Efficient Parameters for Rotation Processing of Data Augmentation

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Profile

Birth
17, Jan 2000

Name	Duke Maeda.
Affiliation	Tokai University Bachelor degree program.
Interest	Language, Culture, AI
Language	English Japanese Arabic ..etc
Culture	martial arts
AI	This technology can make society better.

Introduction

Problem

Huge amount of time to prepare

Prepare a large number of images

※1

Solve

Data augmentation

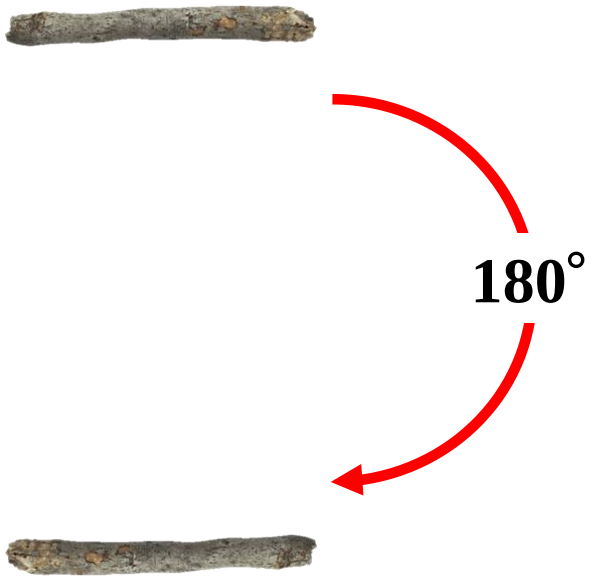
Horizontal flipping

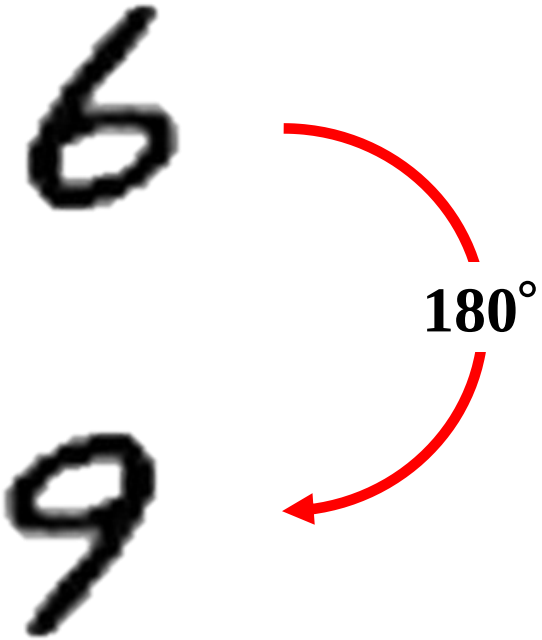
Rotation

Color jittering

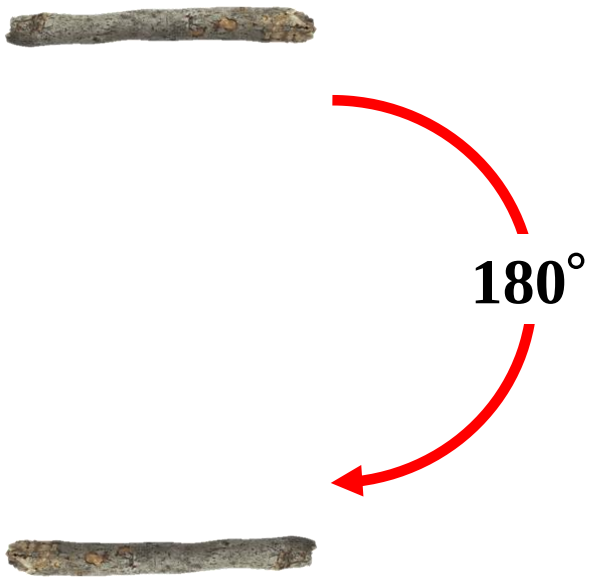
※1：D. Rhodes, “Automatic Dog Breed Identification”, 2015

