



Bharati Vidyapeeth's
College of Engineering, New Delhi

DEPRESSION DETECTION USING TEXT -SAMPLES

Major Project

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INTRODUCTION

DEPRESSION IS A MENTAL DISORDER CHARACTERIZED BY PERSISTENT FEELINGS OF SADNESS, HOPELESSNESS, AND A LACK OF INTEREST IN ACTIVITIES. IT CAN HAVE SERIOUS CONSEQUENCES IF LEFT UNTREATED.

MORE THAN 300 MILLION PEOPLE SUFFER FROM DEPRESSION WORLDWIDE.

SO FAR, WE USED LSTM BASED MODEL TO DETECT DEPRESSION BASED ON THE DIALOG ACTS AND OTHER CONTEXTUAL INFORMATION IN THE TRANSCRIPTS.

LITERATURE SURVEY & RESEARCH GAP

Name of Journal and Year	Author Name	Dataset used	Model used	Accuracy	Research gap/ outcome
<u>A Novel Approach for Depression Detection Using Audio Sentiment Analysis 2019</u>	Himani Negi 1, Tanish Bhola2, Manu S Pillai 3, Deepika Kumar4	DAIC-W OZ	<u>6 layer</u> CNN model	F1 score of 0.93	textual sentiment analysis of the words spoken can be added to increase the accuracy
<u>Automated Depression Detection using Audio Features 2020</u>	Suraj G. Shinde1, Atul C. Tambe2, Ayakash Vishwakarma3, Sonali N. Mhatre4	DAIC-W OZ	CNN	F1 score of 0.59 as baseline (no final accuracy is given in the paper)	The model of depression analysis cannot be built upon a single group of classifiers and contains several classifiers in different groups.

<u>AUTOMATIC DEPRESSION DETECTION: AN AUDIO-TEXTUAL CORPUS AND A GRU/BILSTM-BASED MODEL</u> <u>2021</u>	Ying Shen, Huiyu Yang, Lin Lin*	DAIC- WOZ	LSTM	F1 score of 0.59 was achieved	1. Data Imbalance (Database related) 2. Less Interaction with the user, and mode for test samples not defined.
<u>Depression Detection by Person's Voice</u> <u>2022</u>	Evgeniya Zavorina & Ilya Makarov	DAIC- WOZ	MFCC-based CNN Transformer Neural Network and is compared with two baseline models: CNN-LSTM Network and Graph Convolutional Recurrent network.	Accuracy of 73.51%	methods of automatic speech transcription and linguistic feature extraction could improve accuracy of Deep Neural Network for clinical depression recognition

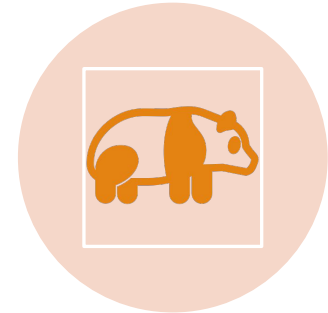
PREREQUISITES FOR MAJOR PROJECT



**TEXT EDITOR AND
INTERPRETER**
GOOGLE COLAB



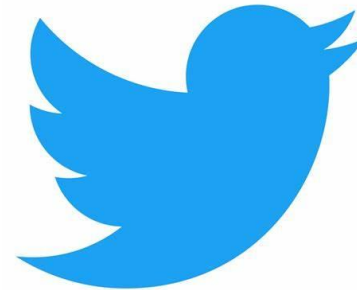
DATASET
DAIC_WOZ & Social Media
Datasets (Twitter, Reddit, etc.)



LIBRARIES
PANDAS, NUMPY, TORCH,
SEABORN, SKLEARN &
MATPLOTLIB

SOCIAL MEDIA DATASET

- Every second, approximately 6,000 Tweets are tweeted on Twitter, which corresponds to over 350,000 tweets sent per minute, 500 million tweets per day, and around 200 billion tweets per year
- We aim to use social media dataset to apply text mining methods to detect the possible presence of symptoms associated with depression



