

## MODELS EVALUATION

Results for all the built models are presented for further evaluation & Accuracy followed by other metrics are calculated and tabled below and best model for given data sample is verified later in document .

Experimental Results for 5 Epochs on Deep Learning NN:

LSTM:

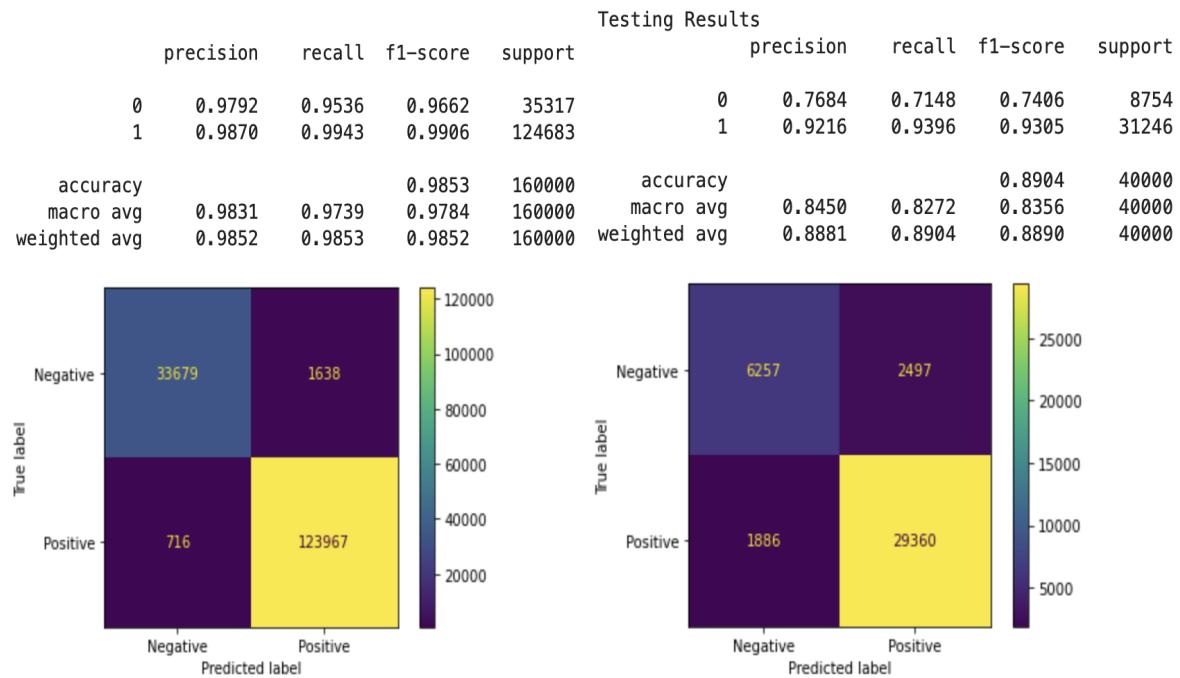


Figure 23 Results for LSTM 5 epochs

BI-LSTM:

Testing Results					Testing Results				
	precision	recall	f1-score	support		precision	recall	f1-score	support
0	0.9833	0.9732	0.9782	35317	0	0.7548	0.7143	0.7340	8754
1	0.9924	0.9953	0.9939	124683	1	0.9211	0.9350	0.9280	31246
accuracy			0.9904	160000	accuracy			0.8867	40000
macro avg	0.9879	0.9843	0.9861	160000	macro avg	0.8380	0.8247	0.8310	40000
weighted avg	0.9904	0.9904	0.9904	160000	weighted avg	0.8847	0.8867	0.8856	40000

