

Group Number	G3
Member Names	S. Guna
TCE ID	19S011
Domain	Sentiment Analysis in social media

Objective:

Explore the application of CNN/RNN/Transformer networks in specific domains, identify three significant papers, and conduct a comparative analysis.

	Paper 1	Paper 2	Paper 3
Title of the paper	Depression Classification from tweets using smaller deep transfer learning language models	BREE-HD: A Transformer-Based Model to Identify Threats on Twitter	Biden vs Trump: Modeling US General Elections Using BERT Language Model
Authors	MUHAMMAD RIZWAN, MUHAMMAD FAHEEM MUSHTAQ, UROOJ AKRAM, ARIF MEHMOOD, IMRAN ASHRAF, BENJAMÍN SAHELICES	SINCHANA KUMBALE, SMRITI SINGH, G. POORNALATHA, SANJAY SINGH	ROHITASH CHANDRA, RITIJ SAINI
Year of Publication	2022	2023	2021

Networks Used	Electra Small Generator (ESG), Electra Small Discriminator (ESD), XtremeDistil-L6 (XDL) and Albert Base V2 (ABV)	BREE – HD (Bert Inspired Machine Learning Model for Automatic Threat Detection)	BERT And LSTM
Depth of Network	5	Not mentioned About the depth of network used but it uses BREE – HD Bert Inspired transformer model to classify things.	4
Application	Classification Depression Intensity Classification categorized as severe, mild, moderate.	Classification Classifying the tweets into sexist or not-sexist tweets	Classification Classifying the responses Joe Biden and Trump's tweets during US election period into Neutral, Positive, Negative
Loss Function Used	Categorical Cross Entropy	Loss Function is Not mentioned, but considering binary classification they might have used binary cross entropy as loss function. Adam optimizer is used.	Loss Function is Not mentioned, but considering multi class classification they might have used categorical cross entropy as loss function.

Evaluation Metrics	Precision, Recall, F1 – Score, Accuracy, Specificity	Precision, Recall, F1 – Score, Support	F1 - Score
Name of the dataset	Dataset used in this study consists of depression-related tweets that were extracted using Twitter public APIs by putting different depression-related hashtags as seed words.	Bret – HD <u>URL</u> https://figshare.com/s/c5ddb496ab8b5dbfd15	Raw US-2020 elections dataset that features tweets from October 15th 2020 to November 8th 2020. Only considered tweets that have geo-location within USA from the dataset of 1.72 million tweets.

Conclusion:

Reading all these research papers, each paper is with its unique application. The first paper studies the intensity of depression related to the tweets being posted, it uses various algorithms like Electra Small Generator (ESG), Electra Small Discriminator (ESD), XtremeDistil-L6 (XDL) and Albert Base V2 (ABV). The first paper experimented with the above algorithms to choose the best one among them. Electra small Discriminator and Albert Base v2 work best among them.

The Second paper concludes that the proposed methodology of using a transformer-based model for identifying threats on Twitter is effective and can be used to detect online harassment and threats. The model achieved an accuracy of 97% and can classify tweets into threats or non-threats that are either sexist or non-sexist. The paper also provides a publicly available dataset (BRET-HD) consisting of tweets annotated as “Sexist Threat,” “Non-Sexist Threat,” “Sexist Non-Threat” or “Non-Sexist Non-Threat”.

The paper concludes that sentiment analysis via deep learning techniques can be helpful in understanding public behaviour during US presidential elections. The authors analysed approximately 1.2 million tweets associated with the US 2020 presidential elections and found that sentiment analysis can form a general basis for modeling election outcomes. The BERT model indicated that Biden had a better chance of winning based on the tweets during the electoral campaigns. The authors suggest that sentiment analysis could be helpful in predicting election results if given more data and geographical information.

From the above papers, I choose “Depression Classification from Tweets using Smaller Deep Transfer Learning Language Models” since it uses extremely robust methodologies and considers various aspects of data to handle a very sensitive use case. It also used various transformer architectures to find out the best-performing one. The authors used various performance metrics to evaluate the performance such as Precision, Recall, F1 – Score, Accuracy, Specificity. So I choose this paper to perform implementation.