

ANALYSING DEPRESSION FROM USERS' SOCIAL NETWORK FOOTPRINT

**MINI PROJECT: FINAL
EVALUATION**

**PRAJNEYA KUMAR
NIKHIL CHANDAK
ARVINDH A
SHRI VIDHATRI M M**

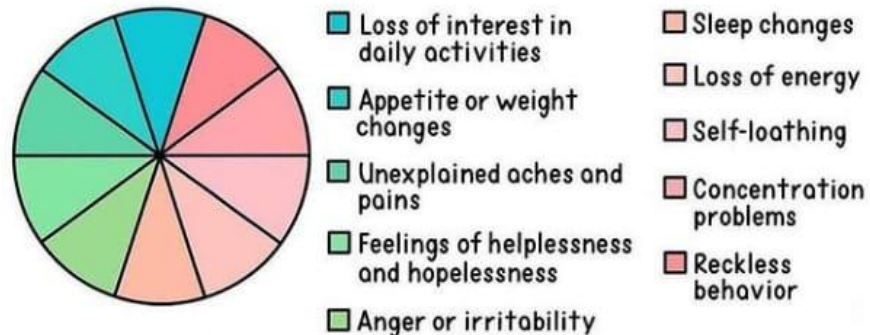


OUTLINE OF THE PRESENTATION

What people think depression is



What depression actually is



- ★ Introduction & Motivation
- ★ Relevant Work and Statistics
- ★ Behavioral Analysis
- ★ Approach
- ★ Feature Extraction
- ★ Conclusion and Future Work

INTRODUCTION AND MOTIVATION



- COVID-19 has raised anxiety levels: India is the most depressed country in the world, according to the WHO
- Mental health of a country and economic growth.
- Depression symptoms: DSM-IV, BDI-II criteria
- Depression is associated with bipolar disorder, anxiety, PMS, parturition, PTSD; Depression can turn into a suicide risk
- Untreated anxiety/depression in adolescents and young adults leads to several behavioral, physical, and mental difficulties
- Emotional depression has been proposed as a predisposing factor for cancer

BEHAVIORAL AND FUNCTIONAL ANALYSIS



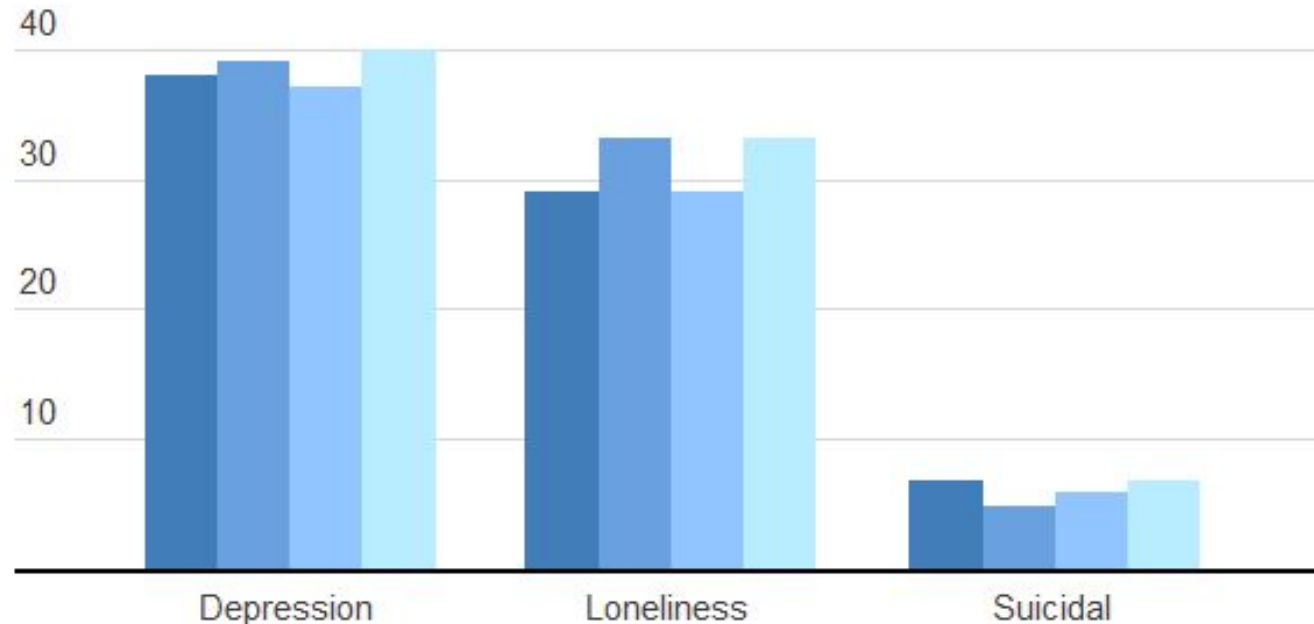
- Stress triggers depression and mood disorders,
- Depression differs by age and gender of the victim
- Antidepressants for depression
- Dysthymia: chronic “low-grade” depression(PDD).
- Clinical depression : MDD
- Other types of depression
- Situational depression

Depression: The most severe mental illness

Mental illness/anxiety among youth is a pan-Indian problem

Columns show percentage of students (15-34 year old) who reported suffering from these problems in last couple of years

Male Female Urban Rural



[via Mint](#)

42.5% of **corporate employees** in india suffer from depression.

