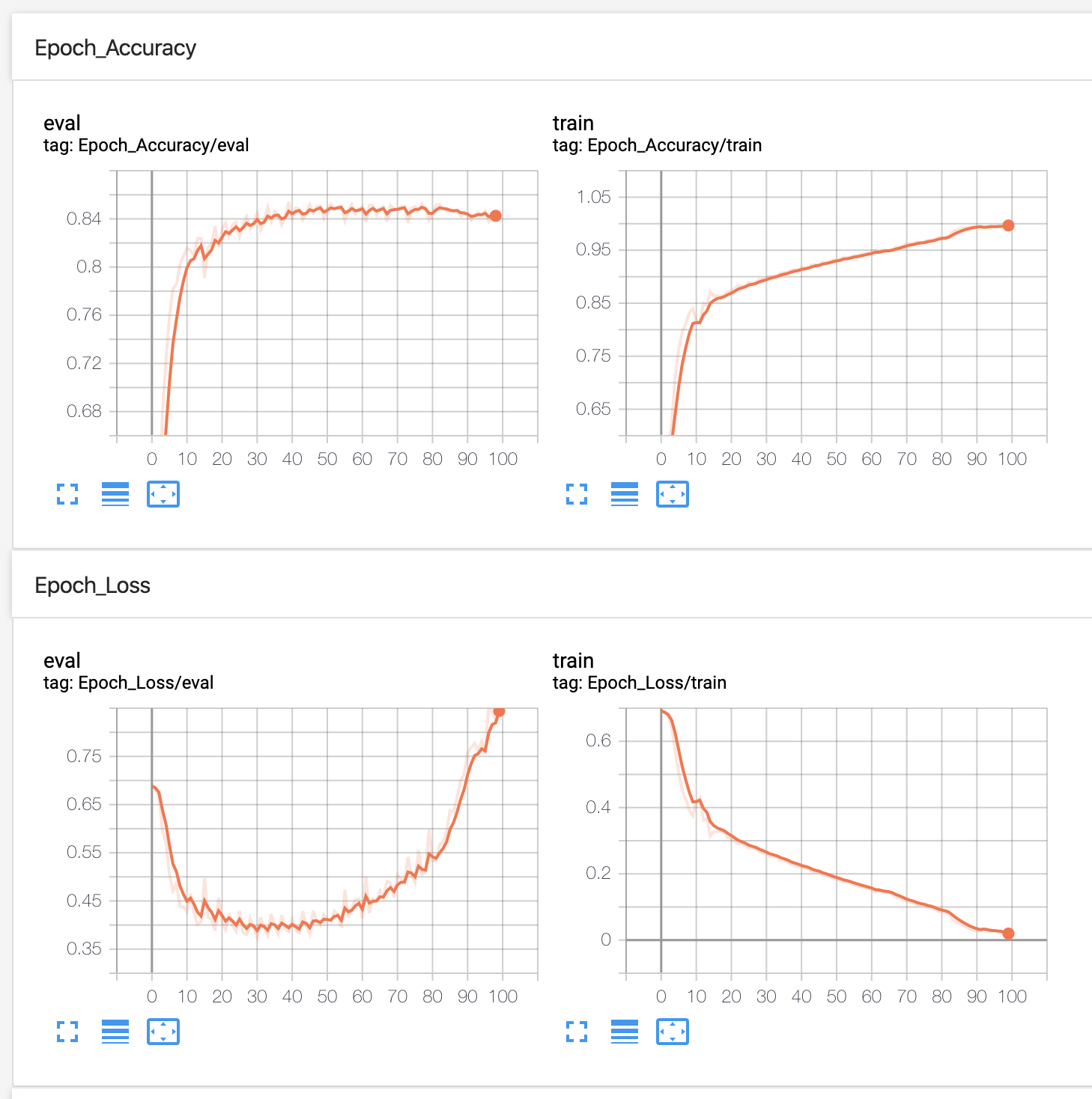
**Mathew Varughese**

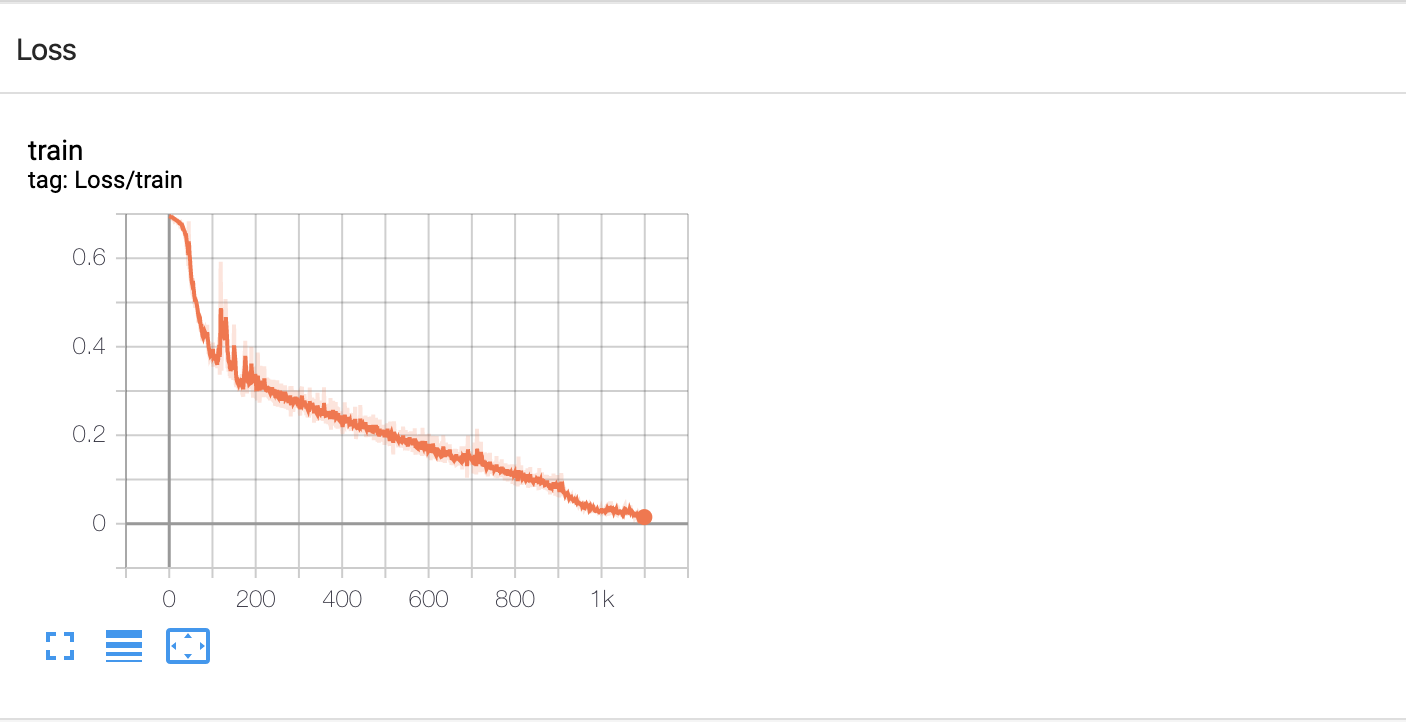
CS 1699

HW 5

**Part I: Sentiment Analysis on IMDB Reviews**

1. **Running GRU Cell**



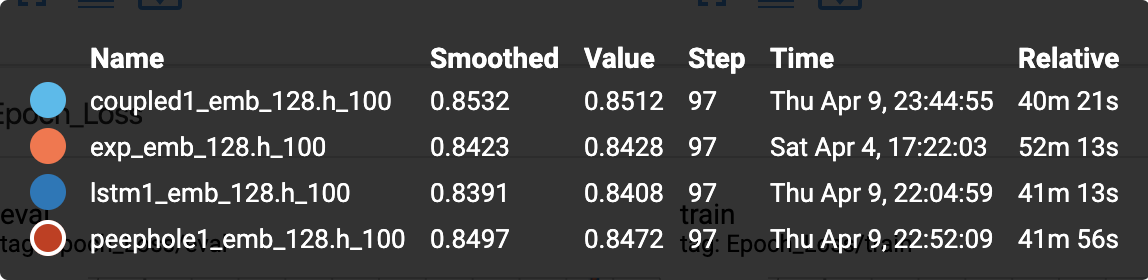


1. **Total Parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| GRU | LSTM | PEEPHOLED | COUPLED |
| Total Parameters: 68700 | Total Parameters: 91600 | Total Parameters: 121600 | Total Parameters: 68700 |

1. **Results**

The next pages include the results. All LSTMs performed pretty similar. The coupled LSTM was a little better and slightly faster. The Peephole Loss graph shows it followed a slightly different trajectory than the other LSTMs. However, I think this exercise shows that different LSTM architectures do not make *that big* of a difference. As mentioned in the [Greff, et al (2015)](https://arxiv.org/pdf/1503.04069.pdf) paper, these LSTM variants are about the same. This chart shows the validation accuracy and the time taken.

