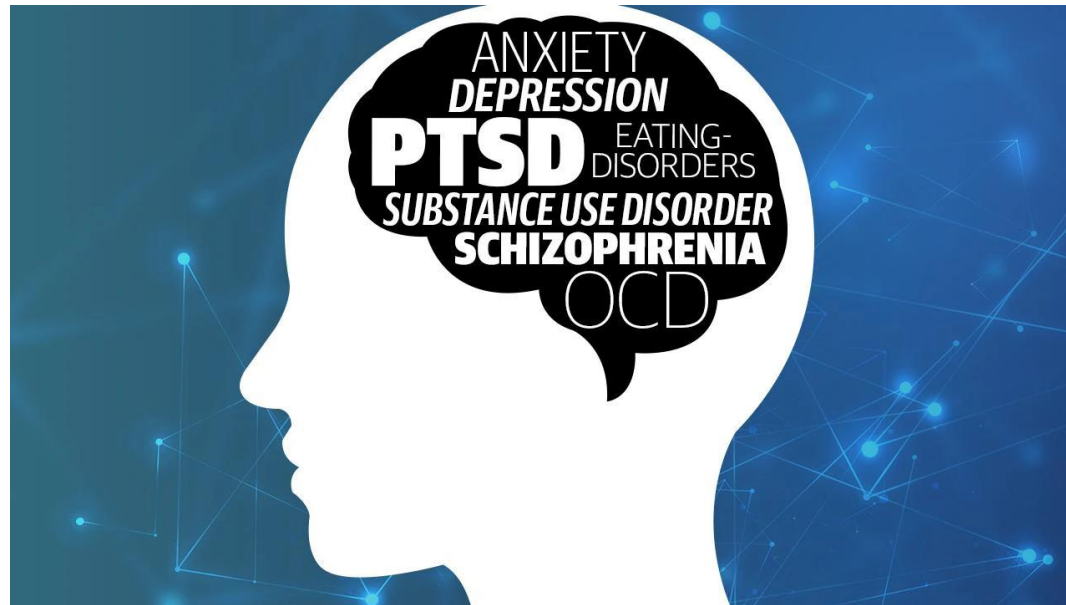# UNIVERSITI TEKNOLOGI MALAYSIA

PRESENTATION SLIDE

MENTAL DISORDER CLASSIFICATION IN SOCIAL MEDIA TEXT USING VADER AND MACHINE LEARNING APPROACH

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https://youtu.be/dOZHcNxEPLk

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INTRODUCTION

Mental disorders are increasing globally (Cha, Kim, & Park, 2022), worsened by the COVID-19 pandemic, affecting 1 in 8 people worldwide (World Health Organization, 2022). Diagnosis is traditionally subjective, leading to biases and inefficiencies. Advancements in technology, particularly natural language processing (NLP) and machine learning, offer promising methods for early and accurate diagnosis through social media text analysis (Chung & Teo, 2022).

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PROBLEM BACKGROUND

Mental disorders cause significant cognitive, emotional, and behavioral disruptions (Delaram et al, 2022). These disorders encompass a wide array of conditions, including depression, schizophrenia, bipolar disorder, anxiety, and borderline personality disorder (World Health Organization, 2022). Untreated mental disorders increase risks such as suicidal behavior (Meller, Patel, Duarte, & Kapczinski, 2021) and are exacerbated by social stigma. Researchers are now exploring linguistic patterns on social media to identify early signs of mental illness using NLP and machine learning (Bae, Shim, & Lee, 2021).

PROBLEM STATEMENT

RESEARCH GOAL

Classifying mental disorders through social media text is challenging due to the complexity of linguistic patterns and a lack of comprehensive research. There's a need for innovative approaches to improve the accuracy and efficiency of mental disorder classification.

To classify mental disorders in social media content using VADER and machine learning for early diagnosis, aiding timely intervention and support.

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RESEARCH OBJECTIVES

OBJECTIVE 1

To study the classification of mental disorder by using VADER and machine learning on social media text data.

OBJECTIVE 2

To develop the classification of mental disorder by identifying distinctive features of mental illness using VADER and machine learning algorithm.

OBJECTIVE 3

To evaluate the mental disorder classification in VADER and machine learning using accuracy, precision, recall and F1-score.

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RESEARCH SCOPES

Focusing on the classification of mental disorder using machine learning approaches and VADER applied to social media content.