(Source - ASSOCHAM)

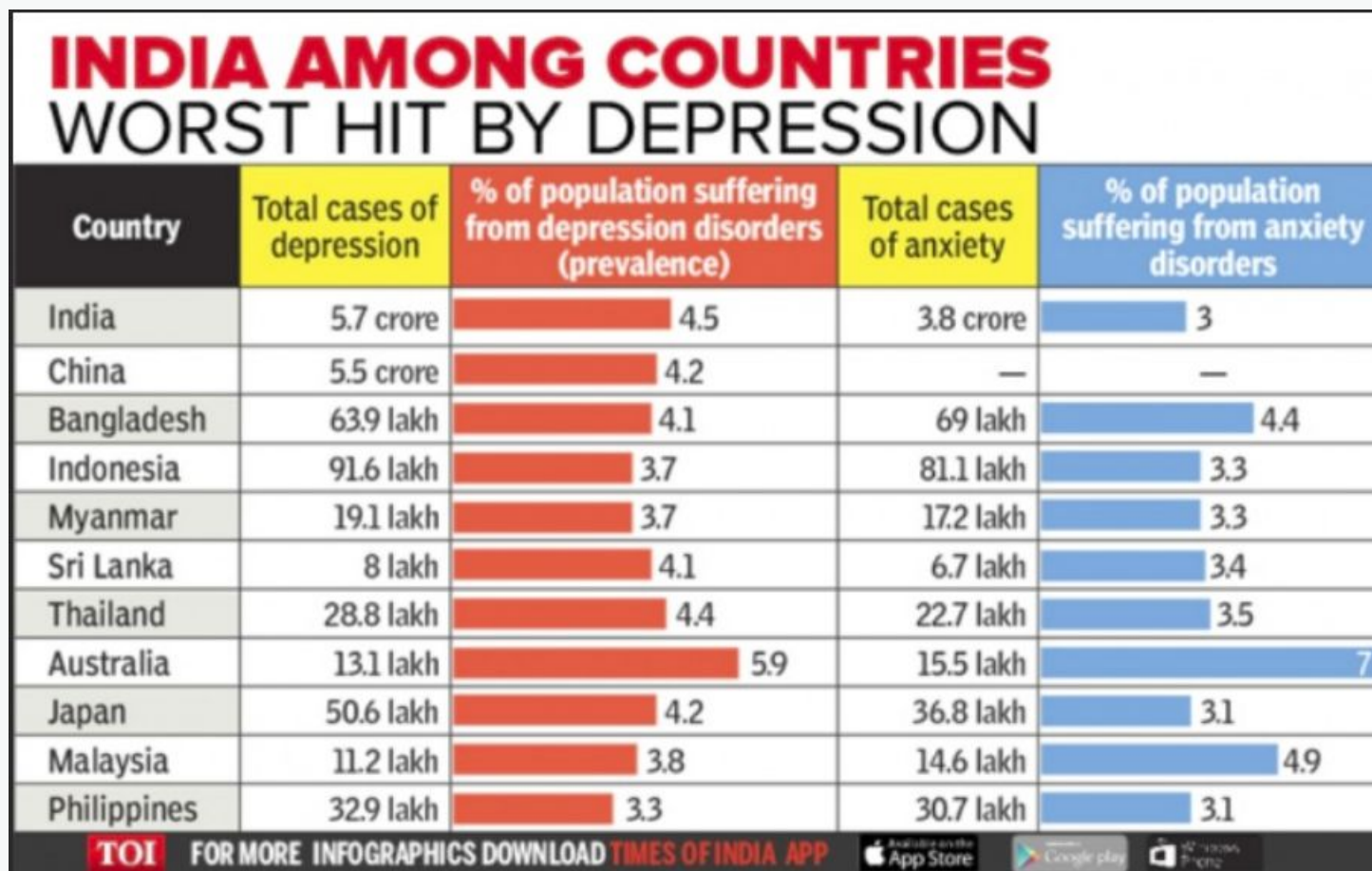


MOTIVATION



- COVID-19 has raised anxiety levels.
- Mental health of a country and economic growth.
- Impact on students
- Untreated anxiety/depression in adolescents and young adults leads to several behavioral, physical, and mental difficulties. Hypertension, coronary heart disease, alcohol dependence, nicotine addiction, depression, and suicidality are some of the complications that may be experienced by those with untreated disorders ([link](#)).
- Emotional depression has been proposed as a predisposing factor for cancer: Cancer-causing habits such as smoking or alcohol drinking, as well as suppression of the immune system happens as a side effect of depression ([link](#)).
- Depression can turn into a suicide risk and it is necessary to identify the symptoms of the extent of depression before treatment

