Assignment 3 (CS 747): Deep Shakespeare's sonnets

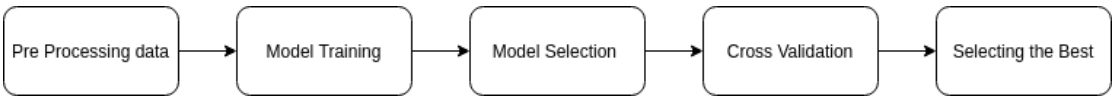
Pankaj Kumar Jatav – G10338769

Goal:

This assignment consists of building a model that generates new text, based on a corpus of data, especifically Shakespeare's sonnets. You will build and train a character generating model using RNNs and utilize it to generate a text sequence given a prompt.

Approach:

I followed the below diagram step to solve this assignment.



Pre-Processing of Data:

Below are the steps taken to pre-process that data.

1. Text Vectorization: As neural network can't take in the raw string data, we need to assign numbers to each character. Let's create two dictionaries that can go from numeric index to character and character to numeric index.

```
char_to_ind = {u: i for i, u in enumerate(vocab)}
ind_to_char = np.array(vocab)
```

Model Training:

I have used the sbelow archeture. We will use an LSTM based model with a few extra features, including an embedding layer to start off with and two LSTM layers. We based this model architecture

```
Model: "sequential_3"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
embedding_3 (Embedding)      (1, None, 64)             5376
```

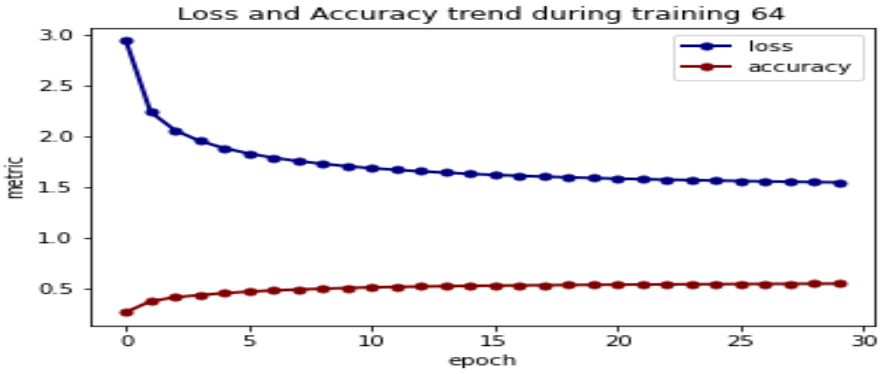
```
lstm_3 (LSTM)                (1, None, 256)            328704

dense_3 (Dense)              (1, None, 84)             21588

=================================================================
Total params: 355,668
Trainable params: 355,668
Non-trainable params: 0
_________________________________________________________________

=================================================================
```

For models trining I have used the tensorflow library and below are the parameter for used in model training.

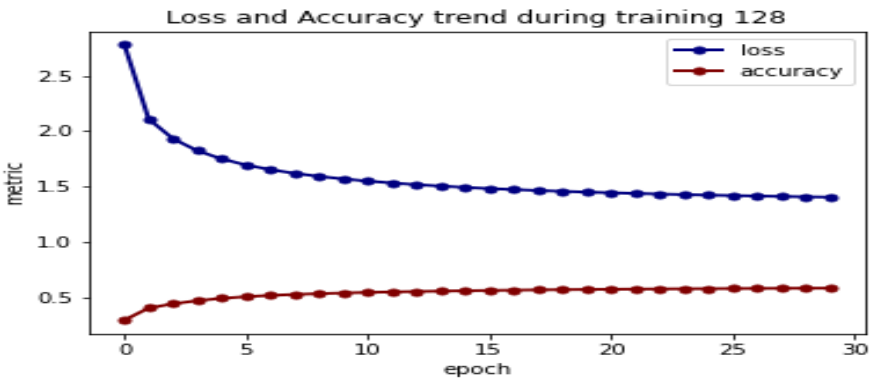
```
Dropout = [0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9]
# Number of RNN units. Your choice. YOU MUST EXPERIMENT WITH THIS NUMBER.
rnn_neurons = [64, 128, 256, 512, 1024]
```

Model Selection(Results):

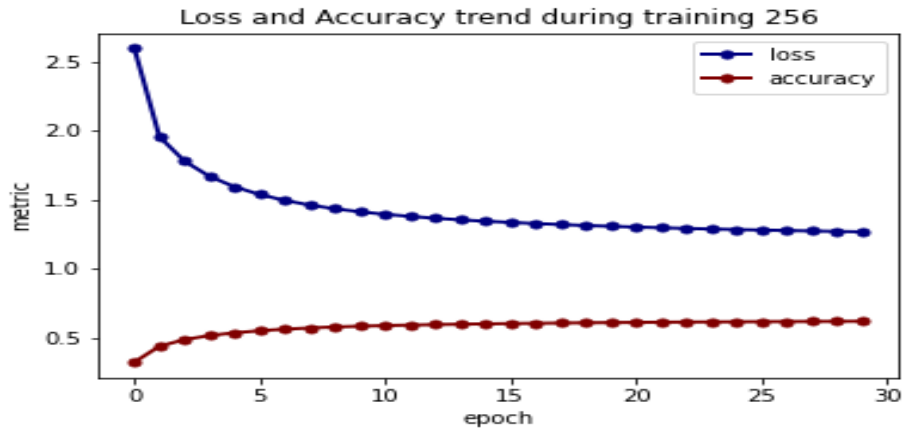
Trained the below model for this assigment and select the best based on the loss and accurary on traning data. Also the dropout did not work worked well.