Rotation

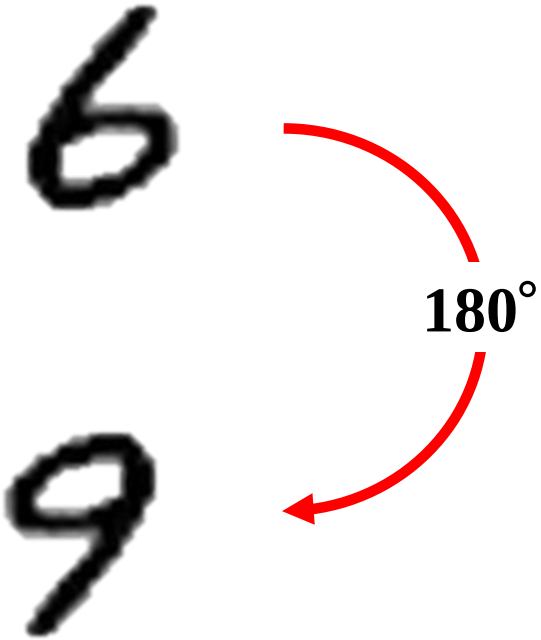




Rotation



Not lose object features



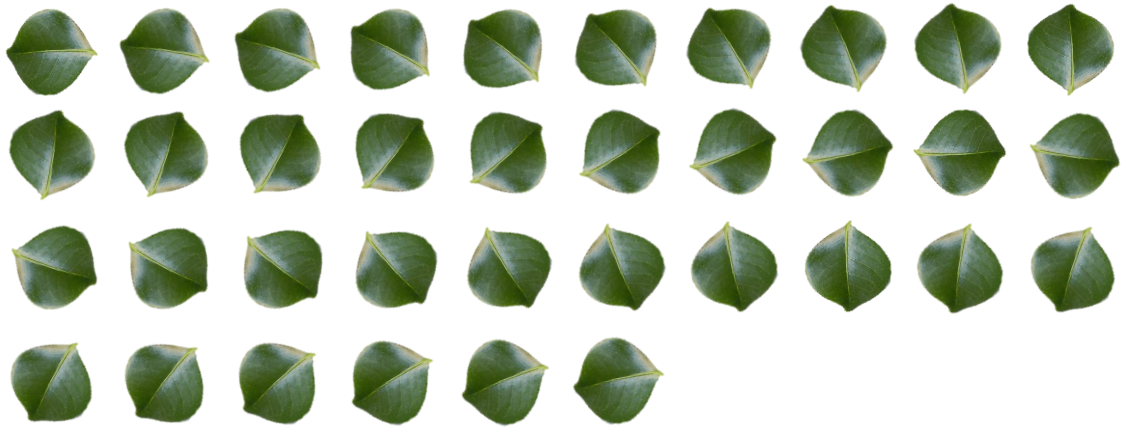
Lose object features

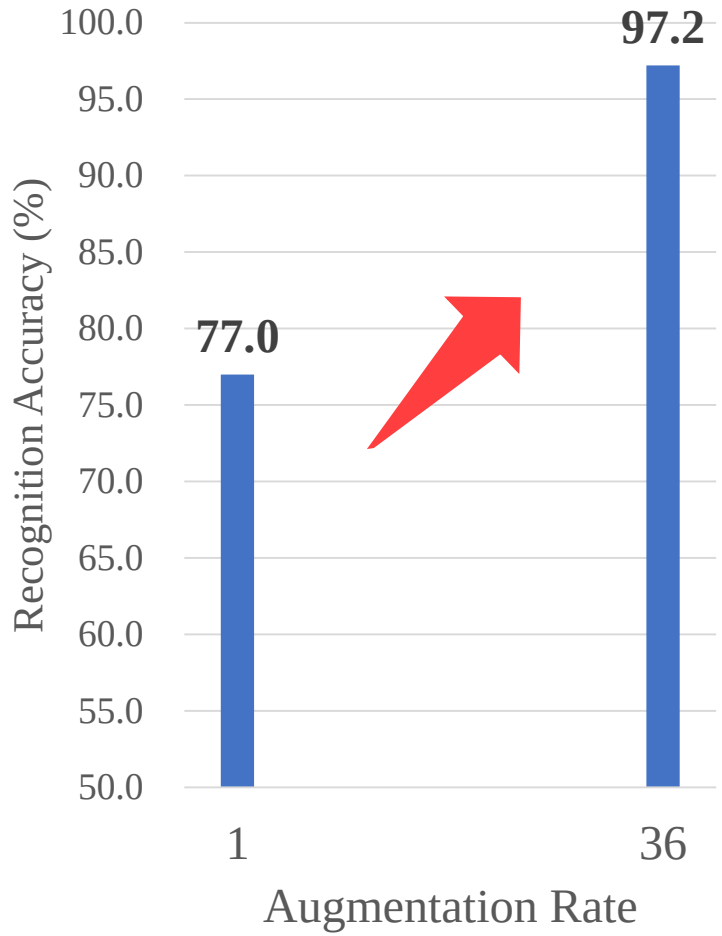
Previous research

Identified plant diseases ※1

Original

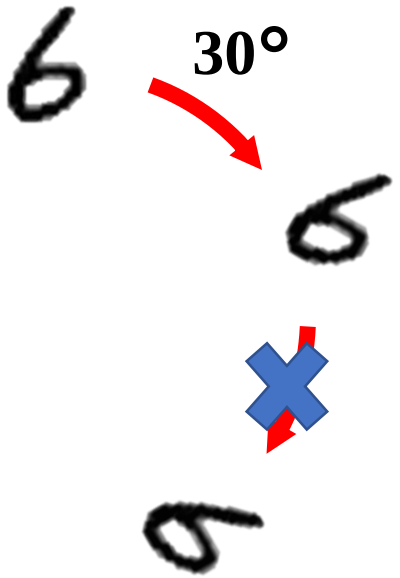
36-fold



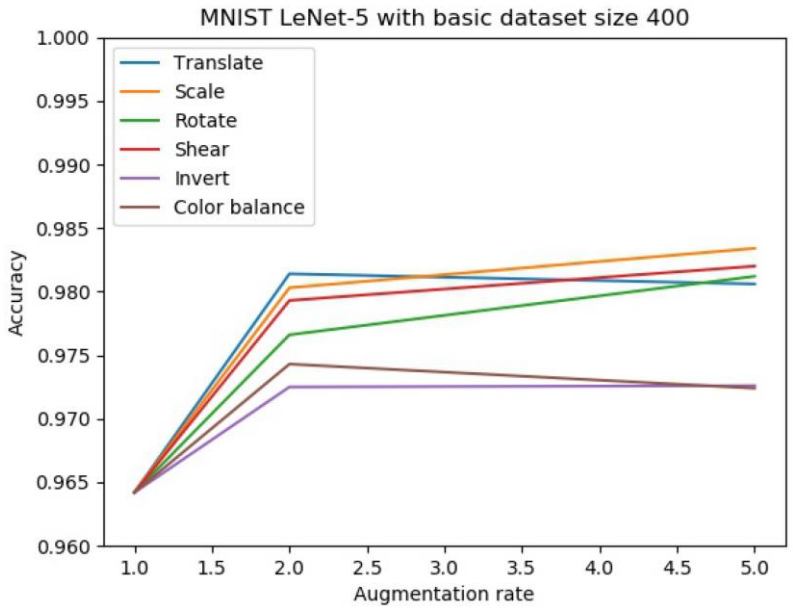


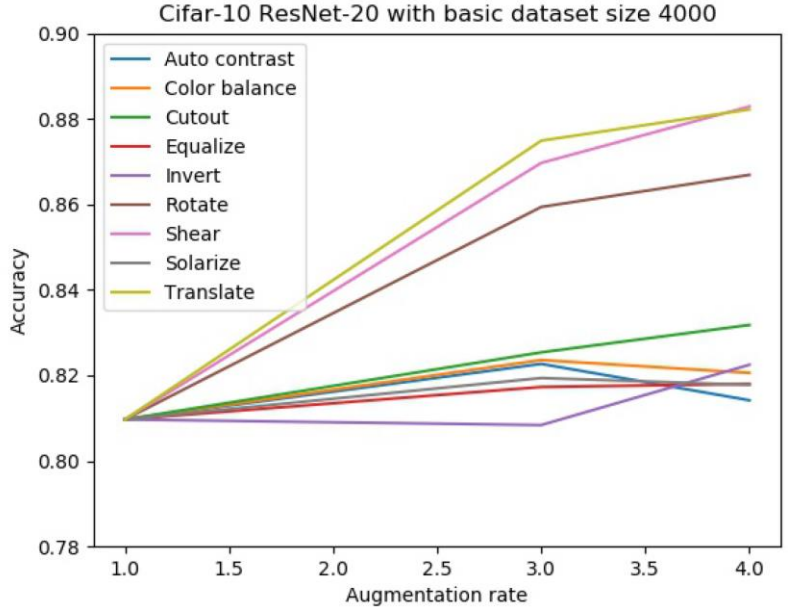
※1：Y.Kawasaki et al, “Basic Study of Automated Diagnosis for Viral Plant Diseases with Convolutional Neural Networks”, 2015

Previous research



※1





※2

※1 L.Taylor G.Nitschke, “Improving Deep Learning using Generic Data Augmentation”, arXiv:1708.06020vl [cs.LG] 20 Aug 2017.

※2 Benlin.Hu et al. “A Preliminary Study on Data Augmentation of Deep Learning for Image Classification”, arXiv:1906.11887v1, 2019

Problem

How to rotate ?

How to augment ?

?

