Blindness Detection

Detect diabetic retinopathy to stop blindness before it's too late

0852603 朱愷擇
0613144 葉之晴
309653008 楊大昕

Outline

PART 01

Introduction

Illustrate the motivation and the purpose of our project.

Introduction

In Taiwan, more than two million people have diabetes.

Diabetes can cause many health complications.

Ex: Diabetic nephropathy, diabetic retinopathy.

The eye is the window of the soul.

Millions of people suffer from diabetic retinopathy globally.

The leading cause of blindness among working aged adults.

PART 02

Materials & Methodology

Introduce the dataset and the methods we used.

Materials

Aravind Eye Hospital in India hopes to detect and prevent this disease among people living in rural areas.

Aravind technicians travel to rural areas to capture images and then rely on highly trained doctors to review the images and provide diagnosis.

Materials

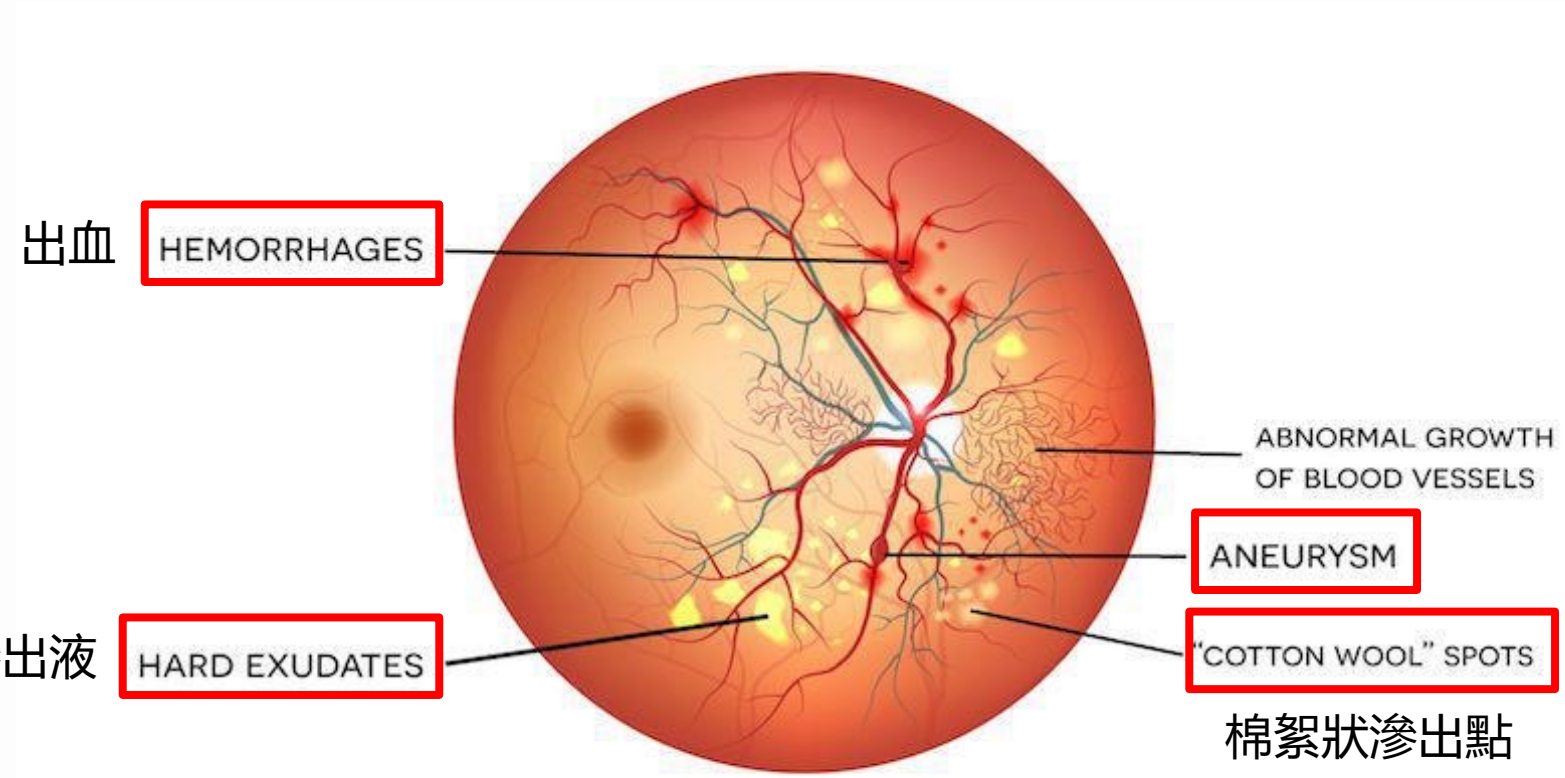
Their goal is to scale their efforts through technology.

