

SRTP summary report stage II

- Data result processing and visualization
- Comparison of label pictures and test data
- To be improved

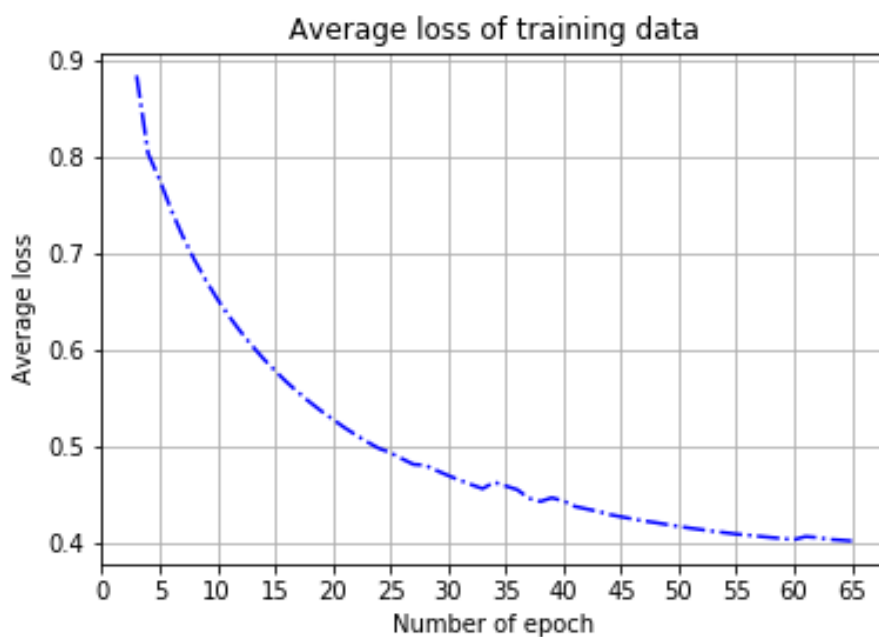
1. Data processing and visualization

Train & test data indicator

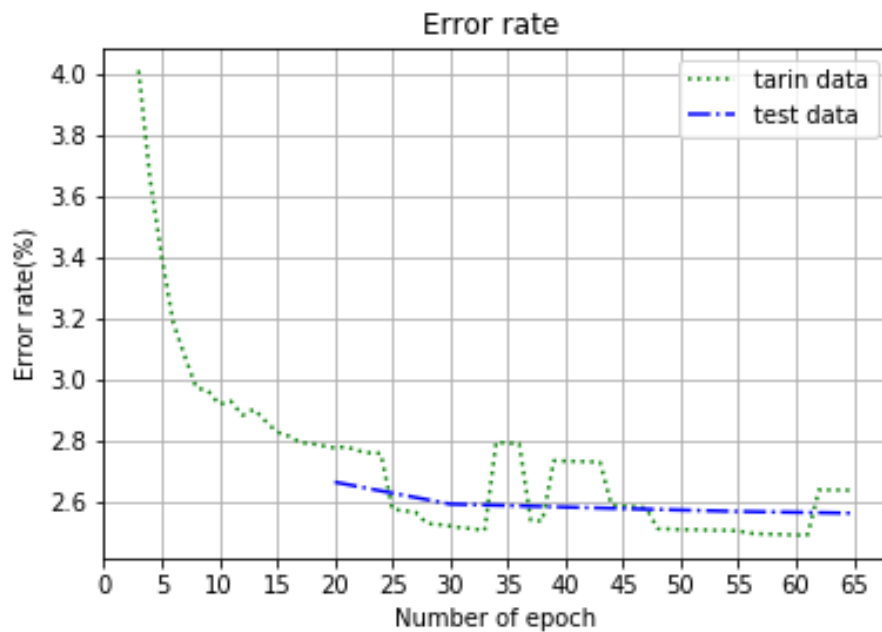
Epoch	Average loss of train data	Error rate of train data	Error rate of test data
20	0.5286	2.690%	2.662%
30	0.4818	2.563%	2.590%
45	0.4331	2.577%	2.575%
55	0.4095	2.502%	2.566%
65	0.4024	2.635%	2.560%

Visualization

1. Average loss of training data under different epochs



2. Error rate of training and test data under different epochs



Notes

- This training model is based on the previous 20 epoch trained model, and a total of 65 epochs at present, each epoch still contains 2000 iterations.
- Test set error calculation: L_1 - error calculated by comparing the predicted image with the label image after saving it as a binary image.
- Interruption happened midway, training under the adjacent epoch has almost the same loss value and error rate, so we've deleted five epochs of the two calculated value to draw again.