Purpose

Rotation Angle

Not lose object features

Augmentation Rate

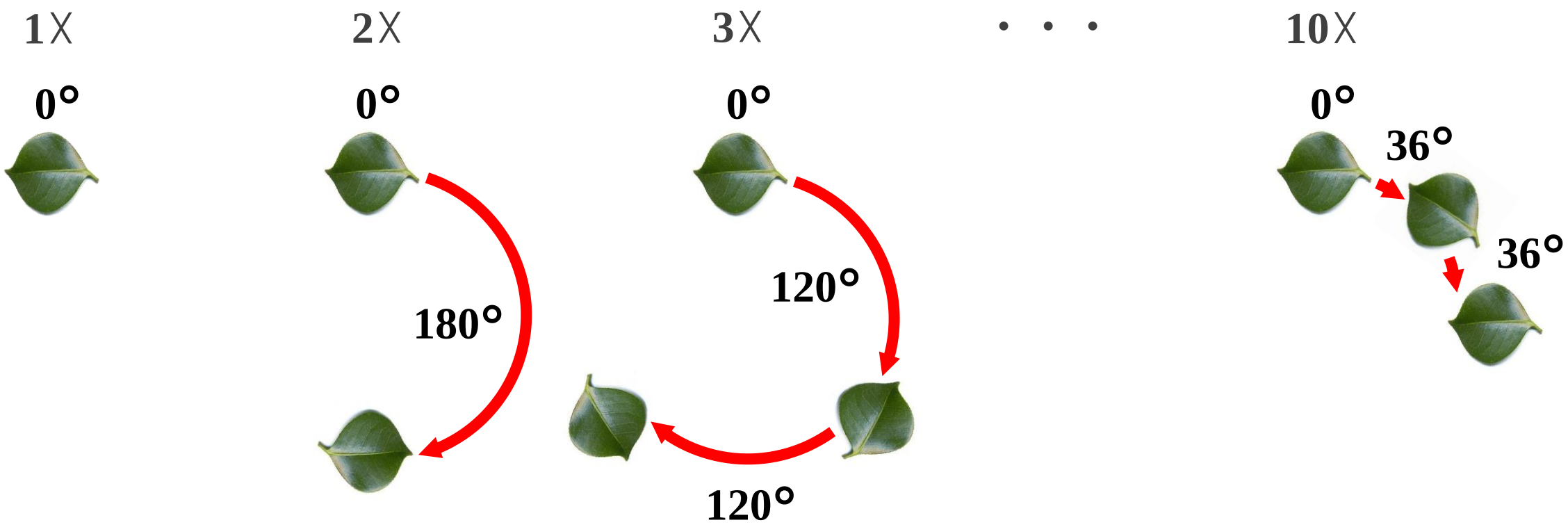
Lose object features

Experiment

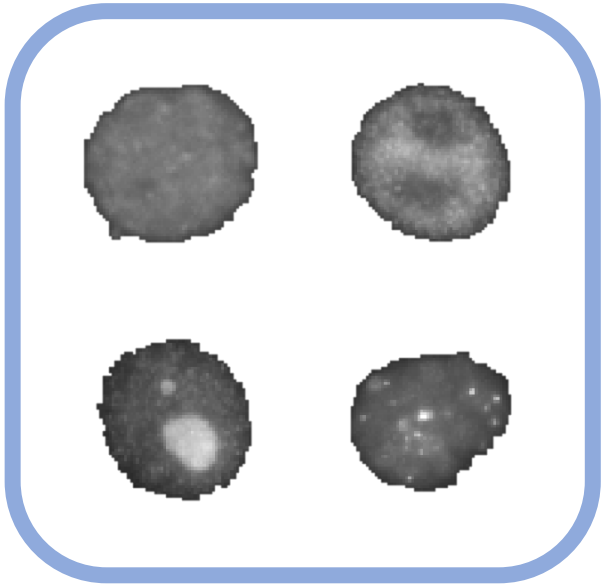
Not lose object features

Experimental methods

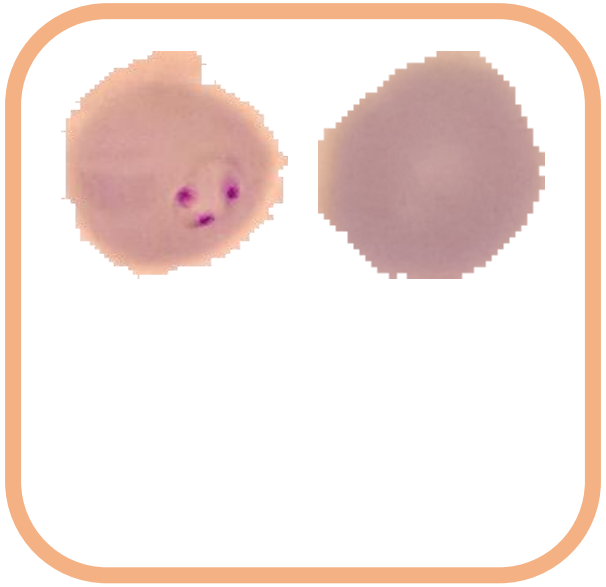
Rotation Angle = 360° / Augmentation Rate



Experimental methods



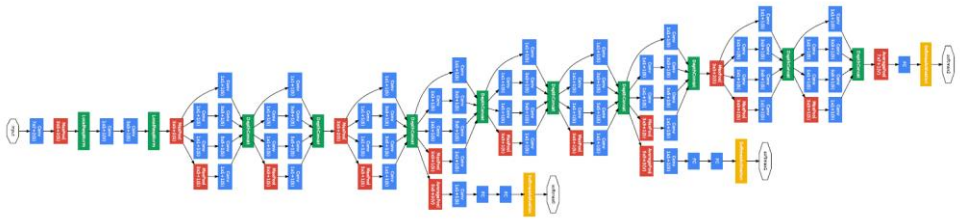
HEp-2 cell



Malaria-infected cell

Branches

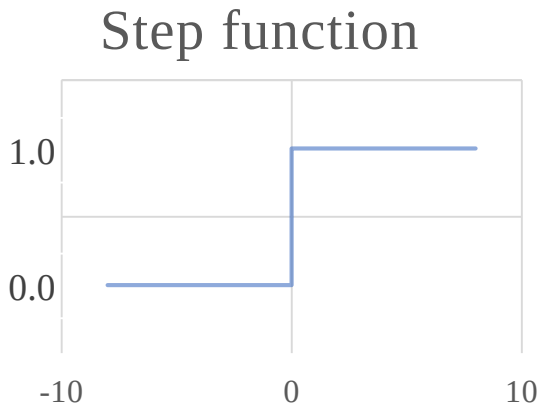
Experimental methods



GoogLeNet

Caffe

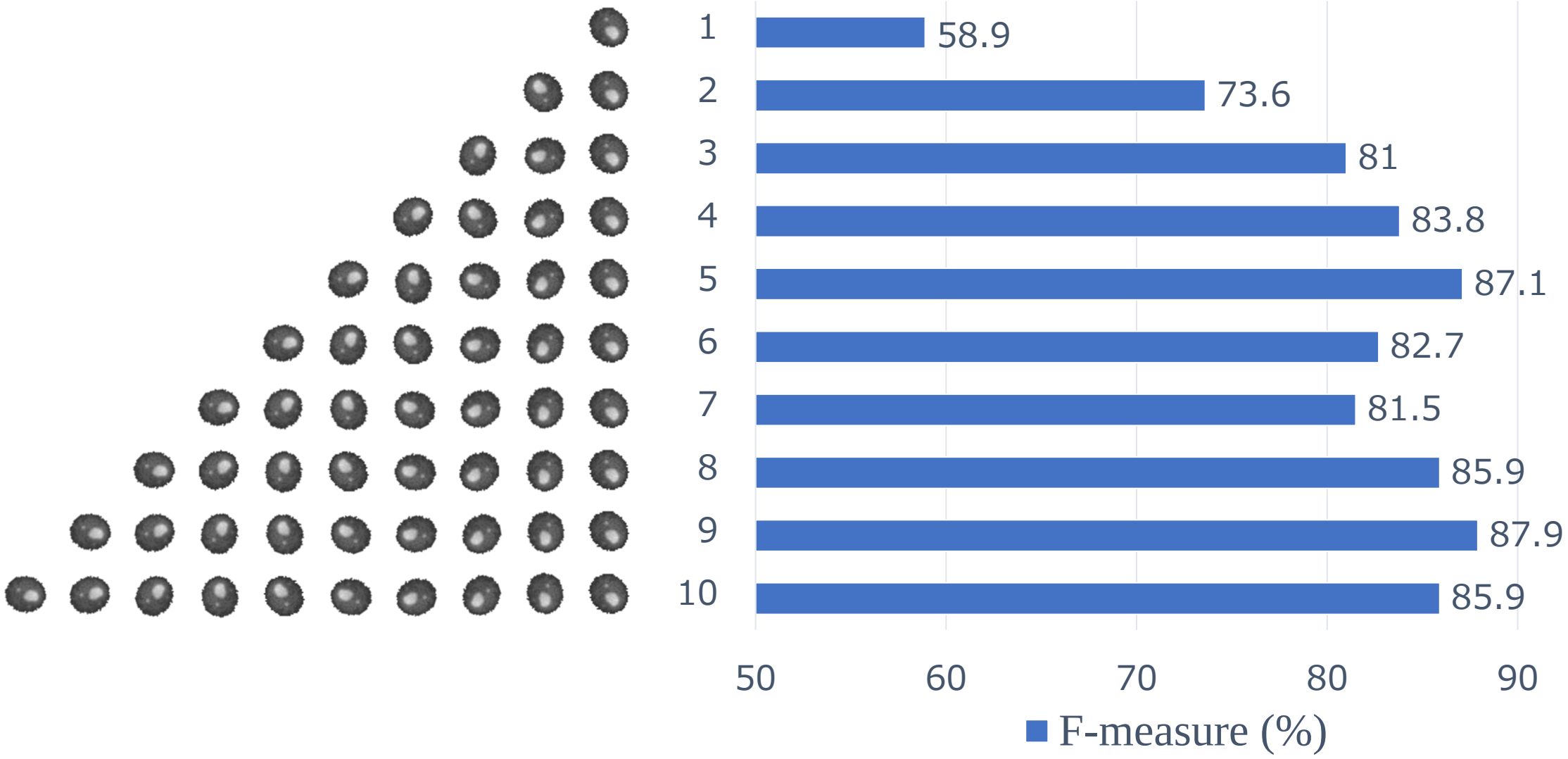
Initial Learning Rate	0.001
Max Epoch	100 Epoch
Step Size	30 Epoch