Gain the ability to automatically screen images for disease.

Provide information on how severe the condition may be.

Methodology

We can spot on five things to know diabetic retinopathy.



Methodology

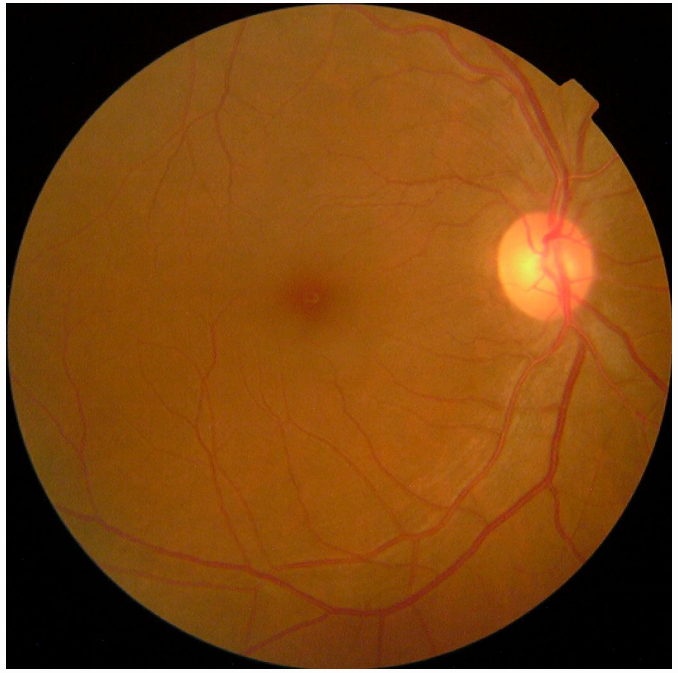
3662 training images and 1928 testing images.

Each image has been rated on a scale of 0 to 4.

Label	Stage
0	No DR
1	Mild
2	Moderate
3	Severe
4	Proliferative DR

Methodology

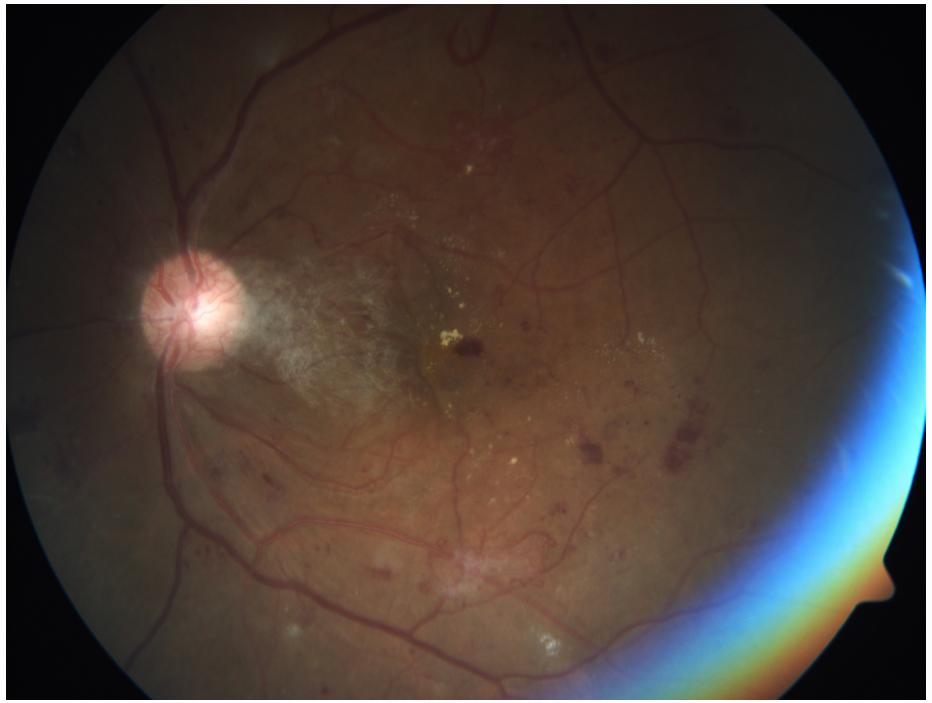
Original images are taken using fundus photography.

