

CS 203: Software Tools & Techniques for AI
IIT Gandhinagar
Sem-II - 2024-25

LAB 07
GROUP 15
Members-

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Hardik Shudhodhan Khobragade (24120029)

Colab Link-

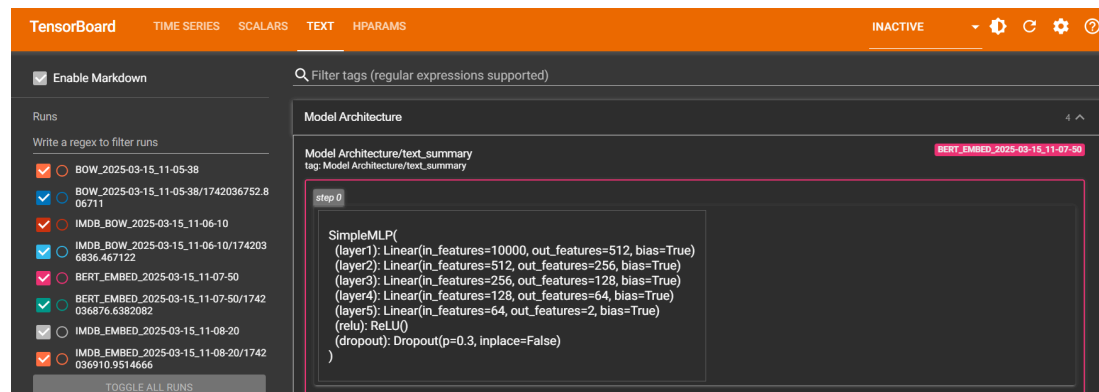
https://colab.research.google.com/drive/1a7AekEY8RubZoxwsObbfO_PkZyH6Fk1p?usp=sharing

Github Repo Link-

Screenshots of the following displaying:

- Model architecture.

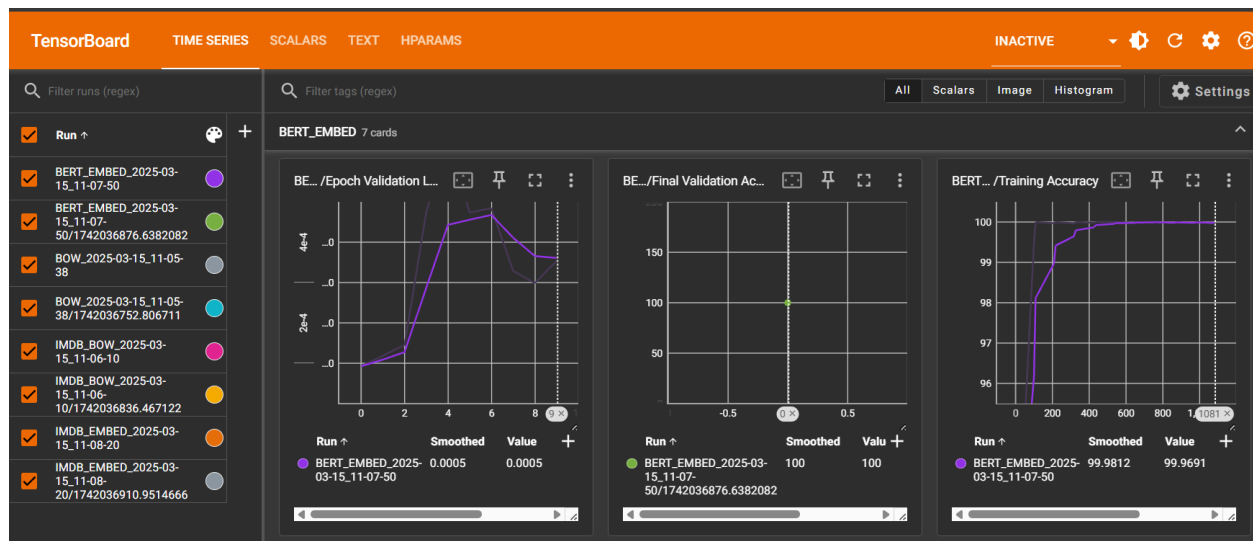
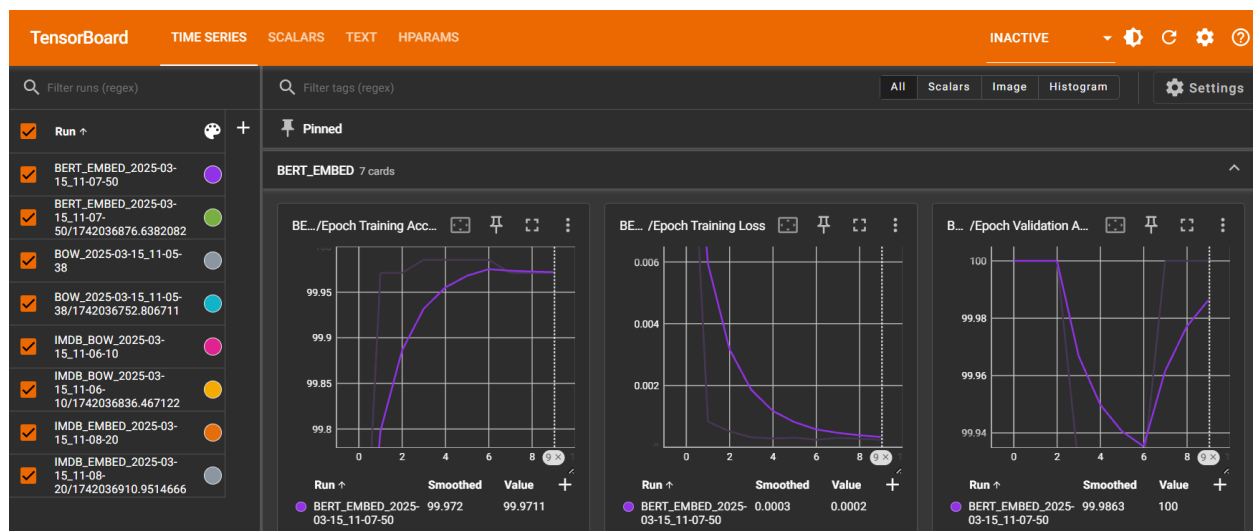
```
Model architecture:
SimpleMLP(
  (layer1): Linear(in_features=10000, out_features=512, bias=True)
  (layer2): Linear(in_features=512, out_features=256, bias=True)
  (layer3): Linear(in_features=256, out_features=128, bias=True)
  (layer4): Linear(in_features=128, out_features=64, bias=True)
  (layer5): Linear(in_features=64, out_features=2, bias=True)
  (relu): ReLU()
  (dropout): Dropout(p=0.3, inplace=False)
)
```