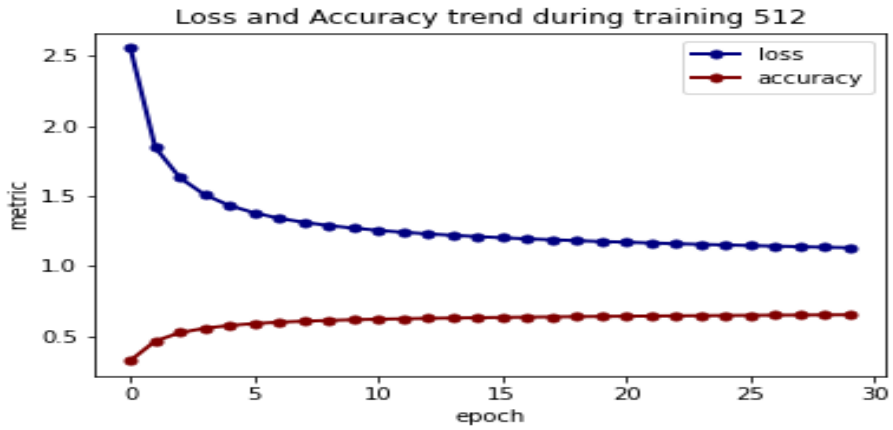
Plot a) Model Tunning for 64 RNN unit



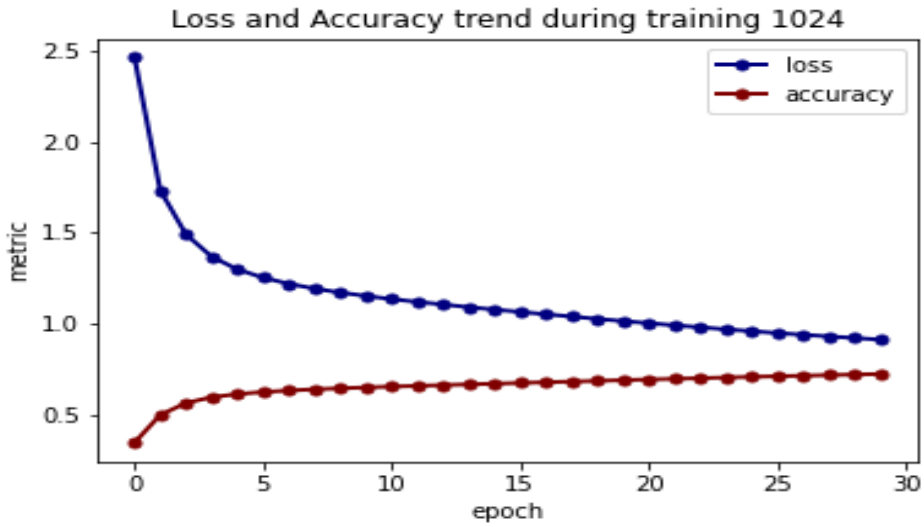
Plot b) Model Tunning for 64 RNN unit



Plot c) Model Tunning for 256 RNN unit



Plot d) Model Tunning for 512 RNN unit



Plot e) Model Tunning for 512 RNN unit

Resuls Comparison:

Below are the resutls from different models also we can find the same in noteboks too.

```
In [37]: print(generate_text(model,"But",gen_size=1000))

         Butcniz,
             They'll will have her even to you my woo'ful.
             I crum'd uppers'd for her, sir; as the shame,
             With all rose; be resistery.
           BOLINGBROKE. Even his purse opposeth the bether
             Turn with feast. This is a minut, monate.                Exeunt SENAMAN and a cried ot STUPYNINCE and Tybrows a
         light all now of them,
             I'll empliam?
           POLIXENES. I pray I have done; gentlemen-robbet?
           HUBERT. Is any bold!
           BEROWNE. Uplike it back. But thou lost not a fortune
             And I cannot hence, sweethat looks.
           PETRUCHIO. Sir, how shapes of it, if you keep you.
           ANTONY. We'll heard it me too thus tenny swe, King and thought
             Than gives between A gotten begins!
              When this is us thinks.
             The general street, posain join'd off proud- good;
             and my stumberlanching-strements may not be think
             When Atroad, peasery, witness not for her and of you.
           TAMORA. I bespech me, that is this purpos'd from mine e, sir,
             To paint, moress, Opiniar, besheinds, but
             frungm to eat hi
```

fig: Result for but using RNN unit 256

```
[ ] print(generate_text(model,"But",gen_size=1000))

But!
                  Enter Clroous wither trues in skelf,
  And I'll be so by thee.
DROMIO OF EPHESUS. I have way thou brokends,
    Sherch, once, and my art and valiant of
    things I will.
  PAROLLES. I do deliver'd thy bewath ingent it humble!
  ARVIRAGUS. Now I small to Antony. Most delieves Dia

      Enter ORLANDO with his villainy on his preserver reputation
    Could every day and ease thy best; they wand
    My daughter's power,
    Abtorrends, for eightory
    If you'd distire eyes when I am full from this mouth
    Mare fair true kings
    Or would he speaks way it off? Your blood,
    All deports leave up a; 'tis all be we
    Were his froild watch they hope himself awake, and leave him that your belly pleasing span
                                                    Exeunt



ACT IV SCENE 5.
Rousillon. The COUNT'S palace

Enter CYMBELINE and QUEEN
  BRTTRILUS, on our stirring knew.
  Hor. Indeed, let's do thee reserv'd. For myself,
    I should be denied. I shall r
```

fig: Result for but using RNN unit 1024

Conclusion:

As we noticed that we can got better results when adding more rnn unit. And 1024 rnn unit perform well as compare to all other models.

The dropout do not work well for my archeture, I output of with dropout was same as plot a. When I trainined the model with 64 rnn unit.