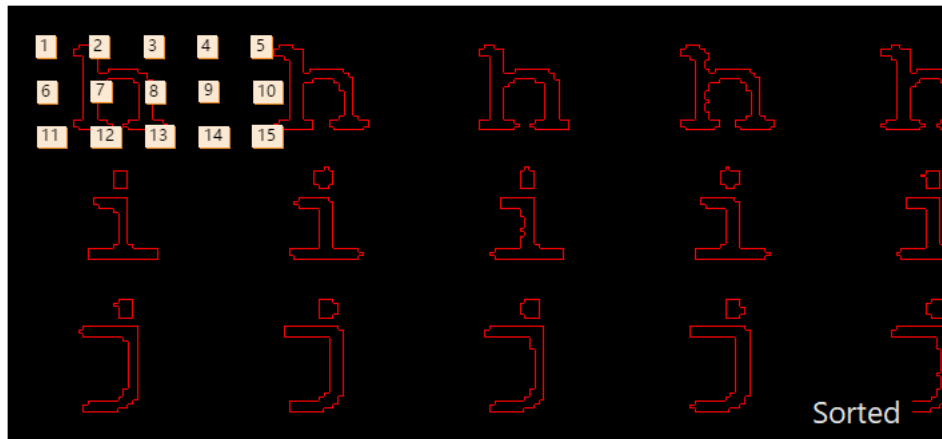
Sort Letter Regions

We can choose “**row**” or “**column**” sort for segmented regions

Sort

row ▼

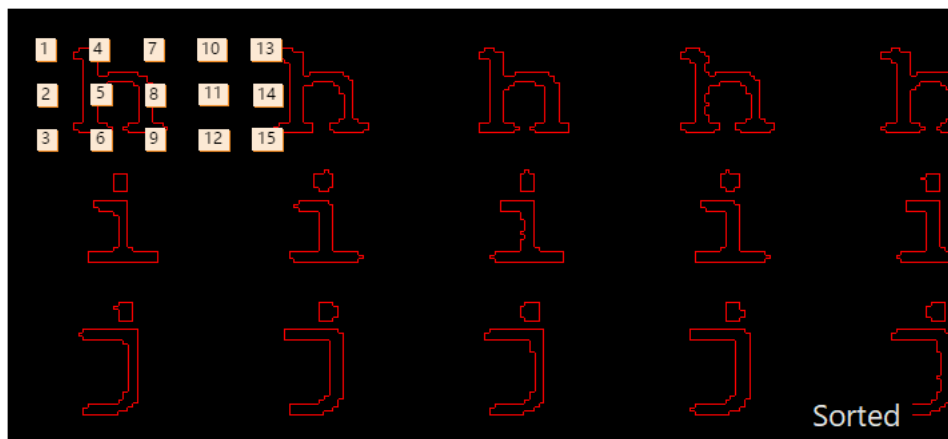
Sort



Sort

col ▼

Sort



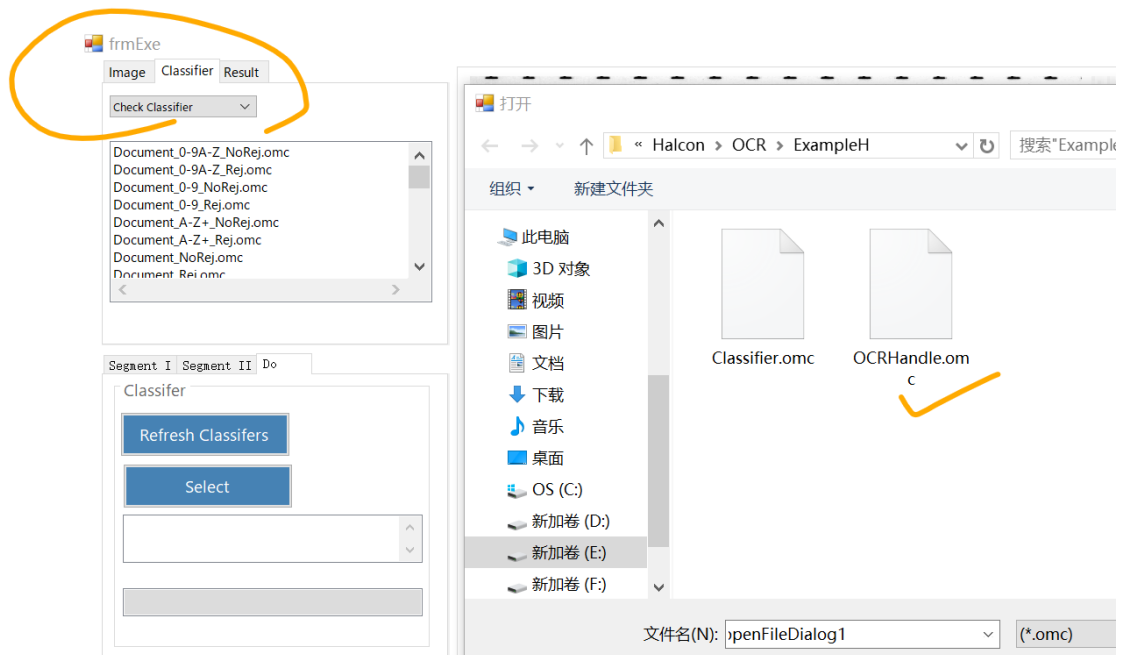
Till this step, the segment job for letter regions has been finished.

