



# E-SAN THAILAND CODING & AI ACADEMY

โครงการวิจัยโมเดลระบบนิเวศการเรียนรู้ที่บูรณาการ CODING & AI สำหรับเยาวชน  
Model of Learning Ecosystem Platform integrate with Coding & AI for Youth



## โครงการย่อยที่ 6

การพัฒนาเยาวชนเพื่อเข้าสู่วิชาชีพขั้นสูงด้าน Coding & AI  
ร่วมกับ Coding Entrepreneur & Partnership: **Personal AI**

# BiTNet: AI for Ultrasound Image Classification

ผศ.ดร.รณพงศ์ อินทะ  
ผู้เชี่ยวชาญด้าน Computer Vision





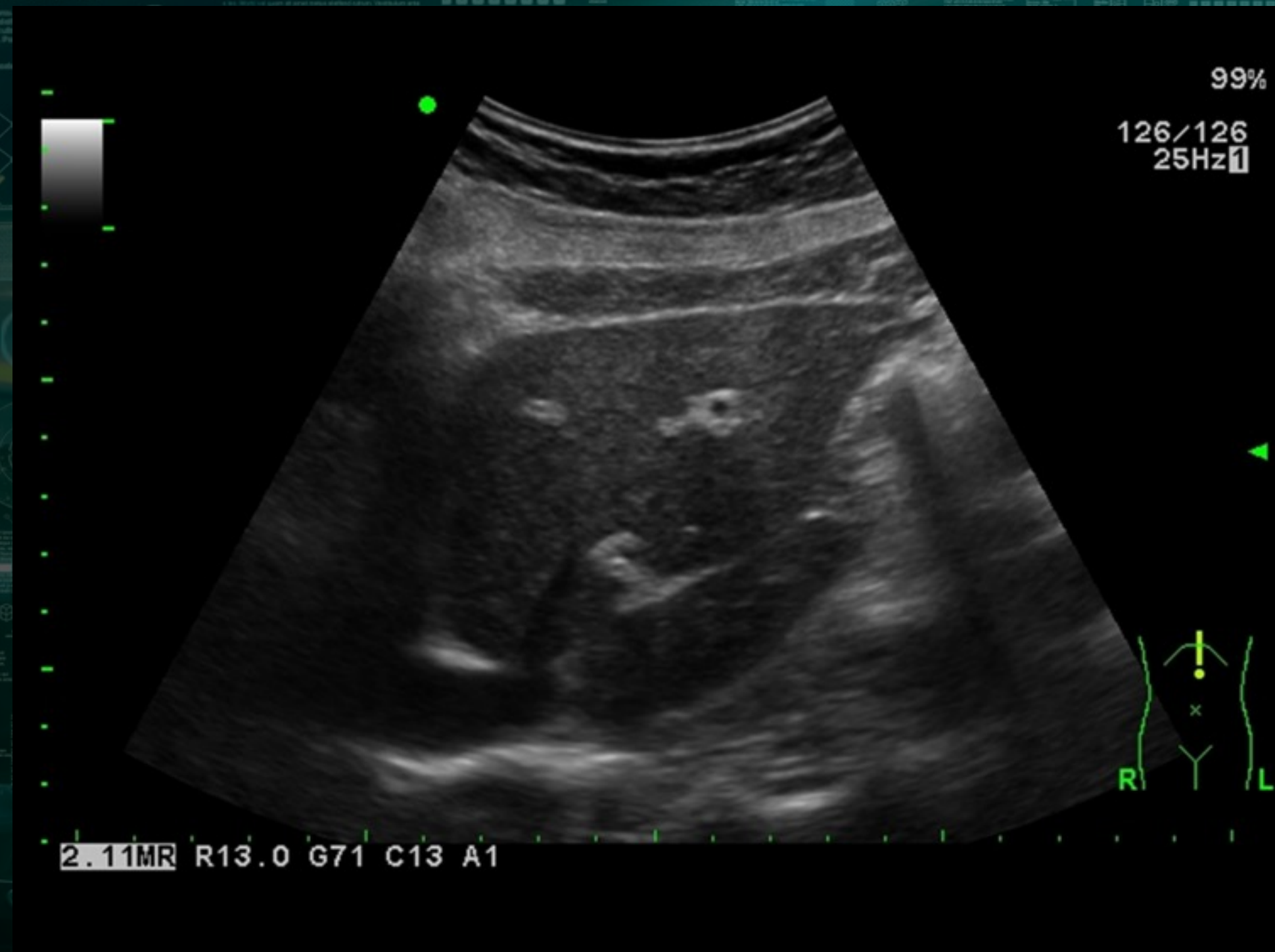
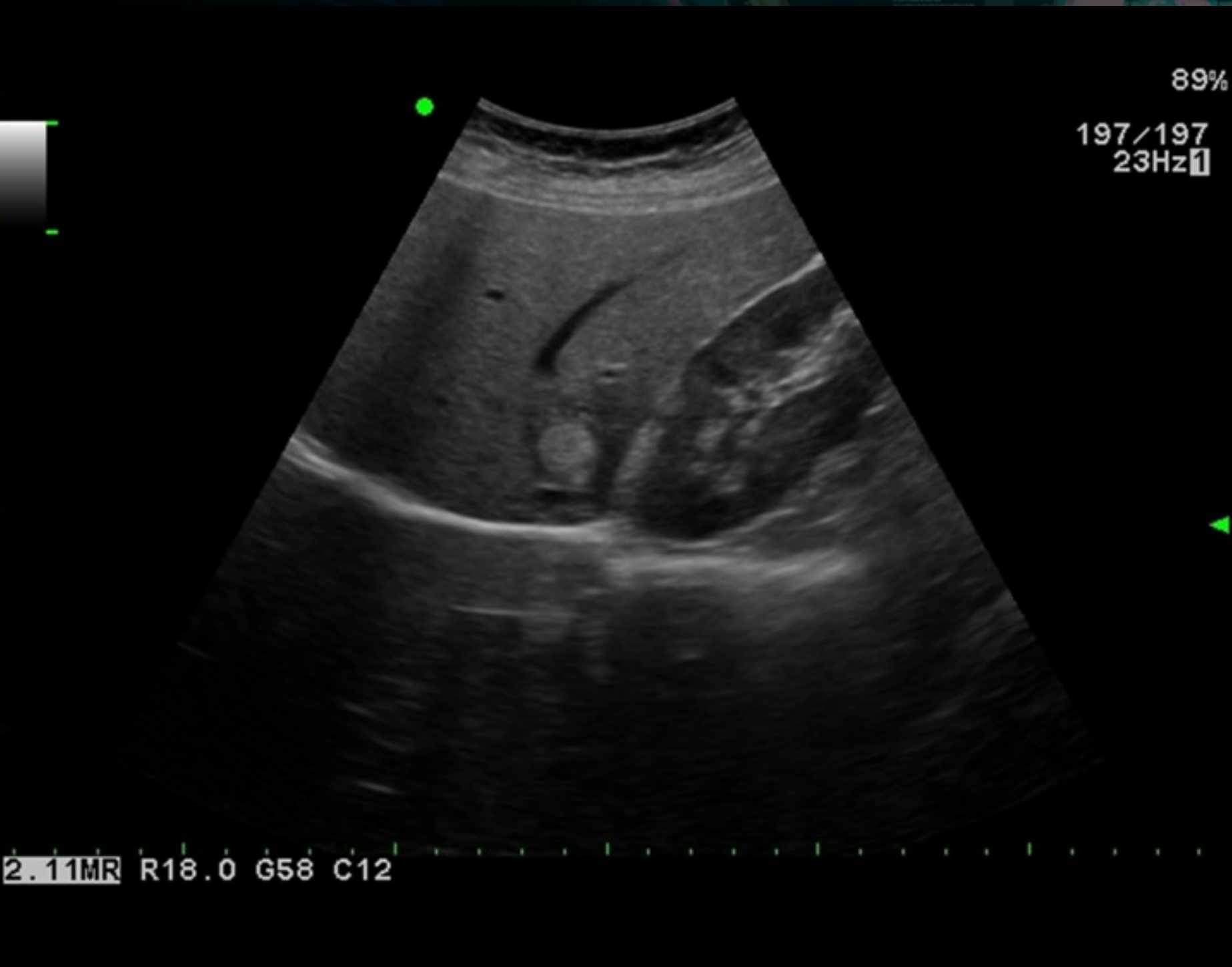
**E-SAN THAILAND**  
**CODING & AI ACADEMY**

โครงการวิจัยโมเดลระบบนิเวศการเรียนรู้ที่บูรณาการ CODING & AI สำหรับเยาวชน  
Model of Learning Ecosystem Platform integrate with Coding & AI for Youth

Add a little bit of body text

# Data preparation





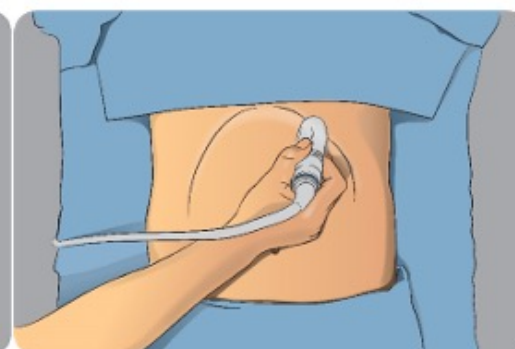


## Hand positions of 16 scanning positions

**P1**



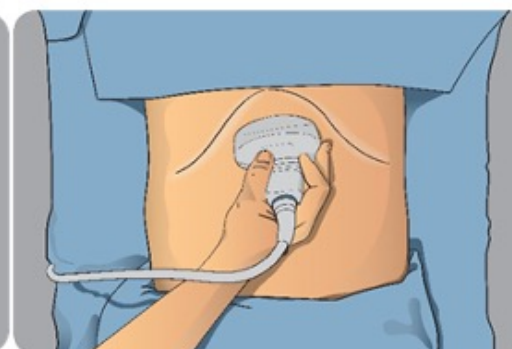
**P2**



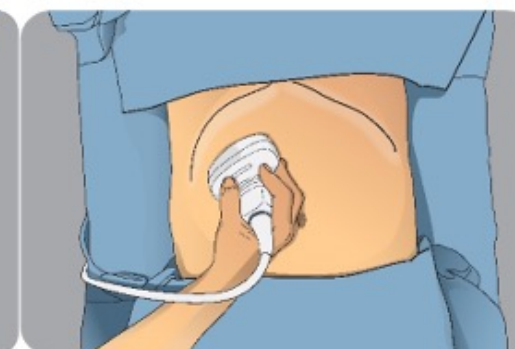
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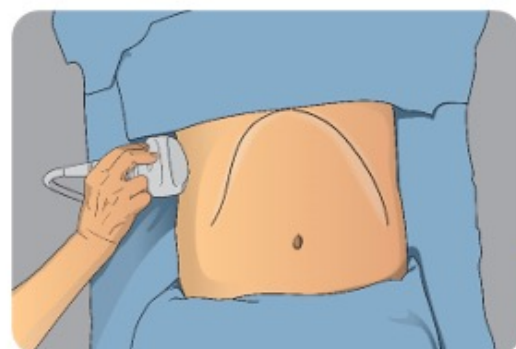
**P4**