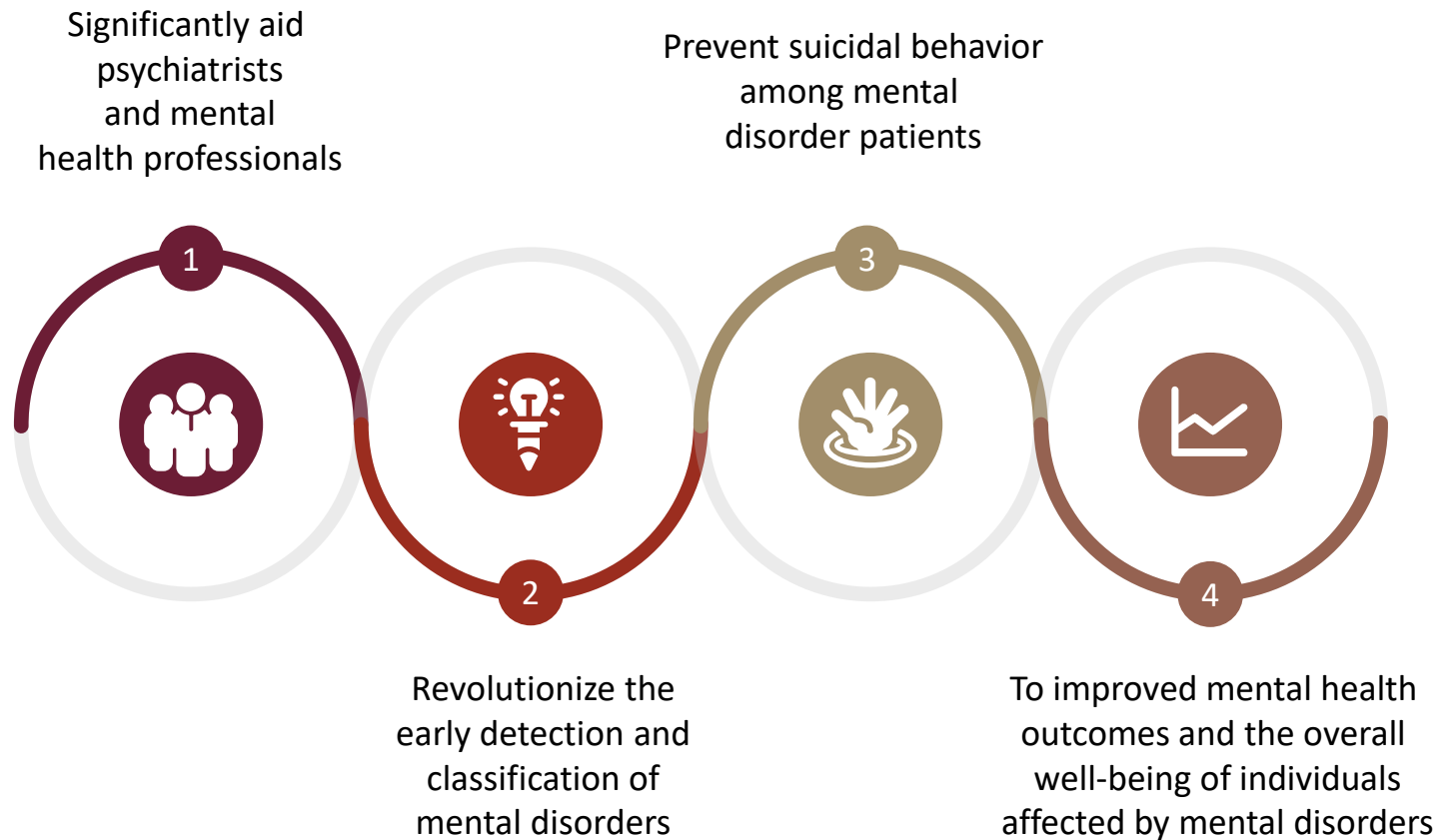Dataset consist of Reddit posts retrieved from GitHub.

Utilizing Python for data preprocess and model development.

Performance measurement using accuracy, precision, recall and F1-score.

