Transformers For NLP

CSE 705 - Recent Advances in Deep Learning and Reinforcement Learning

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What is a transformer?

What is a transformer?

- Consists of an encoder and a decoder that can process words simultaneously.
- Consists of an attention mechanism without using RNNs.
- Unlike RNNs, transformers process the entire input at once.
- Introduced in 2017 by a team at Google Brain.
- Quickly replacing LSTMs and RNNs which are much slower to train.
- Led to the development of pre-trained models like BERT and GPT

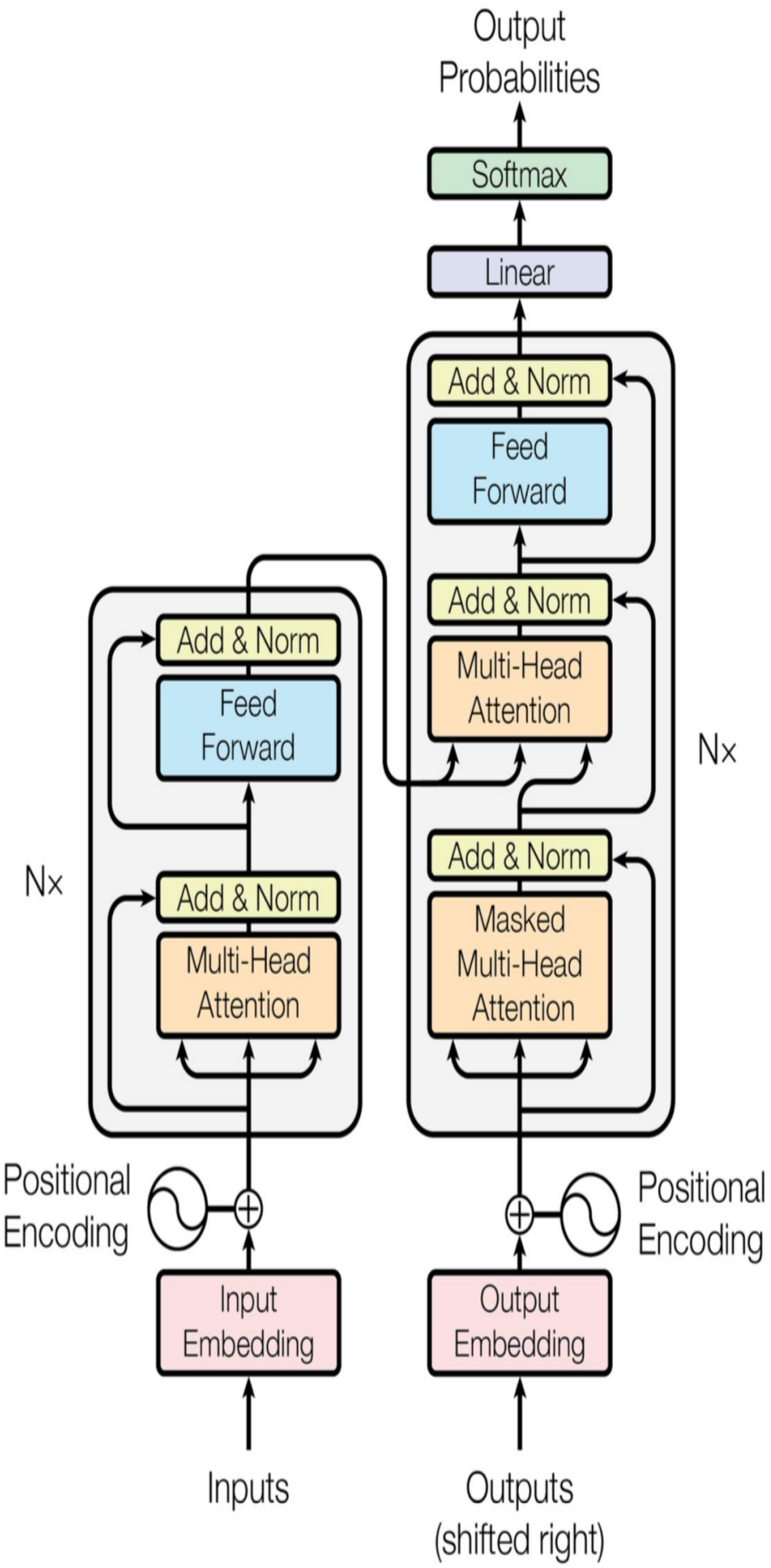

Figure 1: The Transformer - model architecture.