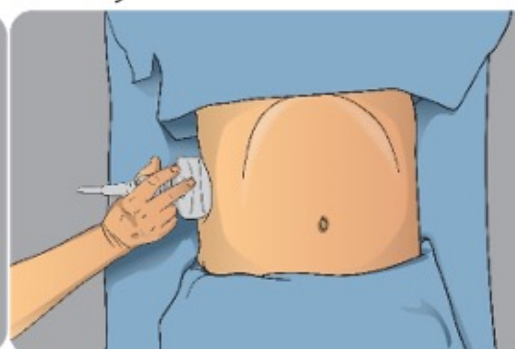
**P5**



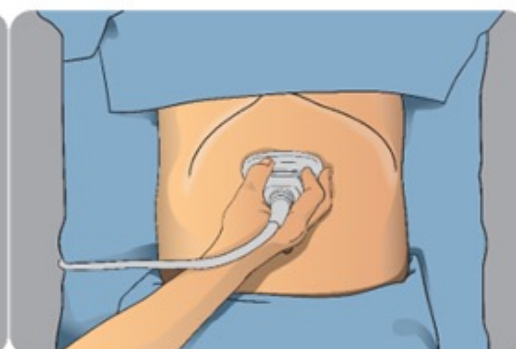
**P6**



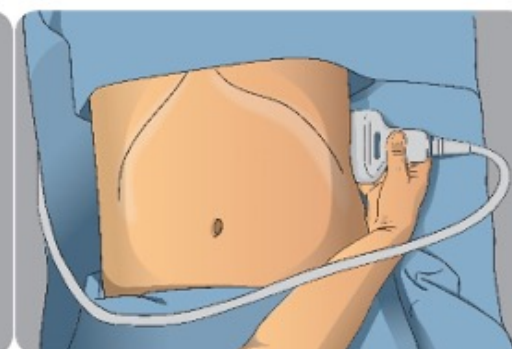
**P7, 8**



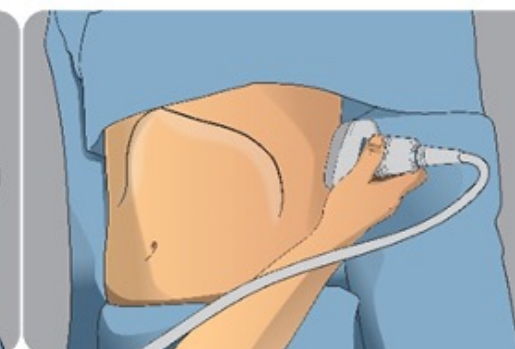
**P9**



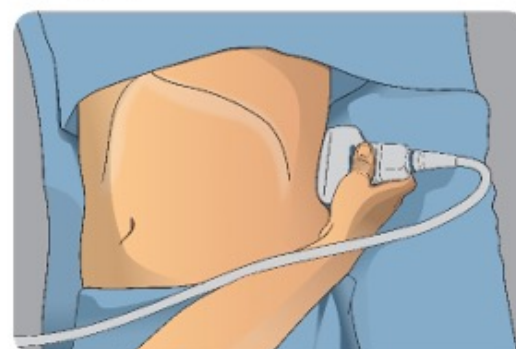
**P10**



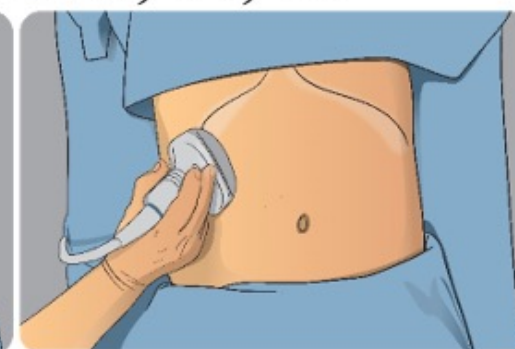
**P11**



**P12**



**P13, 14, 15**



**P13, 14, 15**



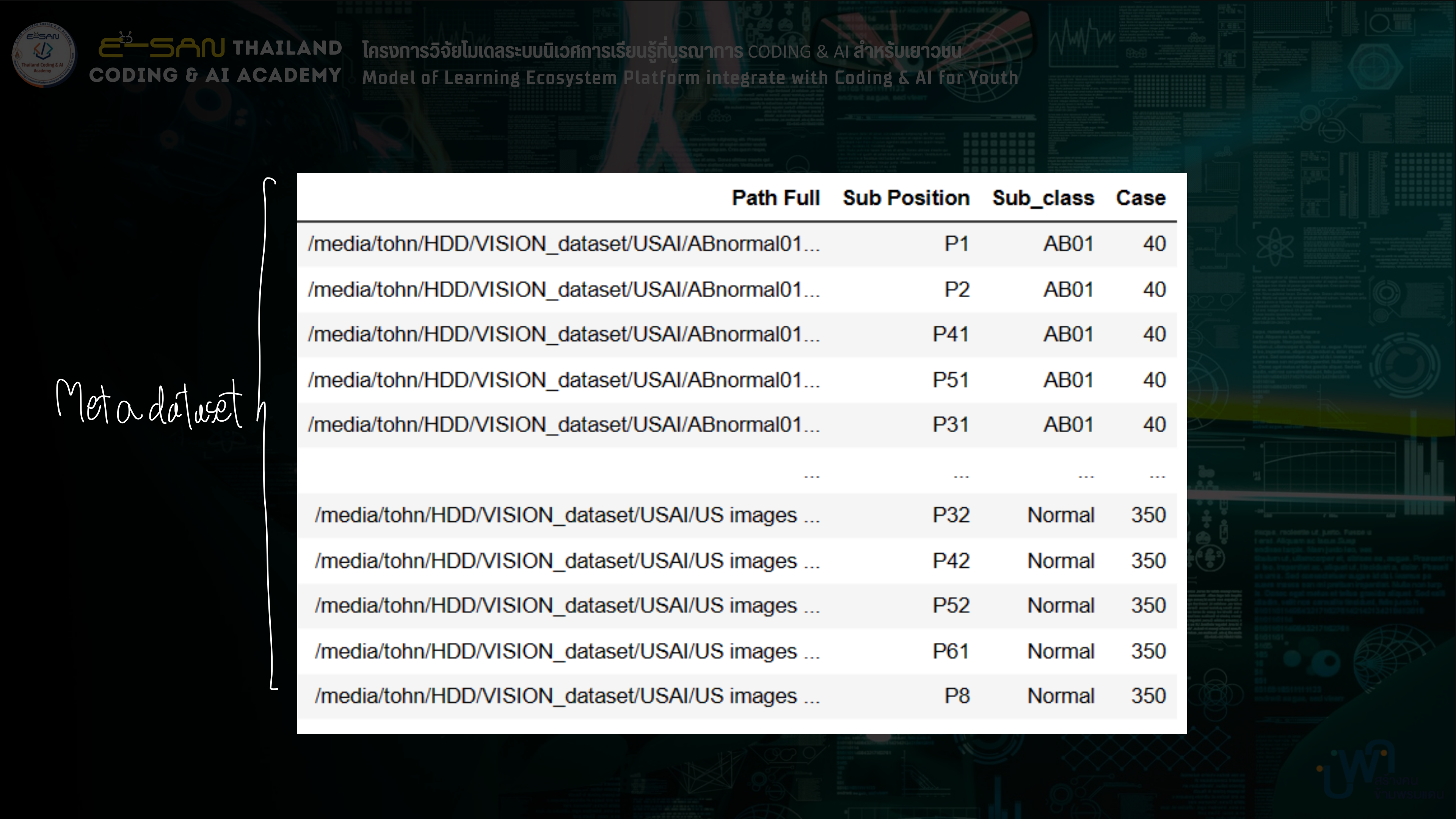
**P16**







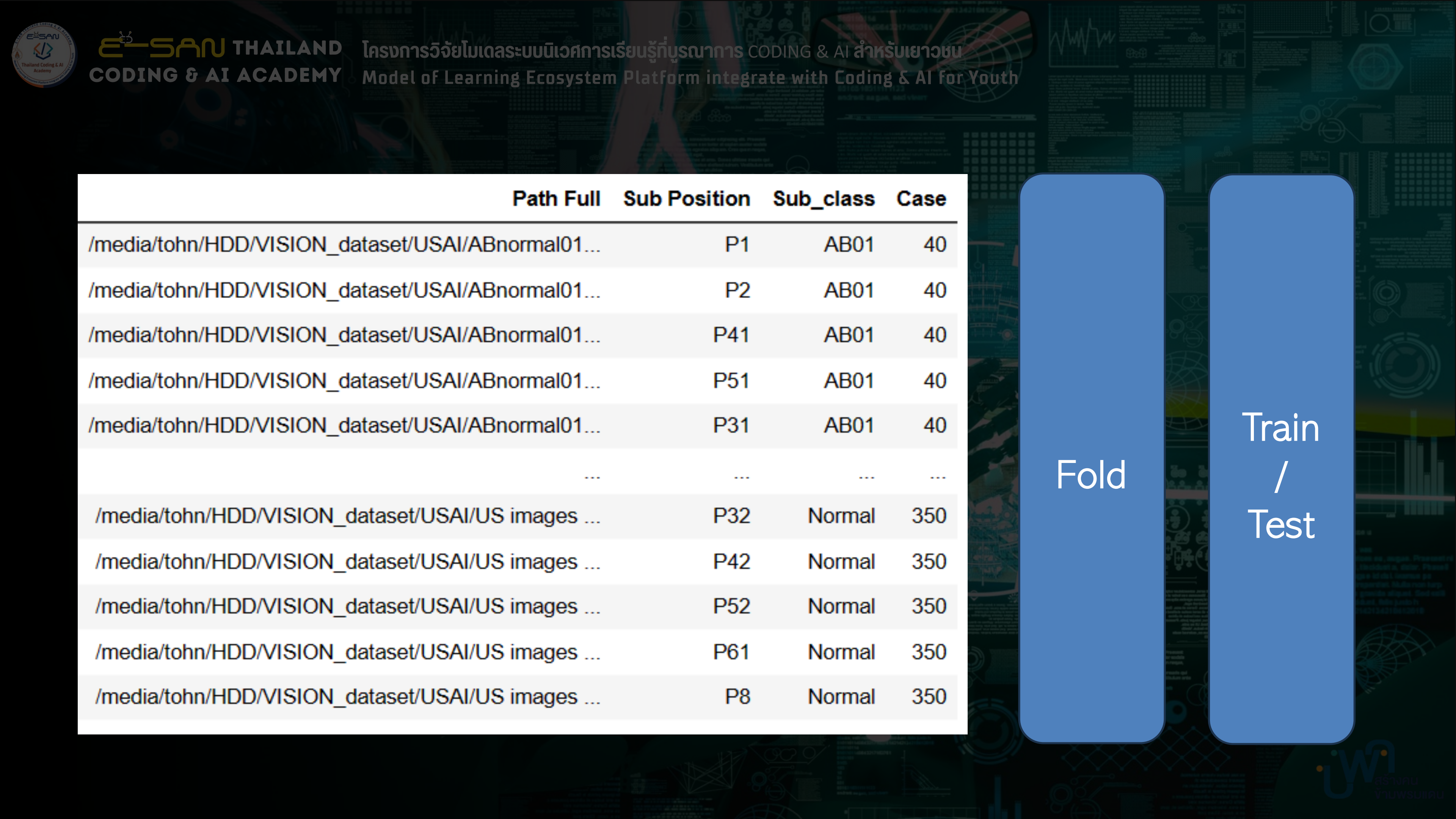




Meta dataset

Path Full	Sub Position	Sub_class	Case
/media/tohn/HDD/VISION_dataset/USAI/ABnormal01...	P1	AB01	40
/media/tohn/HDD/VISION_dataset/USAI/ABnormal01...	P2	AB01	40
/media/tohn/HDD/VISION_dataset/USAI/ABnormal01...	P41	AB01	40
/media/tohn/HDD/VISION_dataset/USAI/ABnormal01...	P51	AB01	40
/media/tohn/HDD/VISION_dataset/USAI/ABnormal01...	P31	AB01	40
...	...	...	...
/media/tohn/HDD/VISION_dataset/USAI/US images ...	P32	Normal	350
/media/tohn/HDD/VISION_dataset/USAI/US images ...	P42	Normal	350
/media/tohn/HDD/VISION_dataset/USAI/US images ...	P52	Normal	350
/media/tohn/HDD/VISION_dataset/USAI/US images ...	P61	Normal	350
/media/tohn/HDD/VISION_dataset/USAI/US images ...	P8	Normal	350