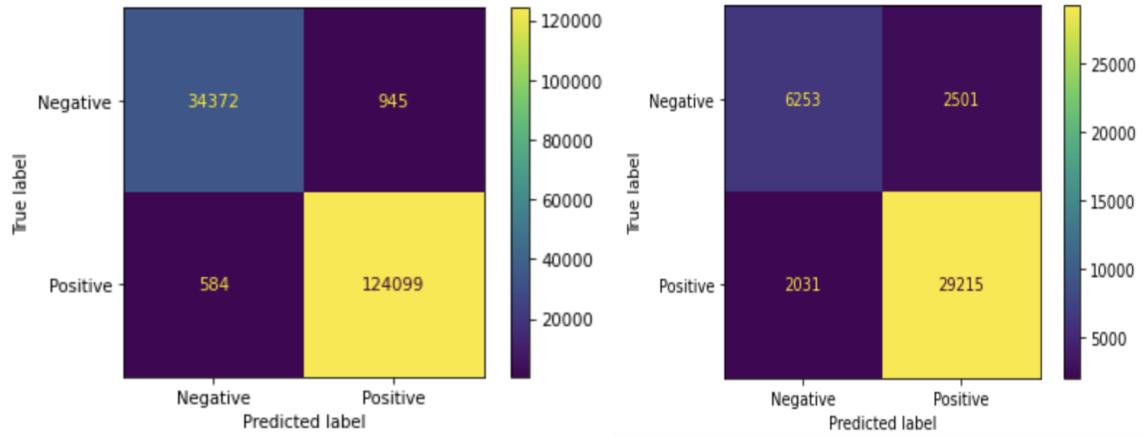


Figure 24 Results for BI LSTM 5 epochs

CNN:

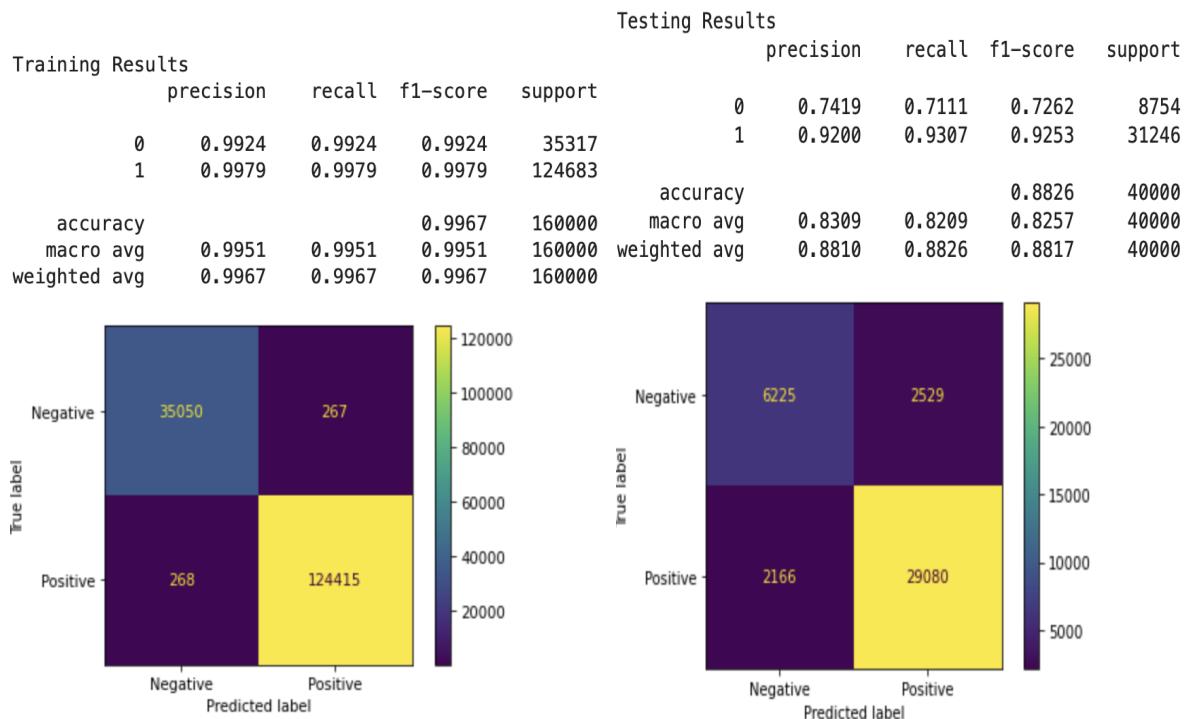


Figure 25 Results for CNN 5 epochs

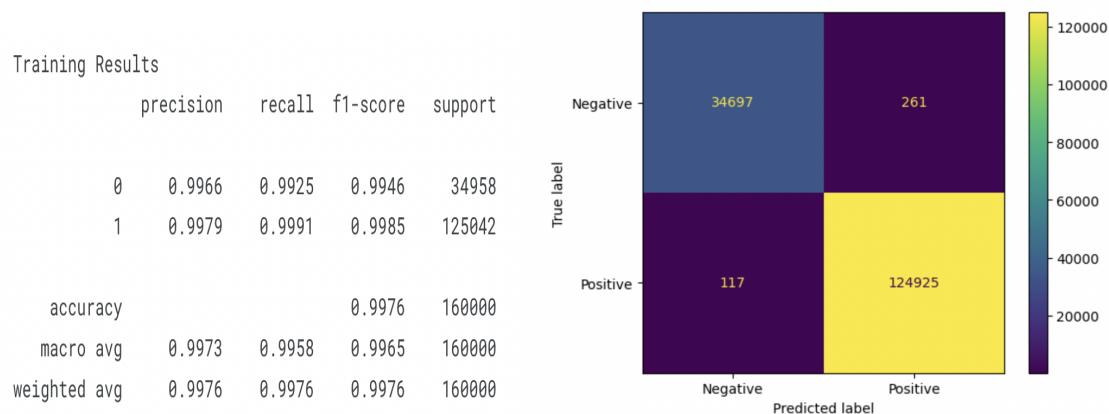
LSTM+CNN:



Figure 26 Results for LSTM+CNN 5 epochs

### Experimental Results for 10 Epochs on Deep Learning NN:

LSTM:



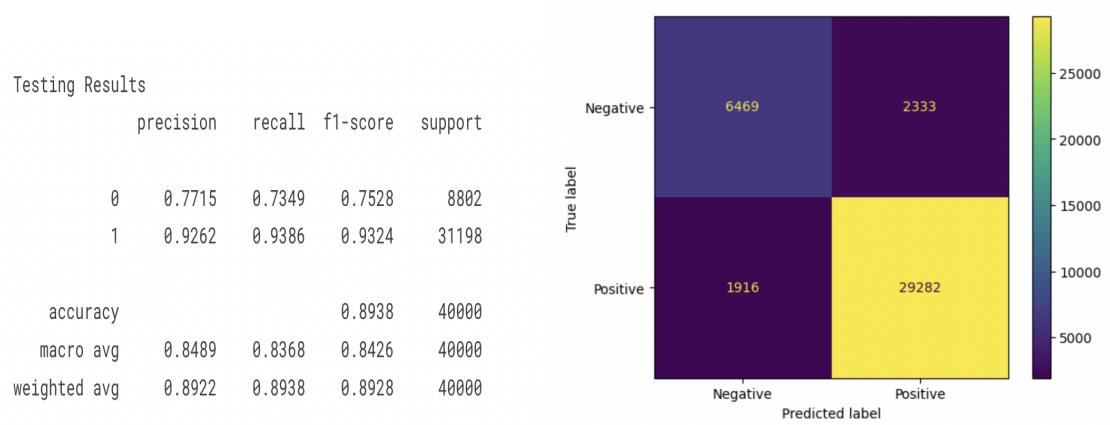


Figure 27 Results for LSTM 10 epochs

BI-LSTM:

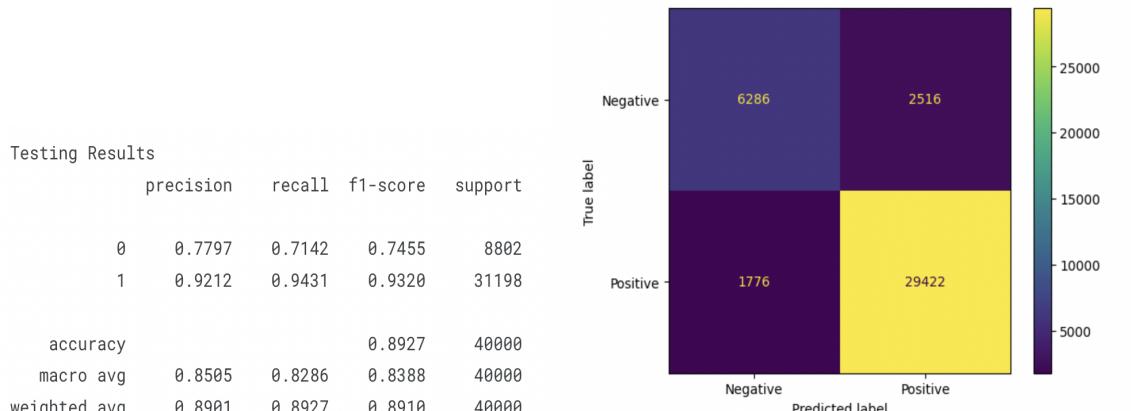
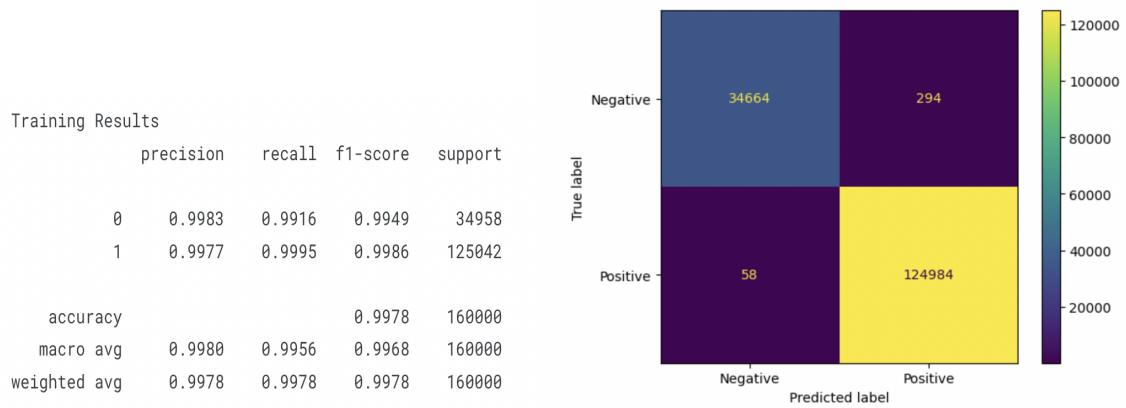
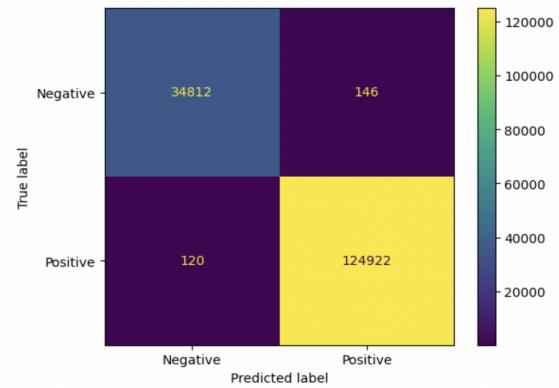


Figure 28 Results for BI LSTM 10 epochs

CNN:

Training Results				
	precision	recall	f1-score	support
0	0.9966	0.9958	0.9962	34958
1	0.9988	0.9990	0.9989	125042
accuracy			0.9983	160000
macro avg	0.9977	0.9974	0.9976	160000
weighted avg	0.9983	0.9983	0.9983	160000



Testing Results				
	precision	recall	f1-score	support
0	0.7581	0.7227	0.7400	8802
1	0.9228	0.9349	0.9288	31198
accuracy			0.8882	40000
macro avg	0.8404	0.8288	0.8344	40000
weighted avg	0.8865	0.8882	0.8873	40000