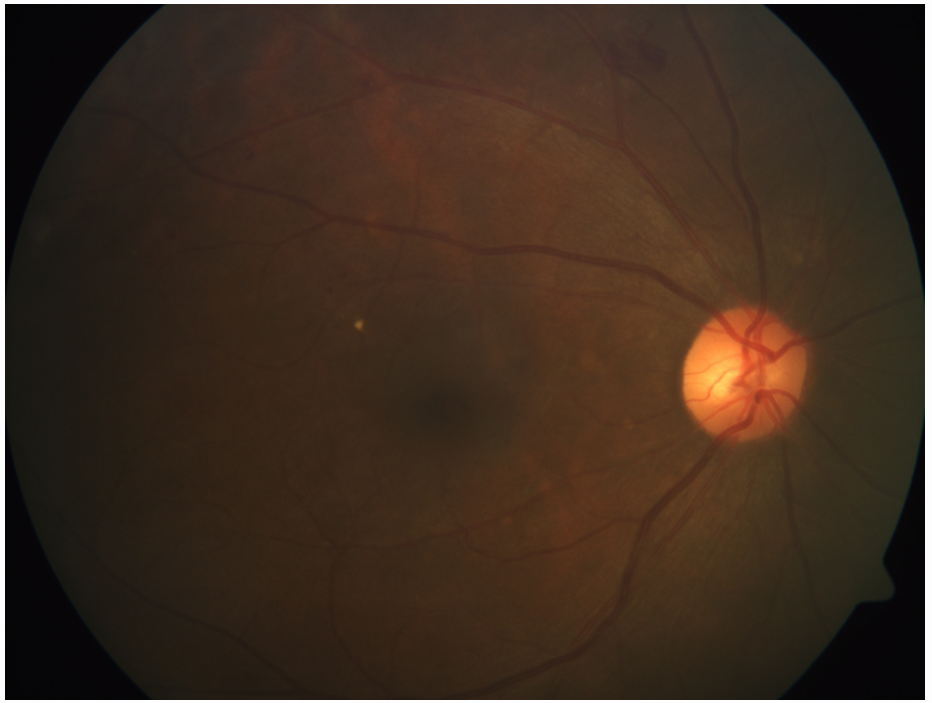




Methodology

Some images are taken under a bad condition.

Ex: Out of focus, underexposed, or overexposed.