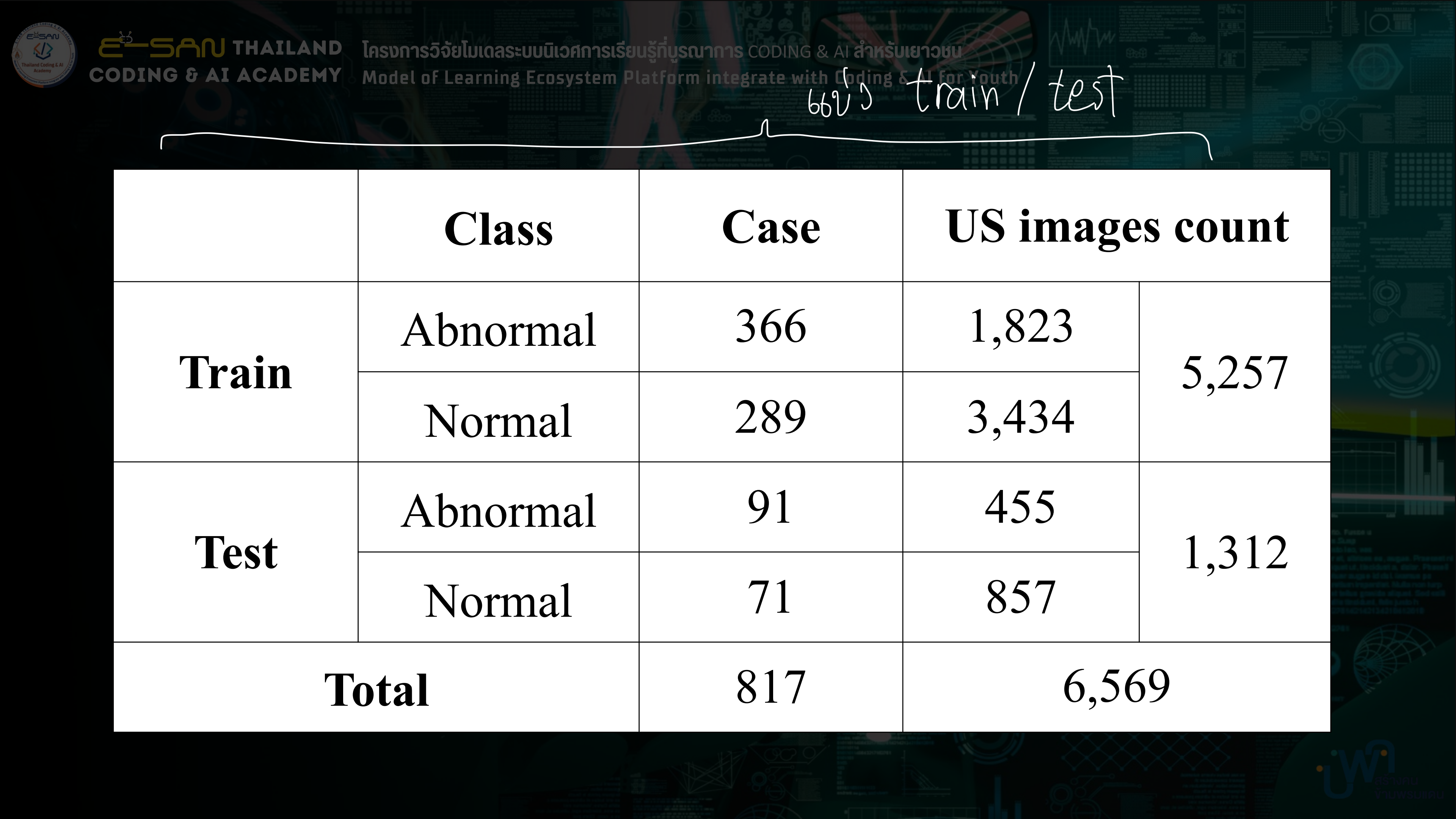


Path Full	Sub Position	Sub_class	Case
/media/tohn/HDD/VISION_dataset/USAI/ABnormal01...	P1	AB01	40
/media/tohn/HDD/VISION_dataset/USAI/ABnormal01...	P2	AB01	40
/media/tohn/HDD/VISION_dataset/USAI/ABnormal01...	P41	AB01	40
/media/tohn/HDD/VISION_dataset/USAI/ABnormal01...	P51	AB01	40
/media/tohn/HDD/VISION_dataset/USAI/ABnormal01...	P31	AB01	40
...	...	...	...
/media/tohn/HDD/VISION_dataset/USAI/US images ...	P32	Normal	350
/media/tohn/HDD/VISION_dataset/USAI/US images ...	P42	Normal	350
/media/tohn/HDD/VISION_dataset/USAI/US images ...	P52	Normal	350
/media/tohn/HDD/VISION_dataset/USAI/US images ...	P61	Normal	350
/media/tohn/HDD/VISION_dataset/USAI/US images ...	P8	Normal	350

Fold

Train  
/  
Test

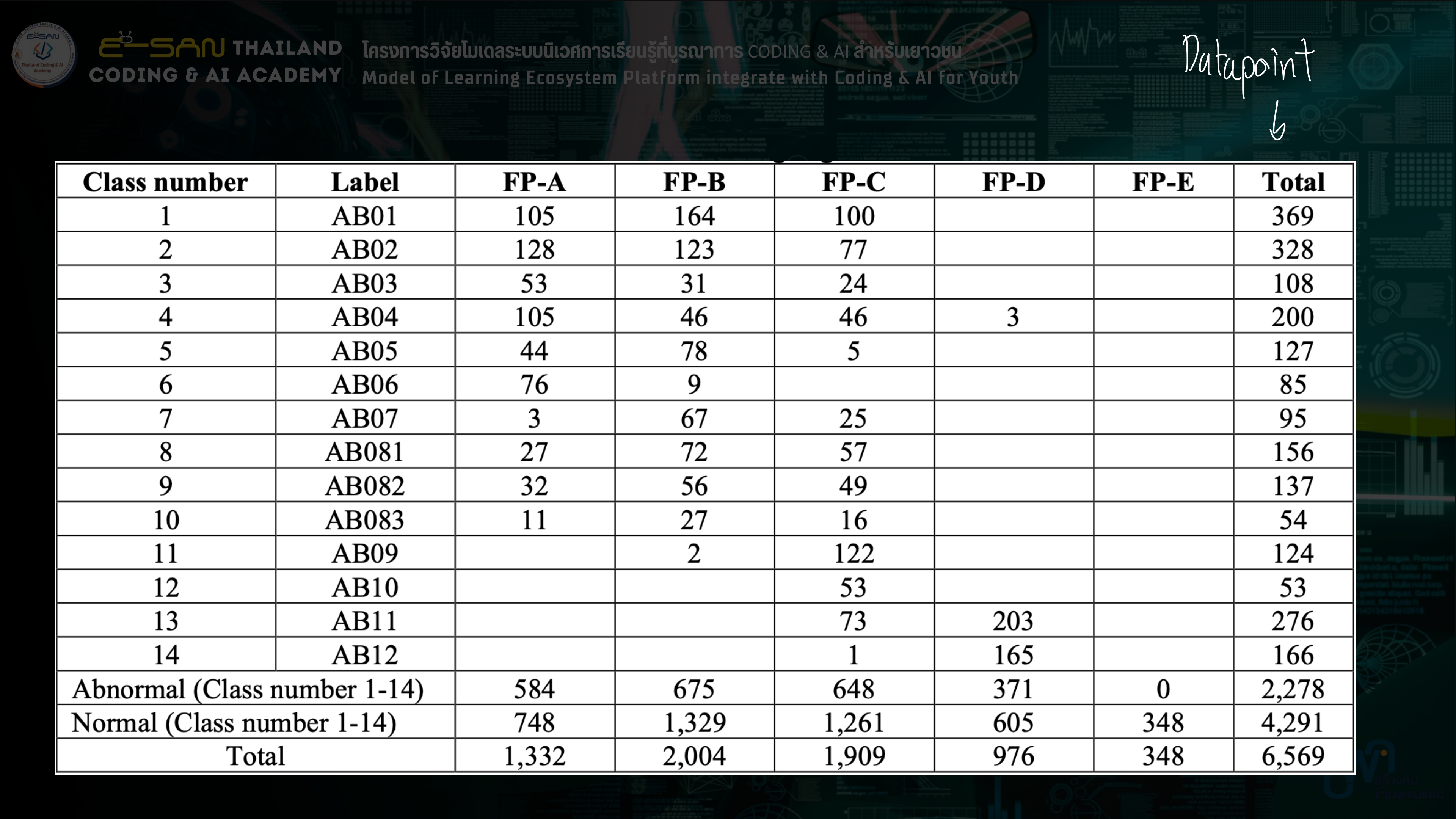




แบ่ง train / test

	Class	Case	US images count	
Train	Abnormal	366	1,823	5,257
	Normal	289	3,434	
Test	Abnormal	91	455	1,312
	Normal	71	857	
Total		817	6,569	





Datapoint  
↓

Class number	Label	FP-A	FP-B	FP-C	FP-D	FP-E	Total
1	AB01	105	164	100			369
2	AB02	128	123	77			328
3	AB03	53	31	24			108
4	AB04	105	46	46	3		200
5	AB05	44	78	5			127
6	AB06	76	9				85
7	AB07	3	67	25			95
8	AB081	27	72	57			156
9	AB082	32	56	49			137
10	AB083	11	27	16			54
11	AB09		2	122			124
12	AB10			53			53
13	AB11			73	203		276
14	AB12			1	165		166
Abnormal (Class number 1-14)		584	675	648	371	0	2,278
Normal (Class number 1-14)		748	1,329	1,261	605	348	4,291
Total		1,332	2,004	1,909	976	348	6,569