News headlines

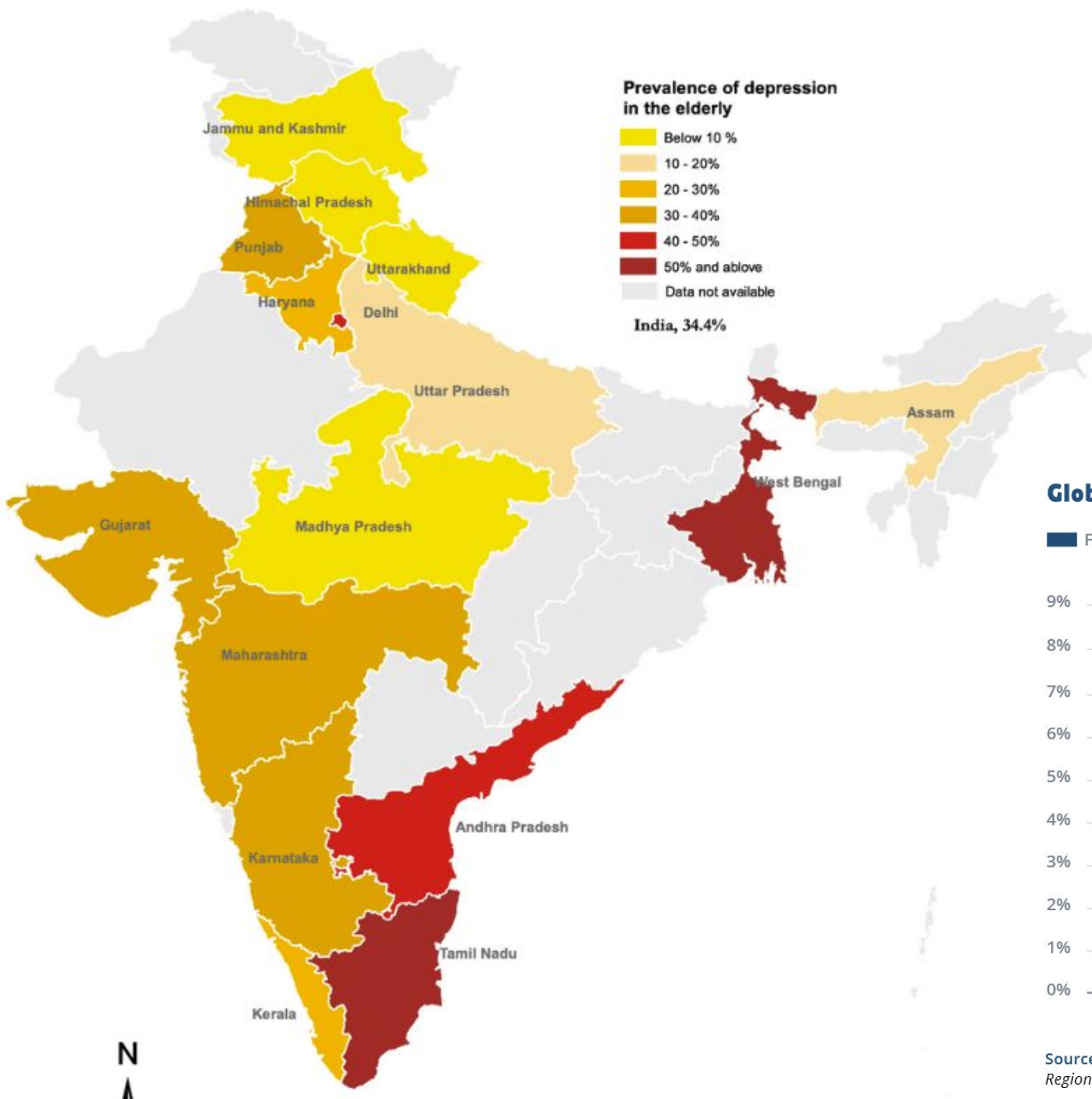


56,675,969 people suffer from depression in India as of 2015.

That's **4.5%** of India's population.