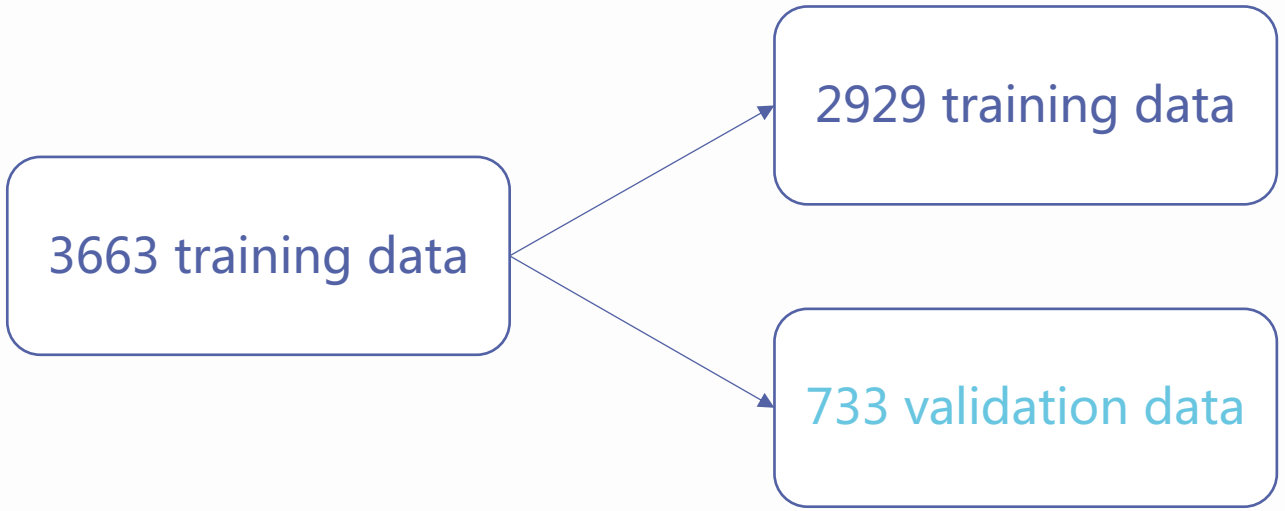




Methodology

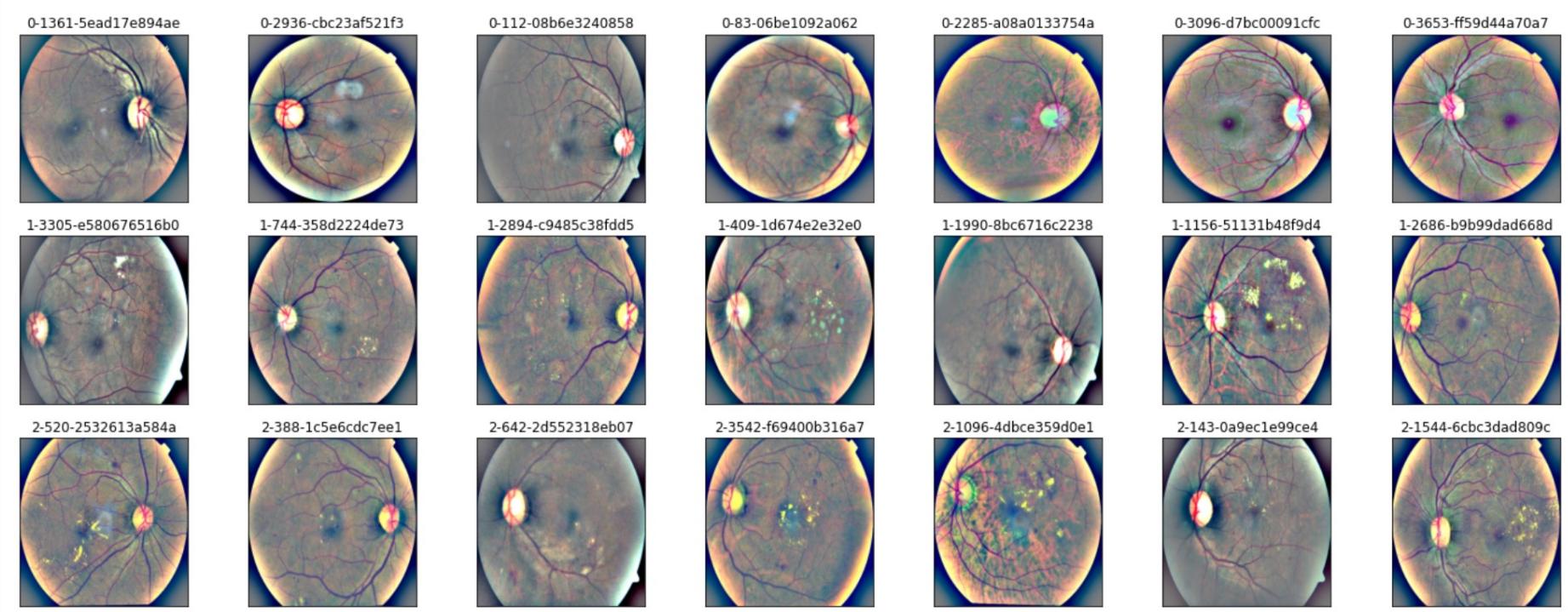
We want to know if its good for prediction if we do some pre-processing to original images.

Split 20% training data as validation data.



Methodology

Use cv2.addWeighted() to merge the original image and GaussianBlured image, and improve lighting condition.



PART 03

Experiment

Use pre-trained model to classify and show the result.