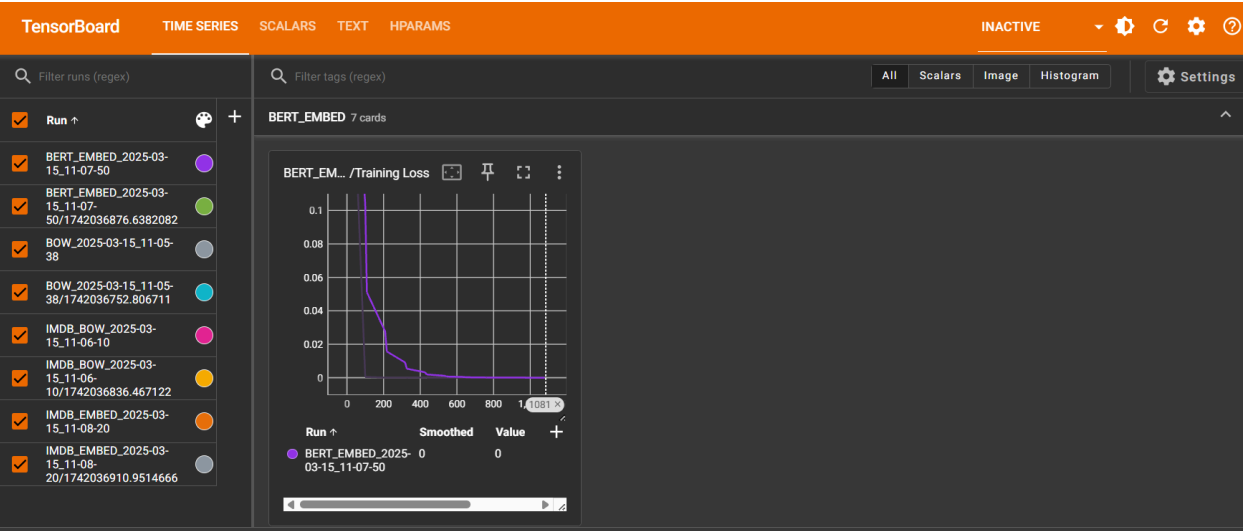


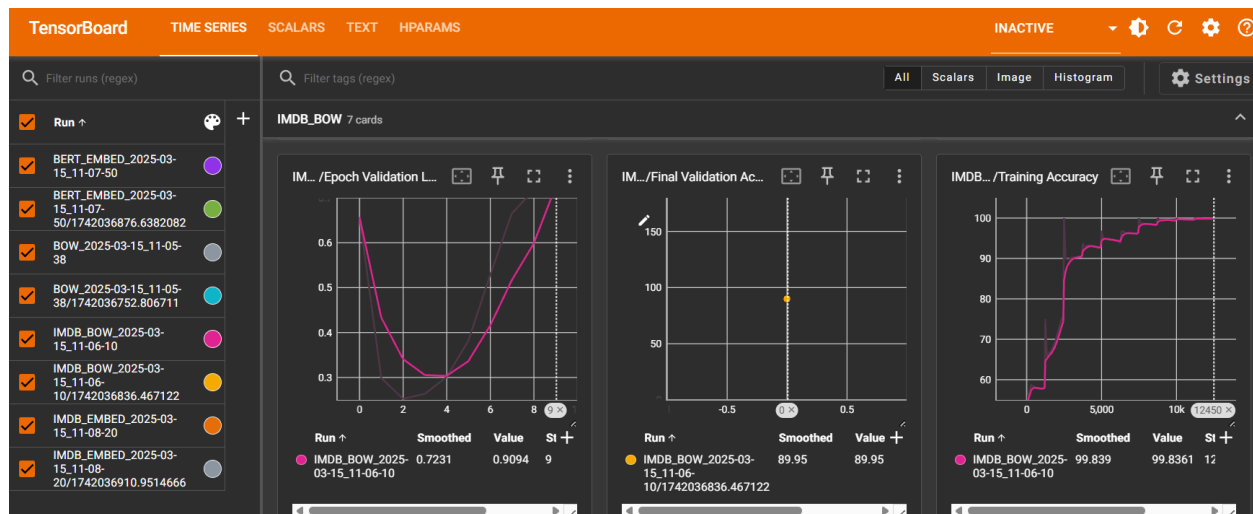
- Hyperparameters.

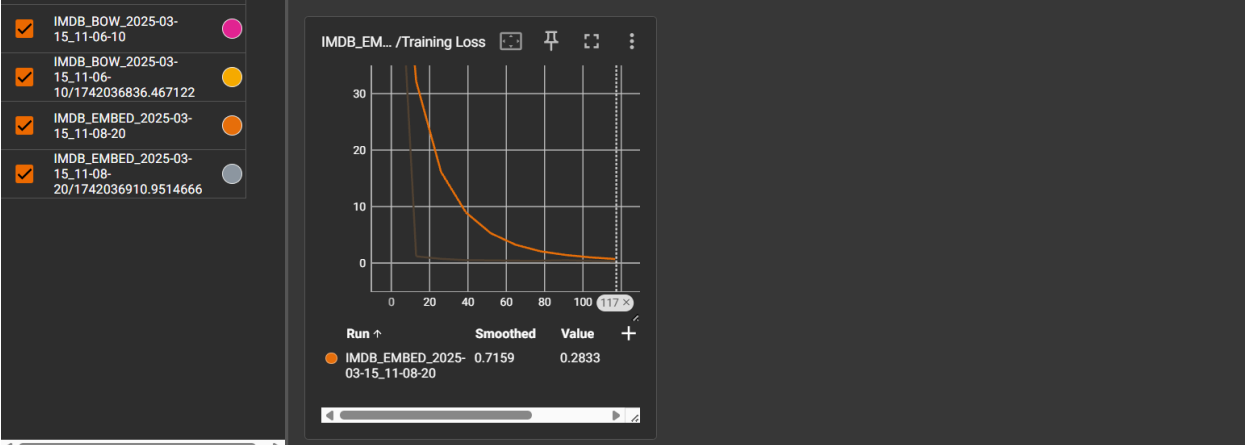
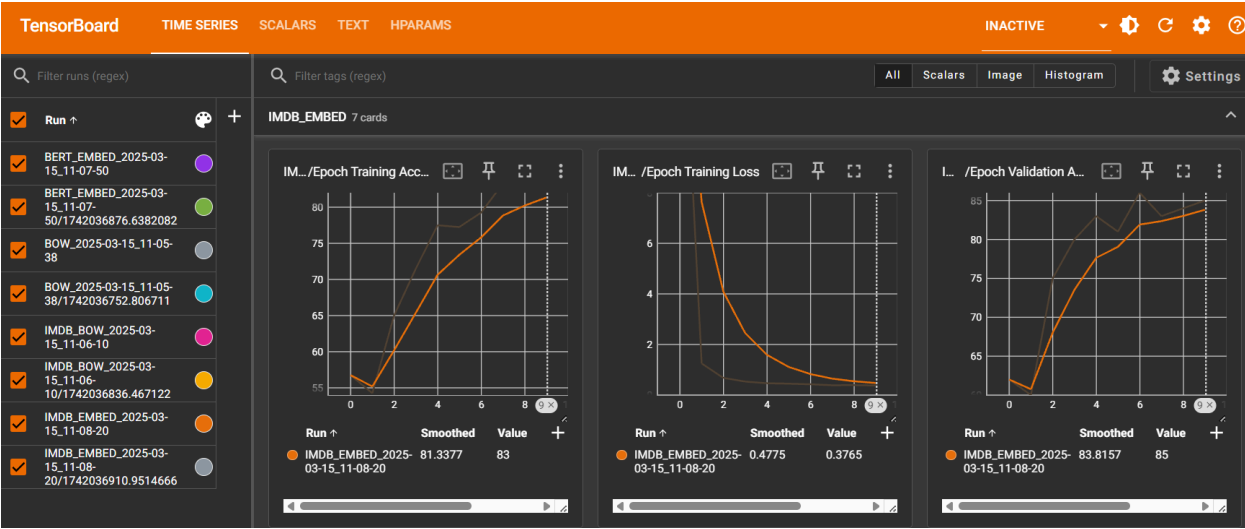
TABLE VIEW		PARALLEL COORDINATES VIEW			SCATTER PLOT MATRIX VIEW	
Trial ID	Show Metrics	Number of Batches	epochs	initial_lr	optimiser	transfer_lr
Dataset1_2025-...	<input type="checkbox"/>	217.00	10.000	0.0010000	Adam	0.00010000
Dataset2_2025-...	<input type="checkbox"/>	109.00	10.000	0.0010000	Adam	0.00010000
IMDB_BOW_202...	<input type="checkbox"/>	1250.0	10.000	0.0010000	Adam	0.00010000
IMDB_EMBED_2...	<input type="checkbox"/>	13.000	10.000	0.0010000	Adam	0.00010000