(Source - WHO)

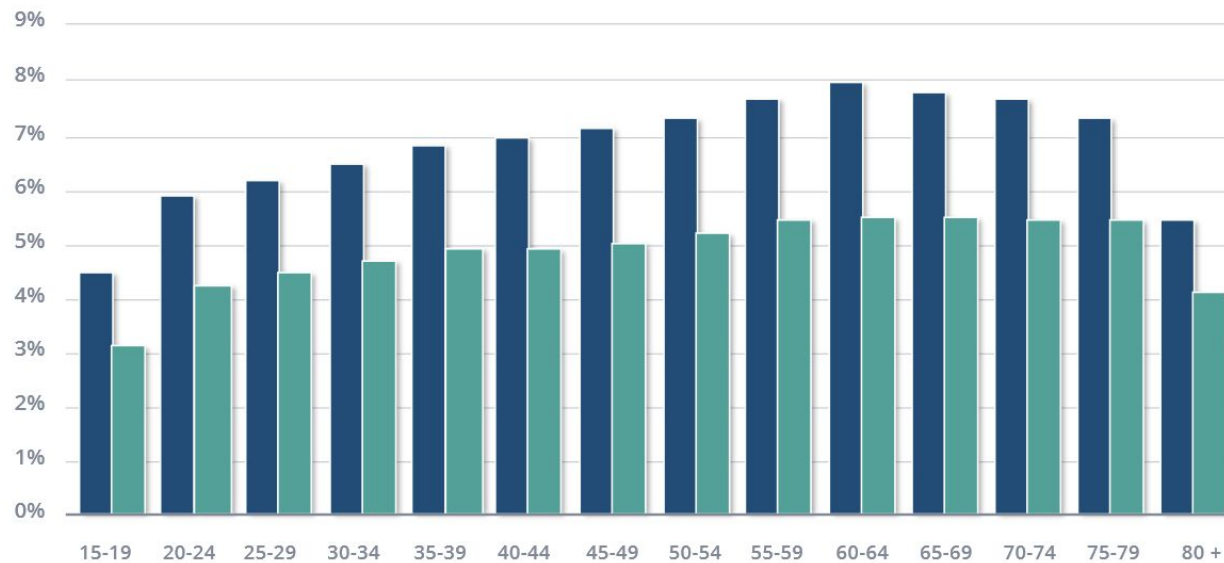




Depression Prevalence

Global prevalence of depressive disorders, by age and sex (%)

Female Male



Source: Global Burden of Disease Study 2015 (<http://ghdx.healthdata.org/gbd-results-tool>)

Regional data shown are age-standardized estimates.

STATISTICS



- As of 2015, on a global level, over 322.48 million people worldwide suffer from some form of depressive disorder and as of 2017, more than 14 percent of the total population in India suffer from variations of mental disorders. The majority of this share includes older adult females in India([link](#)). It is predicted that by end of this year roughly 20 per cent of India will suffer from mental illnesses i.e., 56 million Indians suffer from depression and another 38 million Indians suffer from anxiety disorders ([link](#)).
- The report on Global Burden of Disease estimates the point prevalence of unipolar depressive episodes to be 1.9% for men and 3.2% for women, and the one-year prevalence has been estimated to be 5.8% for men and 9.5% for women([link](#)).
- When it comes to countries, India is the most depressed country in the world, according to the World Health Organisation, followed by China and the USA.
- The state of mental health of a country, correlates positively with its economic growth. Projections show that India will suffer massive economic losses owing to mental health conditions.

A rising issue

The government estimates that about **1 IN 5** people in the country need counselling, either psychological or psychiatric.



Nearly **HALF** of those with severe mental disease aren't treated.



Potential Factors

- Studies have shown that compared to healthy controls and subjects with schizophrenia, depressed patients have significantly greater number of life events prior (6-12 months) to the onset of their illness.
- Compared to patients with mild depression, patients with moderate and severe depression tend to use avoidance as a coping strategies more frequently for the stressful life events, suggesting that it may be a maladaptive way to cope with the situation, which is responsible for development of depression.
- Economic and interpersonal relationship difficulties, partner violence, sexual coercion by the partner as the common causal factors related to development of depression in general and depression during antenatal and postnatal period.
- Studies report that somatic symptoms are the most common manifestation of depression in India.