RESEARCH IMPORTANCE

Significantly aid
psychiatrists
and mental
health professionals

Prevent suicidal behavior
among mental
disorder patients

1

3

2

4

Revolutionize the
early detection and
classification of
mental disorders

To improved mental health
outcomes and the overall
well-being of individuals
affected by mental disorders

Timely and accurate diagnosis of mental disorders is crucial. Traditional methods are subjective and time-consuming. By using VADER and machine learning, this research aims to enhance diagnostic accuracy and efficiency, aiding mental health professionals in proactive intervention and personalized treatment planning, ultimately improving mental health outcomes.

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LITERATURE REVIEW

Title	References	Dataset	Method
Understanding Mental Health Issues in Different Subdomains of Social Networking Services: Computational Analysis of Text-Based Reddit Posts	(Kim, Cha, Kim, & Park, 2023)	Reddit dataset consists of 700 instances and 2 attributes	LIWC, Sentence-BERT, K-Means, UMAP
Sentiment Analysis of the COVID-related r/Depression Posts	(Chen, Z., & Sokolova, M., 2021)	224,557 Reddit dataset Posts	VADER, BERT
Schizophrenia Detection Using Machine Learning Approach from Social Media Content	(Bae, Shim, & Lee, 2021)	60,009 Reddit Posts	LIWC, Support Vector Machine, Logistic Regression, Naïve Bayes, Random Forest
A Deep Learning Model for Detecting Mental Illness from User Content on Social Media	(Kim , Lee, Park, & Han, 2020)	633,385 posts	XGBoost, Convolutional Neural Network (CNN)
A Lexicon-Based Approach To Examine Depression Detection In Social Media: The Case Of Twitter And University Community	(Cha, Kim, & Park, 2022)	10,000 posts	CNN, Bidirectional Long Short-Term Memory (BiLSTM), Bidirectional Encoder Representations from Transformers (BERT)

RESEARCH METHODOLOGY

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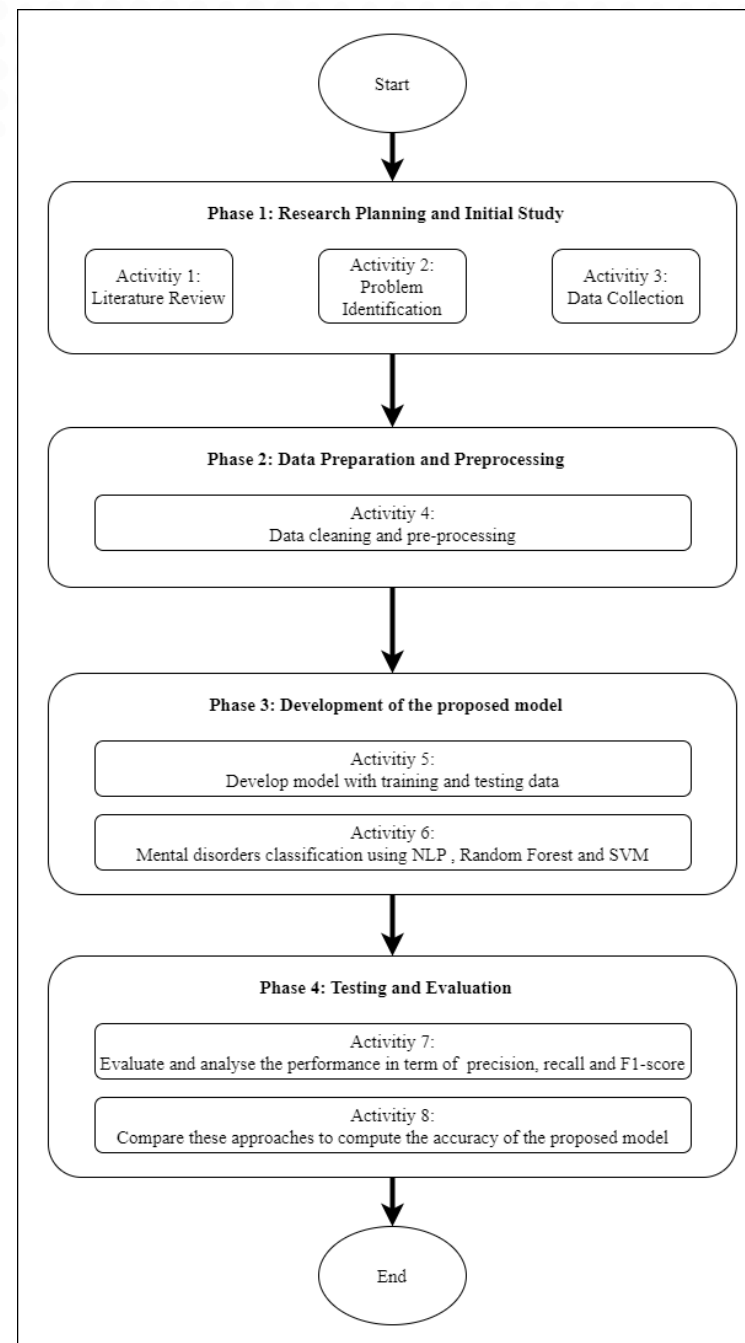
TEXT PREPROCESSING STEPS
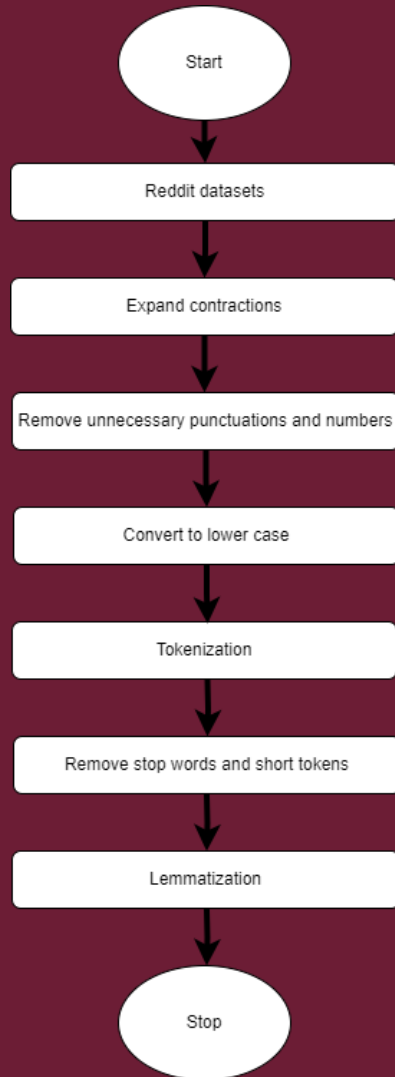
1. Expand Contractions
- don't → do not
- it's → it is