2. Comparison of label pictures and test data

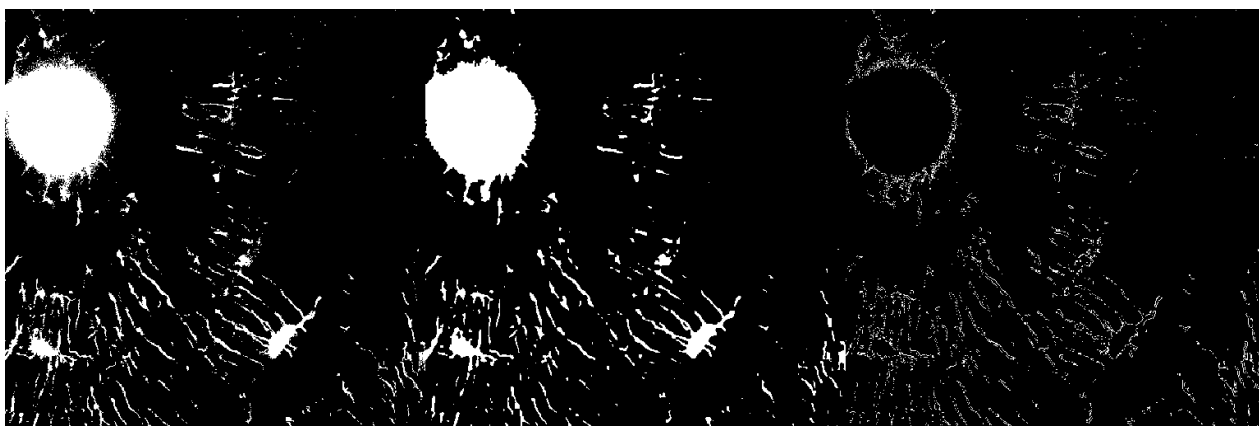
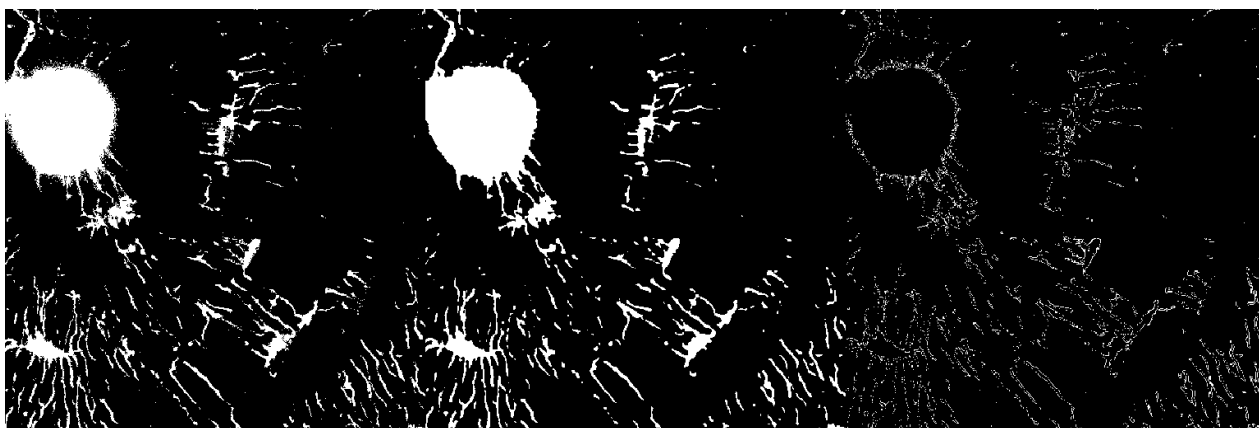
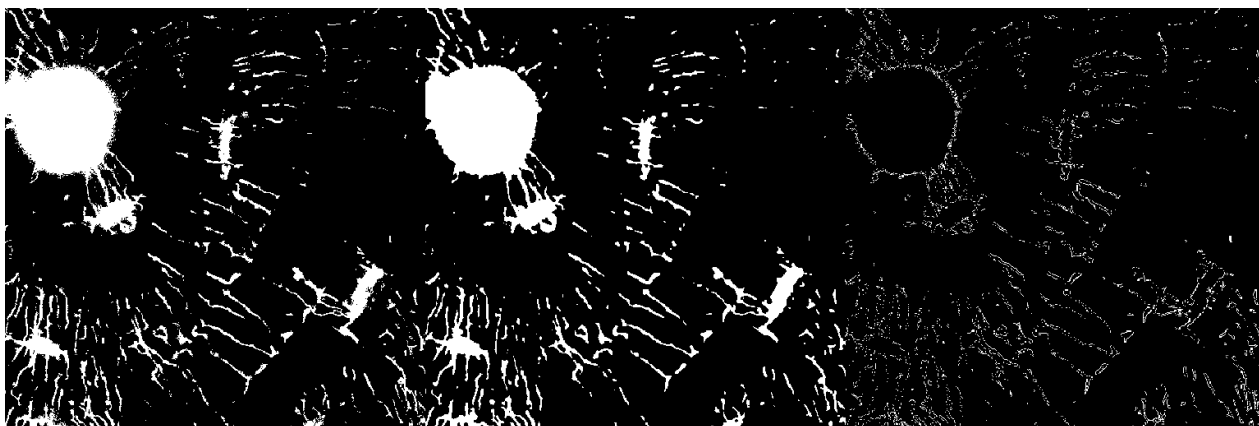
Note: To find the difference between label images and predicted ones using the function `Imagechops.difference()` in the PIL library. The input of this function is two pictures that need to be compared, and output is two pictures composed of all the inconsistent pixels of the pictures to be compared, that is, *xor operation* is performed on the two pictures.