Signs and Symptoms of Depression



Persistent feelings of sadness



Loss of interests in activities



Trouble sleeping or oversleeping



Appetite or weight changes



Fatigue or decreased energy



Difficulty thinking clearly or quickly



Irritability, frustration, or pessimism



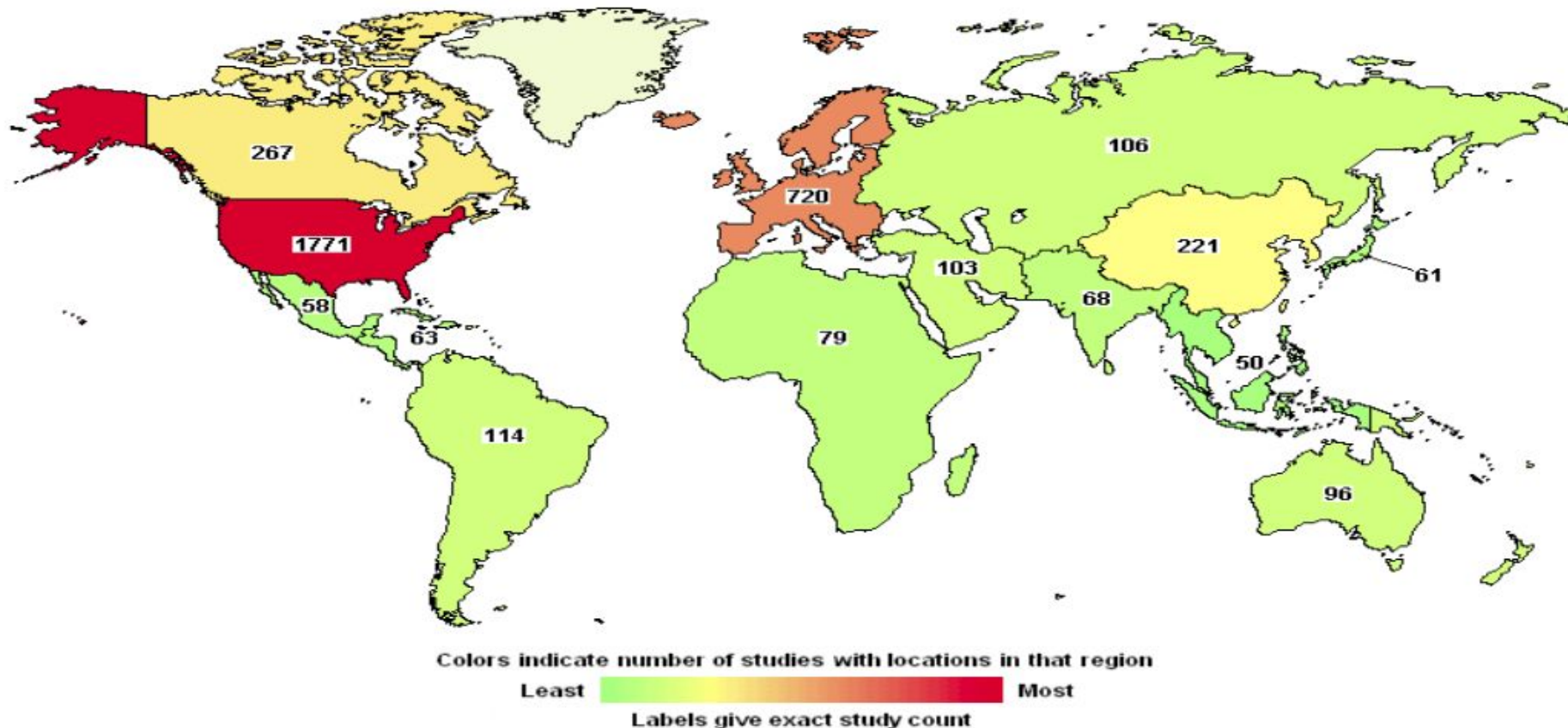
Physical aches and pains



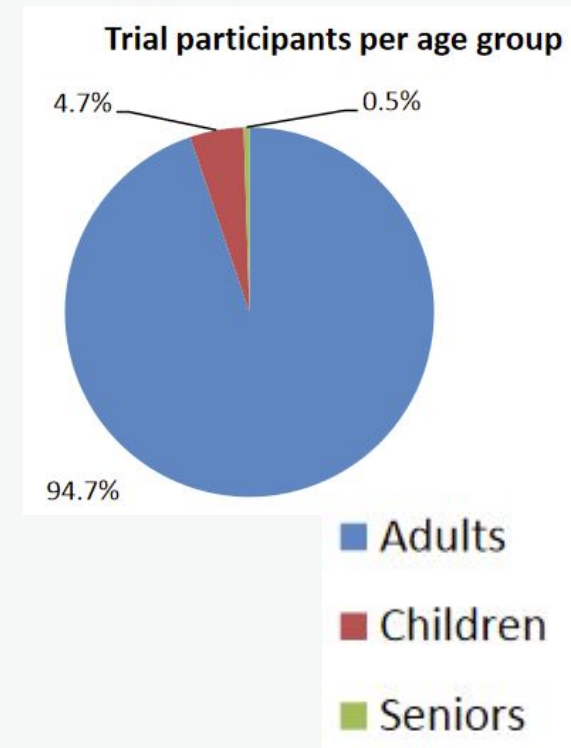
Recurrent thoughts of death or suicide

Past Research Studies Overview: Why our project

Figure 6.15.16: Geographic map number of studies on depression, per region worldwide.