Experiment

Model: Resnet_v2 model

Loss function: Cross Entropy

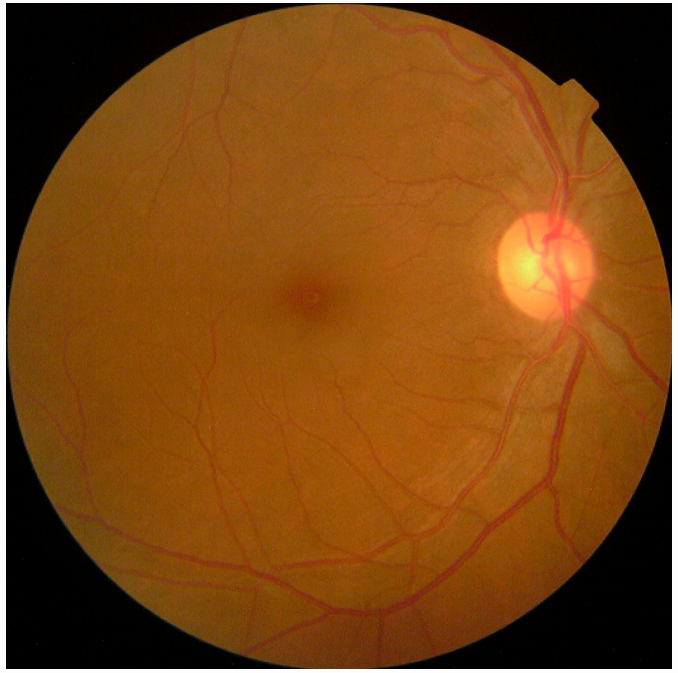
Optimizer: Adam

Learning rate: 5e-6

Epoch: 30

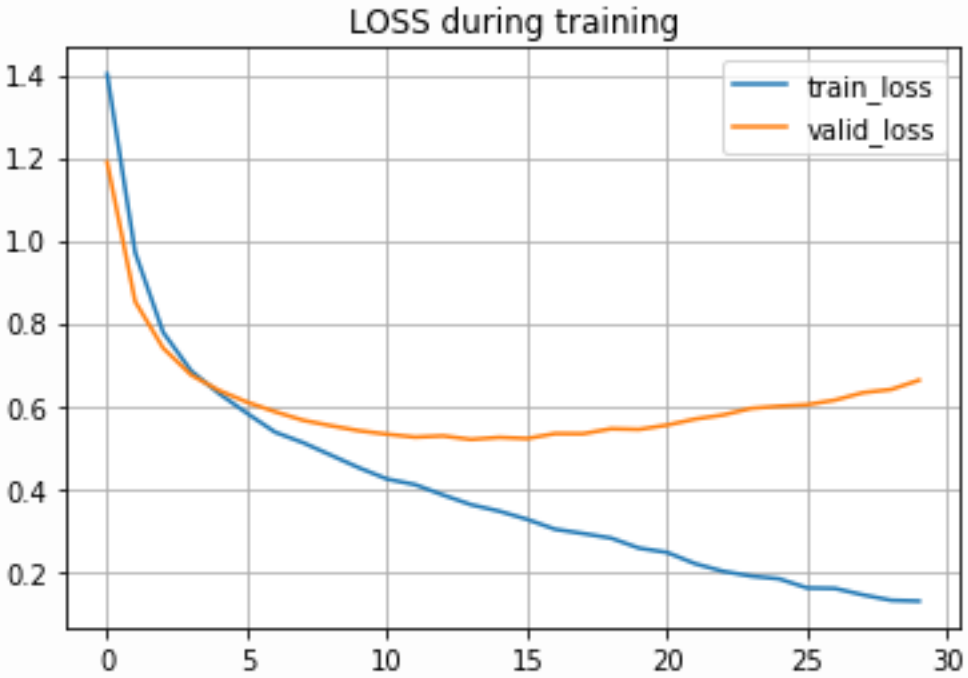
Experiment without pre-processing

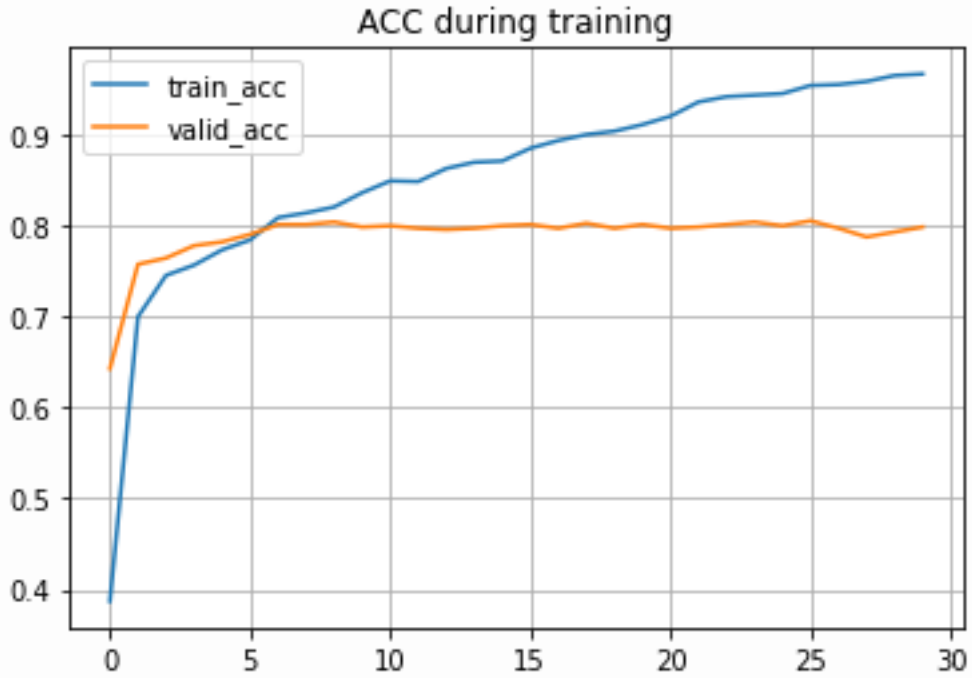
Use original images to train the model.