- Logged metrics.







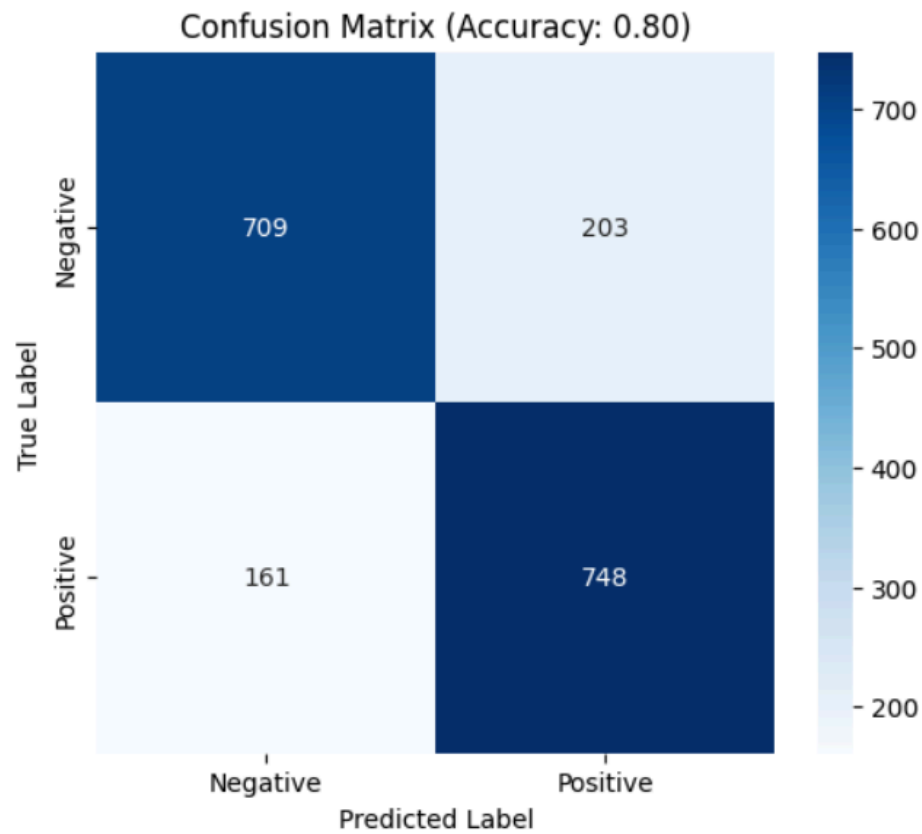


- Final evaluation results.