Source: clinicaltrials.gov²¹⁶



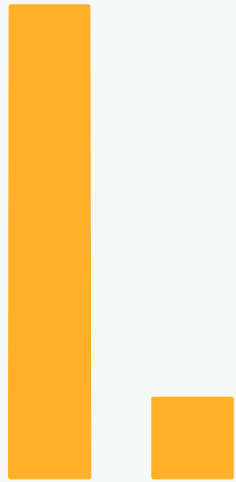
APPROACH AND ANALYSIS

APPROACH AND ANALYSIS

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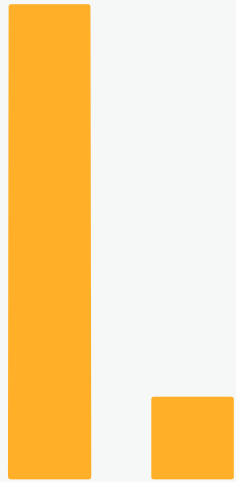
MAJOR
PROBLEMS

APPROACH AND ANALYSIS



ACCURACY

APPROACH AND ANALYSIS



**“I AM AMUSED BY DARK
WEATHER. THIS IS SO
BLEAK AND EXCITING!”**

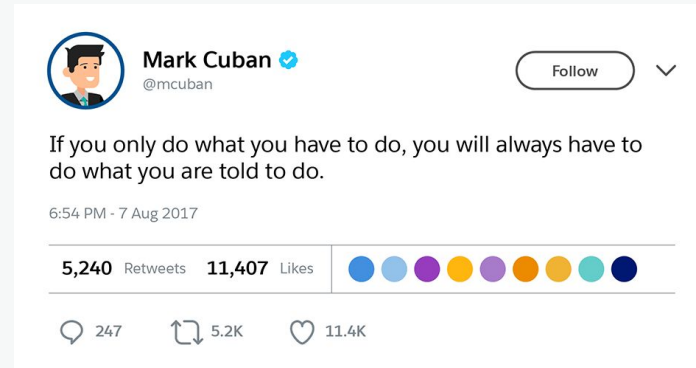
APPROACH AND ANALYSIS

2. DATA TYPOLOGY

APPROACH AND ANALYSIS