Experiment without pre-processing

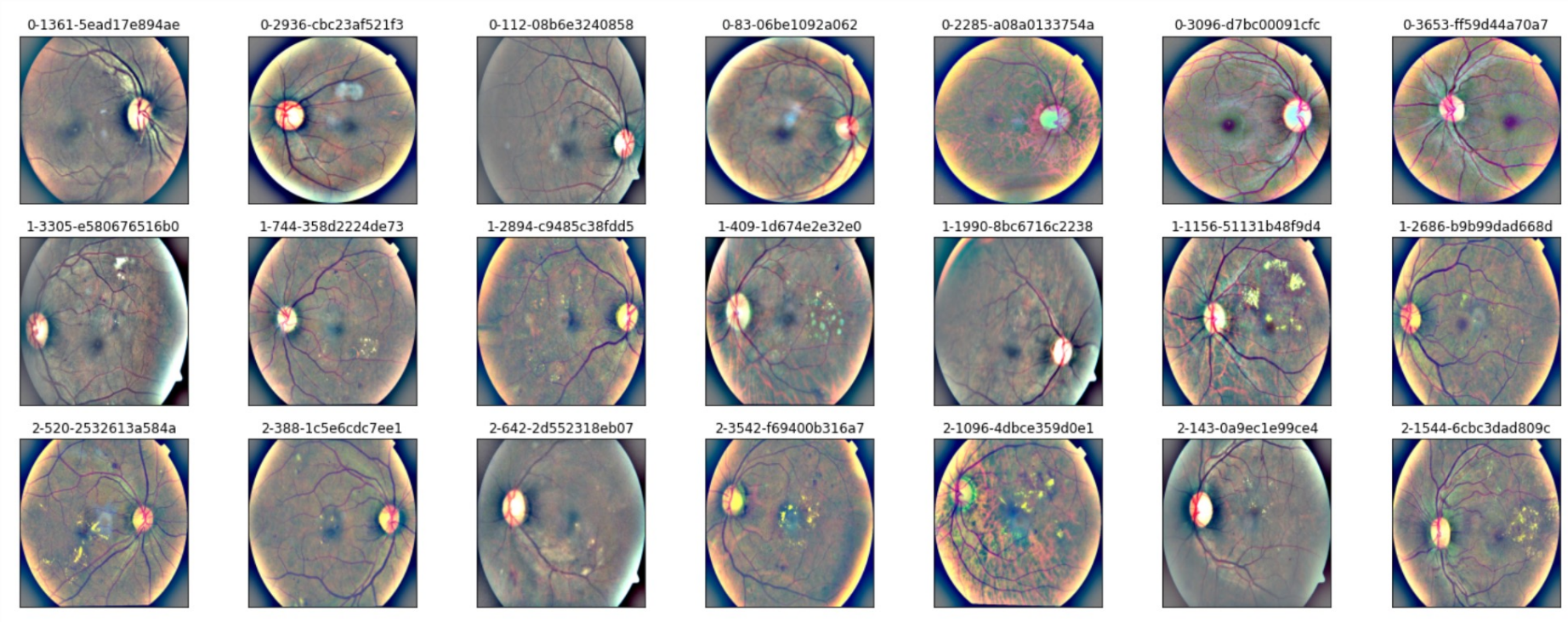
without	Loss	Accuracy
Training	0.128120	0.966200
Validation	0.518663	0.804911