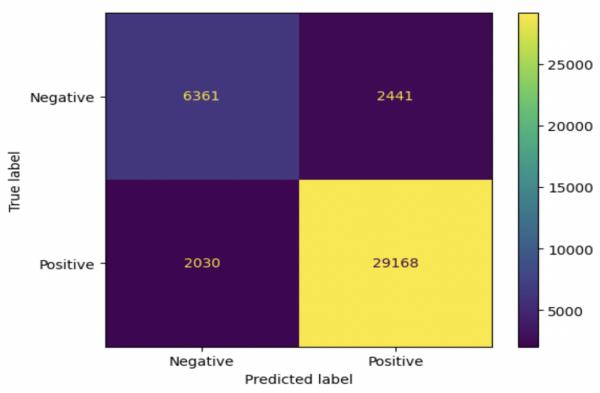
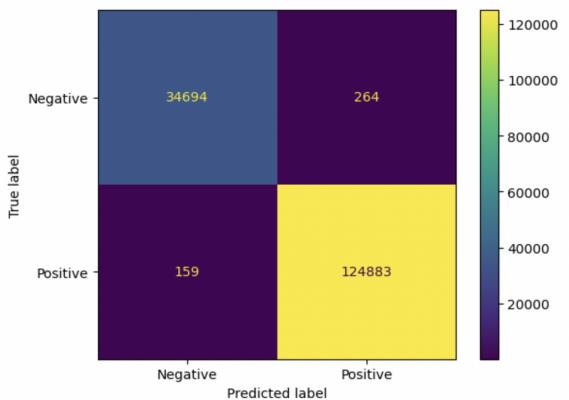


Figure 29 Results for CNN 10 epochs

## LSTM+CNN:

Training Results				
	precision	recall	f1-score	support
0	0.9954	0.9924	0.9939	34958
1	0.9979	0.9987	0.9983	125042
accuracy			0.9974	160000
macro avg	0.9967	0.9956	0.9961	160000
weighted avg	0.9974	0.9974	0.9974	160000



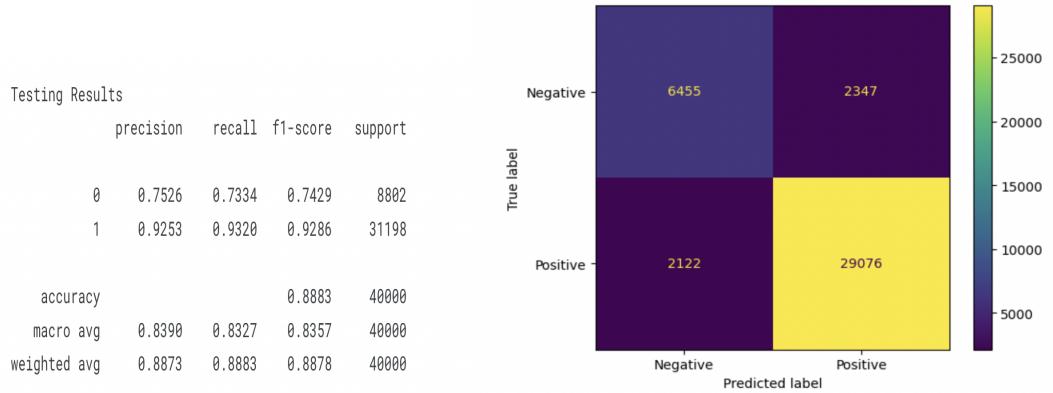


Figure 30 Results forLSTM+ CNN 10 epochs

Results for Naive Bayes variants for same dataset:

Complement NB	Model	Test	Result	
<b>Classification Report:</b>				
	precision	recall	f1-score	support
0	0.56	0.77	0.65	5888
1	0.36	0.24	0.29	3087
2	0.92	0.89	0.91	31025
accuracy			0.82	40000
macro avg	0.61	0.63	0.61	40000
weighted avg	0.83	0.82	0.82	40000

Figure 31 Results for Complement NB

MultinomialNB Model Test Results

MultinomialNB	Model	Test	Result	
<b>Classification Report:</b>				
	precision	recall	f1-score	support
0	0.66	0.61	0.64	5888
1	0.35	0.24	0.29	3087
2	0.89	0.93	0.91	31025
accuracy			0.83	40000
macro avg	0.63	0.60	0.61	40000
weighted avg	0.82	0.83	0.82	40000

Figure 32 Results for Multinomial NB

BernoulliNB Model Test Results

Classification Report:				
	precision	recall	f1-score	support
0	0.66	0.48	0.55	5888
1	0.23	0.23	0.23	3087
2	0.86	0.91	0.88	31025
accuracy			0.79	40000
macro avg	0.58	0.54	0.55	40000
weighted avg	0.78	0.79	0.78	40000

Figure 33 Results for Beroulli NB