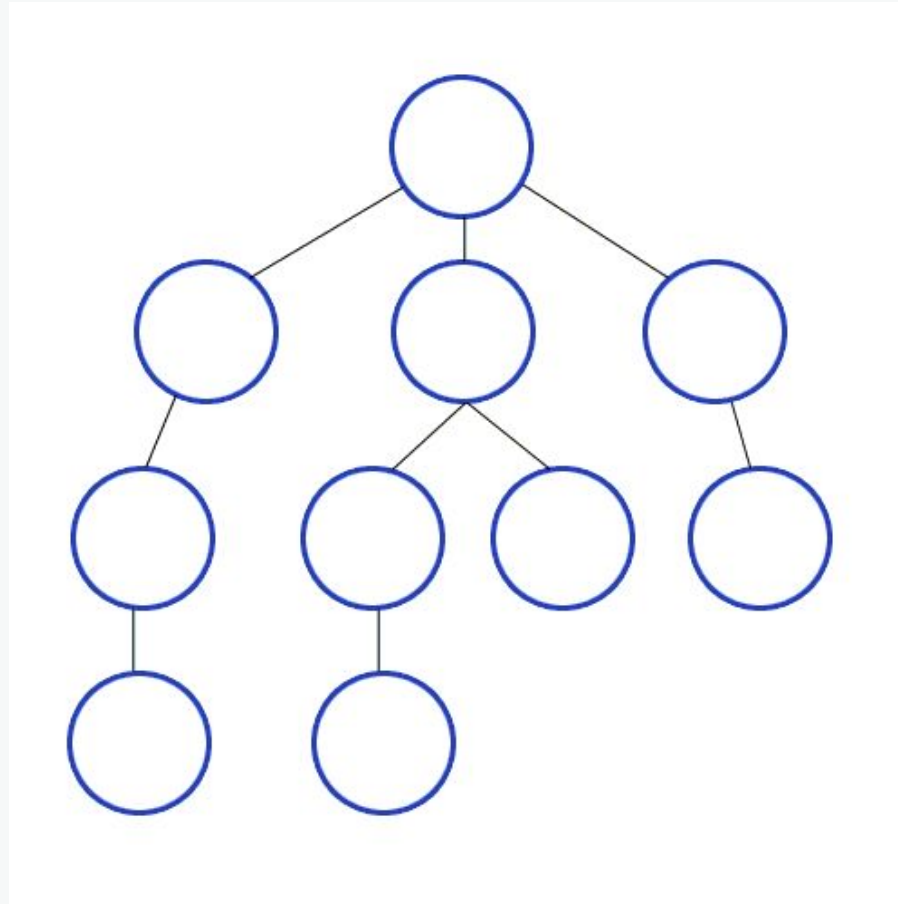


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APPROACH AND ANALYSIS

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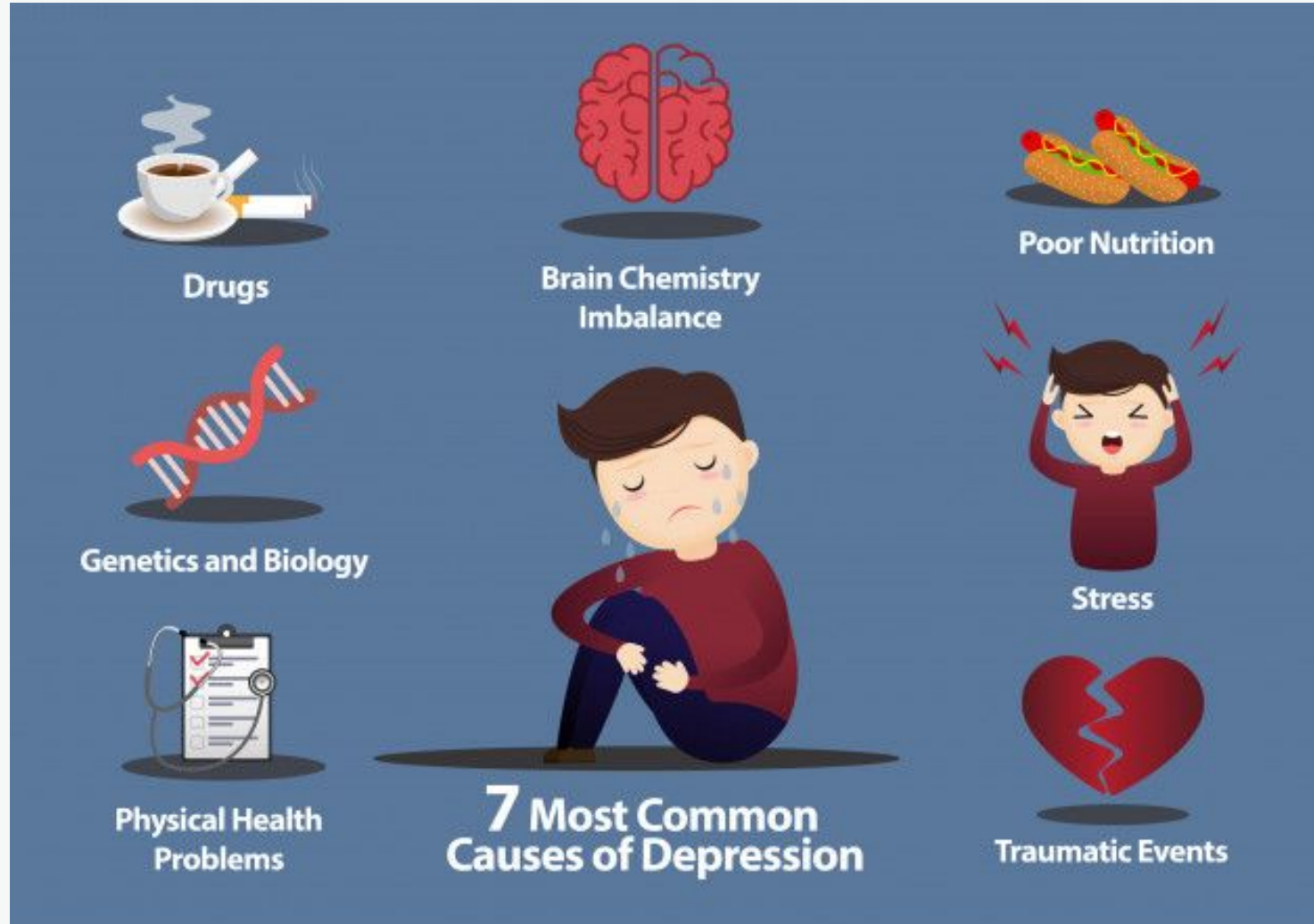


APPROACH AND ANALYSIS

3. TRACEABLE DEPTH

APPROACH AND ANALYSIS

3.



APPROACH AND ANALYSIS

4.

**LACK OF REAL TIME
INTERVENTIONS**

APPROACH AND ANALYSIS 

OUR SOLUTION

APPROACH AND ANALYSIS



PHASE I

**DETECTION OF
DISCONNECTEDNESS**

APPROACH AND ANALYSIS

2.