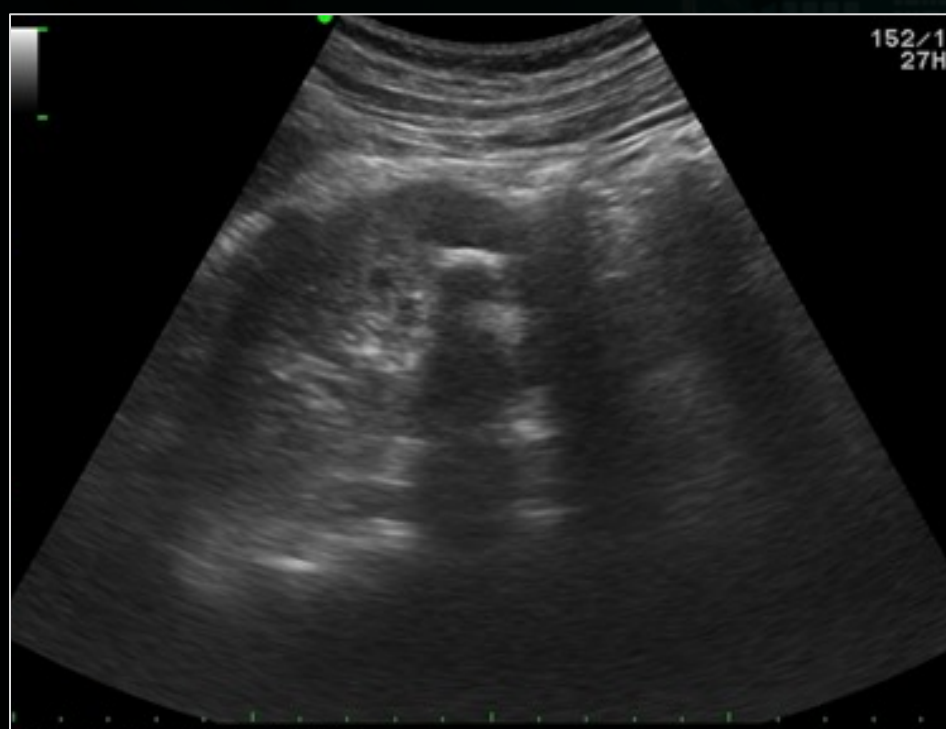






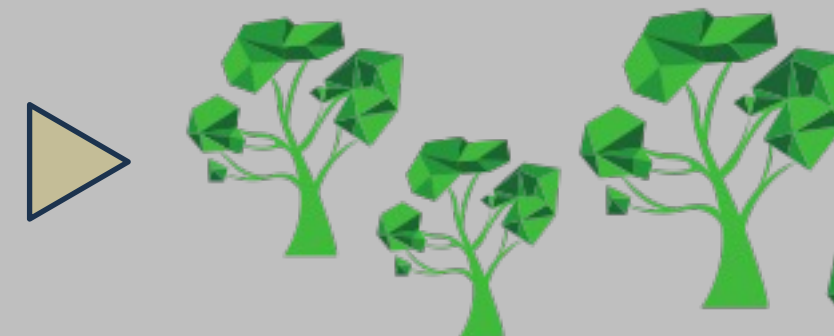
# Input Size

BiTNet

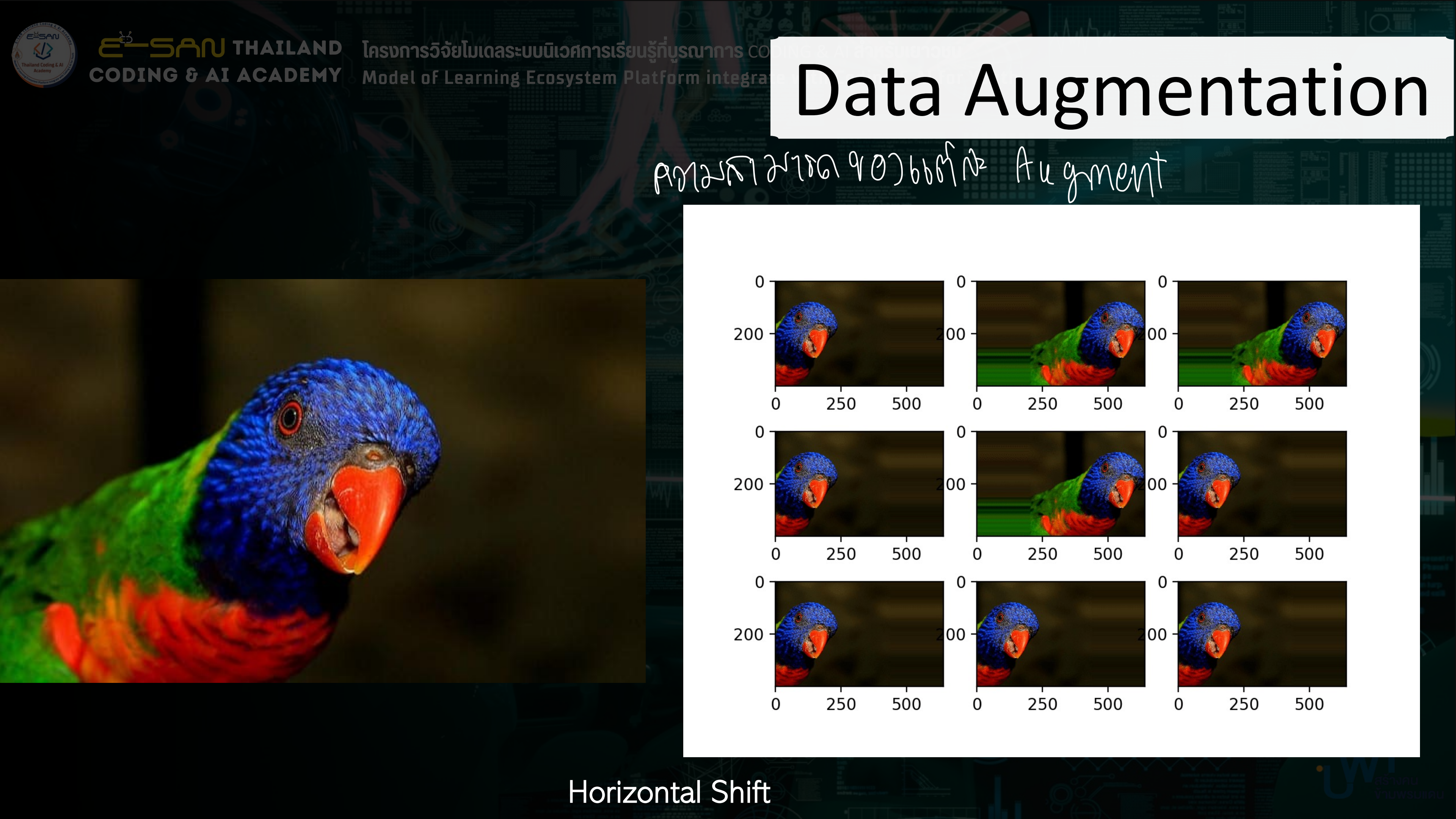


456x456x3

EfficientNetB5

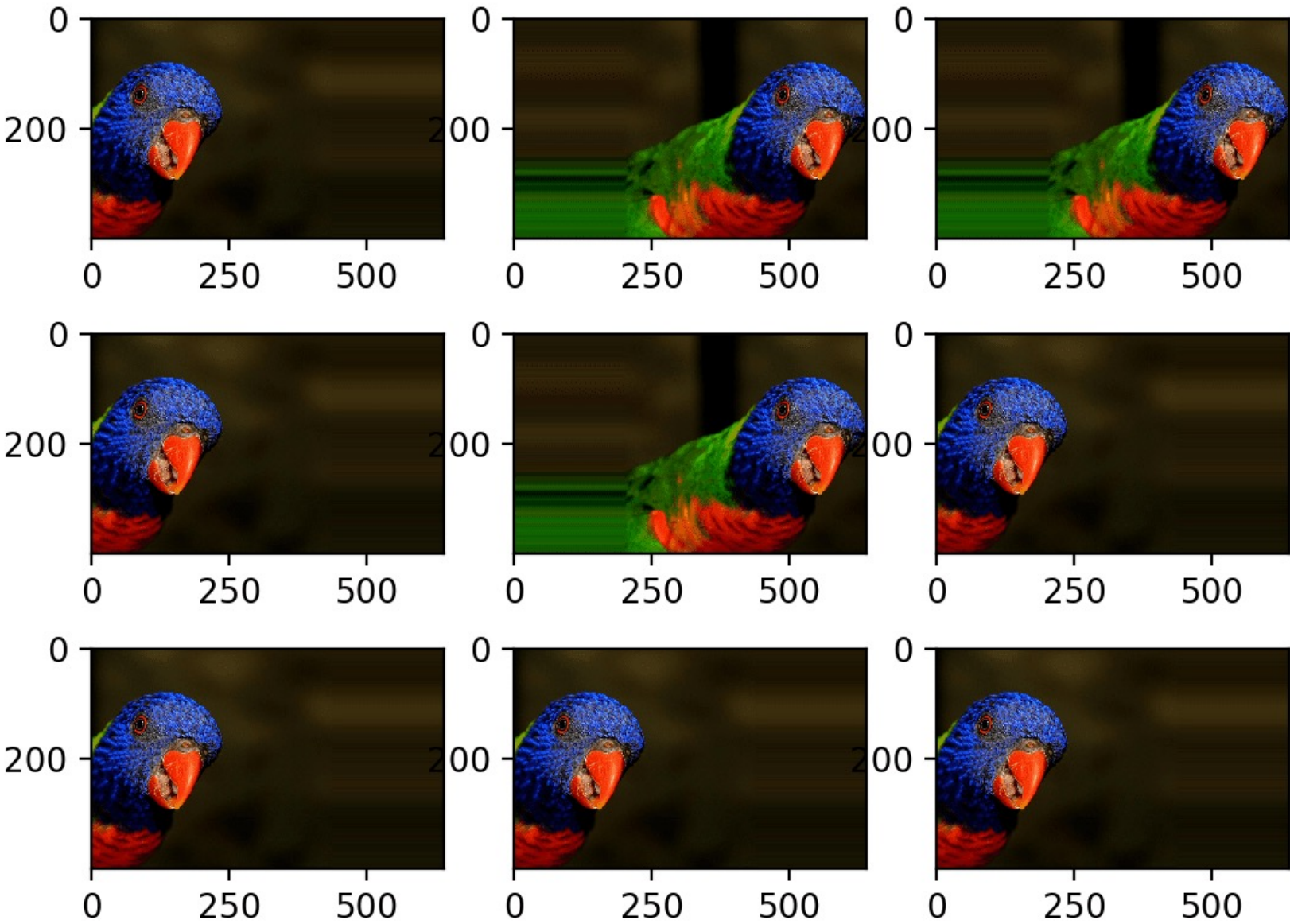






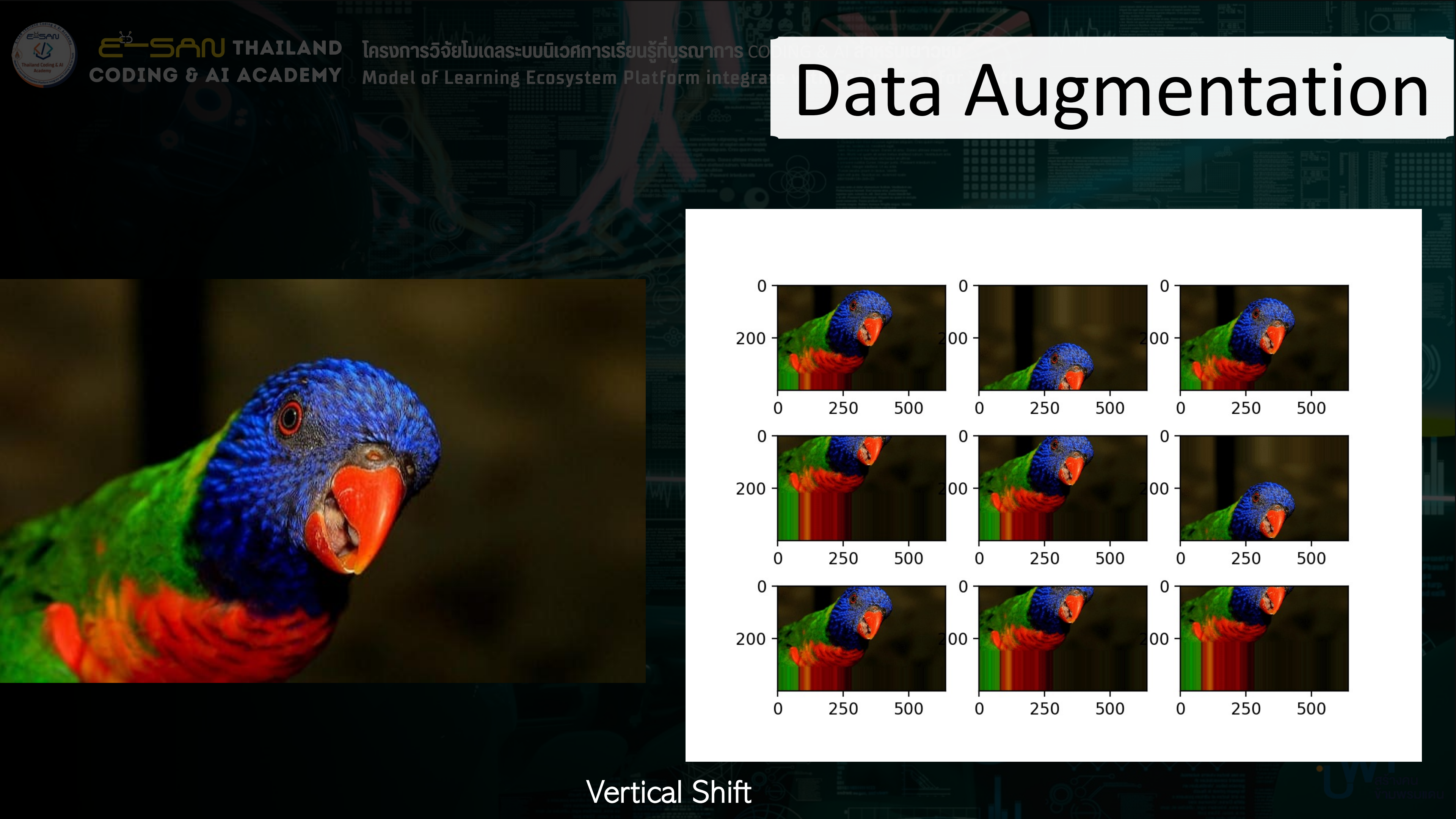
# Data Augmentation

การเพิ่มข้อมูล ๑๐๖๖๖๖๖ Augment

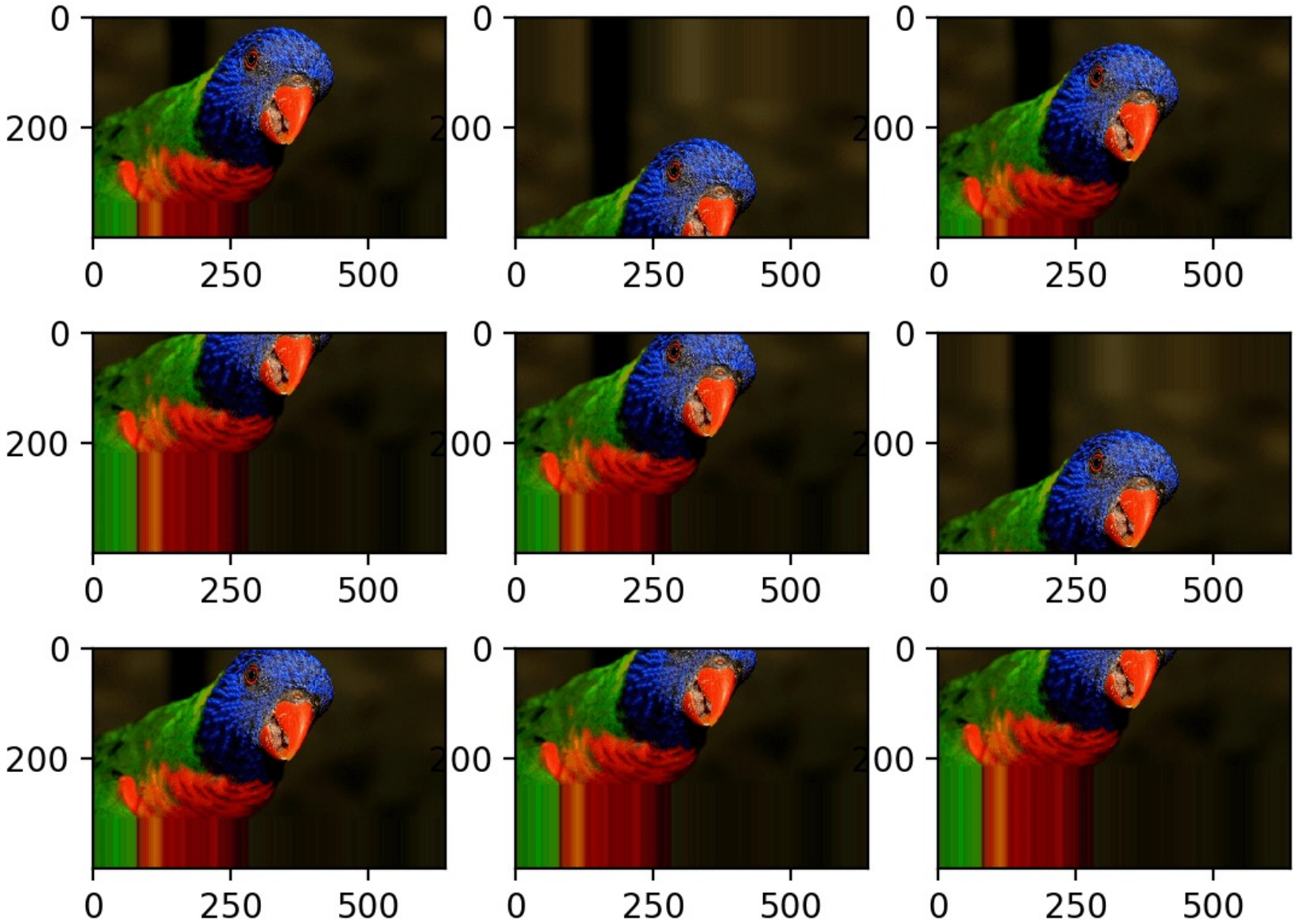


Horizontal Shift



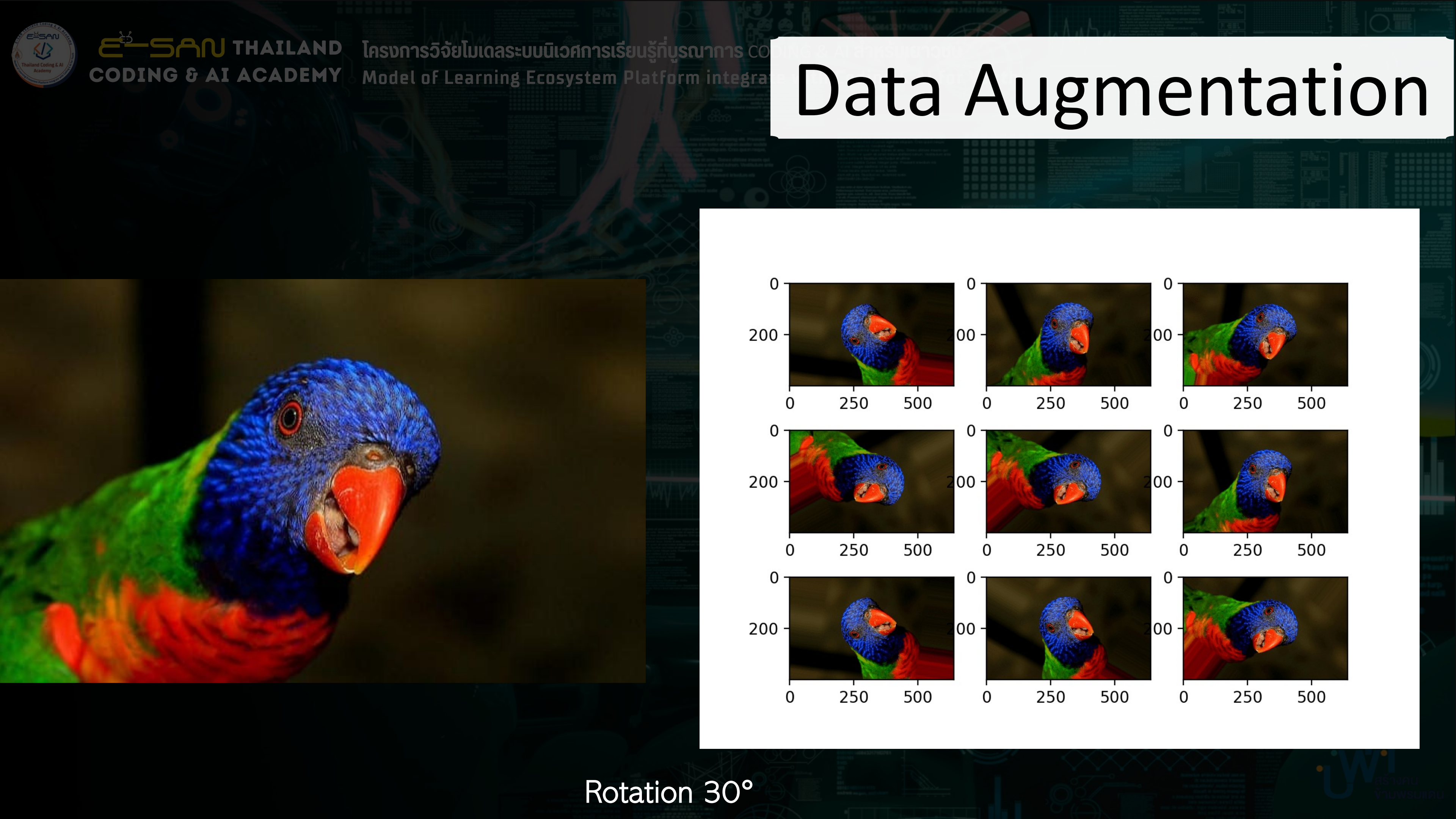


# Data Augmentation

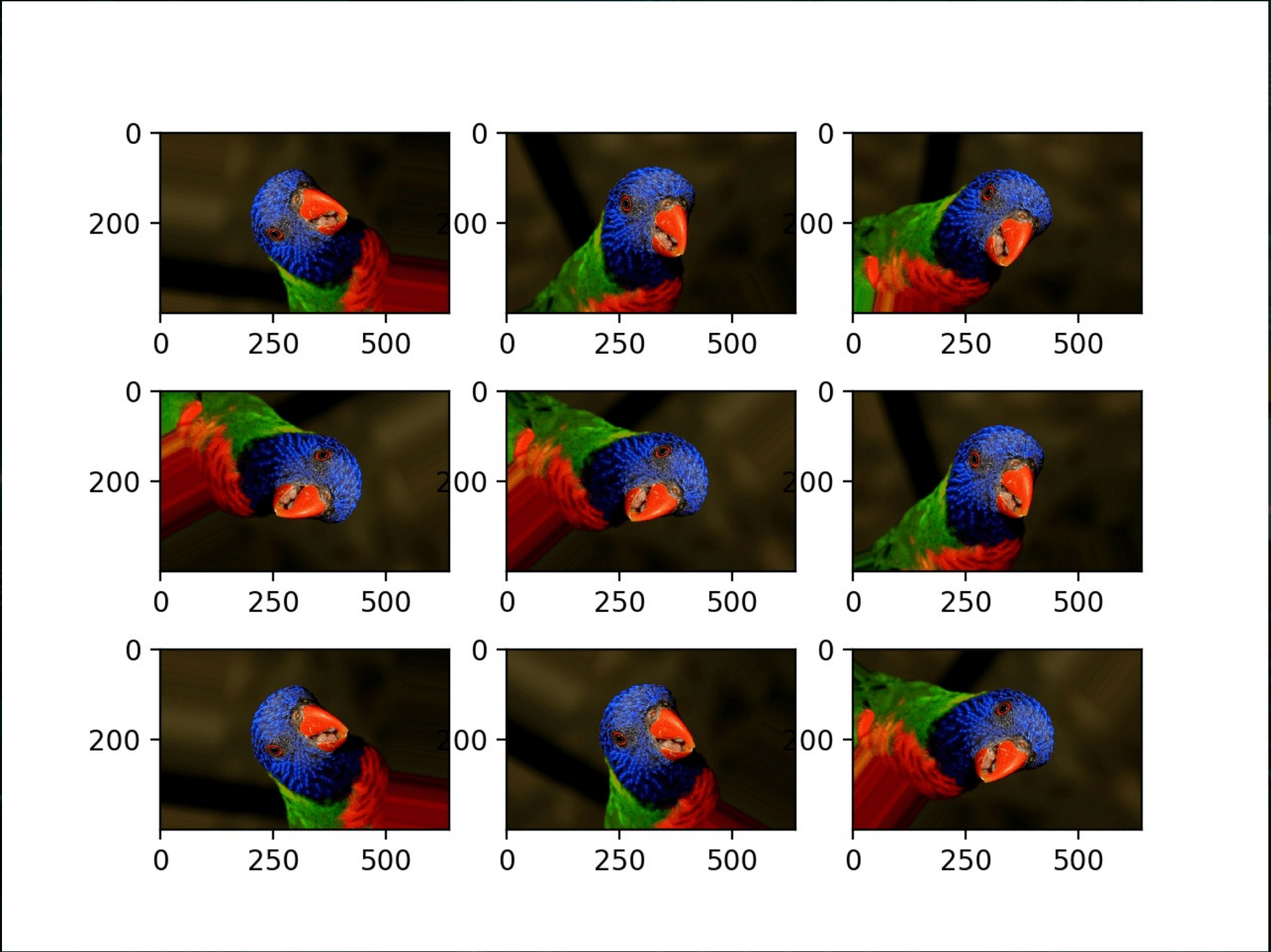


Vertical Shift



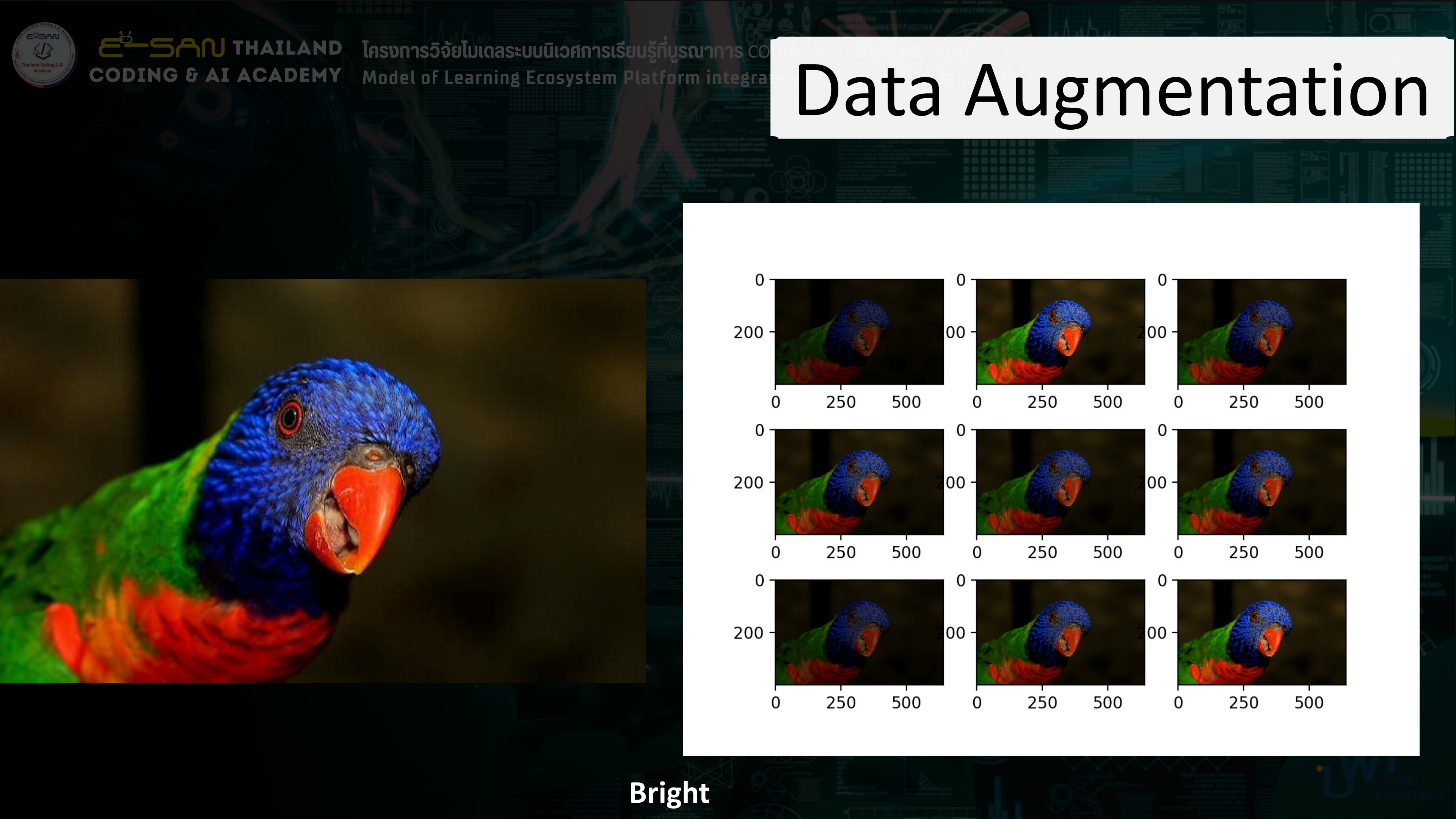


# Data Augmentation

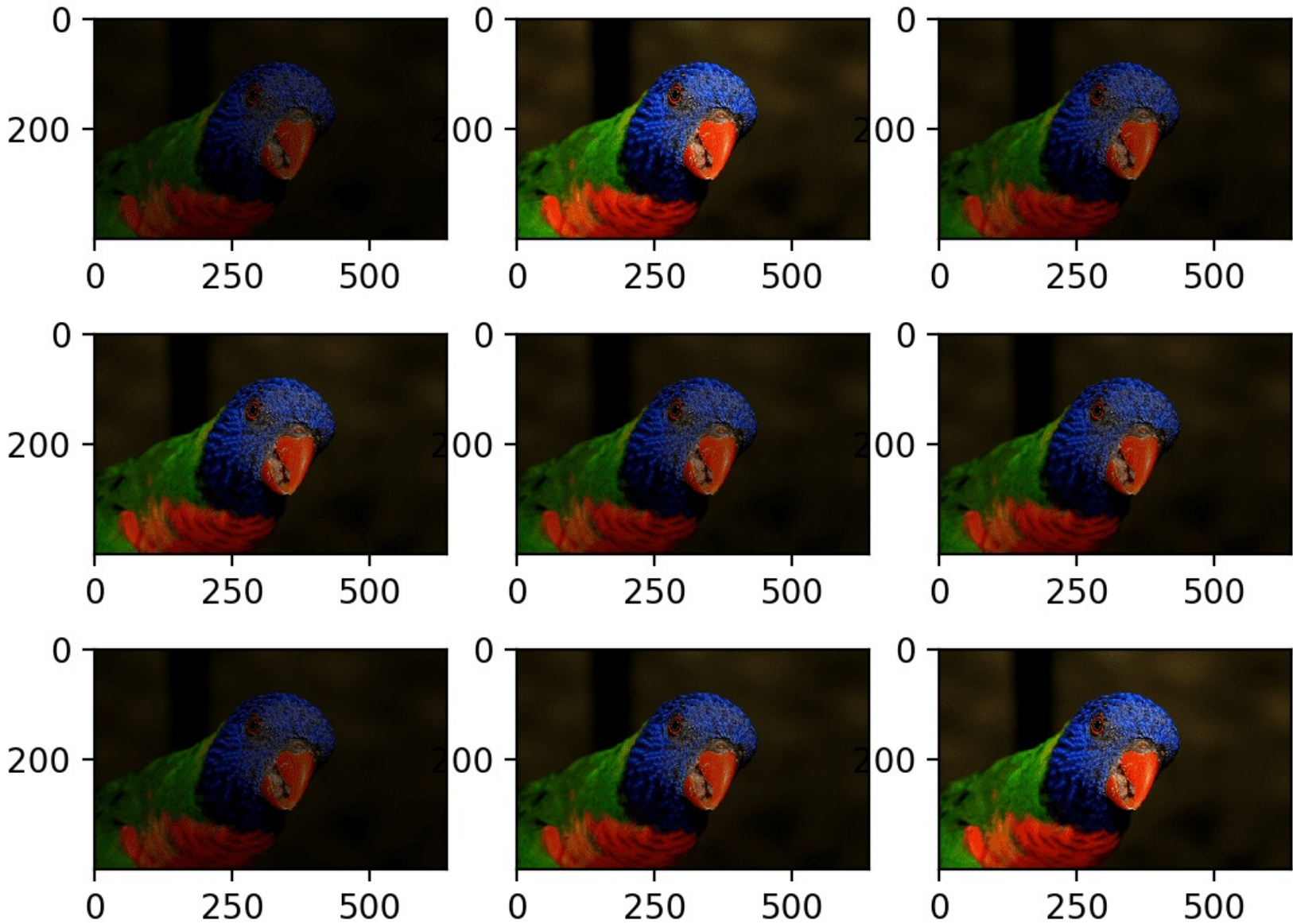


Rotation 30°



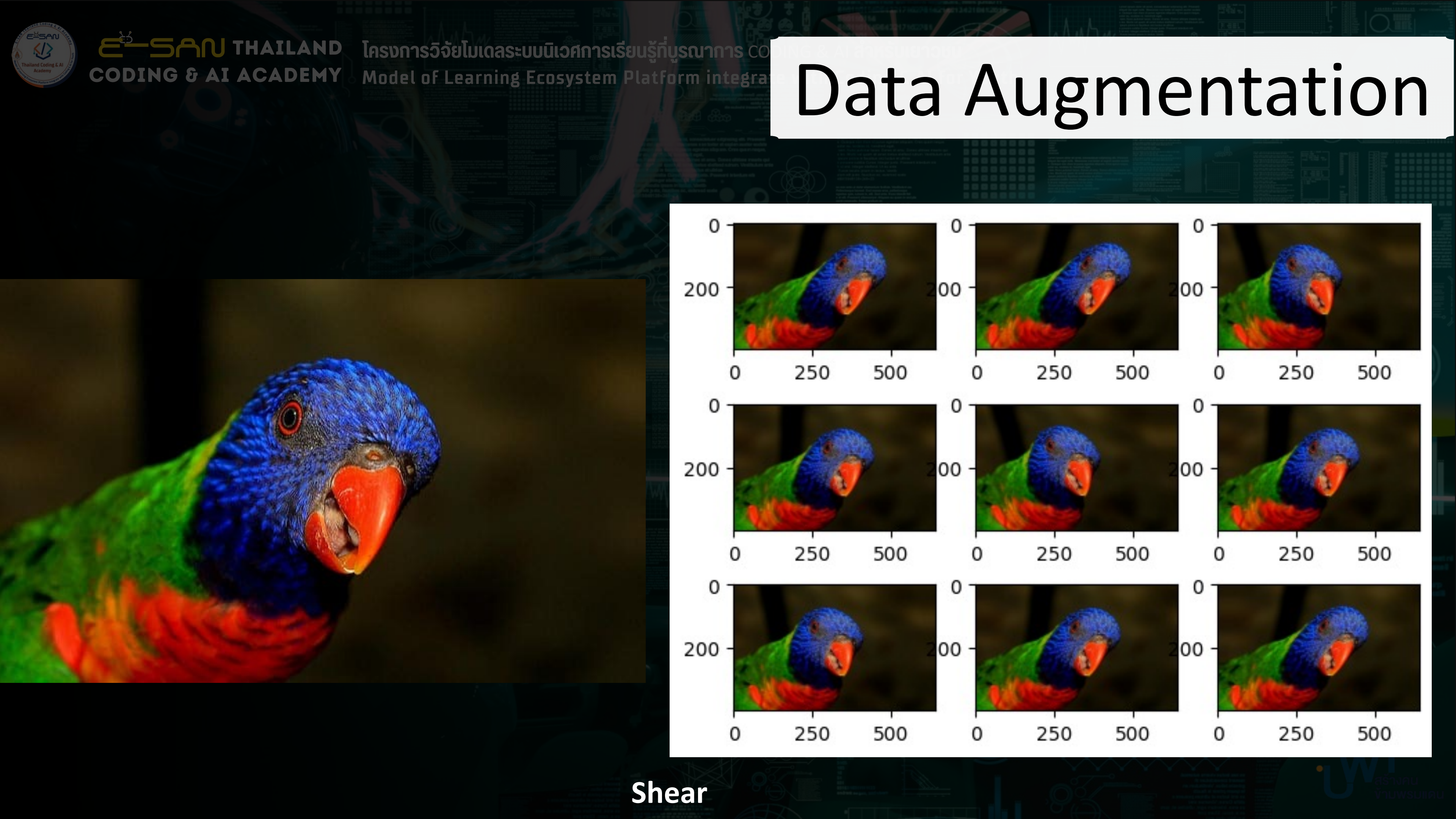