Do OCR

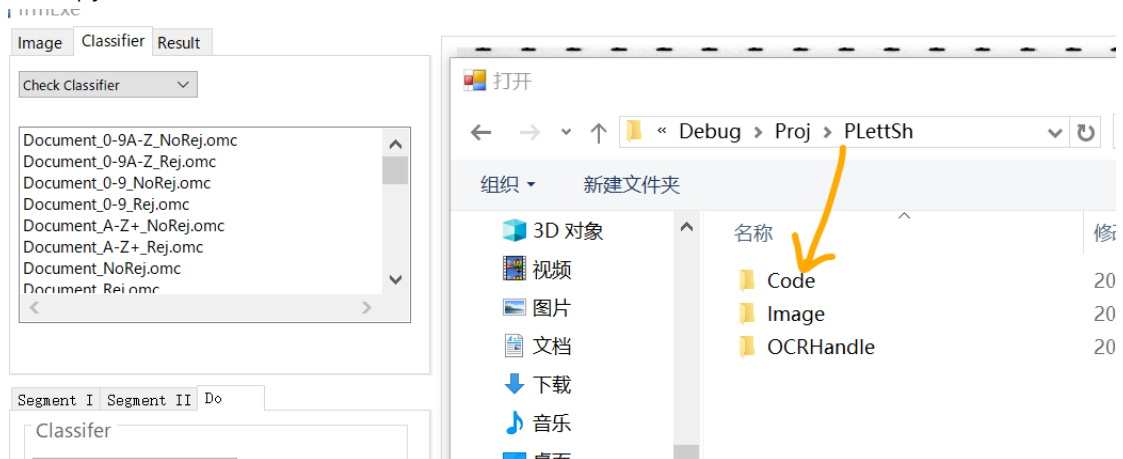
Classifier Collection

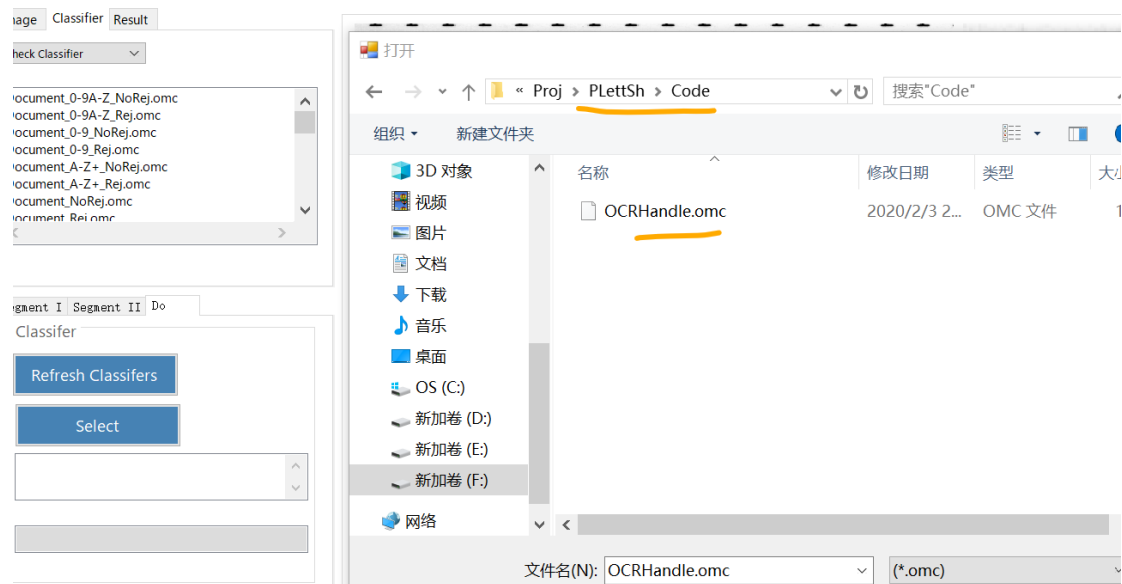
We can go to “**Classifier**” collection folder and choose classifiers stored by “Halcon 18.0” already or we can make OCR Classifier by ourselves.