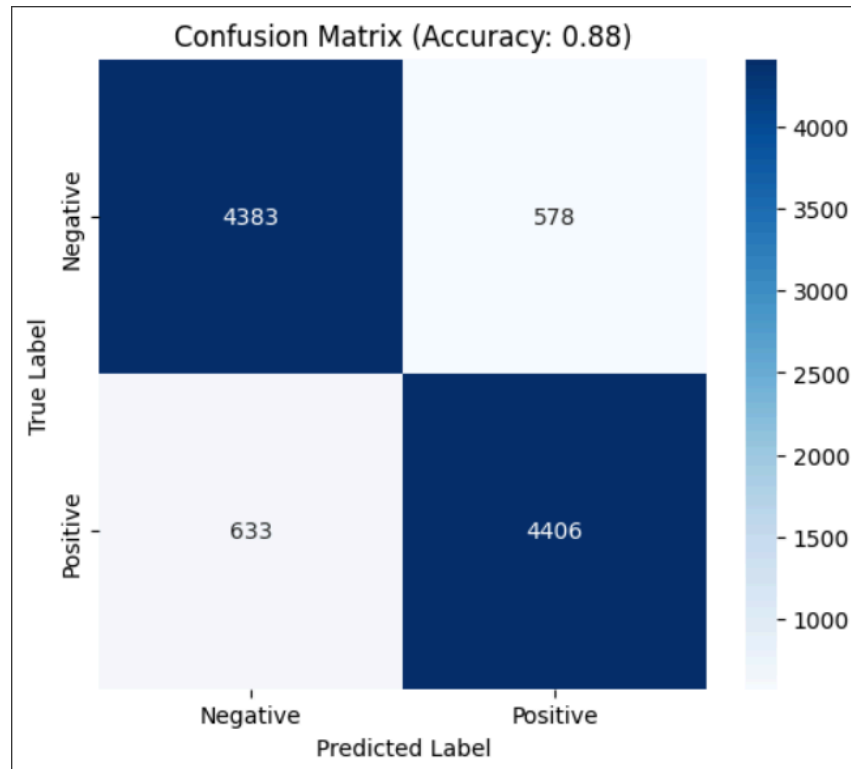
```
Dataset1 - Validation Loss: 0.0000, Accuracy: 100.00%  
  
IMDB_BOW - Validation Loss: 0.6633, Accuracy: 87.89%  
  
Dataset2 - Validation Loss: 0.0001, Accuracy: 100.00%  
  
IMDB_EMBED - Validation Loss: 0.3578, Accuracy: 82.00%
```

- Confusion matrix visualization.

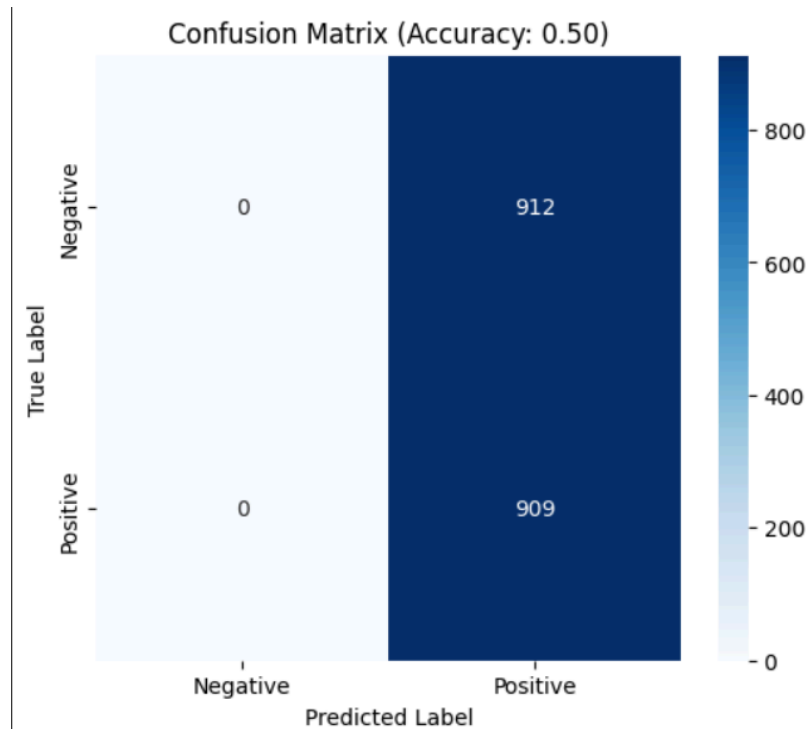
Bag of Words Dataset 1 (test data confusion matrix)