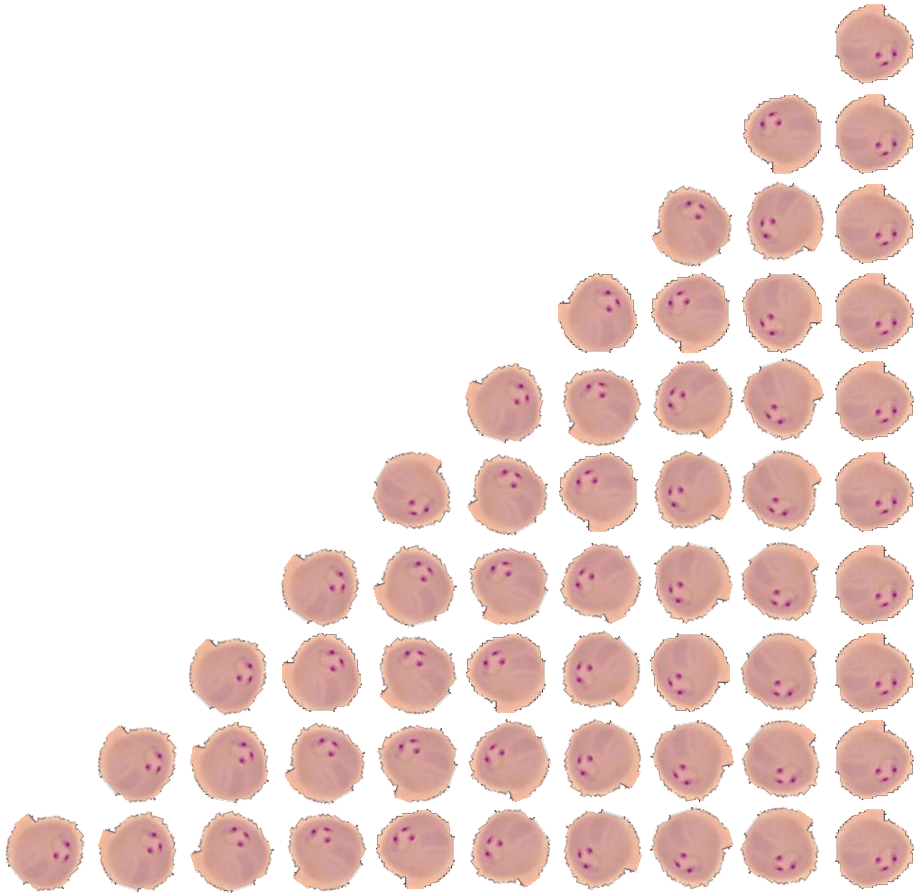
$$F\text{-}measure$$

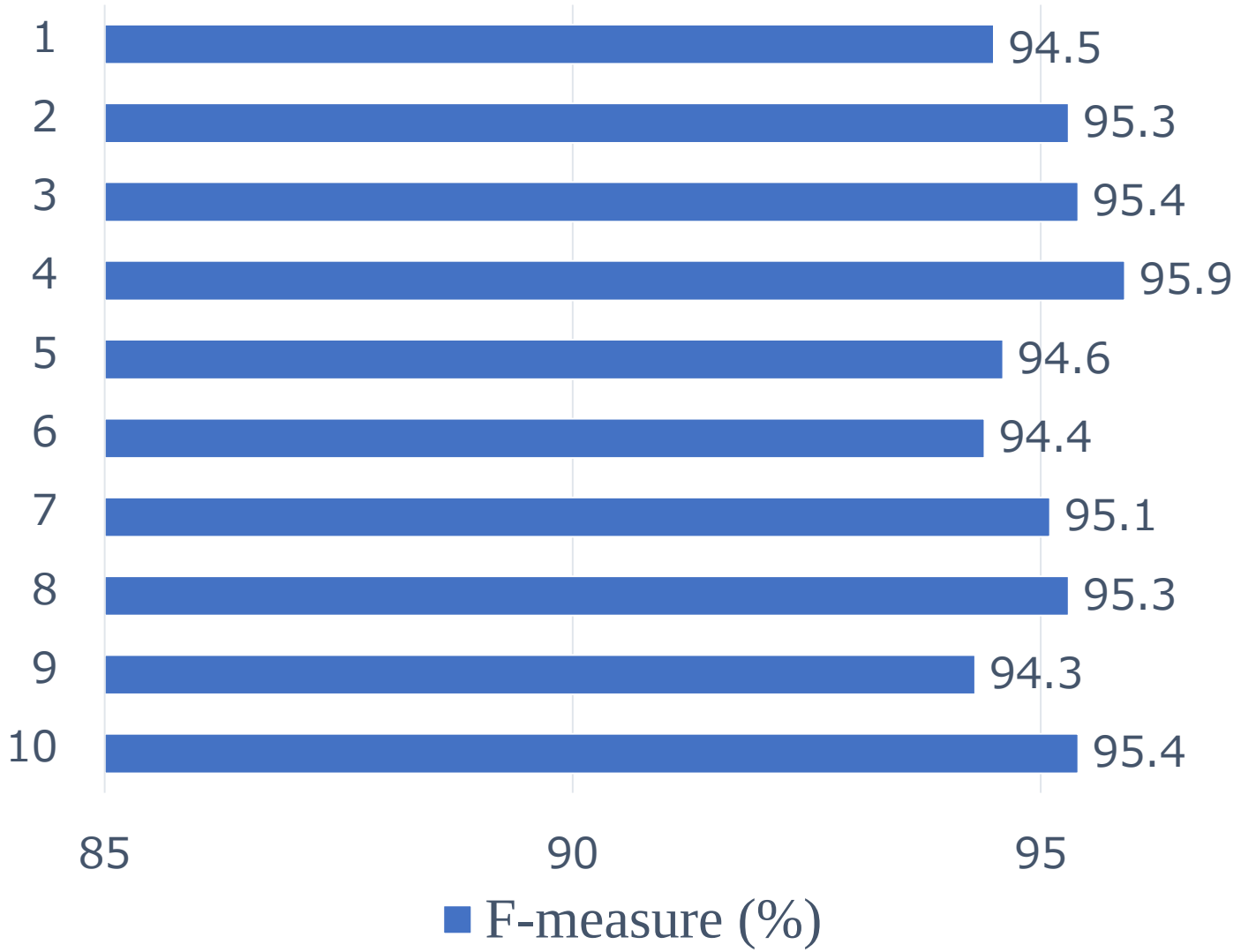
$$\frac{2 \times Precision \times Recall}{Precision + Recall}$$