2. Remove Unnecessary Punctuations and Numbers
- ?, ., !, @

3. Convert to Lower Case
- Apple → apple

4. Tokenization
- I hate myself → ['I', 'hate', 'myself']

5. Stop Word Removal
- and, the, is, in

6. Short Words Removal
- m, s, t

7. Lemmatization
- running → run

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DATASET

Kim, S., Cha, J., Kim, D., & Park, E. (2023). Understanding Mental Health Issues in Different Subdomains of Social Networking Services: Computational Analysis of Text-Based Reddit Posts. Journal of Medical Internet Research, 25, e49074.

subreddit	content
Anxiety	My #1 biggest fear is death. Losing my consciousness. Ever since I was little I have always entertained myself through my own weird and s
Anxiety	Trying my 4th med out soon. The first 3 anxiety meds just made me worse (Buspar, Zoloft, Lexapro) but next week im trying Celexa. Lowe
Anxiety	Nauseate
Anxiety	Angerxiety? Does anyone else experience anger alongside their anxiety? There are certain situations where along with feeling incredibly a
Anxiety	No idea
Anxiety	Paranoia I was wondering if anyone experiences something similar to what I have been going through. I am constantly paranoid that my
Anxiety	Zoloft Hey guys I need some encouragement. I been on 25 mg of zoloft since may but my doctor wants to up it to 50 mg. Iâ€™m scared to
Anxiety	How i
Anxiety	DAE really like to shower when theyâ€™re anxious A lot of times you read about people suffering from depression having a hard time wil
Anxiety	My
Anxiety	Turning past good memories into negative ones? Lately Iâ€™ve been thinking about memories from 5+ years ago and during that time th
Anxiety	Reoccurri
Anxiety	Trying to
Anxiety	How do you guys deal with a panic attack when you're falling asleep? I have them occasionally, I'm actually going through one right, it's sc
Anxiety	My arithmophobia is getting really annoying. Arithmophibia is the fear or dislike of certain numbers. Itâ€™s part of my OCD and itâ€™s g
Anxiety	Anxiety
Anxiety	IUD
Anxiety	How do I
Anxiety	Anybody else have chronic chest pain? So 3 years ago I had a baby and immediately I started getting chest pain, like a squeezing feeling th
Anxiety	Cipralex/Lexapro Successes? about 3 years ago i smoked weed & it triggered horrible anxiety/panic attacks in me (never even knew v
Anxiety	Are your meds helping ? Has anyone been on buspirone, propranolol, ativan for break through attacks and your dr prescribed lexapro? I
Anxiety	Zoloft for