epoch 30

Label

Prediction

Distinction

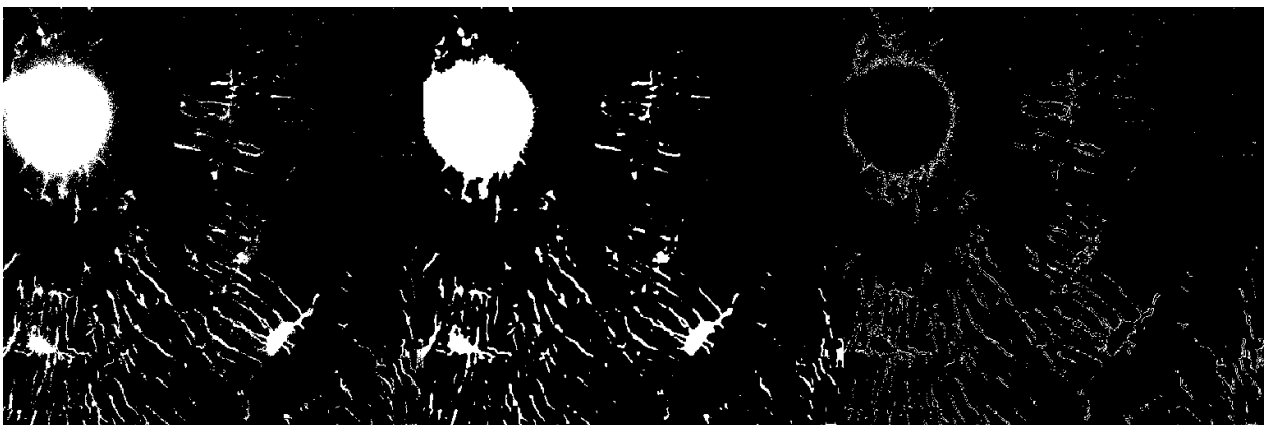
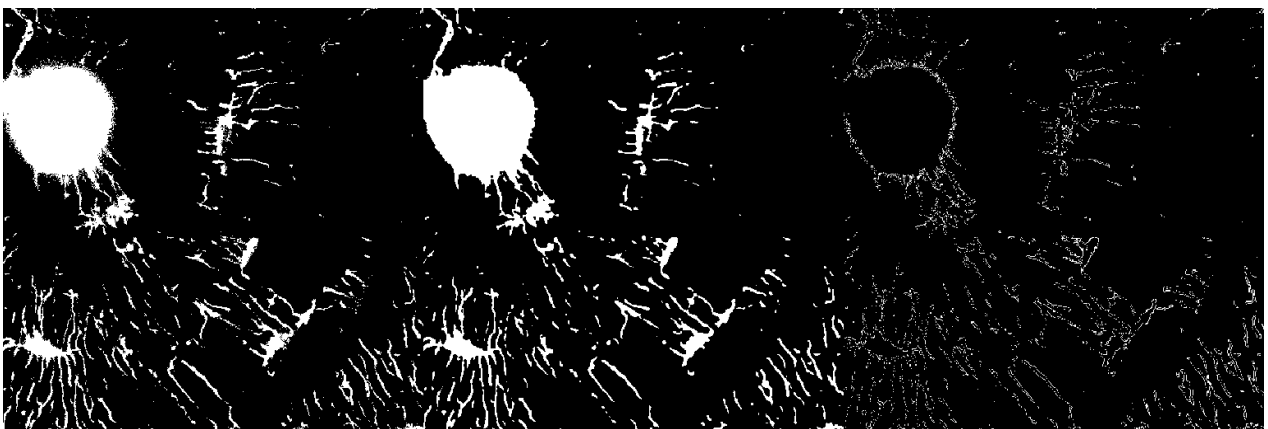
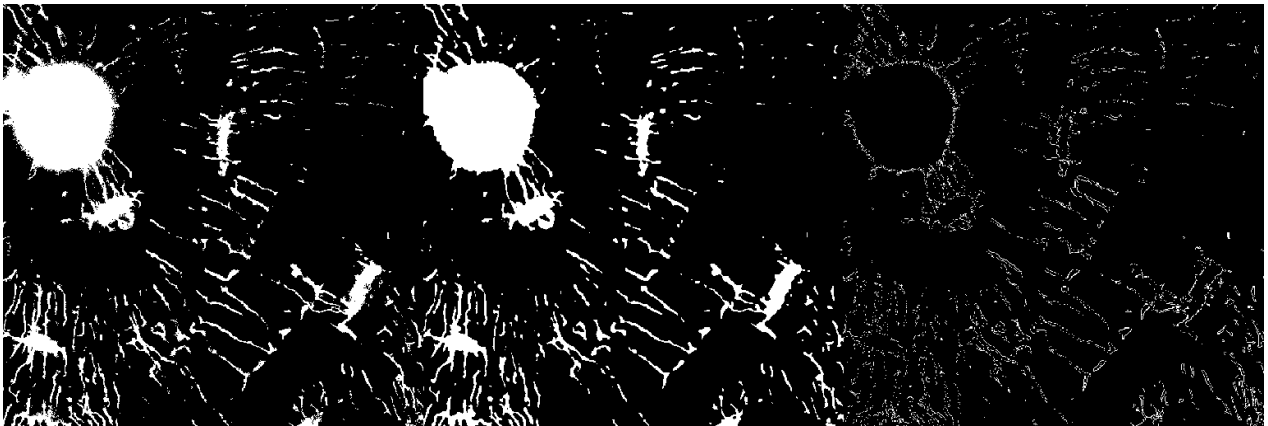


