Depression Detection

- Week 2

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Duration of the presentation: ~10 minutes

Agenda

1. **DEPTWEET dataset**

    1. Details about dataset and present work

    2. Challenges in using the dataset

2. **Alternative dataset**

    1. Details about the dataset

    2. Comparison with DEPTWEET

3. **DAIC-WOZ dataset**

4. **E-DAIC dataset**

5. **Tentative plan for the week**

DEPTWEET dataset

Label	Count
Non-depressed	32400
mild	5242
moderate	1809
severe	740
Total	**40191**

Table 1: Data division in DEPTWEET dataset

Table 5
Performance comparison of baseline models.

Model	Class name	ROC AUC Score
SVM	Non-depressed	0.514816
	Mild	0.511343
	Moderate	0.512785
	Severe	0.547684
BiLSTM	Non-depressed	0.692522
	Mild	0.565517
	Moderate	0.795351
	Severe	0.755356
BERT	Non-depressed	0.763699
	Mild	0.740019
	Moderate	0.748115
	Severe	0.826488
DistilBERT	Non-depressed	0.788841
	Mild	0.747211
	Moderate	0.787959
	Severe	0.866003

Table 1
Sample tweets, seed terms and final keywords list for each symptom of PHQ-9 Questionnaire.

PHQ-9 Symptoms	Sample tweet	Seed terms	Final keyword list
Lack of interest (S1)	Am I depressed or am I just bored? Apathy and irony, postmodern anxiety	Disinterest	Involved, occupied, pessimism, reversion, absorbed, lifelessness, bored, enthusiasm, engrossed, worried, apathy.
Feeling down (S2)	High functioning depression, I cannot fester in my misery but i'm fuckin miserable	Hopeless, depressed	Dejected, dismayed, dispirited, demoralized, grimmed, misery, grim, downhearted, low-spirited, bleak, desperate, lost, frustrated.
Sleep disorder (S3)	Forcing myself up now so I am not awake when the power goes off much later, lol	Awake, sleep	Nap, restless, awake, whole night, bedtime.
Lack of energy (S4)	I am so exhausted and I still have work 9-5 and then red rocks day three	Tired, energy	Weary, fatigue, fag, fag out, overtire, overfatigued, burned-out, burnt-out, exhausted, dog-tired, washed-out, drained, whacked.
Eating disorder (S5)	Another saturday night where i'm too depressed to sleep after overeating....i am extremely bored of this life	Appetite, overeating	Aversion, distaste, loathing, malformed, bulimic, puffy, starve, fat
Low self-esteem (S6)	I got on the scale today and I am disgusted. Like utterly disgusted. Depression really beat my ass and had me slacking	Loser, failure	Loser, relapse, downfall, ruined, flop, dead-duck, disappointment, achiever, misfire, underdog, falling-apart, disgusted
Concentration problems (S7)	Whenever it gets close to my bday I always go through some type of cleansing/depression.. Scattered focus...	Concentrate, focus	Immersed, decentralize, deconcentrate, scattered, dispersed, unsettled, focus
Hyper/Lower activity (S8)	I spend hours of my day staring at screens, immobile. Why am I depressed???	Moving, immobile, restless	Discontent, ungratified, unsatisfied, stand-still, refrained, immobile
Suicidal thoughts (S9)	I know that I cannot undo The self-destruction, the damage I have done	Dead, hurt, suicide	Trauma, harm, suffering, anguish, hemorrhage, penetrating-trauma, torment, agony, excruciate, damaged, gag, suffocate, self-destruction

[1]

1. Access issues – Only tweet_id no text in GitHub dataset
2. Tried extracting through twarc and tweepy
3. Alternatively, can sign Data Usage agreement

[1] DEPTWEET: A typology for social media text to detect depression severity (Kabir et al, 2023) | Paper | Dataset

Alternative Dataset

Label	Count
Minimal	10549
mild	10661
moderate	9473
severe	11176
Total	**41859**

Table 2: Dataset details of HelaDepDet dataset

Model	Precision	Recall	F1 Score
DepressionNet	0.61	0.59	0.60
DEPTWEET	0.62	0.61	0.61
SVM + LBFs	0.51	0.56	0.52
RF + LBFs	0.59	0.54	0.56
MLP + LBFs	0.56	0.54	0.56
Ours - *HelaDepDet*	**0.68**	**0.65**	**0.66**

Fig 1: Sample from the dataset [2]

1. Dataset available with text publicly
2. Curated by combining the DEPTWEET dataset [1] and depression severity annotation corpus [3] followed by balancing the classes

[2] HelaDepDet: A Novel Multi-class Classification Model for Detecting the Severity of Human Depression | Paper | Dataset
[3] Early Identification of Depression Severity Levels on Reddit Using Ordinal Classification | Paper | Dataset

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Work on DAIC-WOZ dataset

1. Several works include using BiLSTM or LSTM for the textual classification section [4] [5]

2. Some more recent work employs transformer models like BERT and T5 [6] [7]

3. A potential point of disagreement is in using only the response versus including both the question and the answer to provide context [6] [4]. Might be interesting to try and see the difference in performance

[4] A multimodal fusion model with multi-level attention mechanism for depression detection (Fang et al, 2023) | Paper

[5] Uncertainty-Aware Label Contrastive Distribution Learning for Automatic Depression Detection (Yang et al, 2023) | Paper

[6] Multilevel depression status detection based on fine-grained prompt learning (Zhang et al, 2024) | Paper

[7] Design and Implementation of Attention Depression Detection Model Based on Multimodal Analysis (Park et al, 2022) | Paper

E-DAIC dataset

Partition	# Subjects	Duration [h:min:s]
Training	163	43:30:20
Development	56	14:47:31
Test	56	14:52:42
All	**275**	**73:10:33**

Dataset	Number of Subjects	Subjects (%)
Train	146	80
Testing	18	10
Validation	18	10
Total	182	100

Data distribution in e-DAIC dataset [8]   Data distribution in DAIC-WOZ dataset [9]

[8] State-of-Mind, Detecting Depression with AI, and Cross-Cultural Affect Recognition (Ringeval et al, 2019) | Paper
[9] End-to-end multimodal clinical depression recognition using deep neural networks: A comparative analysis (Muzammel et al, 2021) | Paper

Tentative Plan

Plan for next week
1. Get started with preliminary data cleaning
2. Look at codes for relevant papers
3. Continue reading relevant literature

Relevant Links
1. Overall project plan and timeline: Link
2. Analysis and notes from relevant papers: Link

End