Obtained from GithHub repository and was retrieved from the previous researchers (Kim, Cha, Kim, & Park, 2023)

2 columns & 700 rows

7 different subreddit - label (schizophrenia, depression, bipolar, autism, BPD, anxiety, mentalhealth)

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PERFORMANCE MEASUREMENT

Actual	Predicted	
	Positive	Negative
Positive	TP	FN
Negative	FP	TN

Performance Evaluation Techniques	Formula
Accuracy	$\dfrac{TP + TN}{TP + FP + FN + TN} \, X \, 100$
Recall	$\dfrac{TP}{TP + FN} \, X \, 100$
Precision	$\dfrac{TP}{TP + FP} \, X \, 100$
F1-score	$2 \, X \, \dfrac{TP}{TP + FP + FN} \, X \, 100$

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REDDIT CONTENT BEFORE

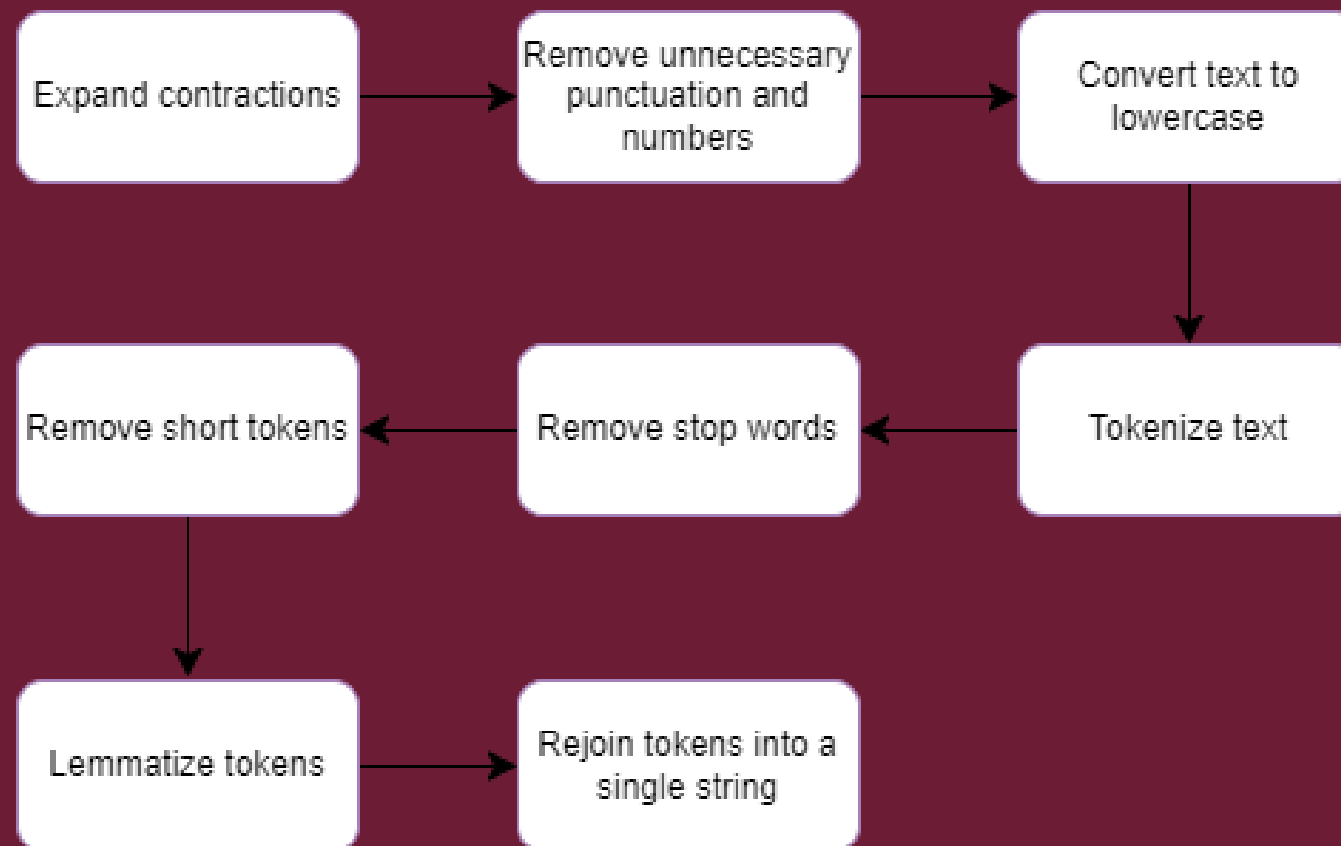| content |
|---|
| Angerxiety? Does anyone else experience anger alongside their anxiety? There are certain situations where along with feeling incredibly anxious, I'm furious. Full of rage, none of which I can express 😔 |
| 0 to 100 real quick. Story of my life. Who esle sad? Today was a good day. Then my ex gf has to make it better! Don't you love when they say you're crazy. Smh maybe I am crazy. |
| No energy to continue I have suicidal thoughts 24/7, it's not Bec I want to "run away" it's just I don't have the energy to continue living this life anymore, I want it all to end. Sometimes I wish I could end this life and begin a new one that's totally different. I hate it here and whenever I imagine i'll be living this life for the next 40 years I feel like I wanna kill myself even more |
| Hey guys, quick question. As an High Functioning Autistic, I rock back and forth to the beat of the song I am listening to. What happens when you listen to music? Do you do the same or something similar? |
| When BPD makes you feel... Empty. So empty and bored and lonely. Like you try to fill the void but nothing is good enough. Nothing is satisfying enough. Then the fact that life is just so predictable. I need some spontaneity in my life ASAP. And I'm feeling risky like I wanna have $3x with a stranger. Ugh! |