In this case, we can choose both Classifiers and put into this “Story” classifier folder.

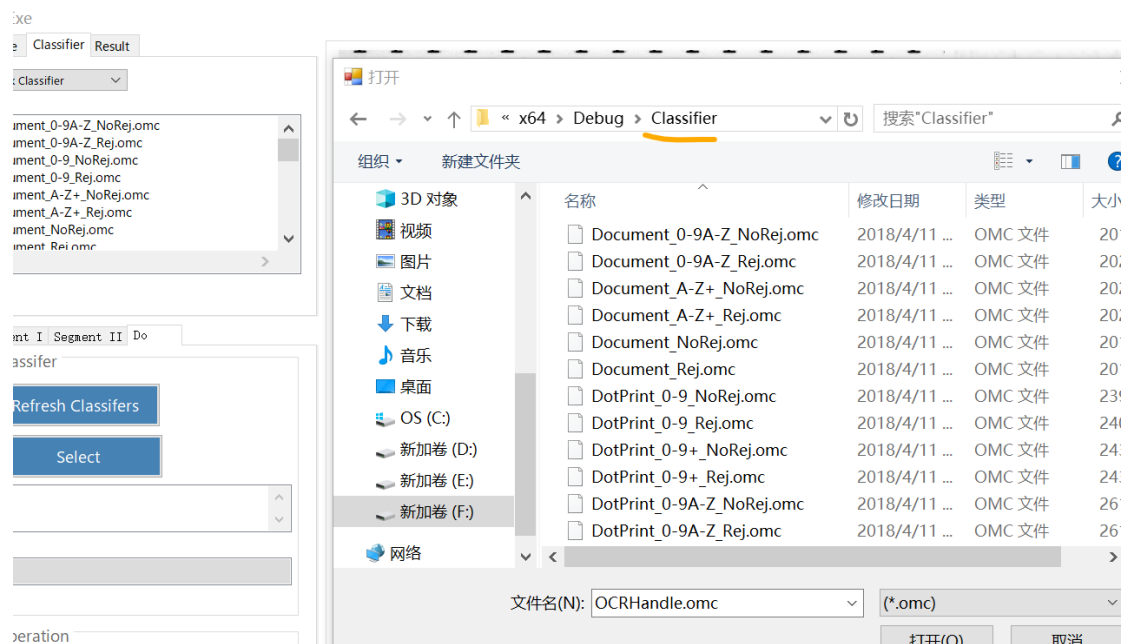


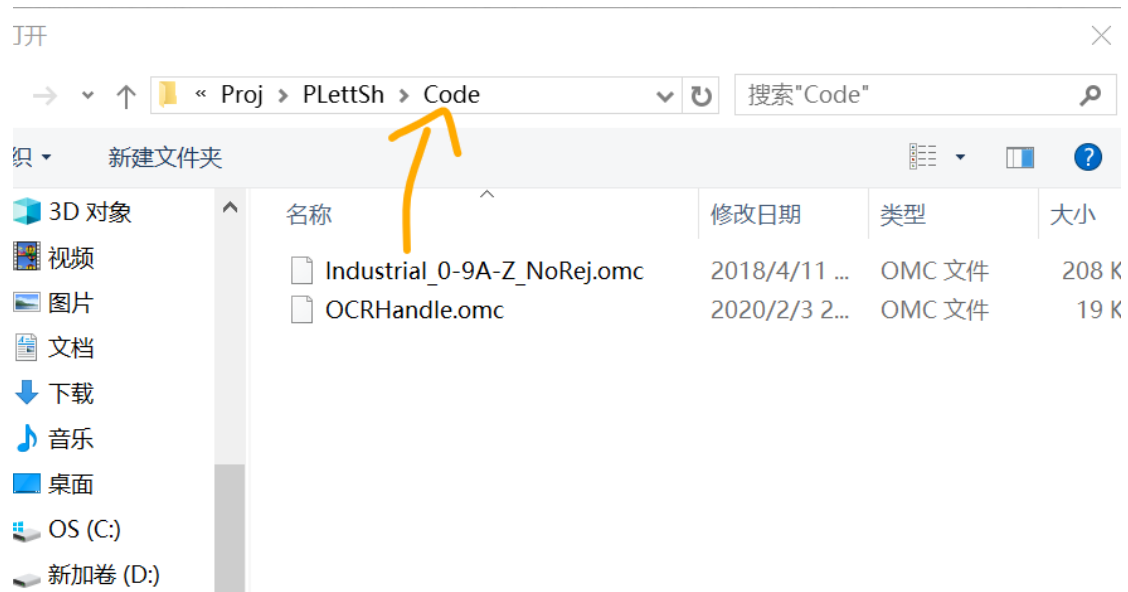
To copy and save all classifiers under “**Code**” folder