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NLP Task and Dataset

NLP Task and Dataset

NLP Task: -

- Perform sentiment analysis on tweets using the BERT transformer and compare the results with LSTM.

Dataset: -

- Financial Tweets
- Contains 5322 unique tweets divided into positive, negative and neutral.

What is LSTM?

What is LSTM?

- They are a type of RNN, capable of learning long-term dependencies.
- They are explicitly designed to avoid the long-term dependency problem
- LSTMs have a chain like structure, but the repeating module has a different structure.
- Instead of having a single neural network layer, there are four, interacting in a very special way.

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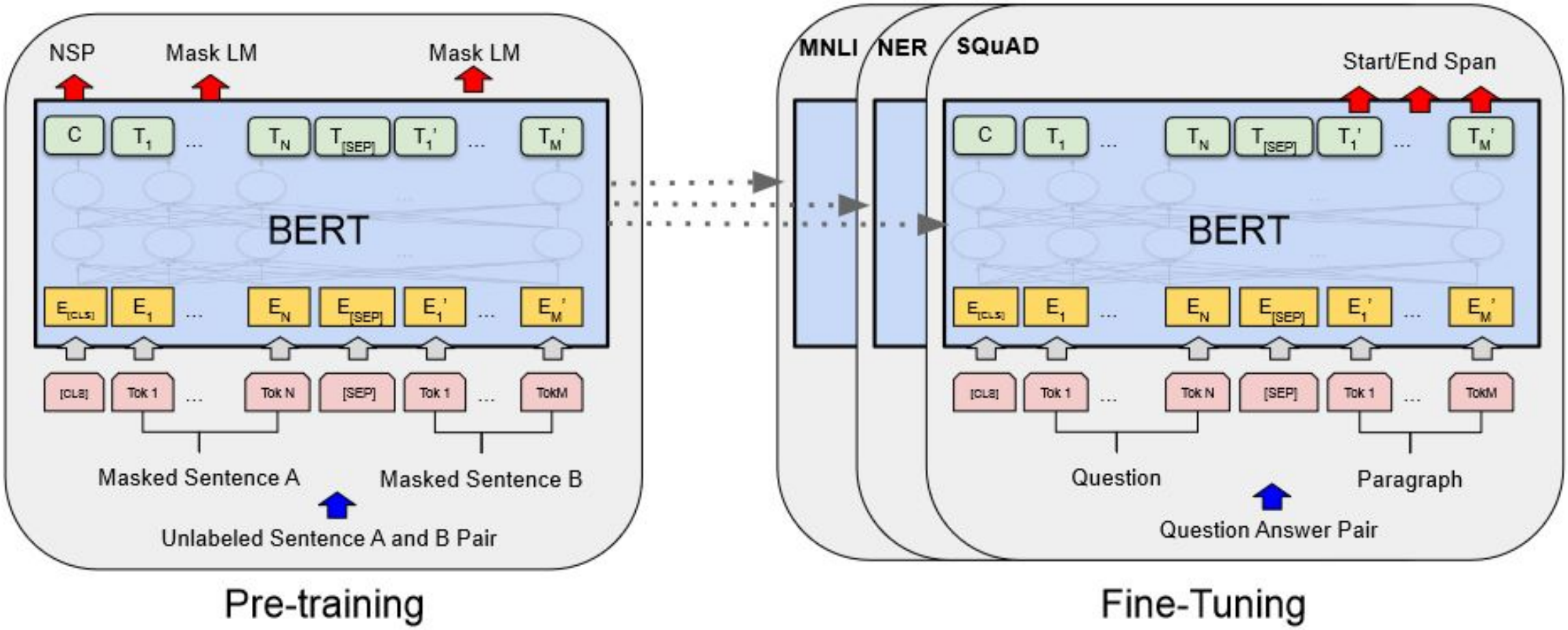
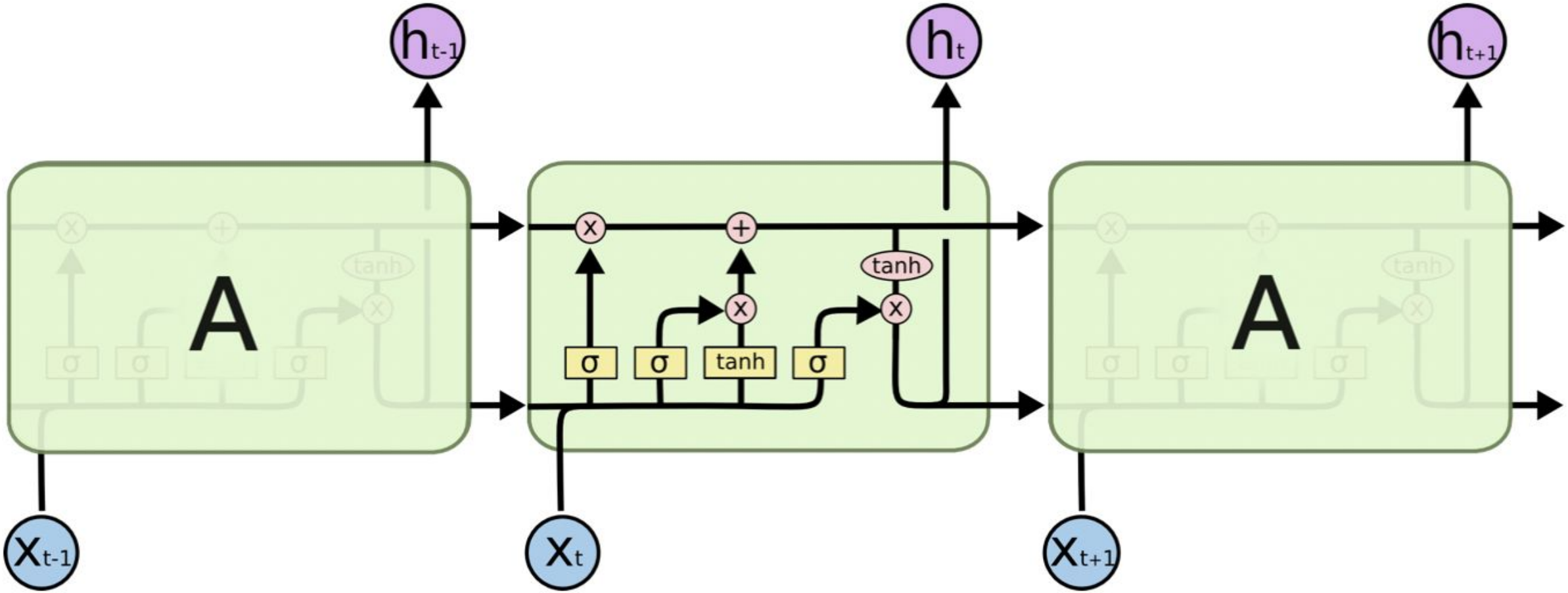
BERT - Bidirectional Encoder Representations from Transformers