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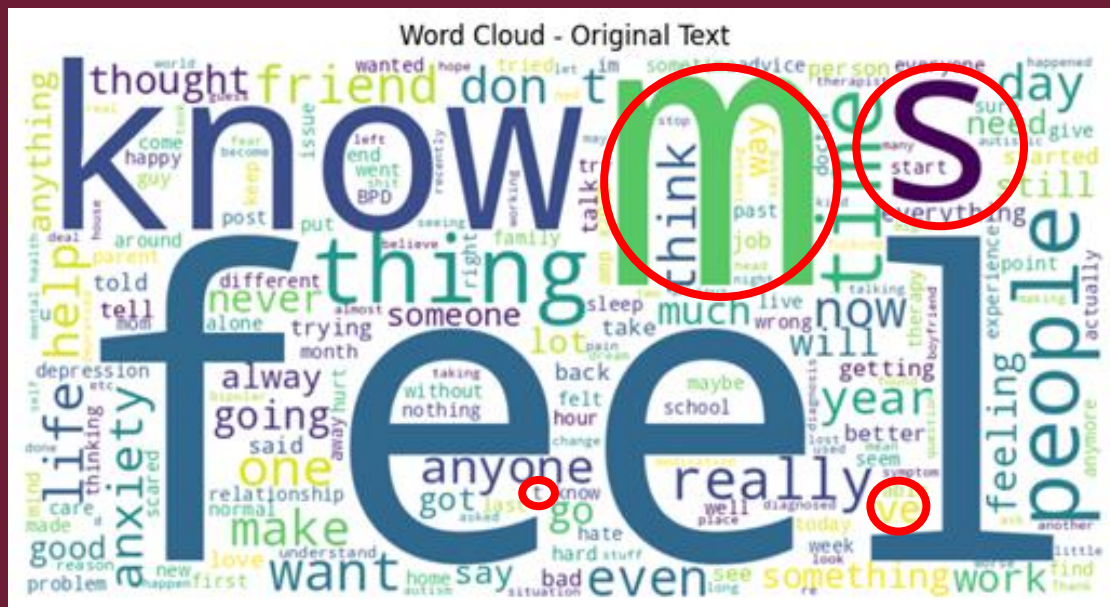# WORD CLOUD BEFORE PREPROCESSING

Word Cloud - Original Text

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TEXT PREPROCESSING

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Word Cloud - Preprocessed Text