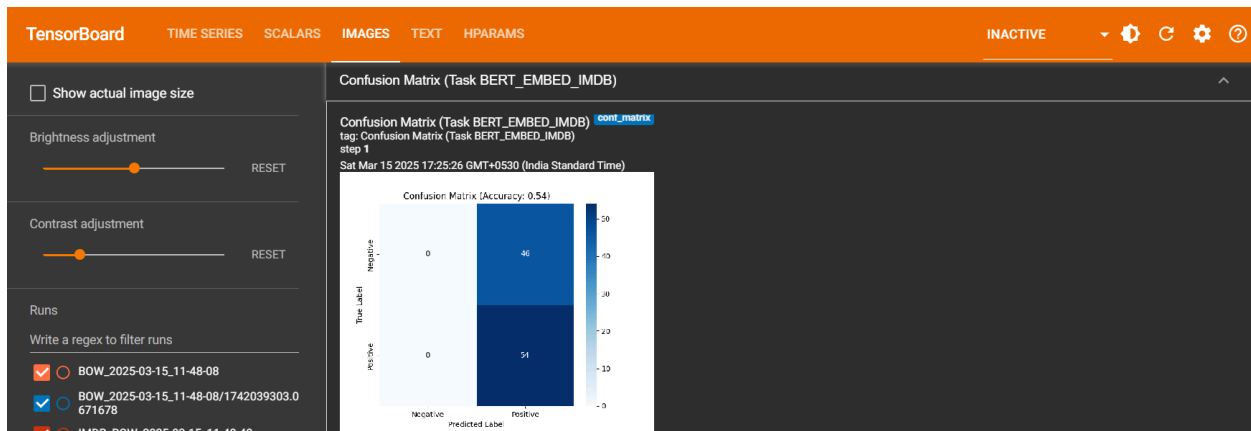
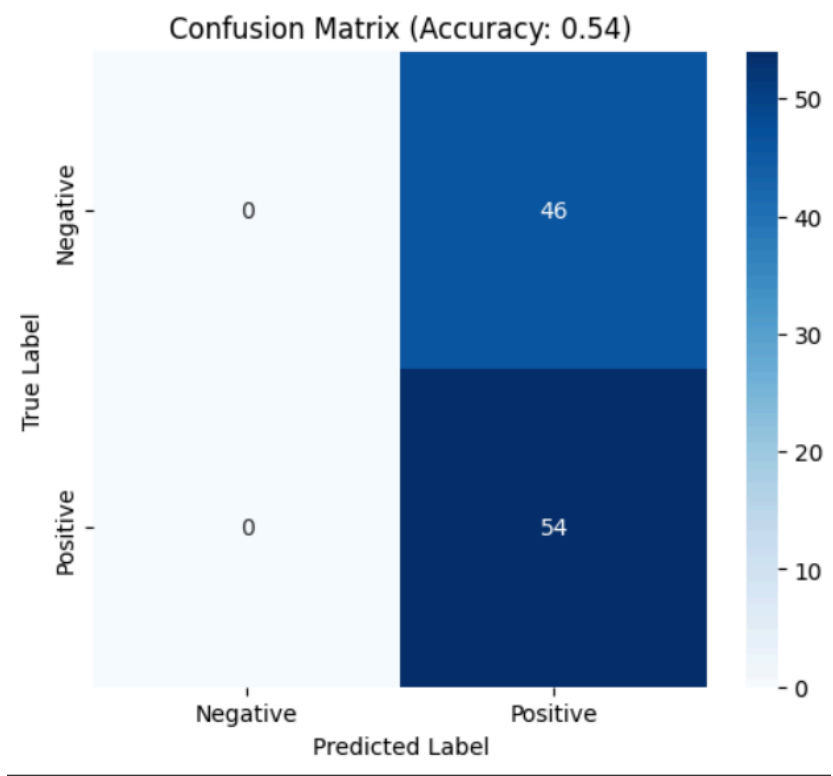
Bag of Words IMDB Dataset (validation set confusion matrix)