Result and Discussion for HEp-2 cell

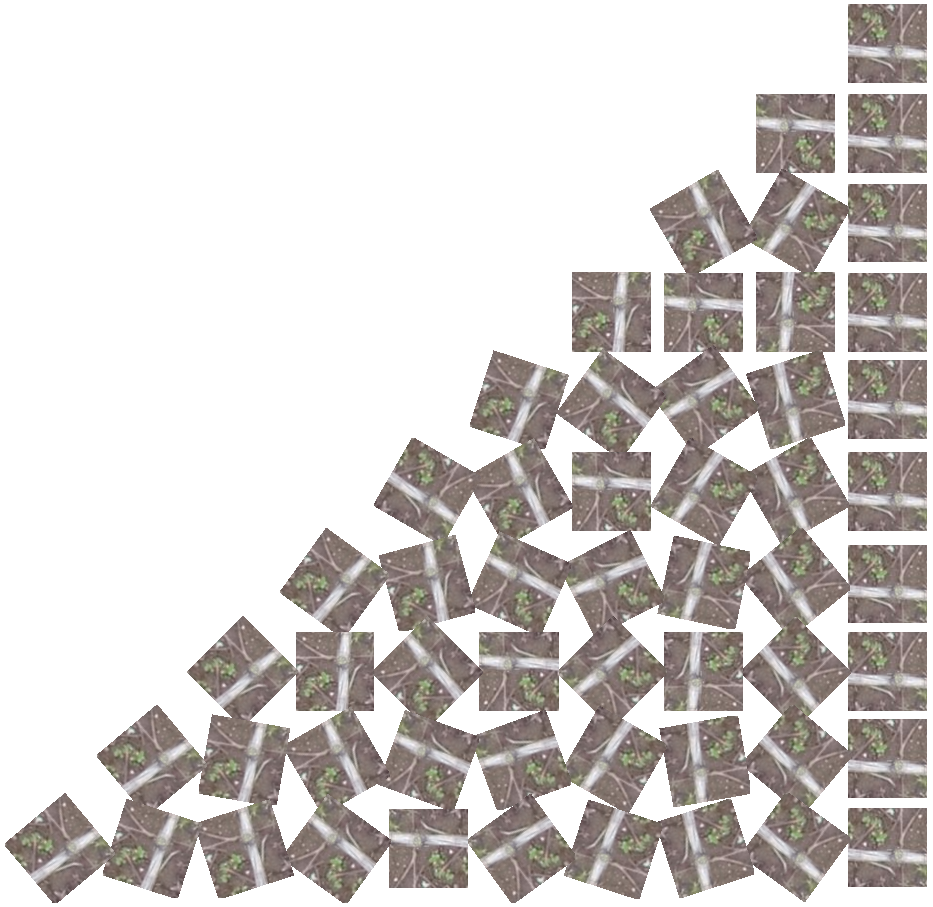


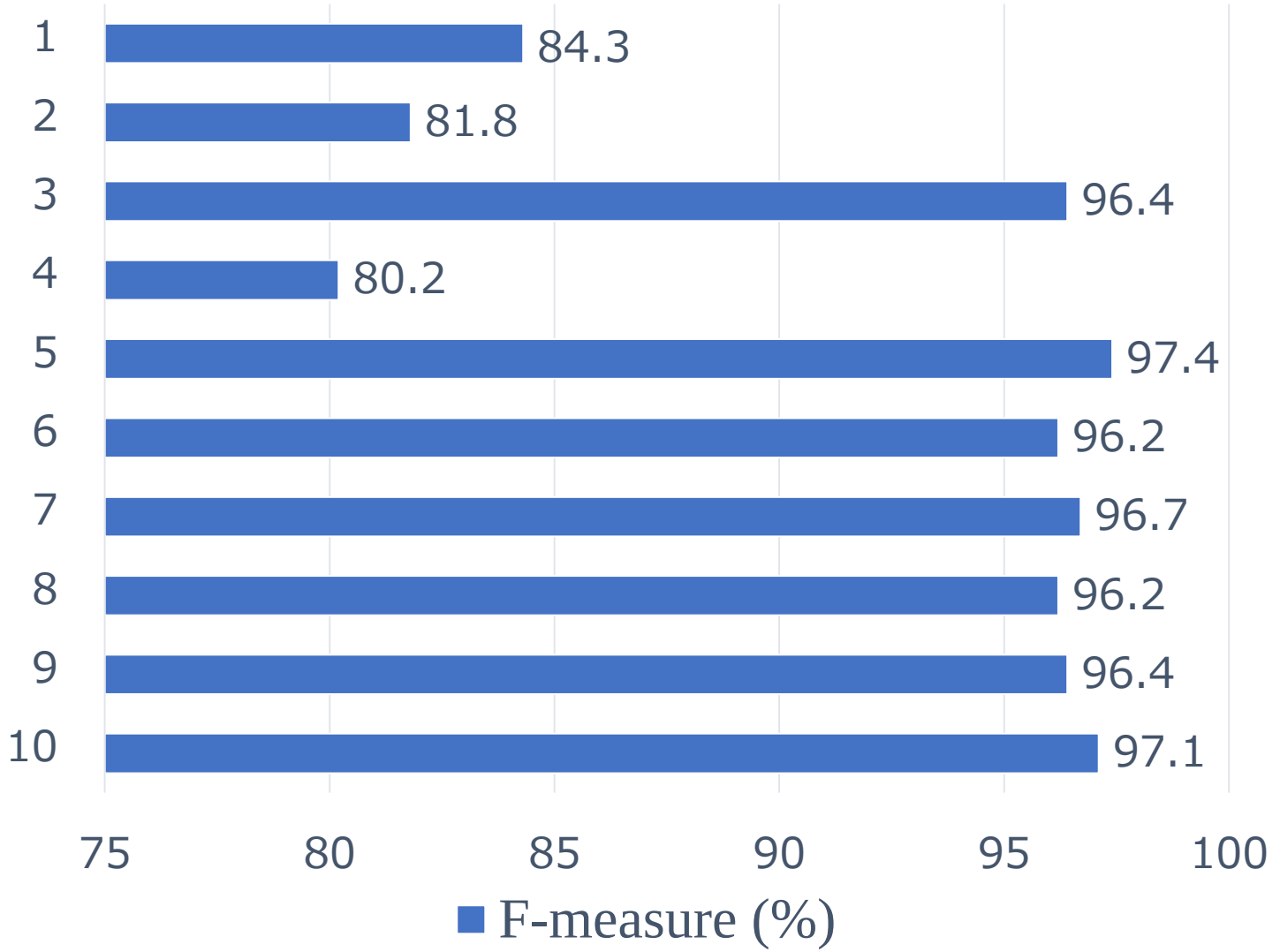
Result and Discussion for Malaria-infected cell





