NLP Project Part 1

Q.7: Here is the classification report that has been generated:

Name	Precision	Recall	F1	Accuracy
Naive Baye	0.516484	0.635135	0.569697	0.526667
Naive Baye	0.670732	0.743243	0.705128	0.693333
Logistic Re	0.738095	0.837838	0.78481	0.773333
Logistic Re	0.701149	0.824324	0.757764	0.74
SVM + TFID	0.777778	0.851351	0.812903	0.806667
SVM + w2v	0.753086	0.824324	0.787097	0.78
Multilayer I	0.761905	0.864865	0.810127	0.8
Multilayer I	0.766234	0.797297	0.781457	0.78

Upon reviewing the precision, recall, F1, and accuracy results from the classification_report.csv file, it is evident that the Support Vector Machine (SVM) model with TF-IDF representation outperforms other models on the test set. This conclusion is primarily based on the model's consistently superior performance across multiple metrics, particularly its high F1 score, which reflects a balanced measure of precision and recall.

In the context of sentiment analysis for a chatbot, achieving high precision and recall is crucial for accurately identifying positive sentiments and capturing as many positive sentiments as possible. The SVM model with TF-IDF achieved the highest F1 score, demonstrating an optimal balance between these two metrics, making it the preferred choice for this task.

Furthermore, the robustness of the SVM algorithm with high-dimensional TF-IDF data, along with its proven effectiveness in text classification tasks, further supports the decision to select this model. The model's consistent performance across all metrics suggests that it will provide reliable sentiment analysis in real-world chatbot interactions.