epoch 45

Label

Prediction

Distinction

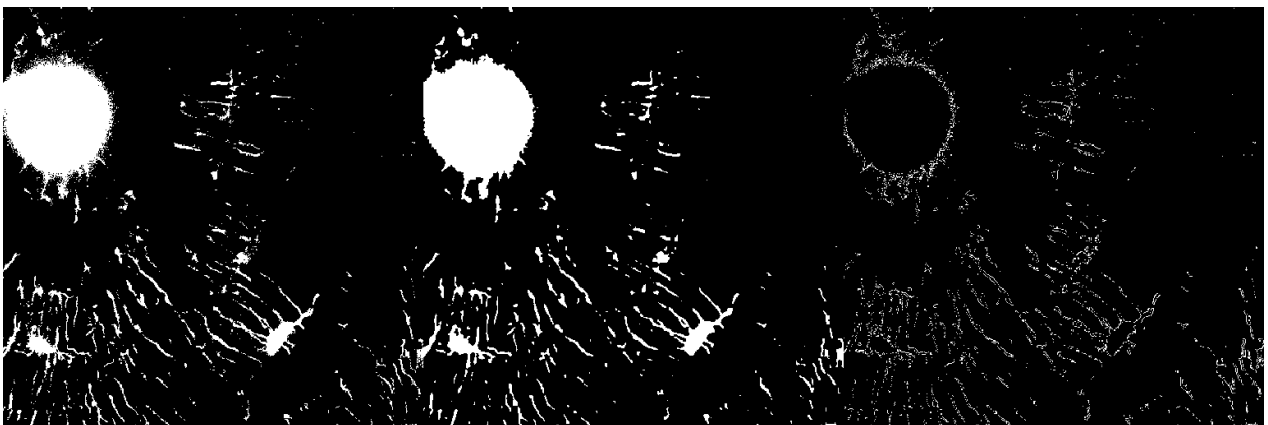
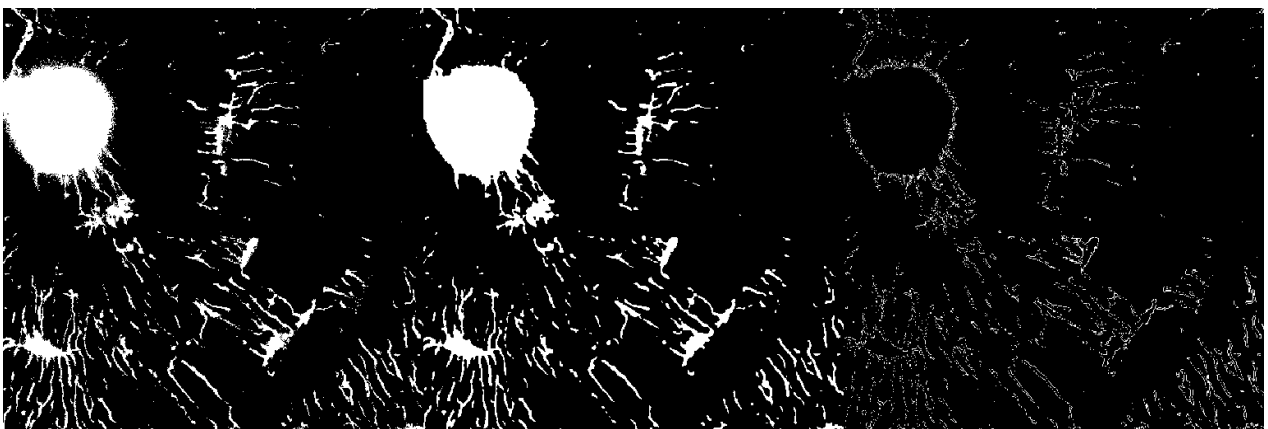
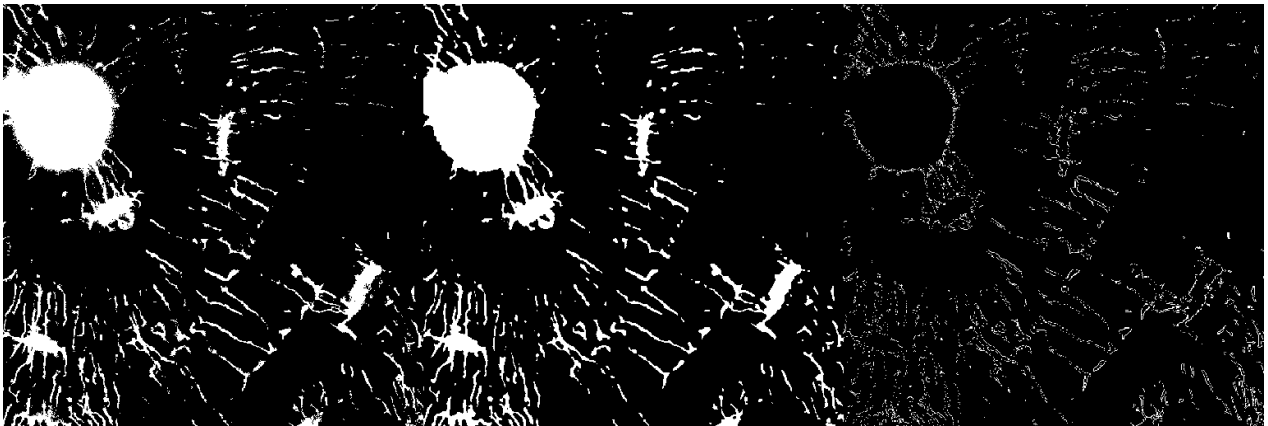