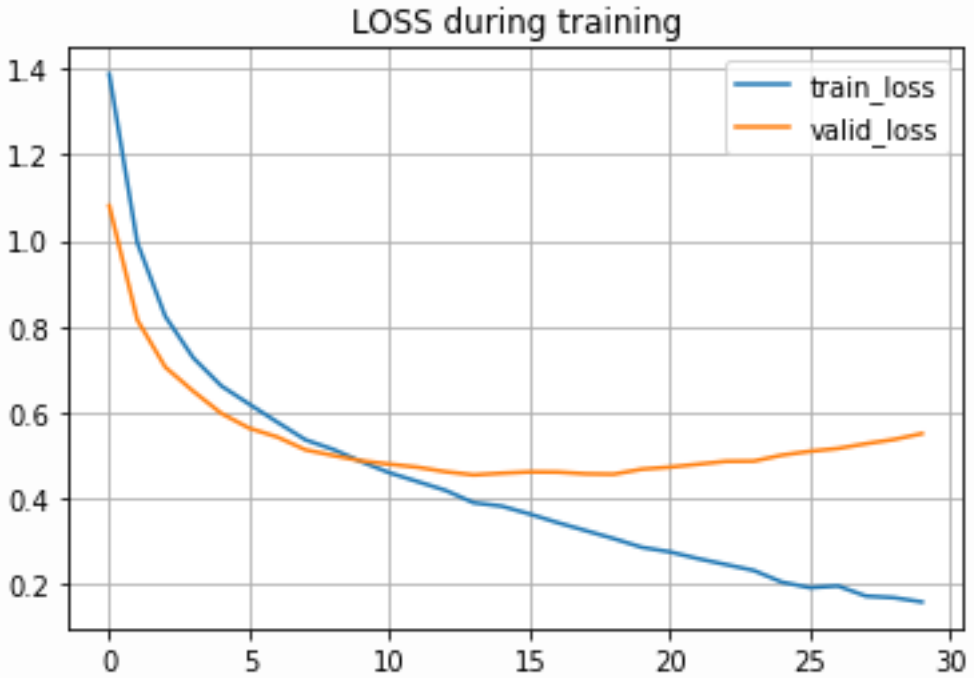
Experiment with pre-processing

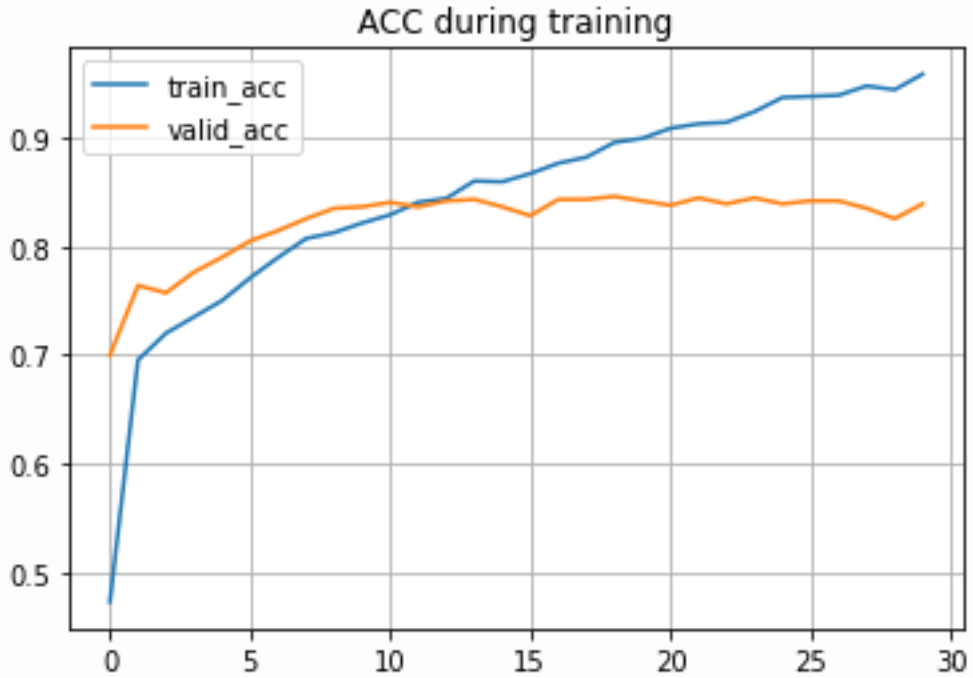
Use pre-processed images to train the model.