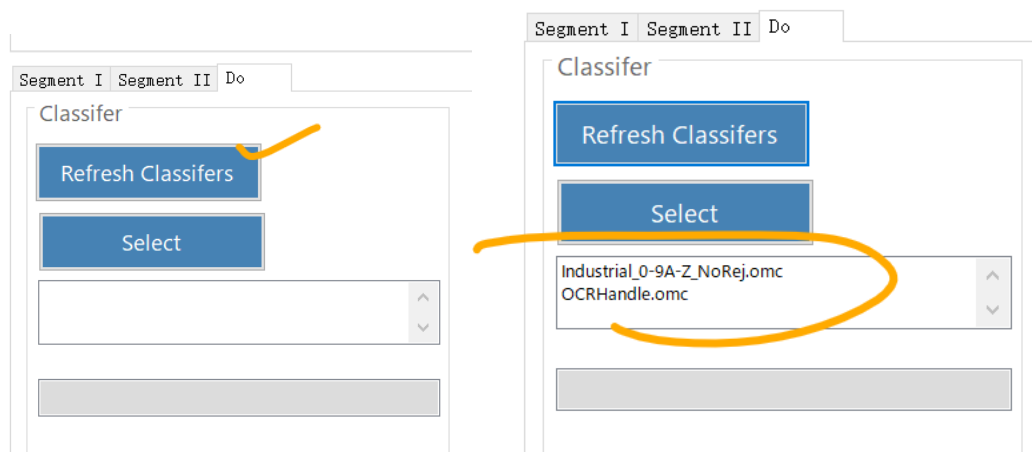


And for all other classifiers have been stored under system's "Classifier" folder. And we can also copy the classifiers under story's classifier folder.





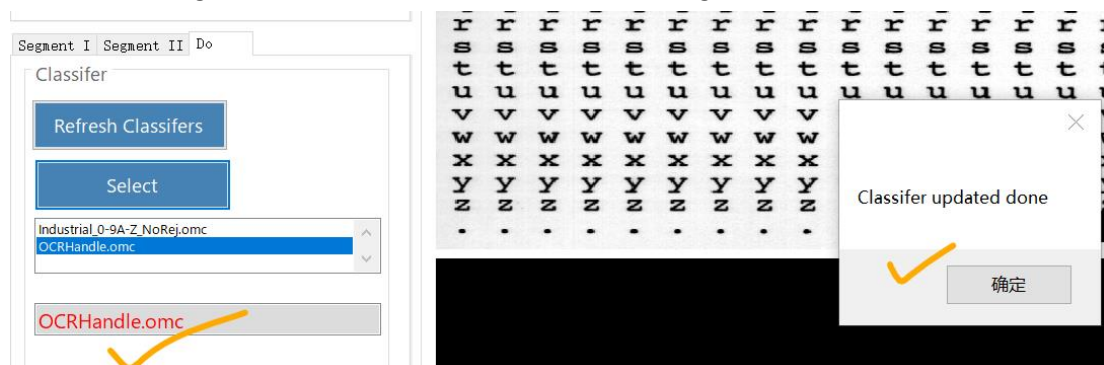
Then right mouse click “Refresh Classifiers” to update this story classifier folder list.



Classifier Select

The software defines **only one** classifier existed in the final working classifier folder, so if the user “Select” one classifier, the folder will automatically clean the former classifier and save the new classifier which have been selected.

The final working classifier will be shown as **RED** in working status column.