DAIC-WOZ

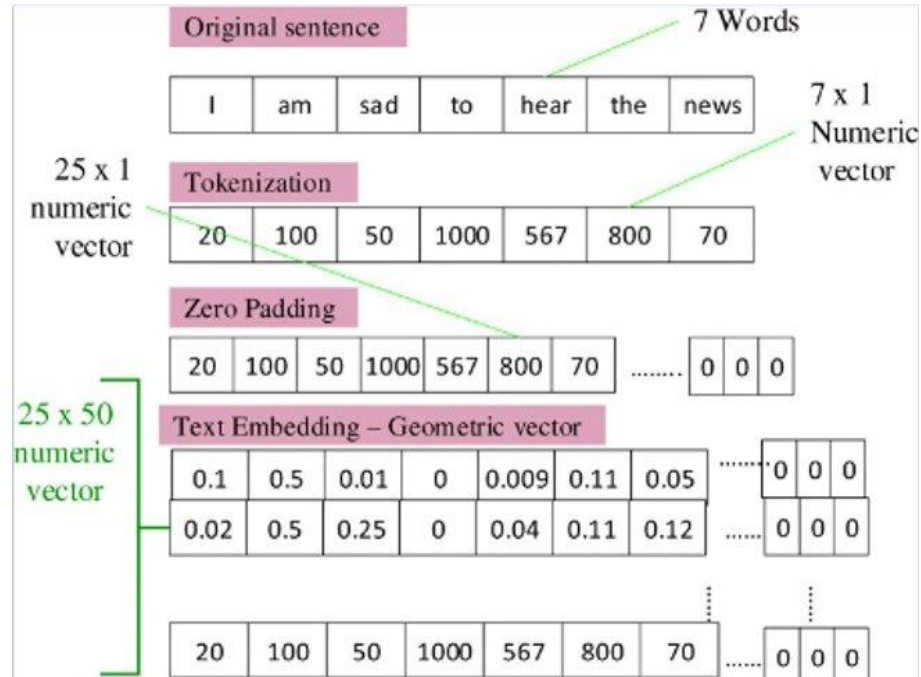
- This database contains clinical interviews designed to support the diagnosis of psychological distress conditions such as anxiety, depression, and post-traumatic stress disorder.
- These interviews were collected as part of a larger effort to create a computer agent that interviews people and identifies verbal and nonverbal indicators of mental illness

Speaker	Value
Ellie	where are you from originally
Participant	los angeles
Ellie	really
Ellie	what are some things you really like about LA
Participant	um
Participant	well <laughter> that's a good question
Participant	um I like the familiarity with everything
	I know where everything is in the city
Ellie	mhm

Models Executed

DAIC-WOZ Dataset	Twitter Dataset
> 1-layer Lstm	> 1-layer Lstm
> 2-layer Lstm	> Naive Baiyes
> Bi-lstm	> Logistic Regression
> CNN	> SVM
> CNN+LSTM (Hybrid)	> Decision Tree
> GRU	

METHODOLOGY - TOKENIZATION



Flow-Chart for Daic Woz



Speaker	Value
Ellie	where are you from originally
Participant	los angeles
Ellie	really
Ellie	what are some things you really like about LA
Participant	um
Participant	well <laughter> that's a good question
Participant	um I like the familiarity with everything
Ellie	I know where everything is in the city
Ellie	mhm

Interview Transcript

Data Preprocessing :

- Convert words to lowercase and split them
- Optionally, remove stop words
- Clean the text