WORD CLOUD COMPARISON

BEFORE

AFTER

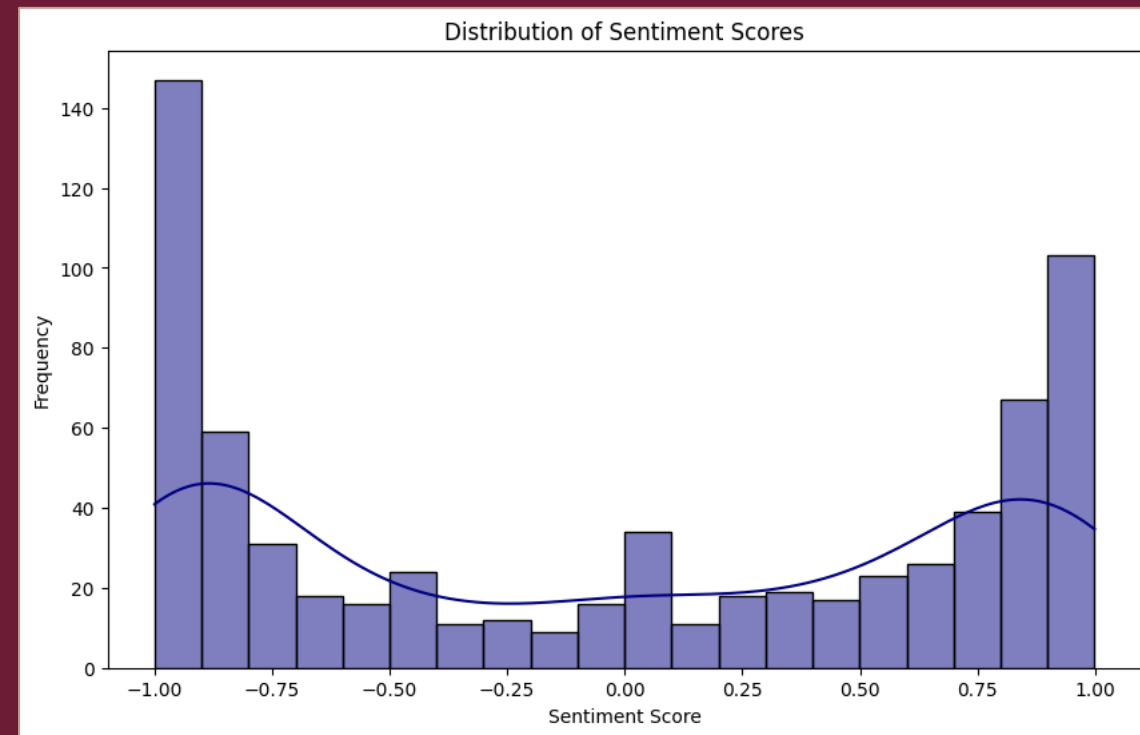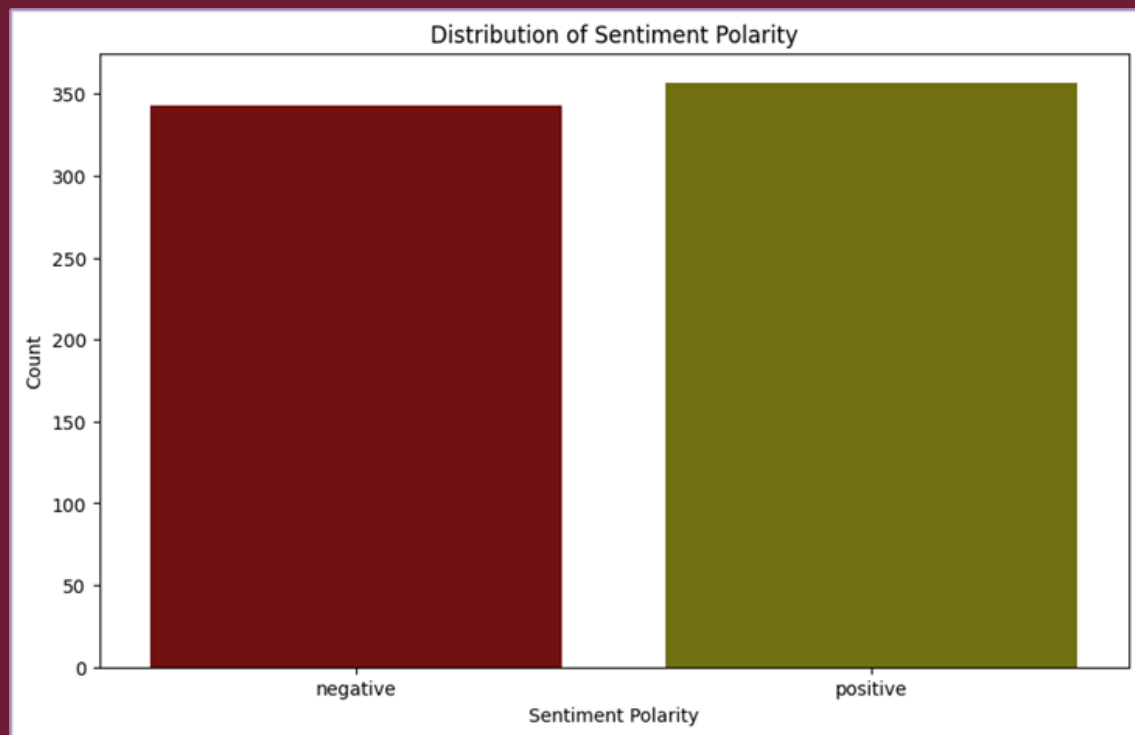| Raw Text	Preprocessed Text
Angerxiety? Does anyone else experience anger alongside their anxiety? There are certain situations where along with feeling incredibly anxious, I'm furious. Full of rage, none of which I can express 😔	['angerxiety', 'anyone', 'else', 'experience', 'anger', 'alongside', 'anxiety', 'certain', 'situation', 'along', 'feel', 'incredibly', 'anxious', 'furious', 'full', 'rage', 'none', 'express']
Seeing other dimensions it felt like in my psychotic episode, anyone else? I could look at a 2d painting and it would feel 3d same with photos. I could see strange godlike creatures and landscapes with my eyes closed but also on walls and floors like I was watching interdimensional television. Does or did anyone else have these symptoms?	['see', 'dimension', 'felt', 'like', 'psychotic', 'episode', 'anyone', 'else', 'could', 'look', 'painting', 'would', 'feel', 'photo', 'could', 'see', 'strange', 'godlike', 'creature', 'landscape', 'eye', 'close', 'also', 'wall', 'floor', 'like', 'watch', 'interdimensional', 'television', 'anyone', 'else', 'symptom']