BERT Architecture



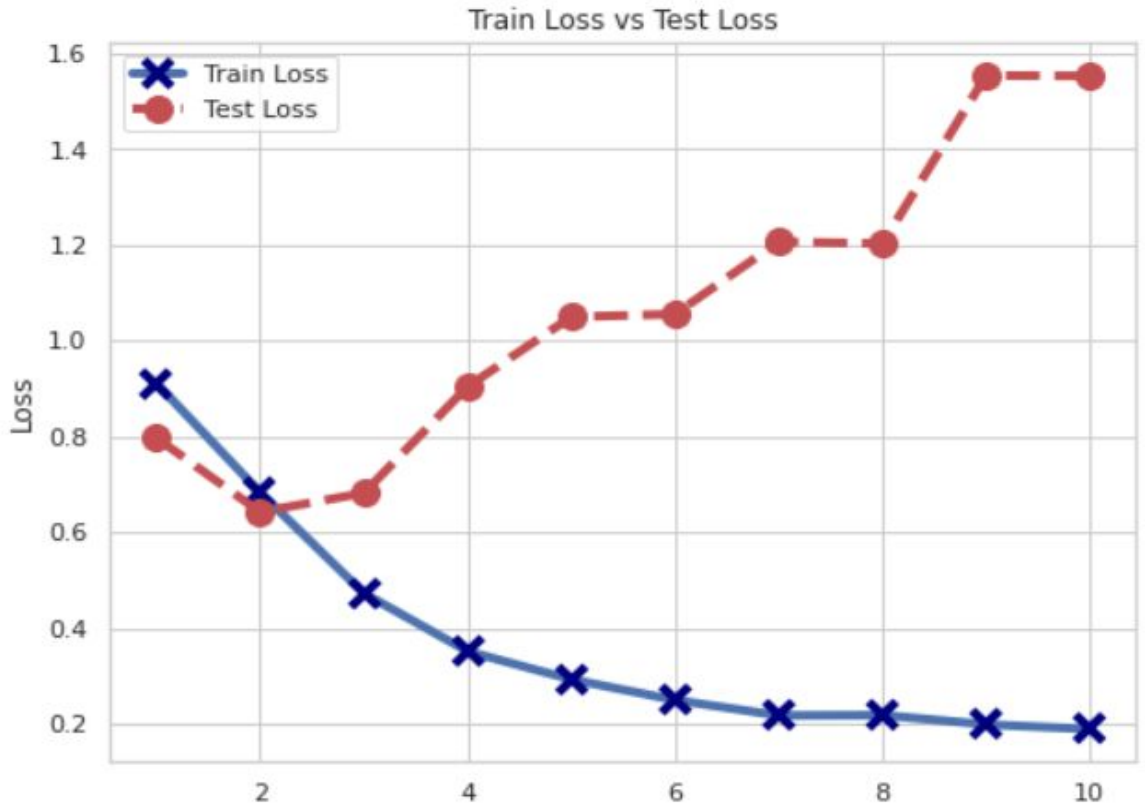
LSTM - Long Short Term memory

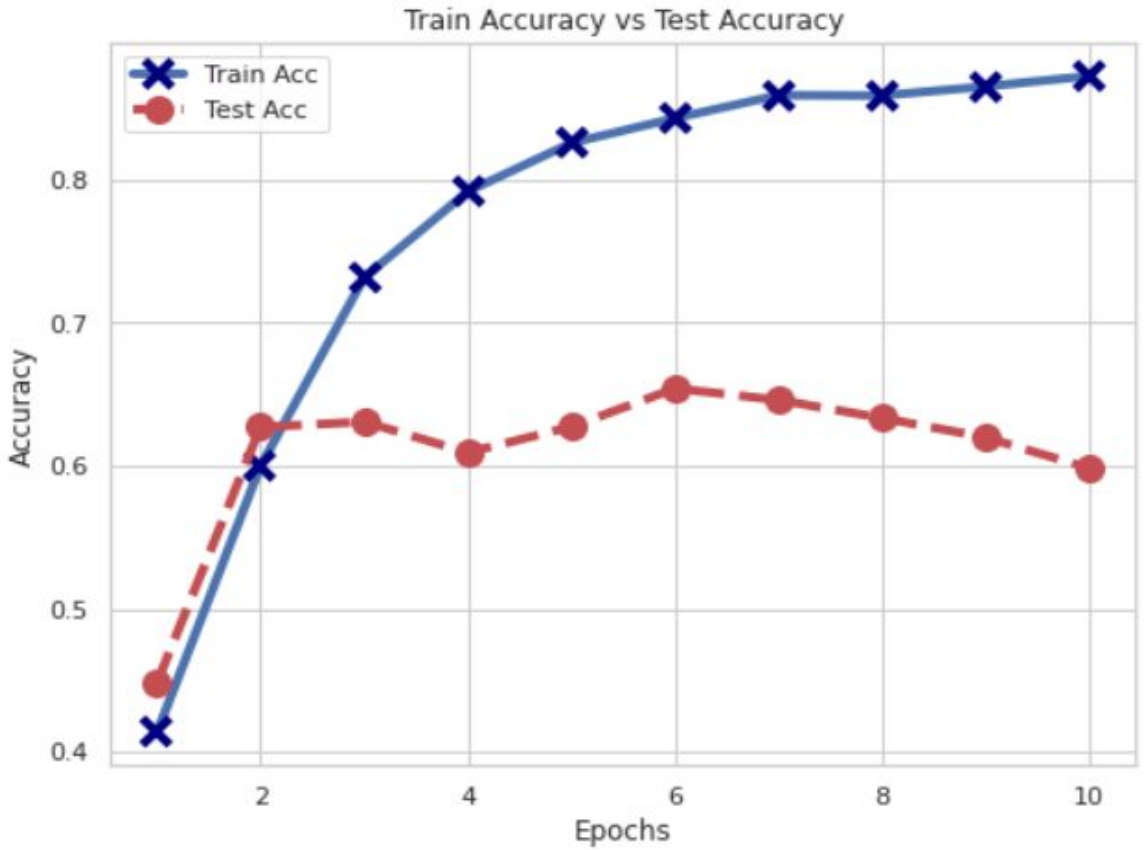
LSTM Architecture



