# Notes For Set Project –

## 1st paper - Sentiment Analysis with Various Deep Learning Models on Movie Reviews - Muhammet Sinan BASARSLAN, Fatih KAYAALP:

### Accuracy:

RNN performed better with 88% accuracy (ACC) [3]. 87% ACC performance was obtained with RNN after Word2Vec [4]. In the model created with Multi-layer perceptron after BoW, 86.67% ACC performance was obtained [5]. After TF-IDF, models were created with Multi Nominal Naive Bayes (MNB), Bernoulli Naive Bayes (BNB), SVM, Random Forest (RF) and Stochastic Gradient Descent (SGD). Results were obtained with RF 83.66%, BNB 82.91% and MNB 83.16% ACC [6]. 87.90% of ACC results were obtained with Hierarchical ConvNets [7].

### Findings:

• Adam performed well in Activation functions in the same batch size and epoch.

• It has been observed that the increase in the number of GRU or LSTM neural network layers increases the model performance despite the increase in the number of Dense layers.

• Although using Dropout has a positive effect on performance, better results are obtained by using the Bi-GRU neural network alone.

## 2nd paper -Sentiment Analysis on Book Reviews Using Convolutional Neural Network (CNN) Long Short-Term Memory (LSTM) Hybrid-

Lenz Baron S. Balita, Kyle Matthew A. Degrano, Andrei Daniel A. Pamoso, Andrei Daniel A. Pamoso:

DataSet: GoodReads dataset

### Findings:

* Once the model was trained to the procured dataset, the results suggested that combining Word Embedding, POS, and SenticNet features drastically improves its performance in contrast to other tested variations.
* In terms of accuracy, the proposed hybrid CNN-LSTM models outperformed single CNN with Word2Vec + POS, single LSTM with Word2Vec + POS, and CNN-LSTM hybrid with Word2Vec on the filtered GoodReads Dataset for book reviews.

### Accuracy:

* Word2Vec+POS applied to a CNN model, it had an accuracy of 81.07%, and precision, recall, and f1-score of 81%.
* Word2Vec+POS applied to an LSTM model, it had an accuracy of 84.27%, precision of 85%, and recall and f1-score of 84%.
* The Proposed Hybrid CNN-LSTM with Word2Vec + POS model achieved 86.07% accuracy, 86% precision, 86% recall, and 86% f1-score.
* The proposed Hybrid CNN-LSTM with Word2 + POS + SenticNet achieved 89.53% accuracy, 90% precision, 90% recall, and 90% f1-score

Limitation:

1. BiLSTM can be used
2. Data Size can be increased.

## 3rd paper - Sentiment Analysis of Movie Reviews Based on LSTM-Adaboost- Ling Zhang, Miao Wang, Ming Liu, Haozhan Li:

### Data Set: IMDB Movie Review

### Findings:

* The results show that the LSTM-Adaboost model has the best result among the LSTM, CNN, and LSTM-Adaboost.

### Limitation:

* Adaboost can only be used for binary classification.

### **Accuracy:**

* The results show that the LSTM-Adaboost model has the best performance among the three, obtaining up to 87.47% accuracy, 89.51% precision, 84.9% recall and 87.14% F1 score.

## 4th paper - Sentiment Analysis Algorithm Based on BERT and Convolutional Neural Network(2021)- Rui Man, Ke Lin:

Data Set: The hotel review corpus (ChnSentiCorp)

## **Findings:**

* The learning ability of CNN is stronger than the learning ability of SVM, and it can better grasp the local characteristics of the data; compared with the Attention mechanism, the learning ability of the Multi-Head Attention mechanism is also stronger and BERT is used as the feature the effect of the extraction model is the best.
* This paper proposes a sentiment analysis algorithm that combines BERT and CNN. It uses BERT to extract the features of each word and uses it as the input of CNN. After convolution and pooling, it is connected to the Softmax layer for classification.

## **Accuracy:**

algorithm Accuracy Recall rate F1

word2vec-svm 0.813 0.811 0.812

word2vec-cnn 0.852 0.849 0.850

word2vec-Att-cnn 0.873 0.871 0.872

bert-cnn 0.905 0.901 0.903

## 5th Paper - Sentiment Analysis on IMDB Movie Reviews using Machine Learning and Deep Learning Algorithms(2022) - K. Amulya, S. B. Swathi, Dr. Y. Bhavani, Dr. P. Kamakshi

Data Set: IMDB Movie Review

### **Findings:**

* Comparison of ML and DL approaches is done by considering IMDB movie reviews. From the observations it is found that DL approaches provided accurate results than ML algorithms. Among the DL algorithms (CNN, RNN, LSTM), RNN gives more accuracy of 88%.

