Report Assignment 4

1. Do a simple experiment to find out whether your convolutional neural network exceeds your linear model (under the same number of epochs). And below are some evaluation metrics you need to finish:

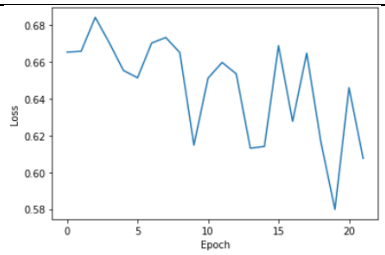
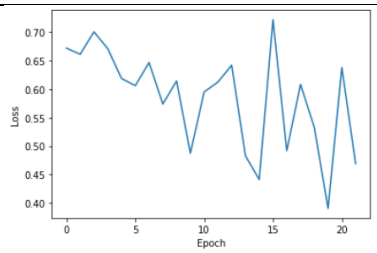
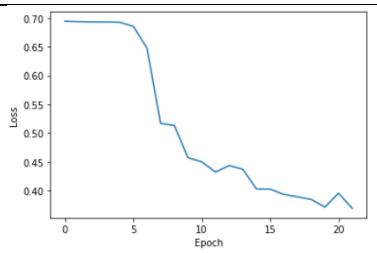
- epochs (2%)

- training time (1%)

- accuracy (both training and valid) (1%)

- number of parameters (2%)

- training loss curve (2%)

	Linear model	My CNN model	Tensorflow CNN model
Epochs	22	22	22
Training time		25 minutes	1 minutes 35 seconds
Accuracy	0.75166667	0.751666667	0.8400
Number of parameters	33,792	551,785	1,584,449
Training cost curve			
Learning rate	0.0015	0.0036	-

2. For the advanced part: Describe how you design or choose your own model architecture, and how you choose loss function and optimizer. (2%)

My advance part model:

32 output filters

3 x 3 filter

Padding = 'same' : padding evenly to left, right, up and down

input_shape = (32, 32, 1) : the input size of the image is 32 x 32, and 1 means the images are grayscale

The model contains only Conv2D layers and MaxPooling2D layers.

The Conv2D layers were designed with different batch size, with the same ReLU activation function.

Then, the Flatten() function was added to make the input to the Dense layer becoming one dimension.

Dense(1) layer with Sigmoid activation function at the end of the model because there are only 0 and 1 in the dataset.

For MaxPooling layers, I made them all have the same pool size of (2,2) and strides of 2.

For the optimizer I choose to use Adam, because after trying with RMSprop, I found out that the output is not so good, or maybe because I cannot find the best learning rate.

I choose to use binary cross entropy since this assignment is a binary classification assignment.

I set the number of epochs as 22, because I want to compare with the CNN model I built in the basic part. Epochs of 22 is the best number that I can conclude from the model I built in basic part. Because if more than 22, the plot of loss vs. epochs will rise again. So, I decided to choose a number between 20 to 30 epochs, which is 22.

Thank you TA for answering my annoying questions patiently!!