Segment I
Segment II
Do

Classifier

Refresh Classifiers

Select

Industrial_0-9A-Z_NoRej.omc
OCRHandle.omc

Operation

OCR

OCR Execution

Segment I
Segment II
Do

Classifier

Refresh Classifiers

Select

Industrial_0-9A-Z_NoRej.omc
OCRHandle.omc

OCRHandle.omc

Operation

OCR

Auto
empty

Finally click “OCR” button and check the result of letters. And it can be printed out as .txt file.

Notes: the “Sort” can change the sequence for letters show up in the “Result” box.



Appendix

Case Example for Engineering Letter

Create Story

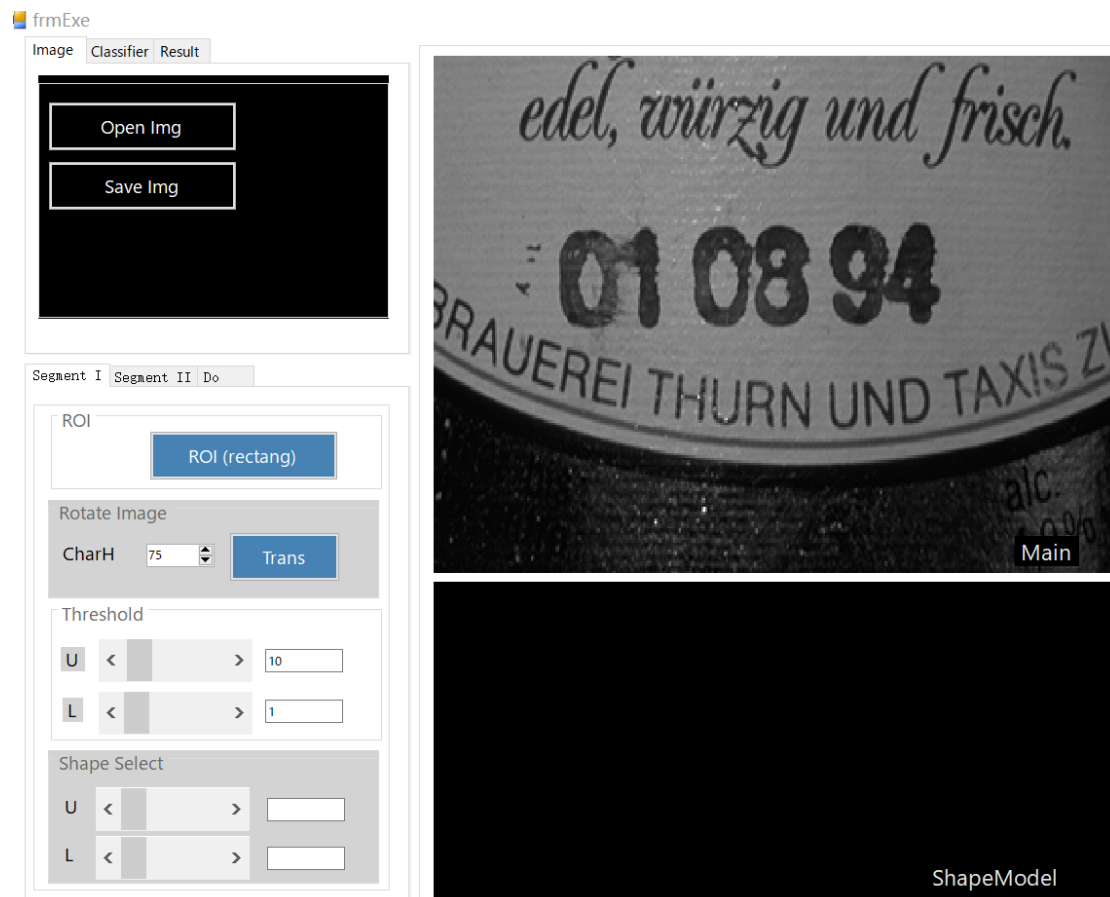
OCRTrainee

OCR ROBOT !