# Data Augmentation

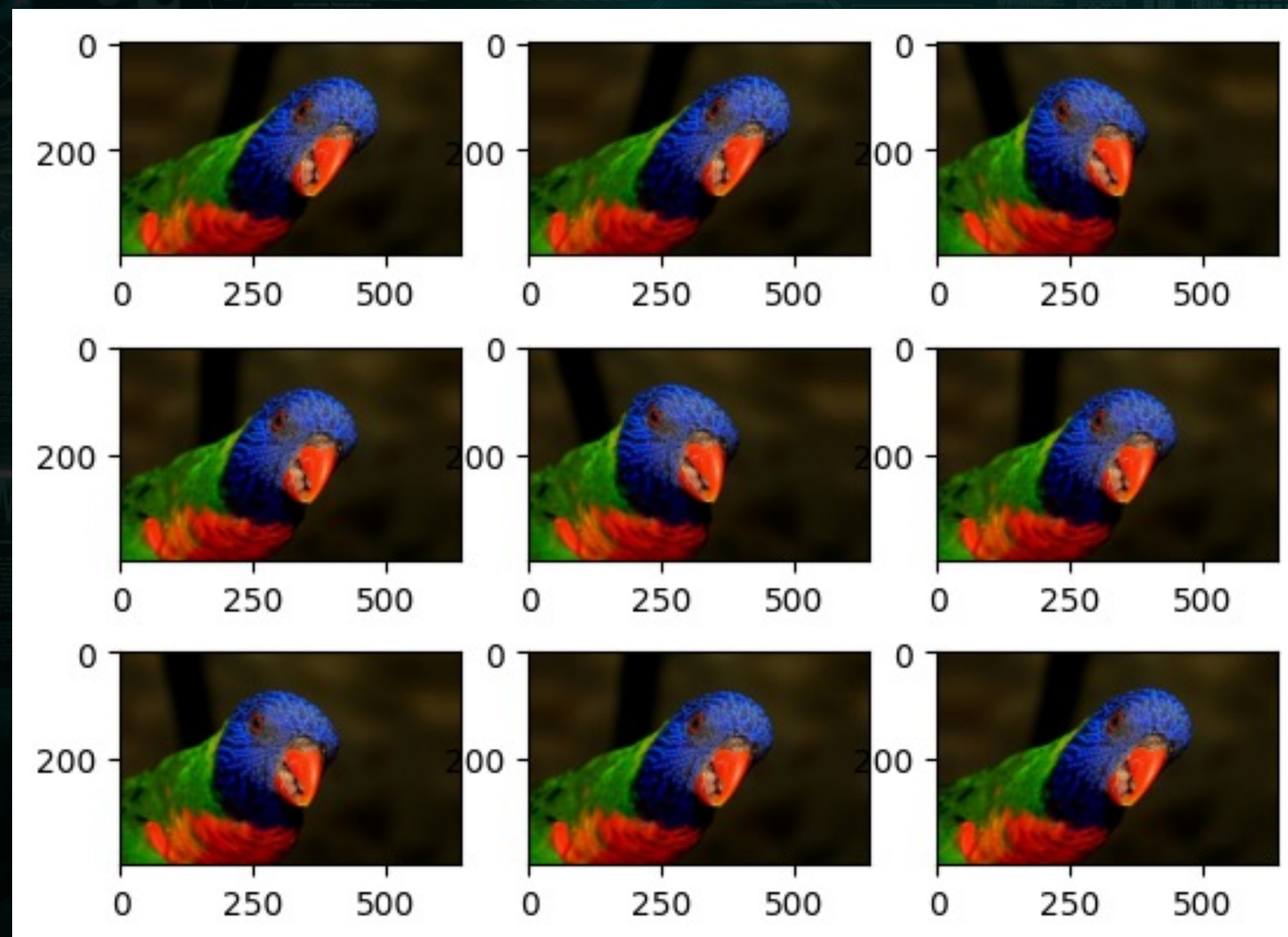


Bright





# Data Augmentation

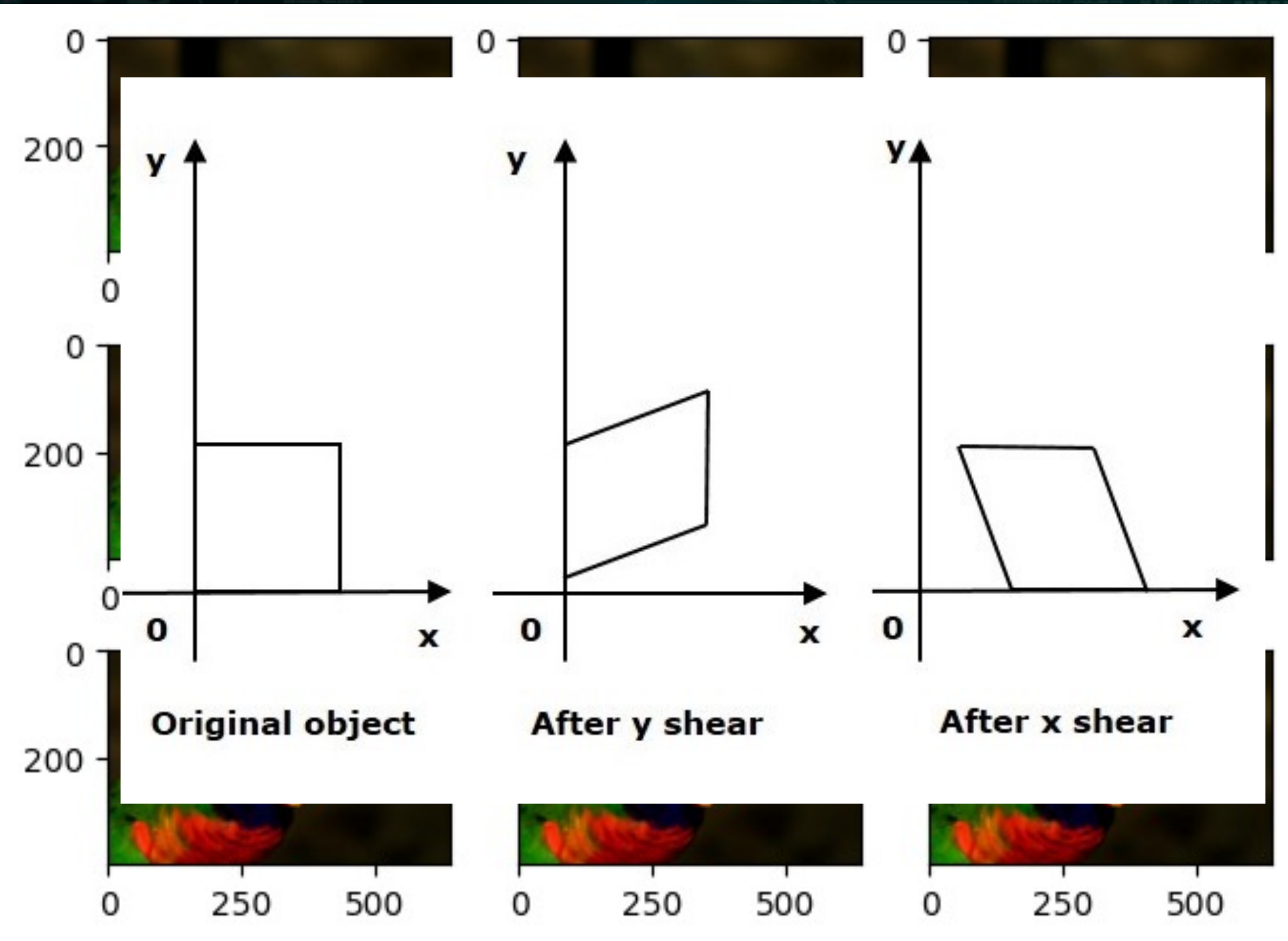


Shear



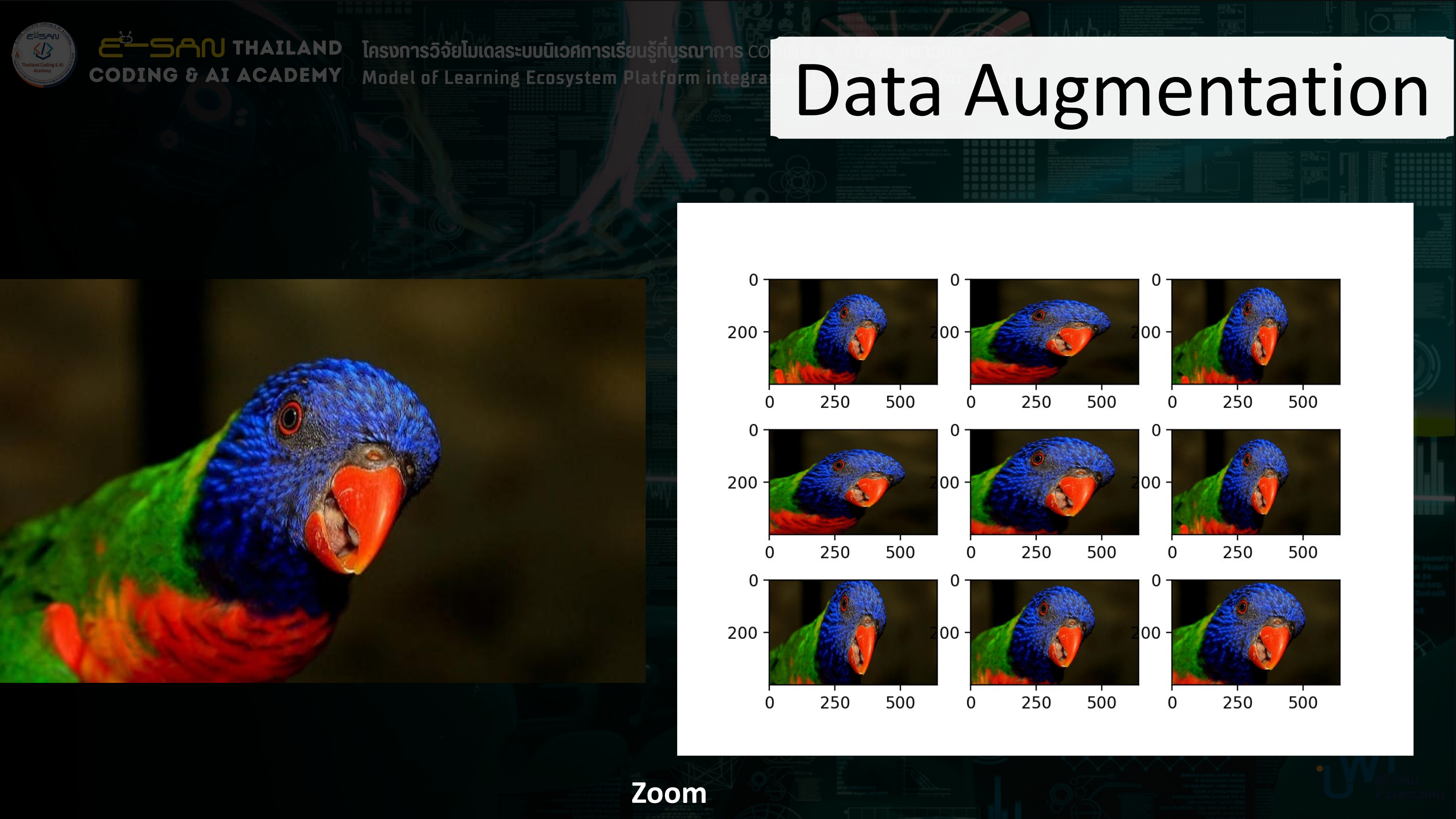


# Data Augmentation

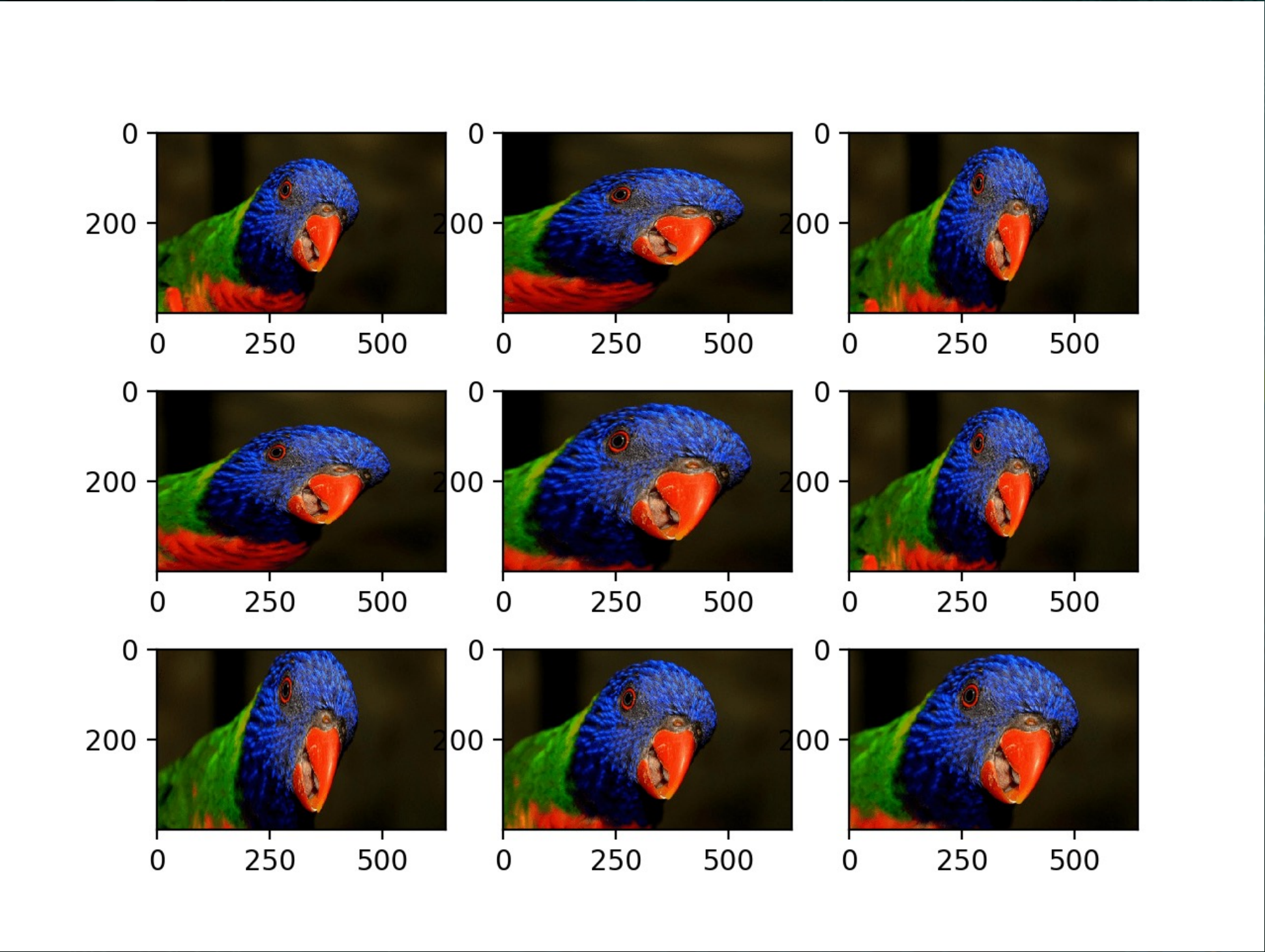


Shear



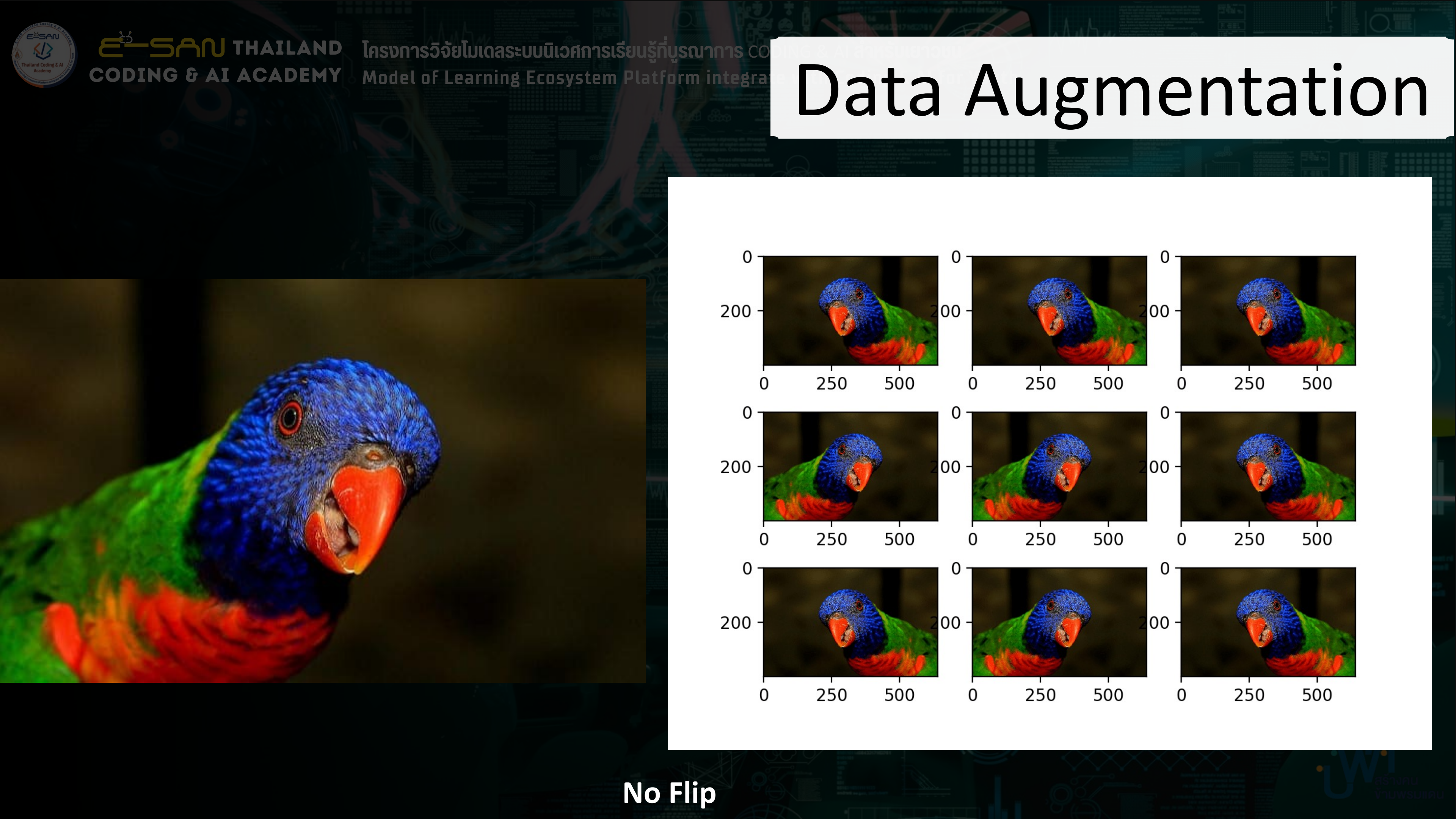


# Data Augmentation

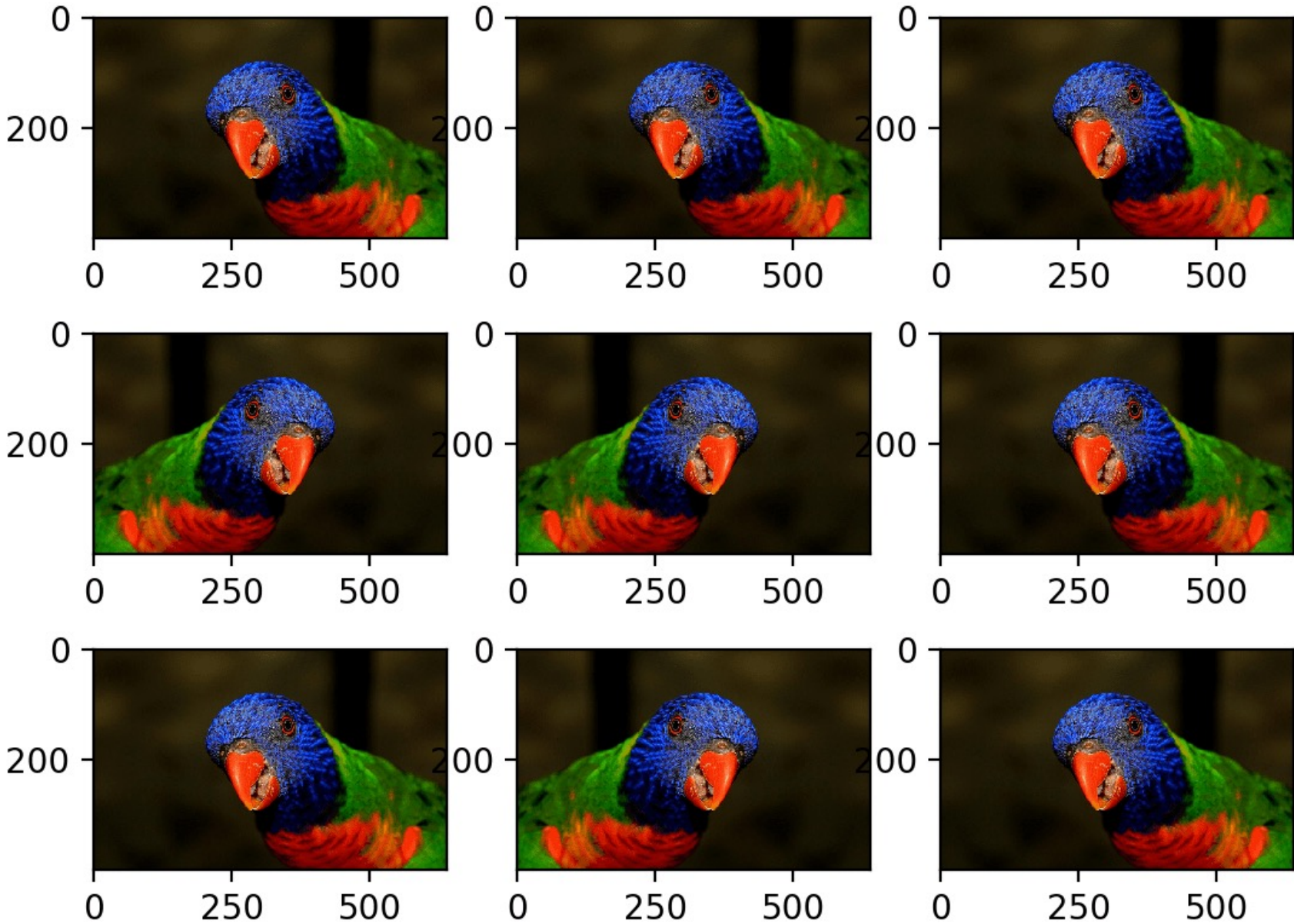


Zoom



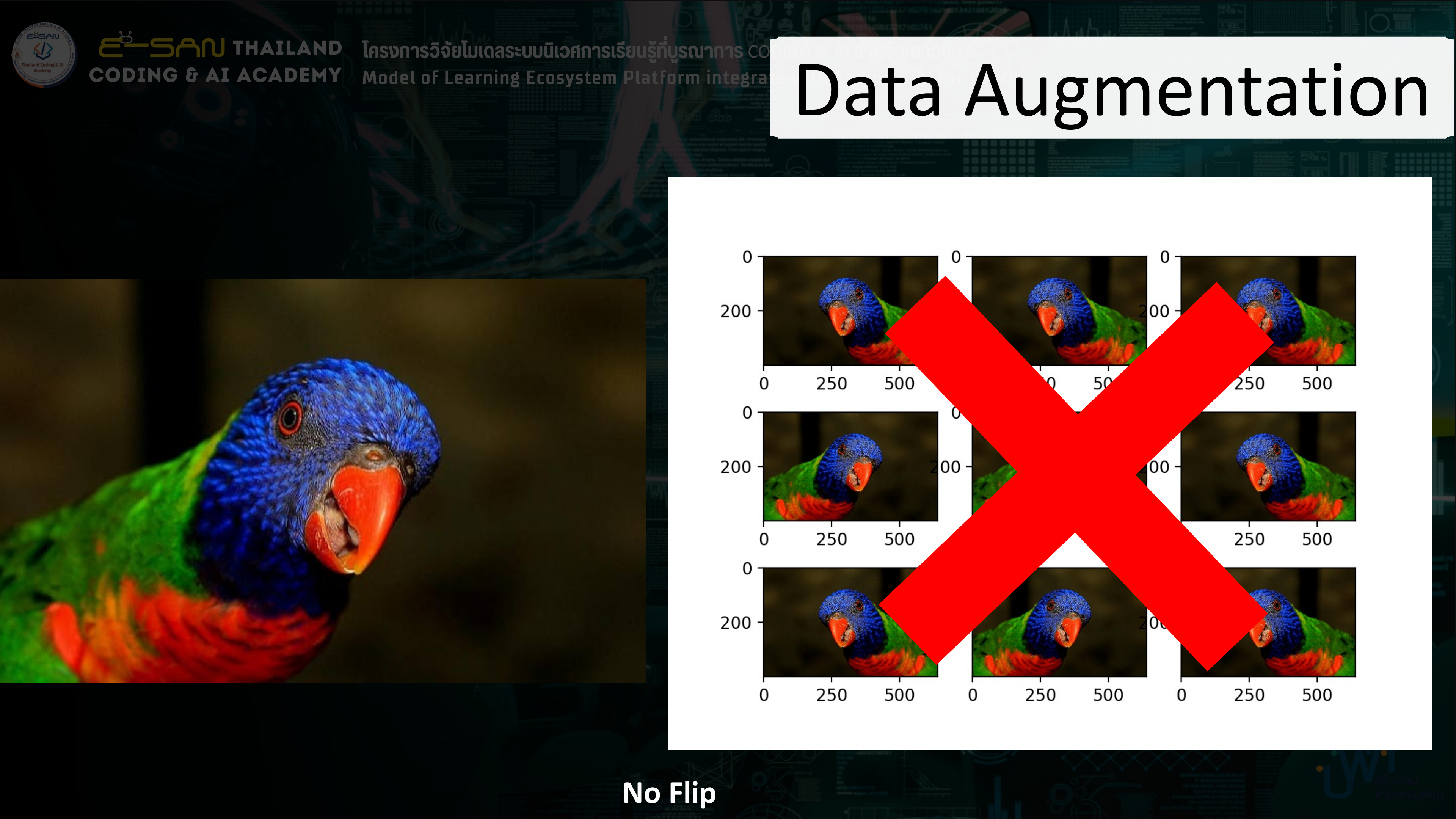


# Data Augmentation

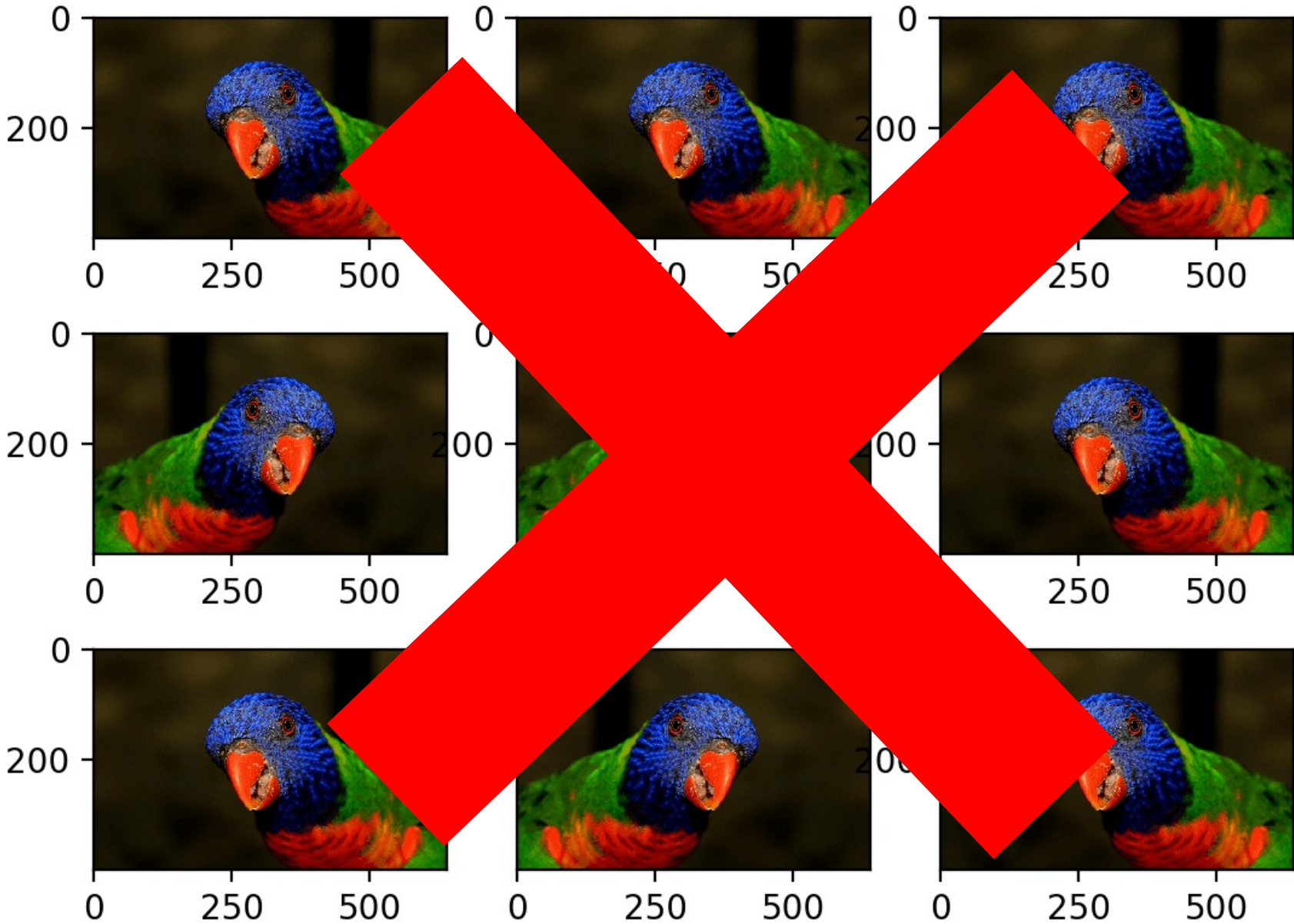


No Flip





# Data Augmentation




No Flip



# Data Augmentation

<https://machinelearningmastery.com/how-to-configure-image-data-augmentation-when-training-deep-learning-neural-networks/>