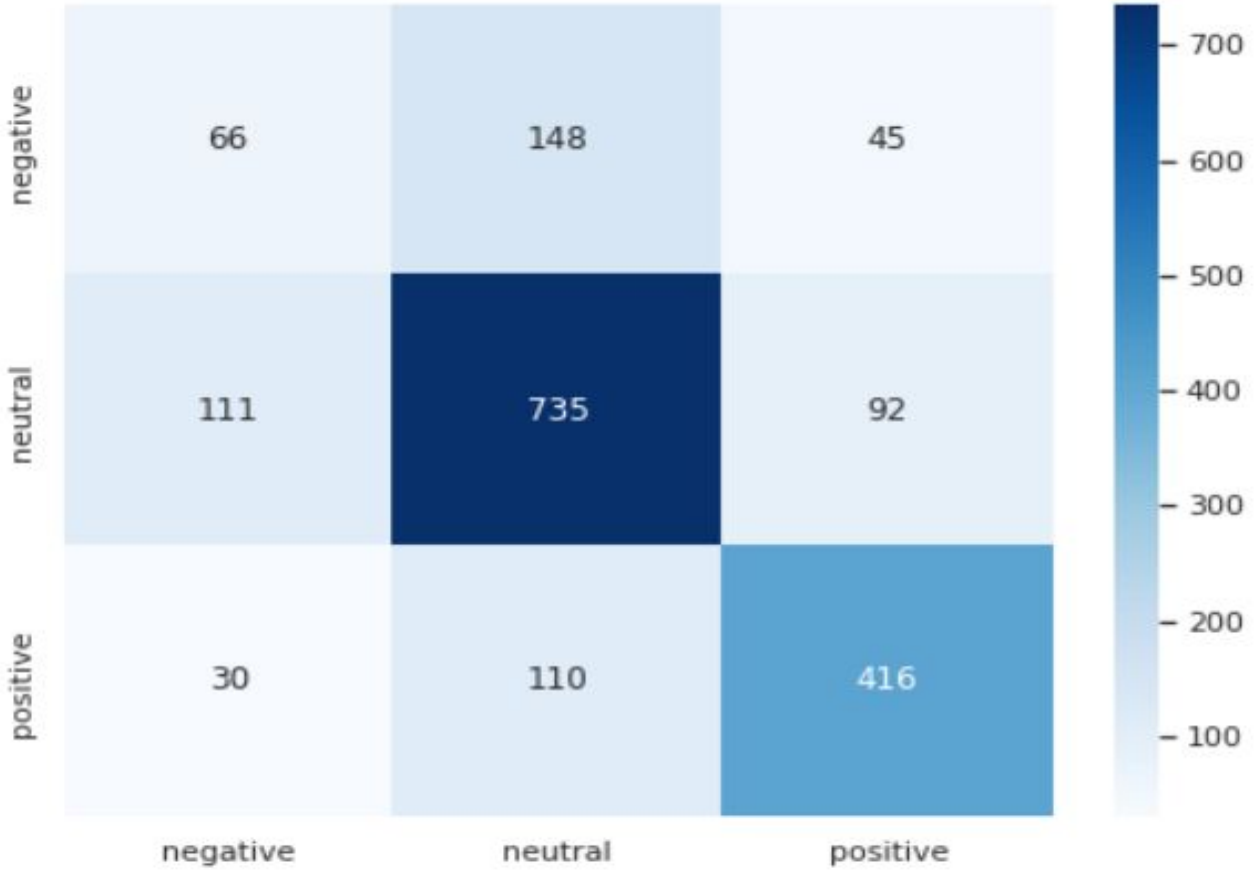
BERT Results

Training Loss / Accuracy vs Testing Loss / Accuracy



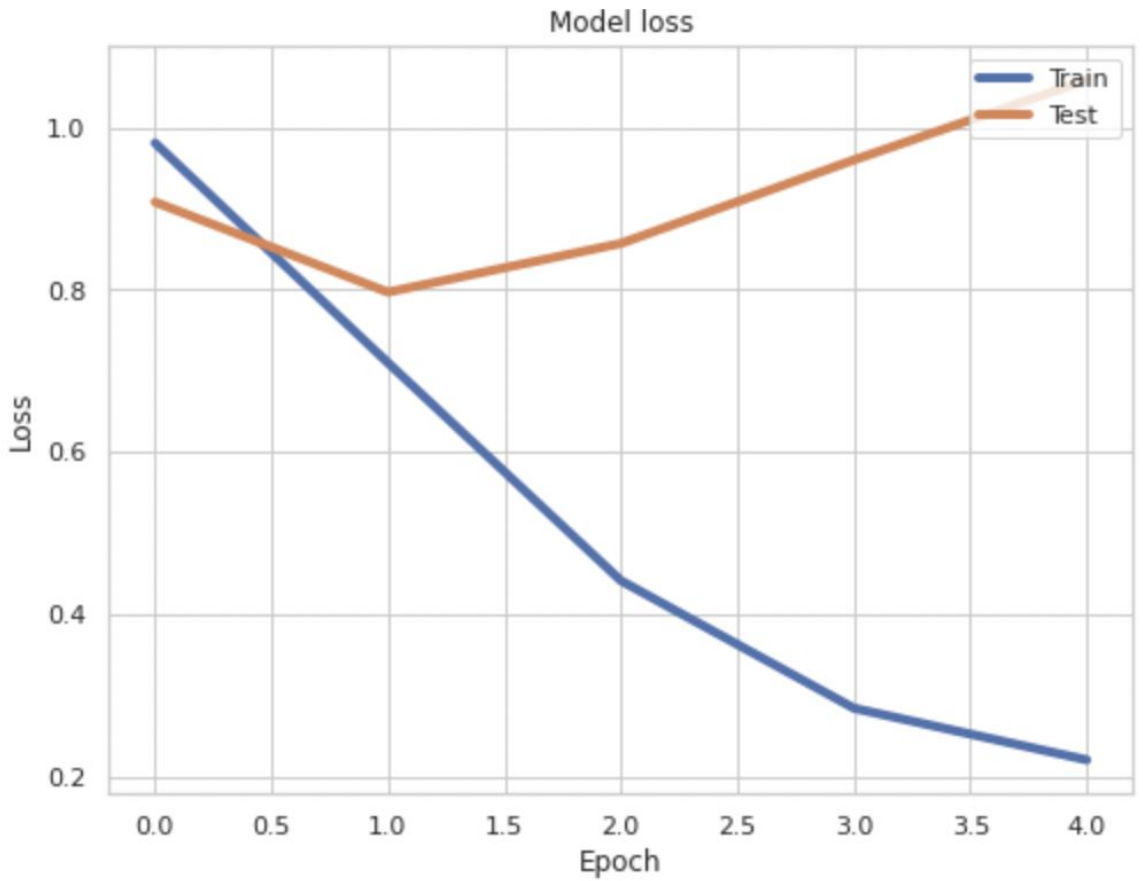