Experiment with pre-processing

with	Loss	Accuracy
Training	0.157332	0.958348
Validation	0.453608	0.845839





PART 04

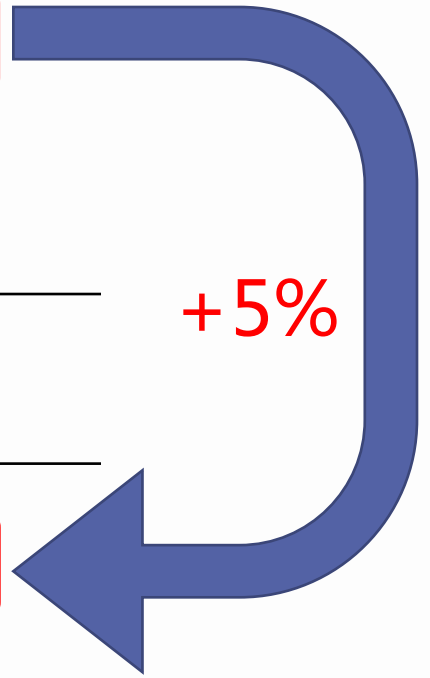
Discussion

Compare two results

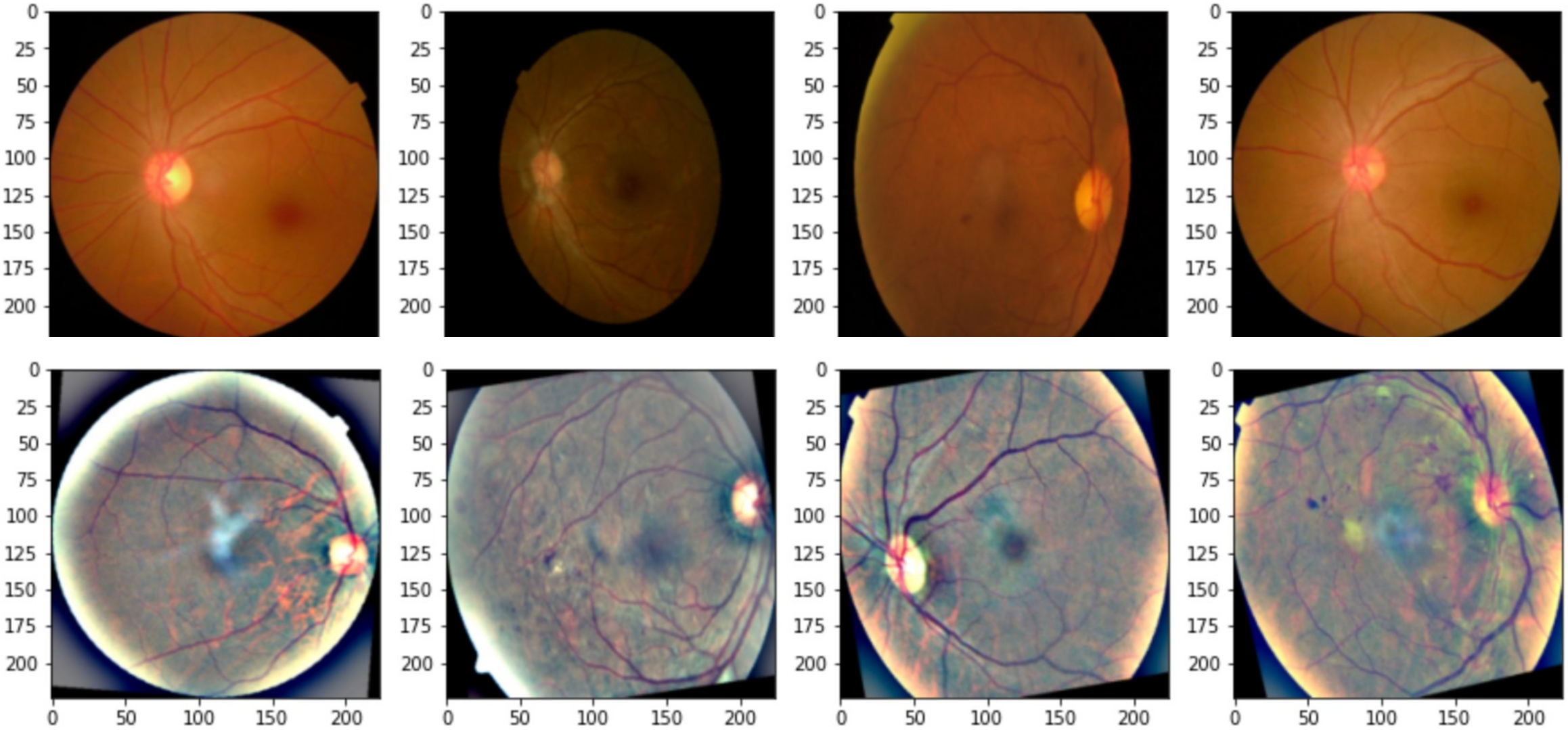
Discussion

without	Loss	Accuracy
Training	0.128120	0.966200
Validation	0.518663	0.804911

with	Loss	Accuracy
Training	0.157332	0.958348
Validation	0.453608	0.845839



Discussion



PART 05

Conclusion

Make a conclusion of this project.

Conclusion

We are usually provided data under bad condition.

Thus, we must do some pre-processing to the provided data, either image data or numerical data.

It is not only for cleaning data, but also for improving the ability of model prediction.

Proper pre-processing is better for feature extraction.

Thanks for listening