### **Accuracy:**

* Logistic Regression - The accuracy score obtained is around 87% for TF-IDF and 86% for the count vectorizer.
* SVM - obtained is 89% for TF-IDF and 86% for count vectorizer.
* Multinomial naïve Bayes- The obtained accuracy is 86% in both cases.
* XGBoost- the accuracy obtained for TF-IDF and count vectorizer is 80%.
* The First Deep learning approach is CNN, by applying this model the accuracy achieved is 87%.
* the second approach is the RNN model and the accuracy achieved is 88%.
* Third and final approach is the LSTM model and the accuracy achieved by this model is 72%.

### **Limitation:**

* Data preprocessing could be better.
* Some more advanced model could be used.

## 6th Paper Sentiment Prediction of IMDB Movie Reviews Using CNN-LSTM Approach

Data Set: IMDB Movie Review

### **Findings:**

* Models Such as CNN, LSTM and CNN-LSTM are used separately on the IMDB movie dataset, CNN-LSTM performed with an accuracy of 85% with long-term dependency and lesser training time.

### **Accuracy:**

* on 8 epochs, CNN-LSTM has an accuracy of 85%, loss of 39%
* CNN has an accuracy of 85% and loss of 80%
* GRU has an accuracy of 50% and loss of 71%
* LSTM has an accuracy of 87% and loss of 34%

### **Limitation:**

* CNN-LSTM has 5% more loss compared to LSTM and has a 2% less accuracy against the given model.

## 7th Paper An Improved LSTM Structure for Natural Language Processing

Wall Street Journal dataset

### **Findings:**

* Improved LSTM performed better in terms of F1 and recall score, works as expected when under limited resources and large dataset.

### **Accuracy:**

* Baseline(DNN) scored 86.51%, classic LSTM scores 88.6,
* Classic BiLSTM scores 89.3%
* Improved LSTM, that we have used for the model is capable of handling such a task

### **Limitation:**

* Only suitable for limited resource period

## 8th Paper Text Sentiment Analysis of Film Reviews Using Bi-LSTM and GRU

Internet Movie Database (IMDb)

### **Findings:**

* Binary Classification was used with Bi-LSTM on the IMDb dataset, checked various models including GRU.It was found that Bi-LSTM GRU had the highest score with 99.65% with 10 epochs. It was found that GRU underperforms with more data

### **Accuracy:**

* GRU acquires an accuracy of 98.24%, works at a lower data than LSTM/LSTM-GRU
* Accuracy of bi-LSTM model is 98.65.

### **Limitation:**

1. needs proper text categorization for Bi-LSTM w/ ReLufor improvable results

## 9th Analysis on Sentiment Analytics Using Deep Learning Techniques:Dr M Anusha,

various large datasets

### **Findings:**

* Accumulates various Deep Learning models that are used in NLP, and compares their accuracy and loss

### **Accuracy:**

* Accuracy of CNN-LSTM on datasets Sick SST, Twitter, FNC, Sentence Polarity, IMDb and and English Data are 86.60%, 96.80%, 97.80%, 98.60%, 90.26% and 82% respectively
* Accuracy of CNN model on datasets sent-strength, sentence polarity, hostel data, IMDb and SemEval are 93%, 99.07%, 94.80%. 97.70% and 87% respectively
* Accuracy of CNN-RNN Model on IMDb sentiment 140, KBP37, SST/DM/CS is 89.67%, 95%, 86.60% and 94.60% respectively

### **Limitation:**

## 10th Paper - Sentimental Analysis on IMDb Movies Review using BERT-Kavita Arora, Neha Gupta, Sonal Pathak(2023):

Dataset: IMDB

### **Findings:**

* In this paper the author used word2vec for word embedding and BERT(Bidirectional Encoder Transformers) model to classify and got an overall 92.40% accuracy to depict that the proposed scheme is an effective and reliable technique to detect sentiments for movie reviews.