MUCH 2020



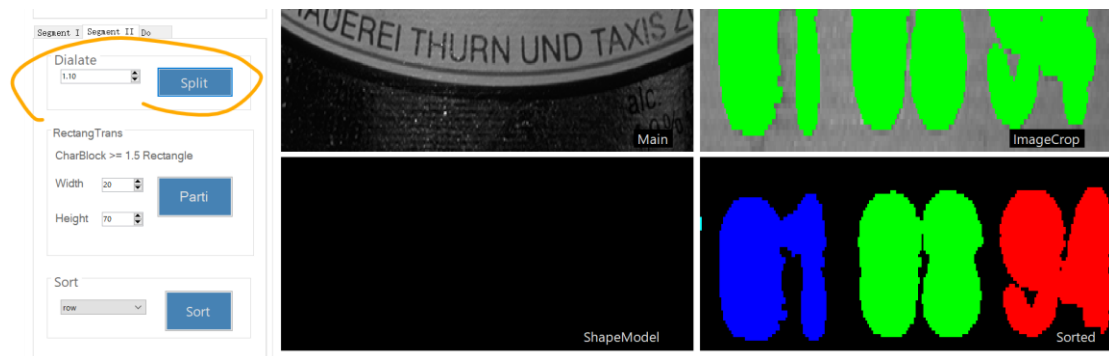
Open execution window



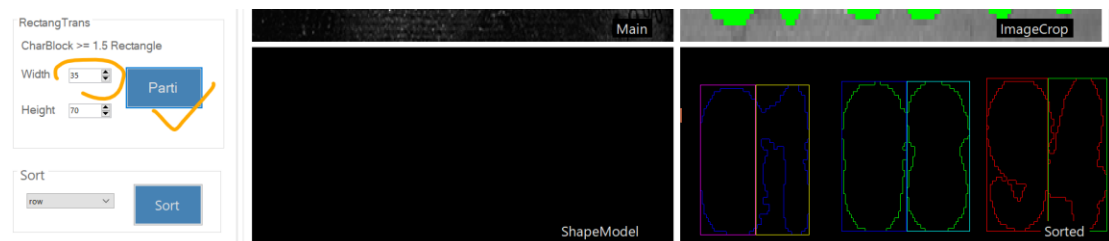
RIO and segment letter region



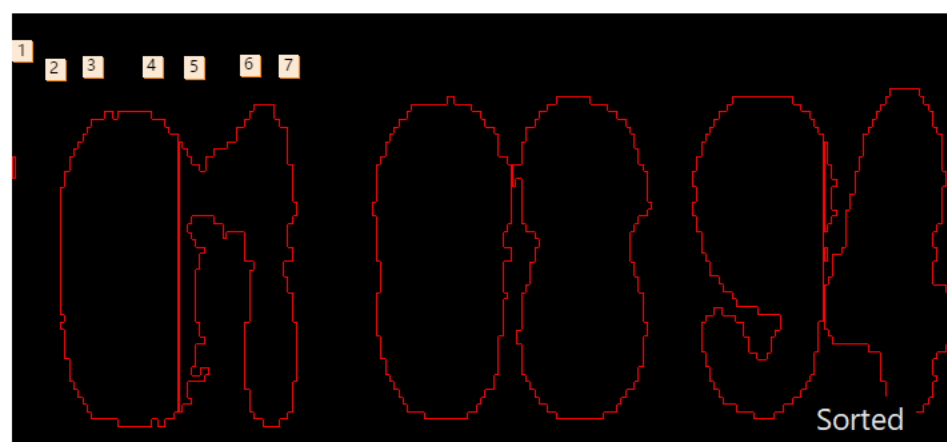
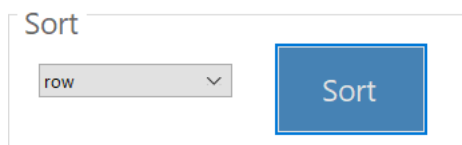
We can see the threshold region has been split into three parts. Then for each region need be further split till letter by letter.



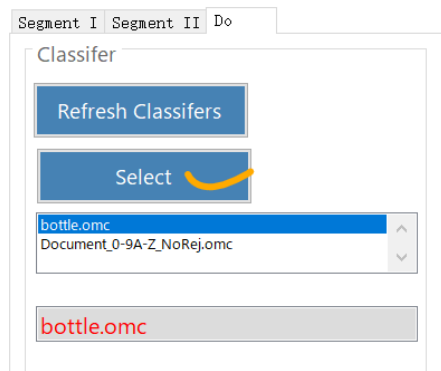
Adjust rectangle width and height till fully split letter region.