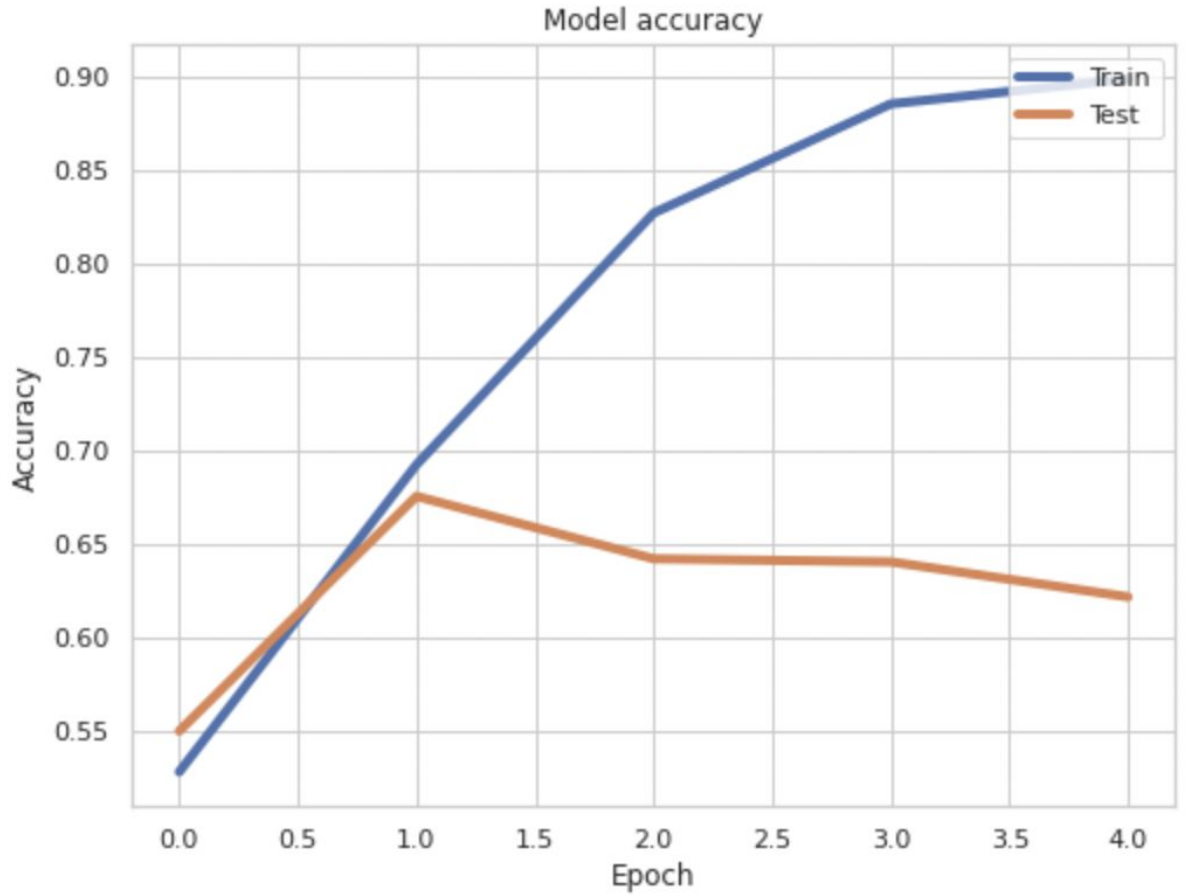
Confusion Matrix



LSTM Results

Training Loss / Accuracy vs Testing Loss / Accuracy





Contribution Summary

Team Member	Presentation / Project Part	Contribution (%)
Rishi Joshi	BERT	50%
Aastha Sood	LSTM	50%

References

References

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Thank You!