BERT EMBEDDINGS Dataset 1(test data confusion matrix)



BERT EMBEDDINGS IMDB Dataset (validation set confusion matrix)

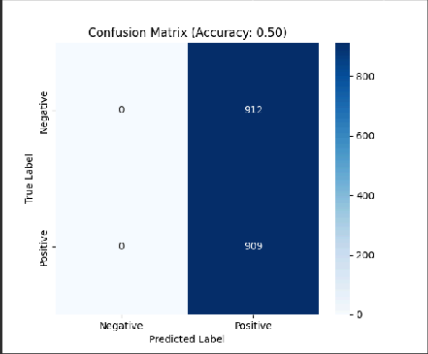


Confusion Matrix (Task BERT_EMBED)

Confusion Matrix (Task BERT_EMBED)
tag: Confusion Matrix (Task BERT_EMBED)
step 1

conf_matrix

Sat Mar 15 2025 17:25:14 GMT+0530 (India Standard Time)



Confusion Matrix (Task BOW_IMDB)

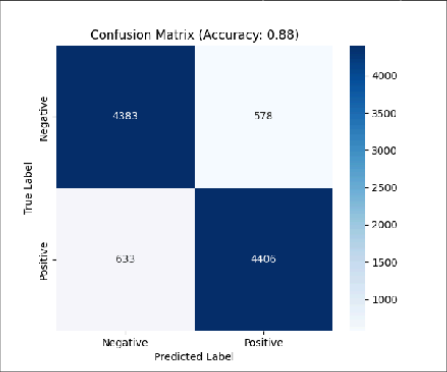
Confusion Matrix (Task BOW)

Confusion Matrix (Task BOW_IMDB)

Confusion Matrix (Task BOW_IMDB)
tag: Confusion Matrix (Task BOW_IMDB)
step 1

conf_matrix

Sat Mar 15 2025 17:29:20 GMT+0530 (India Standard Time)



Confusion Matrix (Task BOW)

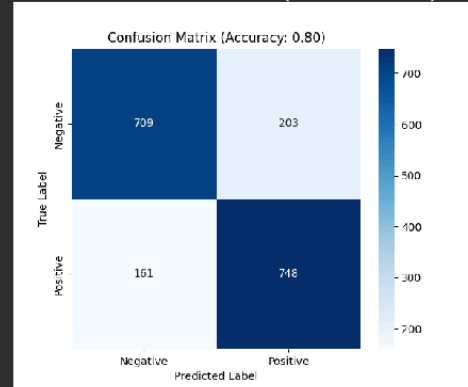
Confusion Matrix (Task BOW)
tag: Confusion Matrix (Task BOW)

conf_matrix

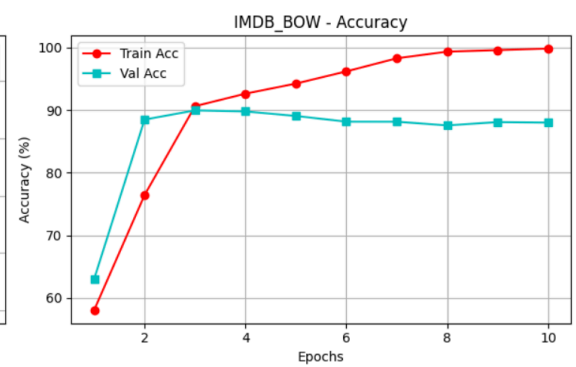
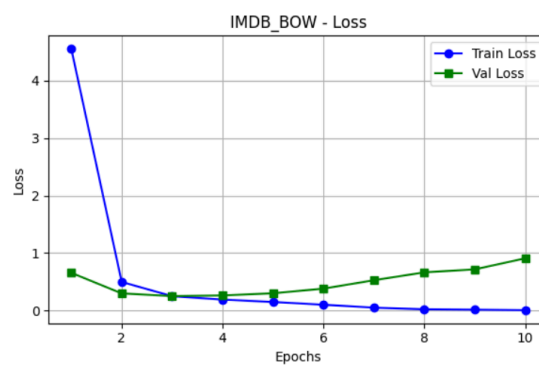
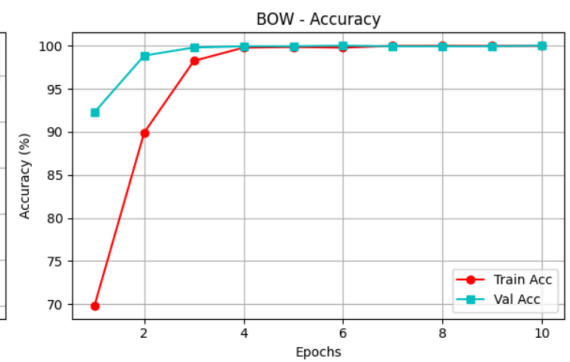
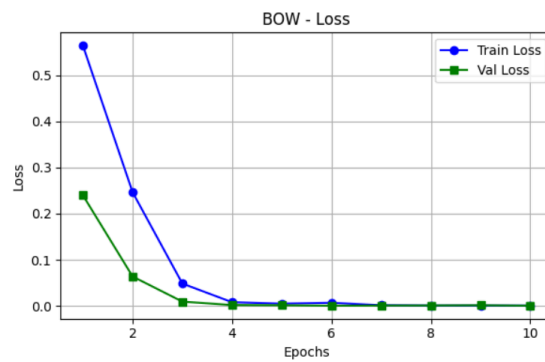
Confusion Matrix (Task BOW)