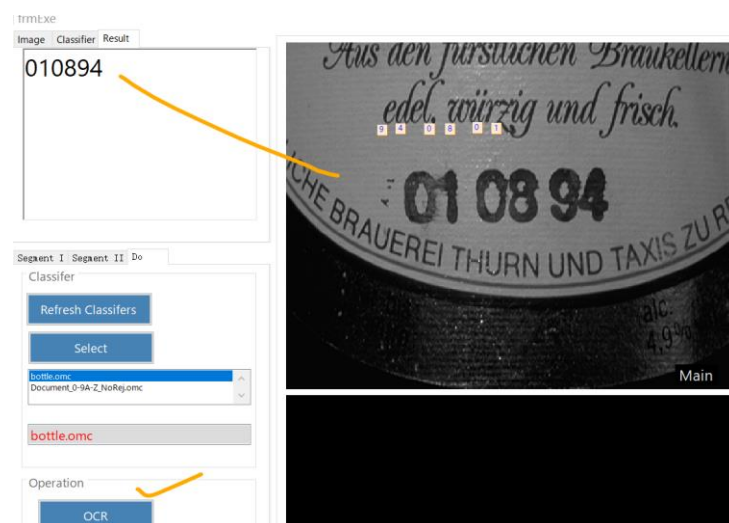
Sort letter regions



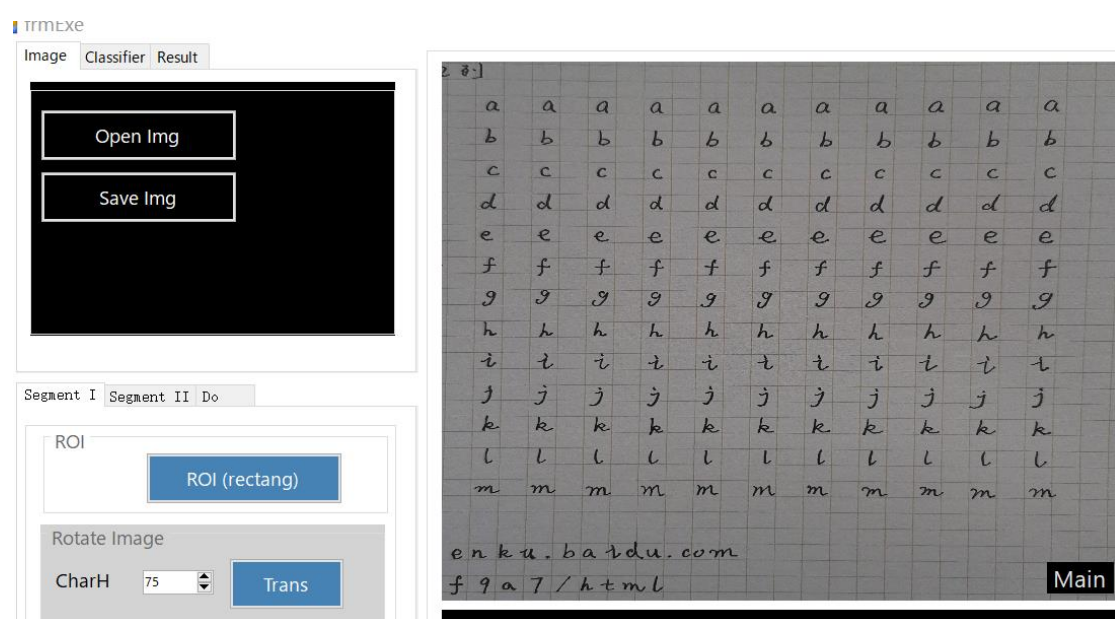
Choose one classifier

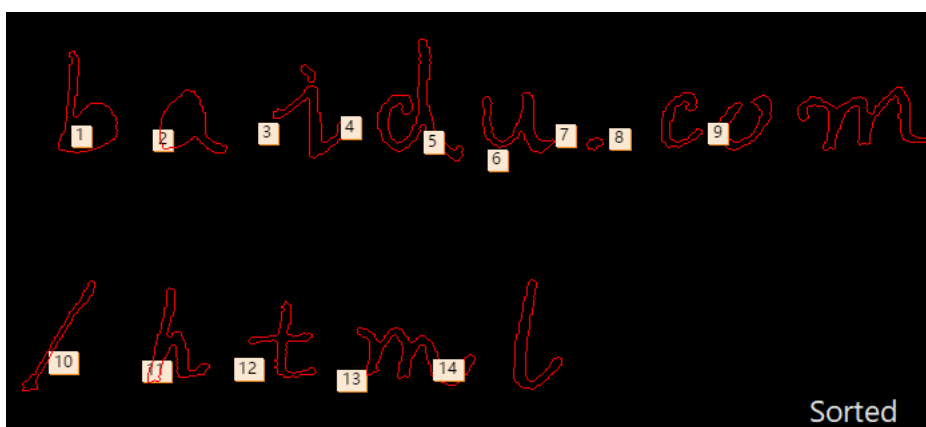
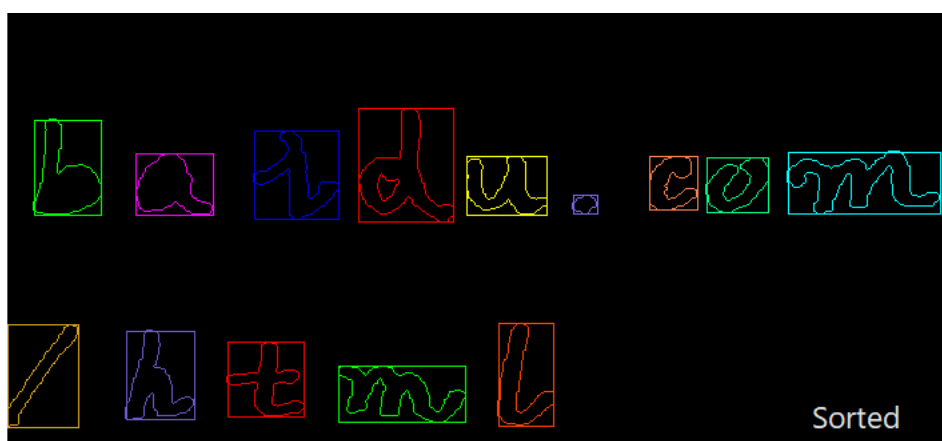
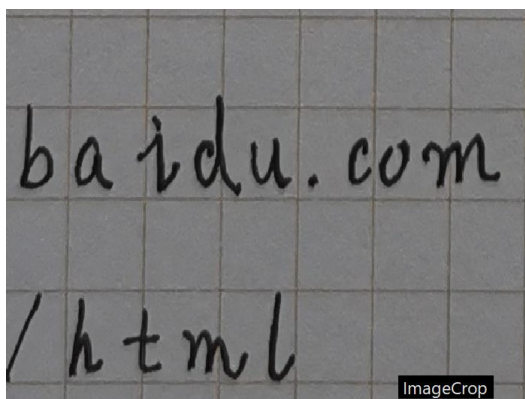


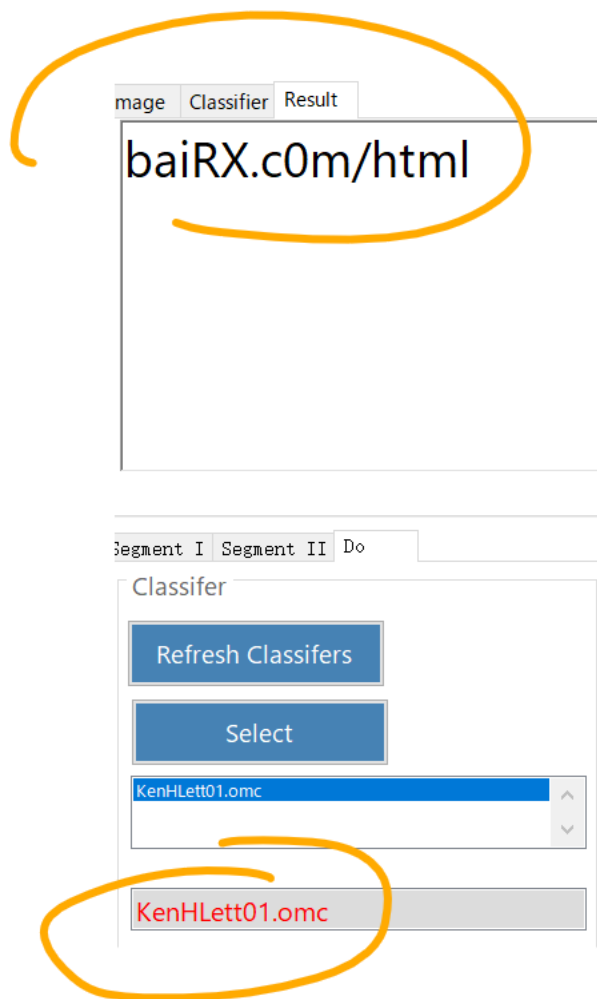
Do OCR



OCR for handwrite letter







OCR Classifier: KenHlett01.omc

Self-training classifier from Jan.2020

For handwriting classifier is trained step by step by programmer. Target is to make self-made classifier more smarter and generalized for various handwrite letters.

For training document and status will be kept updated.

Example for current classifier of [KenHlett01.omc](#) work

