Lab 8: CNN (CIFAR10-Improving accuracy), CNN (Image Classification), and Pygame

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Part 1: CNN (CIFAR10-Improving accuracy)

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The code below is to import tensorflow

A screenshot of a computer

Description automatically generated with medium confidence

The code below is to download and prepare the CIFAR10 dataset

Text

Description automatically generated

The code below is to verify and plot the class data

Text, letter

Description automatically generated

The code below is to create the convolutional base (3 VGG blocks)

For this model, I used batch normalization and dropout to increase the accuracy.

A picture containing background pattern

Description automatically generated

The code below is added dense layers on top

Text

Description automatically generated with medium confidence

The code below is to compile and train the model

For this model, I did include data augmentation to increase the accuracy.

Text

Description automatically generated

The code below is to evaluate the model

Text

Description automatically generated

Part 2: CNN (Image Classification)

Everything will be the same as the part 1 of this lab. However, we will add two more section for this part after the “Evaluate the model” section. Those two sections are: Visualize training results and predict on new data.

The code below is to visualize training results.

Text

Description automatically generated

The code below is to predict on new data. There are five cases in this lab.

Case 1: airplane

Graphical user interface, text

Description automatically generated with medium confidence

Case 2: automobile

Graphical user interface, text, application

Description automatically generated

Case 3: bird

Graphical user interface, text, application

Description automatically generated

Case 4: another bird image

Graphical user interface, text, application, email

Description automatically generated

Case 5: another automobile image

Graphical user interface, text, application

Description automatically generated with medium confidence

If you would like to test another image, you can replace another url to do that.

For instance, 

You only need to replace another bird url image to test.

Part 3: Pygame – Balloon Flight

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The code below is to create a width and height for game window



The code below is to create a color

Text

Description automatically generated

The code below is to get image and display a position for balloon, bird, house, and tree for the game.

Text

Description automatically generated

The code below is to create a global variable and scores array

A screenshot of a computer

Description automatically generated with medium confidence

If you would like to add different background music, you can change in the code below.

Graphical user interface, text

Description automatically generated

The code below is the function for read and write the top five scores

Text

Description automatically generated

The code below is to display the top five high scores when the game is over.

A screenshot of a computer

Description automatically generated with medium confidence

The code below is to draw the characters, background, lives, health, and scores for the game.

A screenshot of a computer

Description automatically generated with medium confidence

You can change the background of the game by changing the line 84 shown above.

The line 90 and 91 is for creating the health bar at the top left conner of the game screen.

The code below is the function for using the right-clicked to keep the balloon flow up.

Text

Description automatically generated

The code below is the function for the flapping animation of the bird in the game.

Text

Description automatically generated

If you would like to change the speed of the bird, you can change in code below.



Similar to the house and tree





In addition, you can change the game play by changing the if statement above to any position. (Line 122 for bird, line 135 for house, and line 141 for tree).

For my game, I gain score whenever the obstacles pass the balloon position (Not passing all way to left of the screen like the original code).

The code below is the game play conditions. The game will be over if the balloon hit the top of the screen or bottom of the ground.

A screenshot of a computer

Description automatically generated with medium confidence

Moreover, the code is another condition for the game.

Text

Description automatically generated

If the balloon gets hit by obstacles, its health bar will be decreased. When you are out of your health, you will be minus one lives. You will have at least two lives to play this game. When you out of lives, the game will be over. It will also the high scores at the end of the game.

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