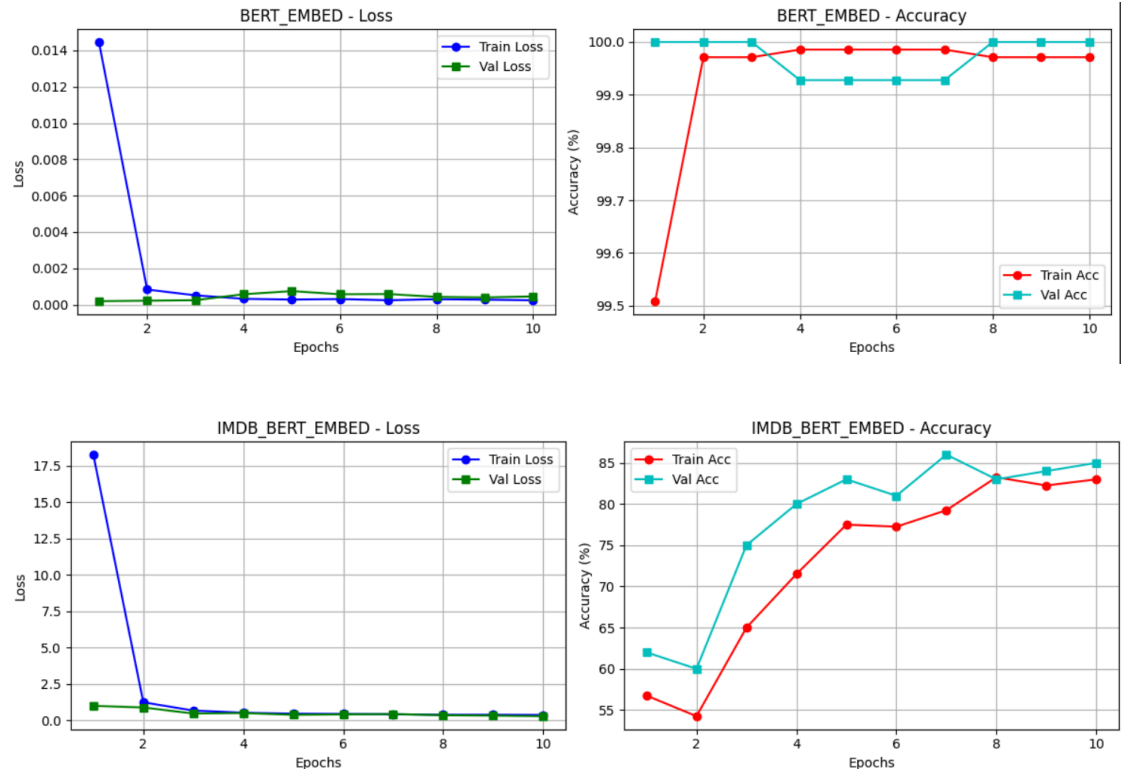
Confusion Matrix (Task BOW)
tag: Confusion Matrix (Task BOW)
step 1

Sat Mar 15 2025 17:28:00 GMT+0530 (India Standard Time)



- Training and validation loss curves.





We can clearly see that the BERT Embeddings aren't a good measure for the training as we get a 768 dimensional vector from BERT model which is then converted to a 10000 dimensional embedding using a layer of neural network, which leads to over fitting.

This could be improved upon by training for lesser epochs as we can see from the loss and accuracy variation curves and also reducing the input layer size in the model architecture could also help reducing the overfitting.