Result and Discussion for Branches

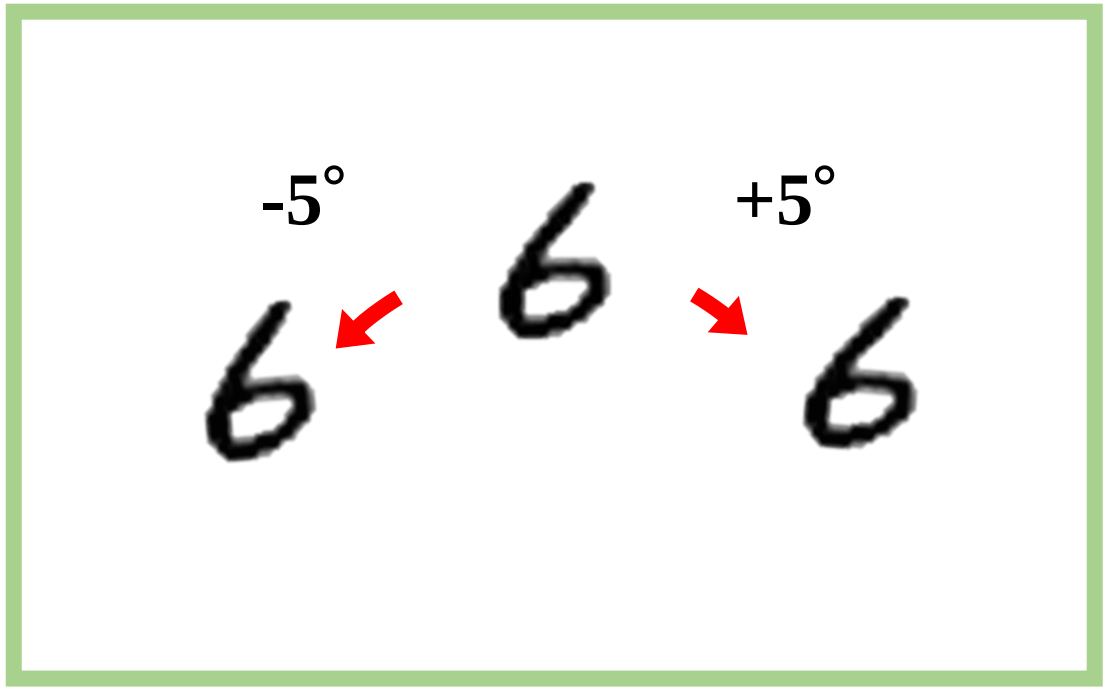


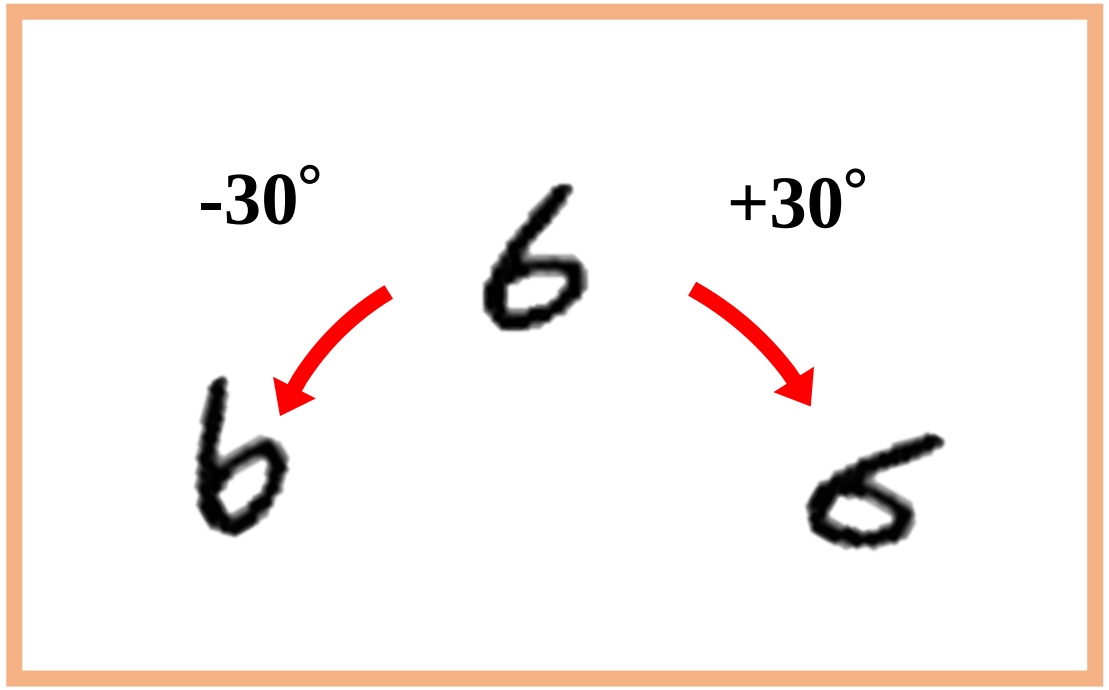


Experiment

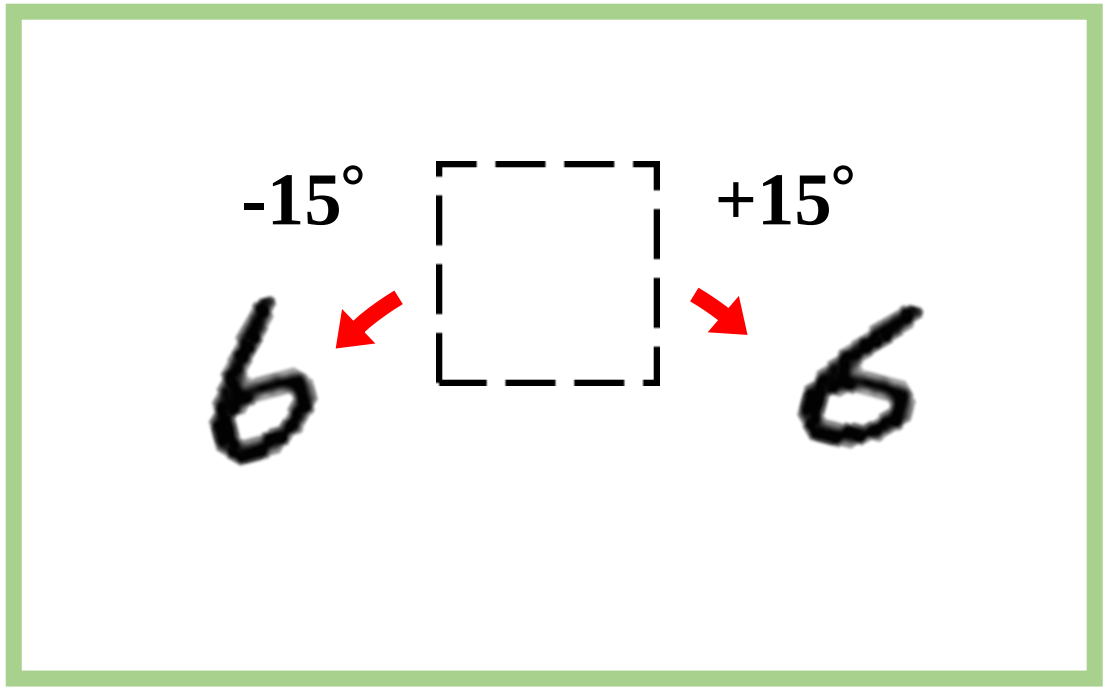
Lose object features

Problem

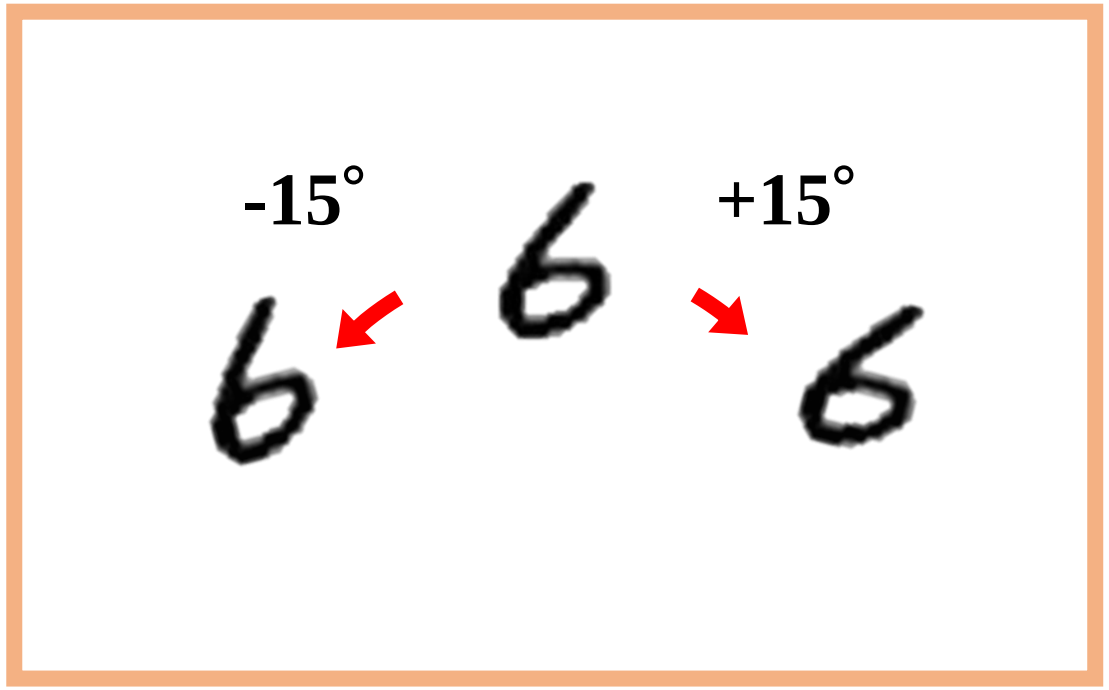




Experimental methods



Doubled



Tripled

Experimental methods

0°

5°

10°

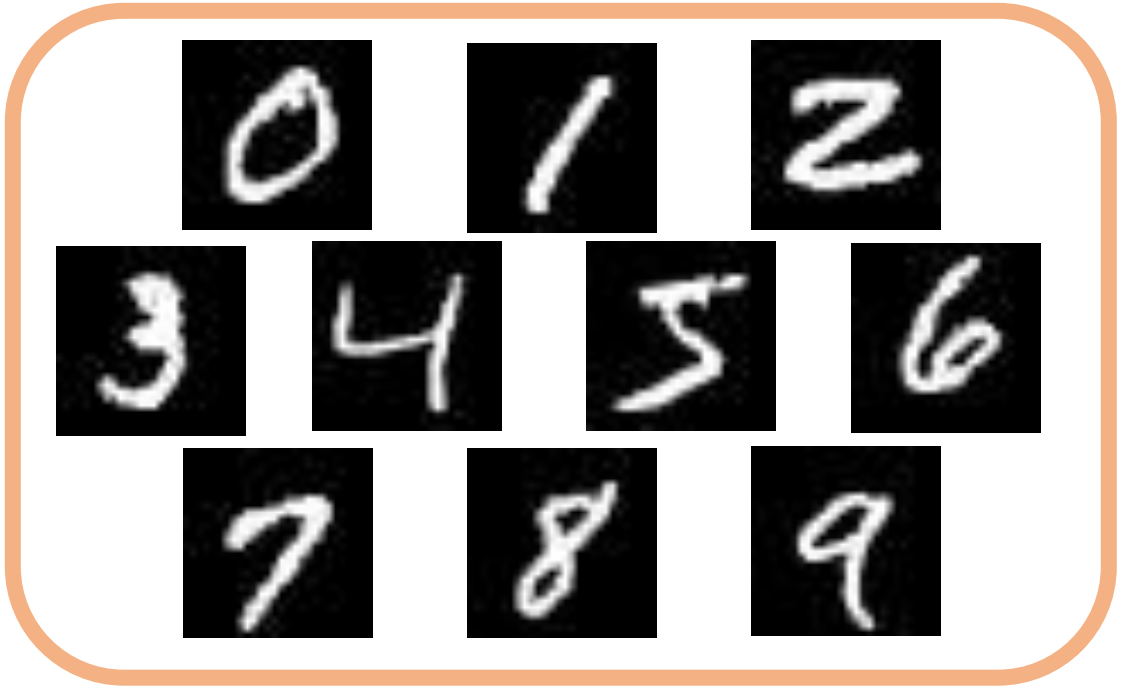
15°

. . .