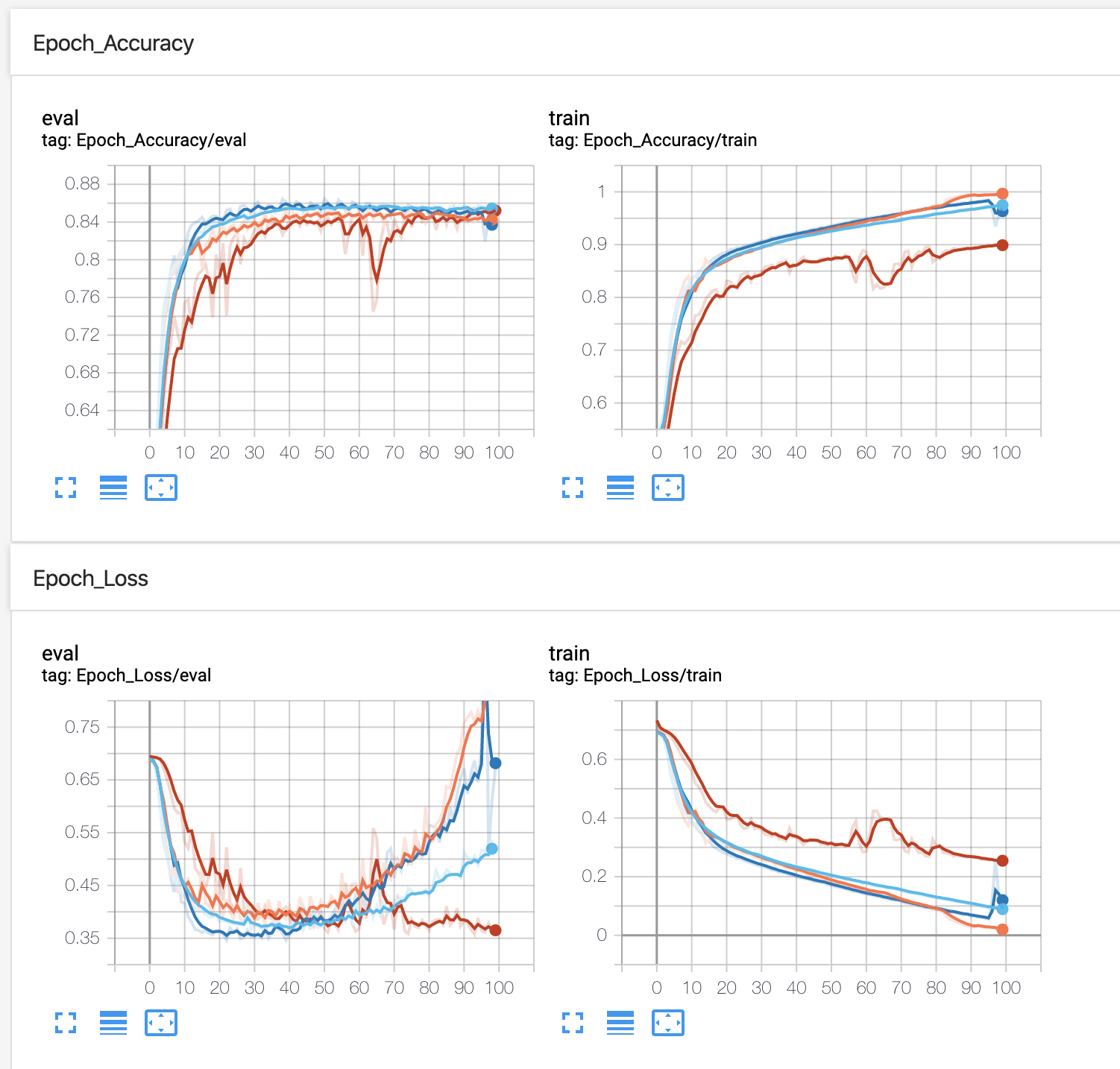


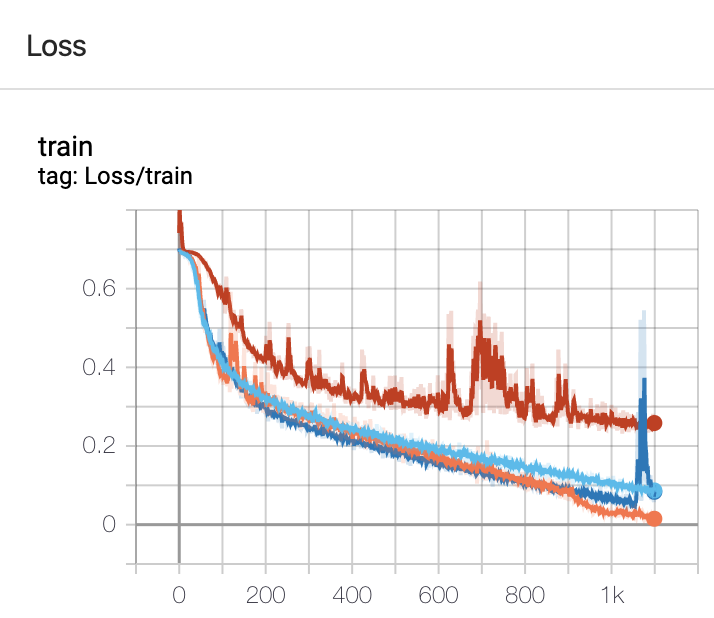
GRU

LSTM

PEEPHOLE

COUPLED

****

****

**Part II: Building a Shakespeare Writer**

Model Architecture:

SentenceGeneration(

(embedding): Embedding(65, 50, padding\_idx=0)

(rnn\_model): GRUCell(input\_size=50, hidden\_size=50, bias=True)

(classifier): Linear(in\_features=50, out\_features=65, bias=True)

)

Loss: 2.0736, Accuracy: 0.4115: : 545it [43:13, 4.76s/it]

Loss: 1.9892, Accuracy: 0.4310: : 545it [37:11, 4.09s/it]

Loss: 1.8494, Accuracy: 0.4666: : 545it [37:20, 4.11s/it]

Loss: 1.7587, Accuracy: 0.4979: : 545it [38:24, 4.23s/it]

Loss: 1.7559, Accuracy: 0.4809: : 545it [38:25, 4.23s/it]

Loss: 1.7565, Accuracy: 0.4843: : 545it [38:19, 4.22s/it]

Loss: 1.7184, Accuracy: 0.4903: : 545it [38:26, 4.23s/it]

Loss: 1.6420, Accuracy: 0.5258: : 545it [38:04, 4.19s/it]

Loss: 1.6337, Accuracy: 0.5182: : 545it [38:23, 4.23s/it]

Loss: 1.6120, Accuracy: 0.5038: : 545it [38:00, 4.19s/it]

|  |  |
| --- | --- |
|  |  |

This was generated, after 10 epochs:

ROMEO and JULIET

:

A amamen for of your ragain's firs,

St. up bes othnil's breaks

Mague, dene say 'telf me are tannt,

no? carried an vione you not so was mind I do

he beward: he thing sweet it incad like look'

reser, to fare for'th the

can. Sawnal I tan shall I call known loves,

Poep and perpose,

Groy Eve live Apailes decang

yo med ouse mernects, neight,

There aydial Fremuped to hastly, soltas,

Look on that houndis.

JULIET:

The bood I.

Your suchence buge what a hast lold,

Thush this migh's most park Ancer

By, anlless, eart'gl the Gaid brace

Tee aboud by you so dan let neprit,

Chough hazs of your nothraves him? O prits to for sigs,

And pleack my Emnow, the subsuen he twes right.

POLIUS:

No ances and not prinfens

To supper! Wronder to arm and mit.

Thits od'y me mutar pulled my honess, leired.

CLOMETLANUS:

I, I day, breads on membuse of beserce:

Belard, them intell you meed I to mad of whilats

I worth for that scarte.

Why Vame is shall you preaves

They in but the heir pellest; up thy great;

And for we

That is pretty crazy.

I tried it again with different parameters, mainly a bigger hidden size, and got a slightly better accuracy.

Model Architecture:

SentenceGeneration(

(embedding): Embedding(65, 60, padding\_idx=0)

(rnn\_model): GRUCell(input\_size=60, hidden\_size=130, bias=True)

(classifier): Linear(in\_features=130, out\_features=65, bias=True)

)

Loss: 1.8615, Accuracy: 0.4606: : 545it [02:32, 3.58it/s]

Loss: 1.6313, Accuracy: 0.5080: : 545it [02:32, 3.57it/s]

Loss: 1.6182, Accuracy: 0.5174: : 545it [02:32, 3.57it/s]

Loss: 1.4917, Accuracy: 0.5411: : 545it [02:32, 3.57it/s]

Loss: 1.5287, Accuracy: 0.5368: : 545it [02:32, 3.57it/s]

Loss: 1.5037, Accuracy: 0.5318: : 545it [02:32, 3.58it/s]

Loss: 1.4634, Accuracy: 0.5555: : 545it [02:32, 3.57it/s]

Loss: 1.4492, Accuracy: 0.5428: : 545it [02:32, 3.57it/s]

Loss: 1.4743, Accuracy: 0.5521: : 545it [02:32, 3.57it/s]

Loss: 1.3784, Accuracy: 0.5775: : 545it [02:32, 3.57it/s]

Loss: 1.4391, Accuracy: 0.5580: : 545it [02:32, 3.57it/s]