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SENTIMENT ANALYSIS

SENTIMENT ANALYSIS

DATA TRANSFROMATION

index	subreddit	schizophrenia_label	content_preprocessed
0	Anxiety	0	big fear death lose consciousness ever since little always entertain weird sometimes creative thought always find full conversation discussion head think big fear lose lose consciousness cant comprehend like exist cant imagine lose interaction time love one fuck scary think whenever die gon feel like life cut short last minute consciousness regret there way see living without regret would love regret lose family friend death scariest thing think exist like matter always thought thats one thing almost every human guaranteed thought sudden cant wrap head around like fuck always like somewhere think something consciousness born gone
1	Anxiety	0	try med soon first anxiety med make bad buspar zoloft lexapro next week try celexa low dose possible also gabapentin week see help keep calm experience celexa love hear
2	Anxiety	0	nauseate think holiday deal nausea talk trip make feel ill worry feel ill trip make feel feel sick help tip
3	Anxiety	0	angerxiety anyone else experience anger alongside anxiety certain situation along feel incredibly anxious furious full rage none express
4	Anxiety	0	idea deal new anxiety long remember never anxious person anything fact use roll eye people would use mental healthanxiety excuse couldnt comprehend didnt move right christmas hit bong roommate normal night full blown panic attack last hour fuck couple day cry etc kinda back normal two month later decide hit bong logic fuck weed suppose relax youit use make feel good another panic attack happen course ever since second one chest pain even two doctor trip one urgent care one pcp confirm wasnt anything wrong still struggle first simply bed constantly get twinge stuff keep imagine symptom heart attack hypertension despite physically active year sport make even crazier think somehow thc whatever changedactivated hormone chemical anxiety point start worry dont feel uncomfortable twinge dont know especially light covid cant see really want see doctor right tire cant sleep convince die sleep cant focus anything bare minimum maintain socialschool life moment guess wonder anyone else relate kind experience start deal journal write much appreciate response thank reading

CONCLUSION

successful preprocessing of the text data

preliminary results was obtained using the VADER sentiment analysis tool

These preliminary findings are promising and set the stage for further analysis using more advanced models. The expected output of this research includes a comprehensive sentiment analysis that identifies emotional cues, thereby enhancing the understanding of how mental disorders manifest in social media language.

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THANK YOU