epoch 55

Label

Prediction

Distinction

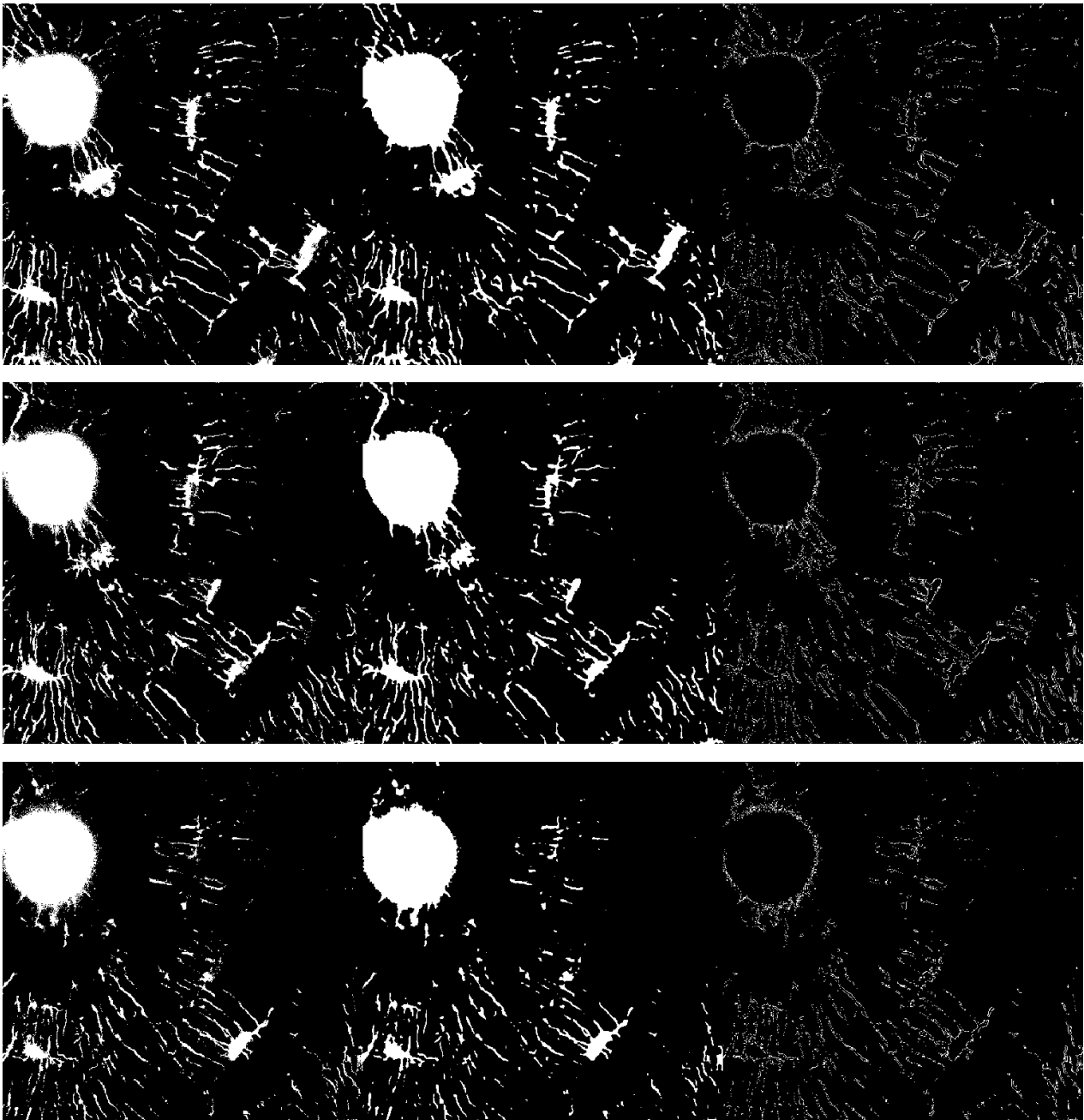


epoch 65

Label

Prediction

Distinction



3. To be improved

- Question came up on stage 1: " the average error of the training data will decrease as the threshold is increasing. However, the derived image with a larger threshold value obviously does not match the label image. Instead, after a smaller threshold processing of the image can be well corresponding label image " we may explain that from the structure of the network: convolution neural network output image size relative to the input image size reduced (image size from the original 512×512 to 472×472), we consider the first layer of convolution neural network **with inappropriate padding layer or stride** . This explains the

previous confusion: when the threshold value was set at a large number, **the majority of black in the image is more, while the main structure such as bone nucleus is still white**, this overlaps with the label image more. In contrast, compared with the predicted image with a reduced field of vision, **magnified the middle main part ---- the white part such as the nucleus**, which undoubtedly increased the proportion of white pixels, so overlapped less with the label image, resulting in greater verification error.