35°

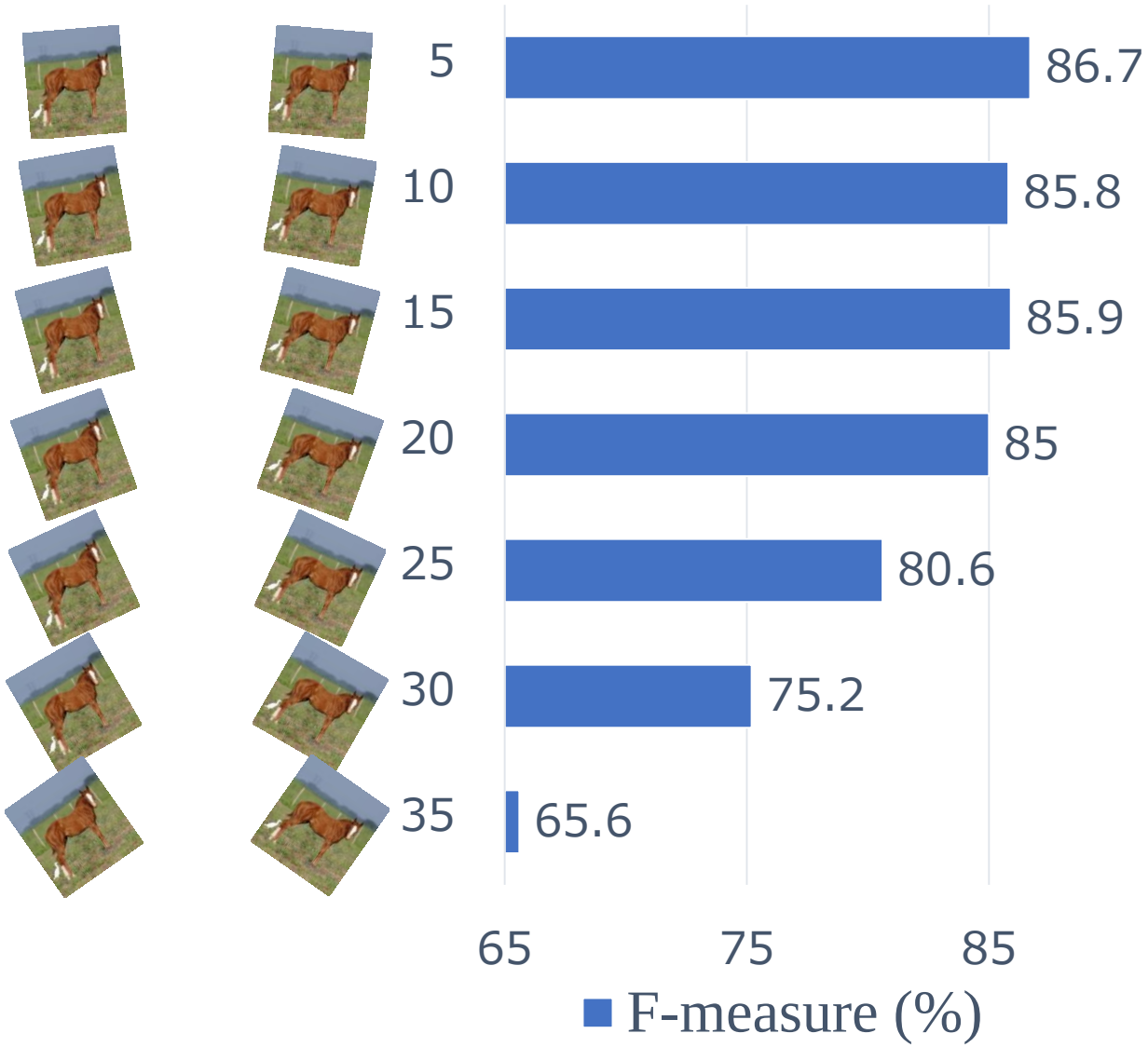
Experimental methods

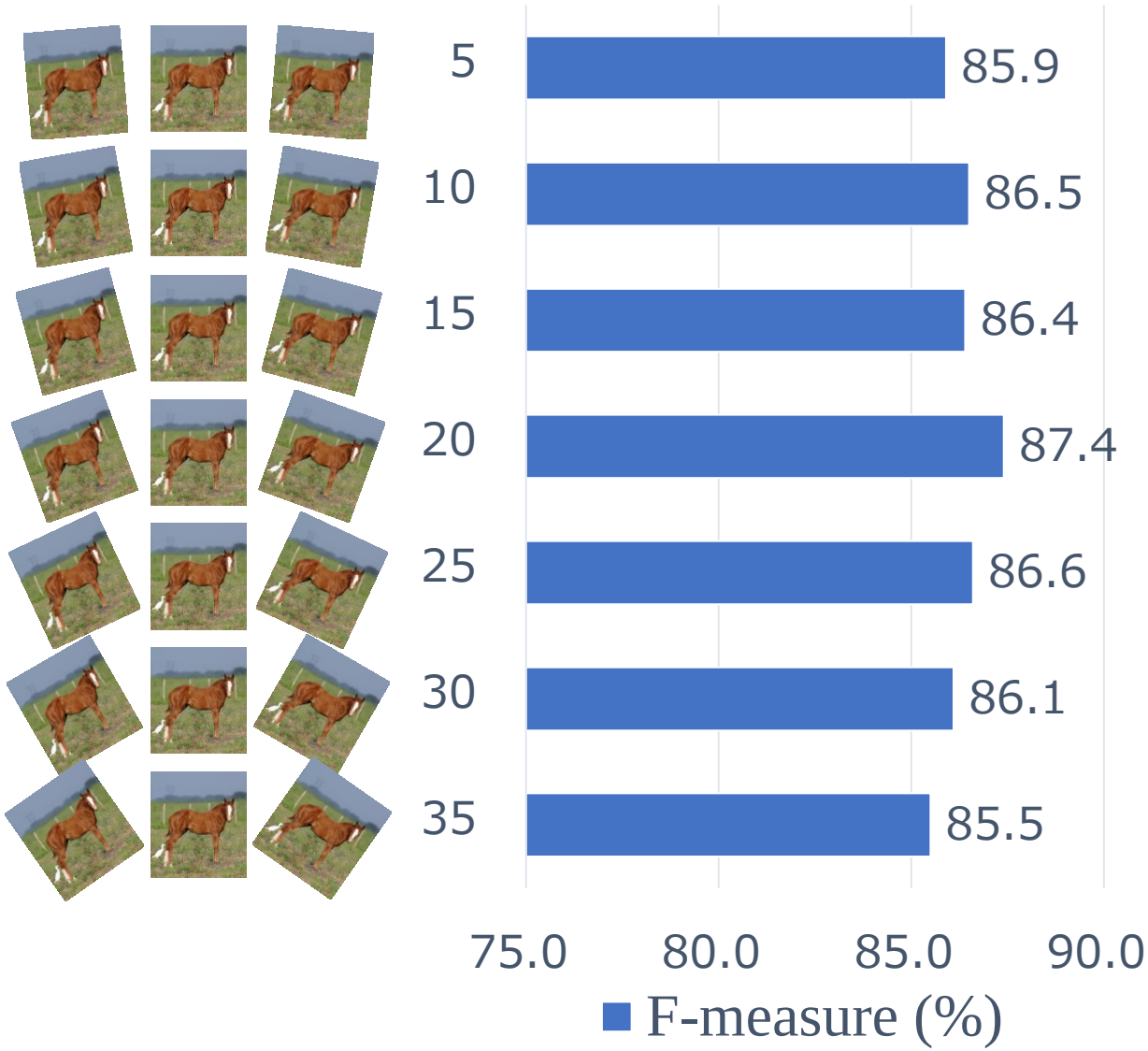
ImageNet



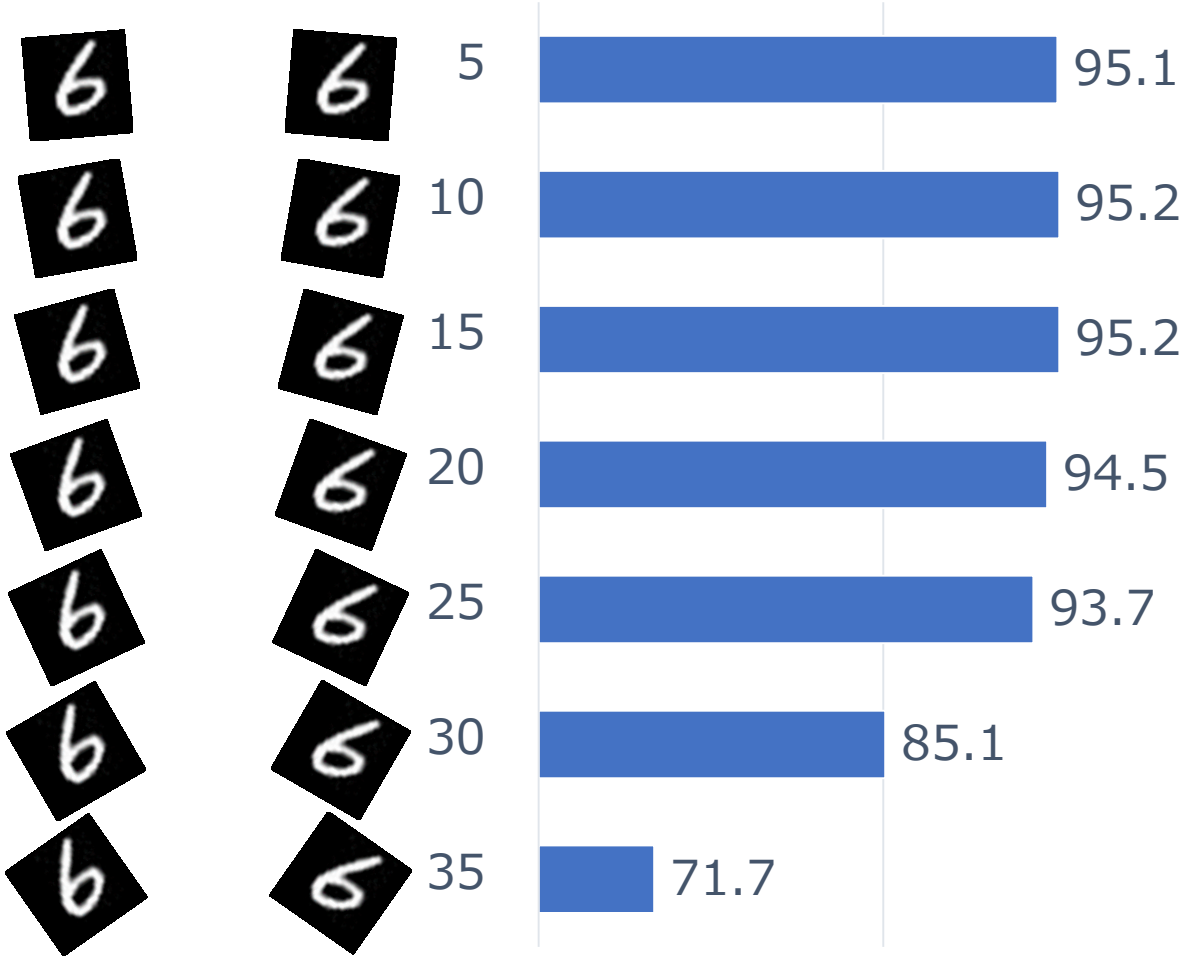
MNIST

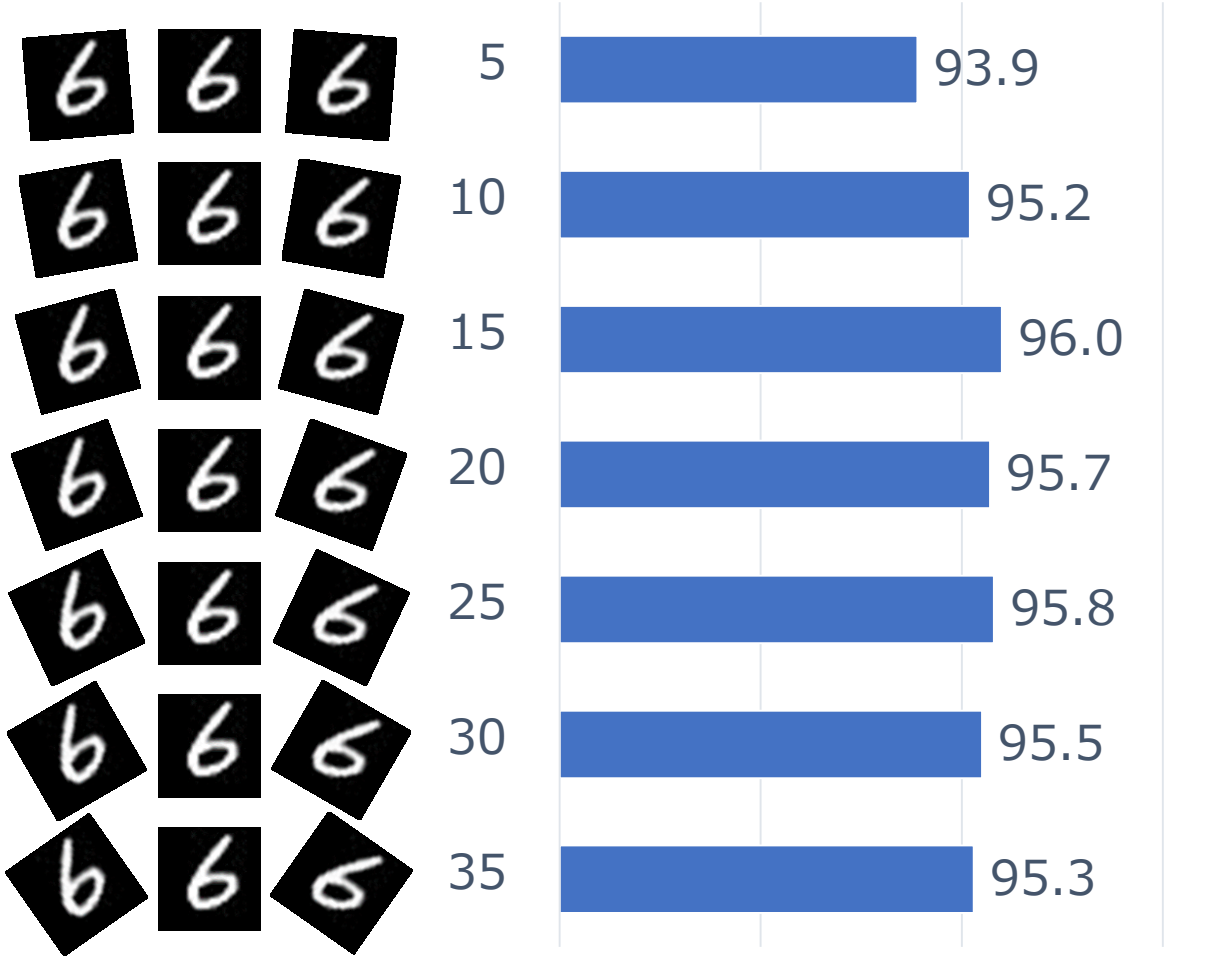