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## How to Configure Image Data Augmentation in Keras

by Jason Brownlee on July 5, 2019 in Deep Learning for Computer Vision 237


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Image data augmentation is a technique that can be used to artificially expand the size of a training dataset by creating modified versions of images in the dataset.

Training deep learning neural network models on more data can result in more skillful models, and the augmentation techniques can create variations of the images that can improve the ability of the fit models to generalize what they have learned to new images.

The Keras deep learning neural network library provides the capability to fit models using image data augmentation via the *ImageDataGenerator* class.

In this tutorial, you will discover how to use image data augmentation when training deep learning neural networks.

 Welcome!  
I'm Jason Brownlee PhD  
and I help developers get  
results with machine learning.  
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```
1 # example of horizontal shift image augmentation
2 from numpy import expand_dims
3 from keras.preprocessing.image import load_img
4 from keras.preprocessing.image import img_to_array
5 from keras.preprocessing.image import ImageDataGenerator
6 from matplotlib import pyplot
7 # load the image
8 img = load_img('bird.jpg')
9 # convert to numpy array
10 data = img_to_array(img)
11 # expand dimension to one sample
12 samples = expand_dims(data, 0)
13 # create image data augmentation generator
14 datagen = ImageDataGenerator(width_shift_range=[-200,200])
15 # prepare iterator
16 it = datagen.flow(samples, batch_size=1)
17 # generate samples and plot
18 for i in range(9):
19     # define subplot
20     pyplot.subplot(330 + 1 + i)
21     # generate batch of images
22     batch = it.next()
23     # convert to unsigned integers for viewing
24     image = batch[0].astype('uint8')
25     # plot raw pixel data
26     pyplot.imshow(image)
27     # show the figure
28     pyplot.show()
```