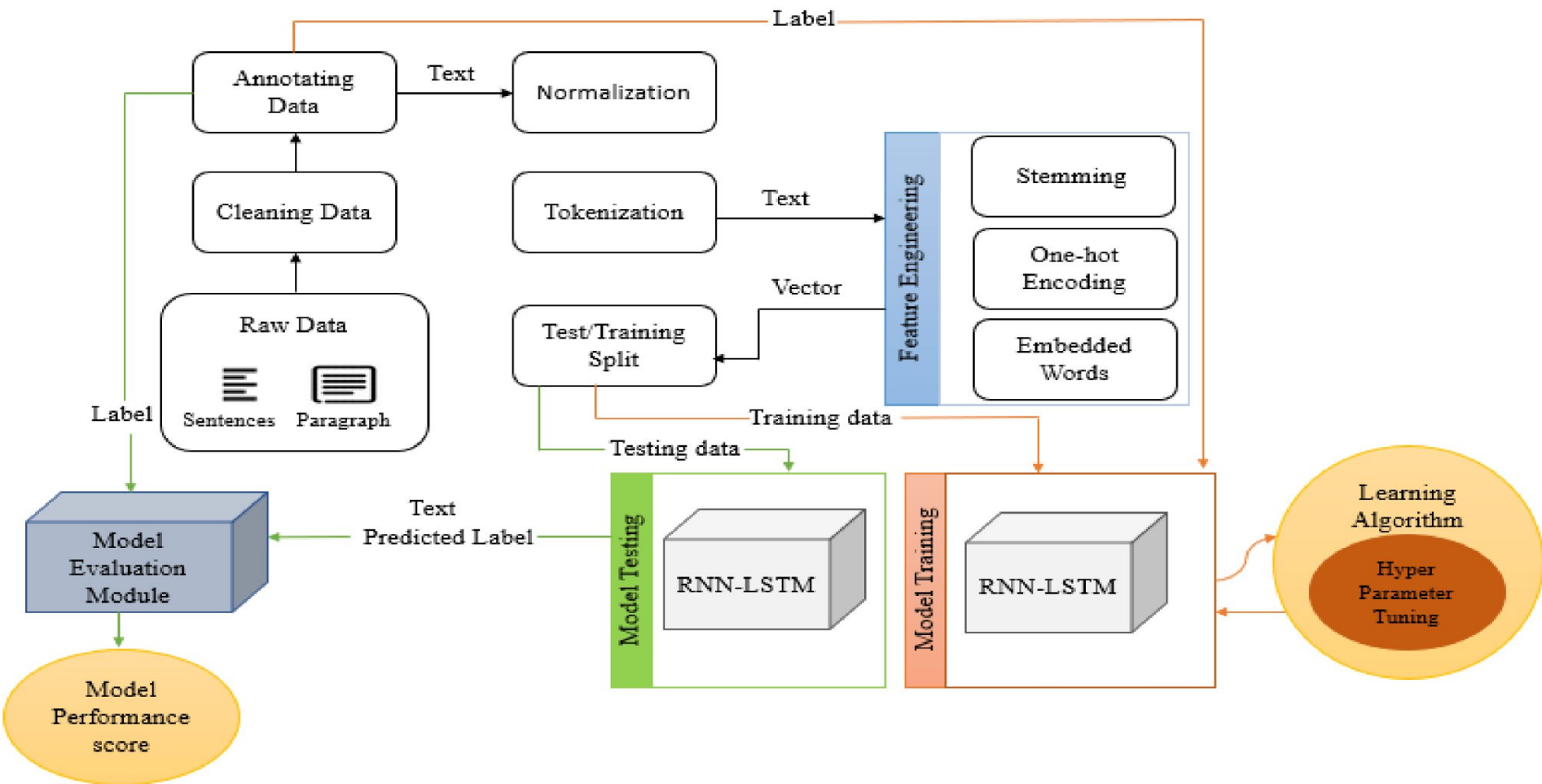
Tokenization

Word-Embeddings Using GloVe

None
Mild
Moderate
Moderately severe
severe

Different DL Model

LSTM, CNN, GRU and GloVe to detect depression and assign them a label based on the score achieved.



DAIC_WOZ MODEL COMPARISON

MODEL	TEST ACCURACY	TEST LOSS
1-Layer Lstm	0.98	0.47
2-layer Lstm	0.86	0.39
Bi-lstm	0.72	0.72
GRU	0.925	0.245
CNN	0.77	0.59
CNN+Lstm (hybrid)	0.50	1.2

SOCIAL MEDIA MODEL COMPARISION

MODEL	CROSS VALIDATION (ACCURACY)	CLASSIFICATION REPORT (ACCURACY)
LSTM	0.849	0.846
NAIVE BAYES	0.739	0.736
Logistic Regression	0.749	0.742
SVM	0.751	0.742
Decision Tree	0.702	0.67

FUTURE SCOPE

- Compare the performance of models that use different types of features (e.g., linguistic, semantic, psychological) for predicting depression.
- Explore the use of non-traditional data sources (e.g., wearable devices, sensor data) for predicting depression.
- Investigate the potential for personalized interventions based on individuals' social media data.
- Study the relationship between social support, social connectedness, and depression using social media data.
- Examine the role of stigma, discrimination, and prejudice in the manifestation and reporting of depression in social media.
- Compare the effectiveness of social media-based interventions to traditional treatments for depression.
- Study the ethical considerations related to using social media data for depression prediction and intervention.
- Investigate the potential for using social media data for early detection of depression and other mental health disorders.

REFERENCES

- [1] Gratch J, Artstein R, Lucas GM, Stratou G, Scherer S, Nazarian A, Wood R, Boberg J, DeVault D, Marsella S, Traum DR. The Distress Analysis Interview Corpus of Human and Computer Interviews. In Proceedings of LREC 2014 May (pp. 3123-3128).
- [2] S. H. Aldhafer and M. Yakhlef, "Depression Detection In Arabic Tweets Using Deep Learning," 2022 6th International Conference on Information Technology, Information Systems and Electrical Engineering (ICITISEE), Yogyakarta, Indonesia, 2022, pp. 1-6.
- [3] G. C. J. Jayasinghe, I. P. M. A. Shamika, G. A. I. P. Dissanayake, R. M. I. A. Ranaweera and P. S. Bandara, "Depression Detection System Using Real-Time and Social Media Data," 2022 4th International Conference on Advancements in Computing (ICAC), Colombo, Sri Lanka, 2022, pp. 168-173.
- [4] T. Garg and S. K. Gupta, "A Hybrid Stacked Ensemble Technique to Improve Classification Accuracy for Neurological Disorder Detection on Reddit posts," 2022 14th International Conference on Computational Intelligence and Communication Networks (CICN), Al-Khobar, Saudi Arabia, 2022, pp. 256-260.
- [5] M. Li, H. Xu, W. Liu and J. Liu, "Bidirectional LSTM and Attention for Depression Detection on Clinical Interview Transcripts," 2022 IEEE 10th International Conference on Information, Communication and Networks (ICICN), Zhangye, China, 2022, pp. 638-643.
- [6] A. -H. Jo and K. -C. Kwak, "Diagnosis of Depression Based on Four-Stream Model of Bi-LSTM and CNN From Audio and Text Information," in IEEE Access, vol. 10, pp. 134113-134135, 2022.

THANK YOU