Result and Discussion for ImageNet





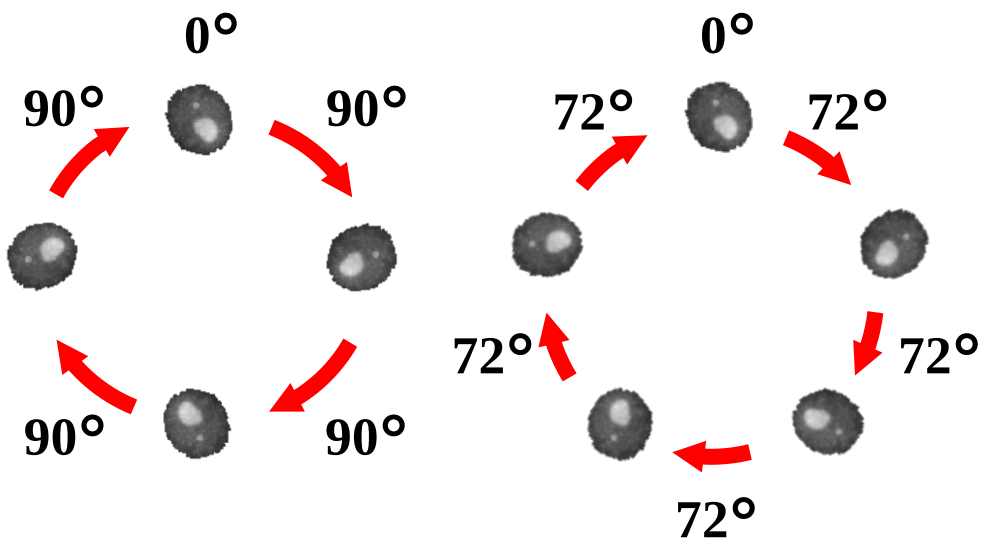
Result and Discussion for MNIST





Conclusion

Not lose object features



Lose object features