PHASE 2
ANALYSIS OF TEXTUAL AND
IMAGE DATA

APPROACH AND ANALYSIS

2.



APPROACH AND ANALYSIS

2.



APPROACH AND ANALYSIS

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APPROACH AND ANALYSIS

3. 

PHASE 3
**STAGNANT BEHAVIOUR
OVER LONG PERIODS OF
TIME**

APPROACH AND ANALYSIS

4.

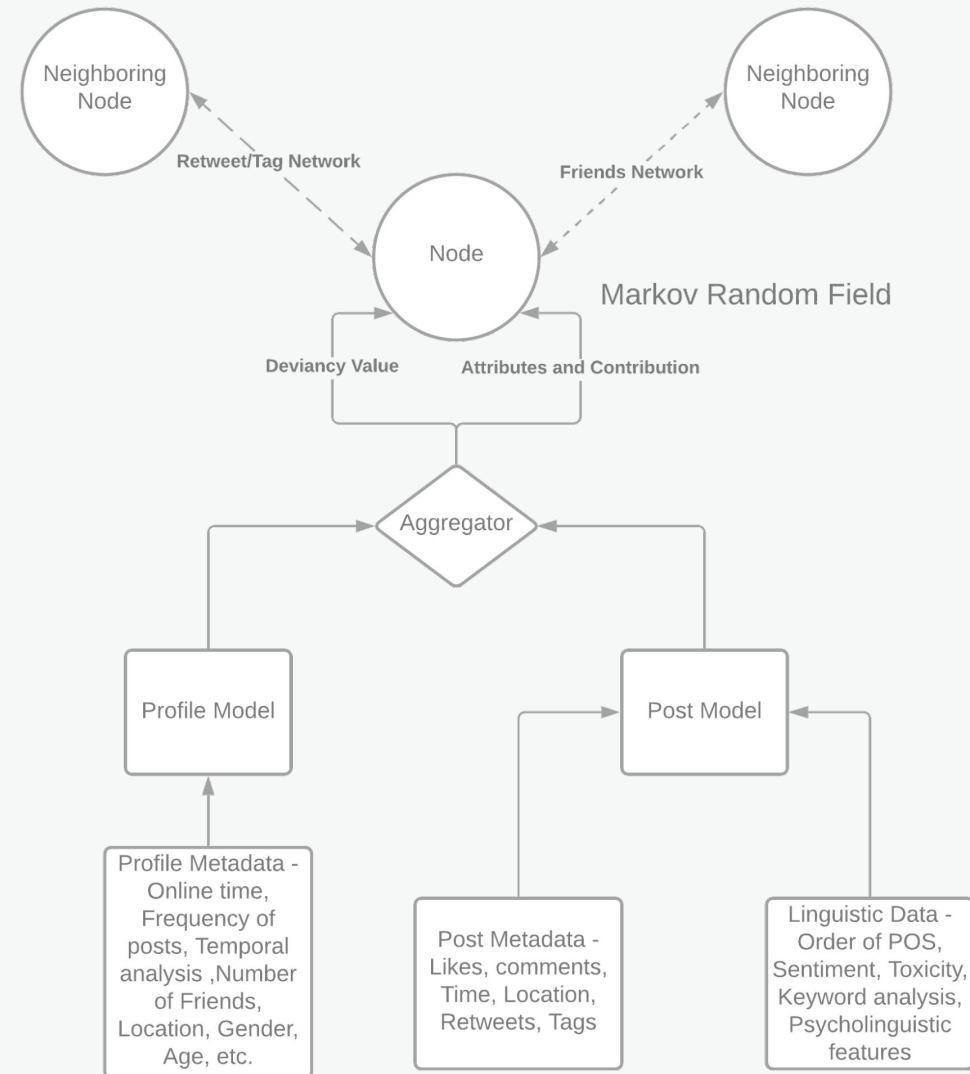
PHASE 4

**INTERPERSONAL
DETACHMENT AND SIGNS
OF HOSTILITY**

SYSTEM ARCHITECTURE



- We use Belief Networks and Markov random field to propagate “Deviant” behavior.
- The main motivation behind the usage of MRFs is that, some people have very low but niche footprint which maybe enough to conclude if a person is deviant but may escape/be misjudged by the model which can be caught using the propagation.
- Each node also stores the distribution of the features that contributed to the total Deviancy value hence addressing the Traceability concern.
- We can adapt an incremental version of MRF, which limits the propagation but keeps the difference within error margin; which can drastically increase the computational speed and hence make it suitable for Real Time Analysis.



FEATURE ANALYSIS

Profile and Post Metadata

- Metadata like location can also be an important factor in the analysis as certain places could be associated with a higher concentration of depressed individuals
- People who go through the same experiences in day to day life tend to have a similar outlook of the world, so exploring the friend network of a depressed individual could unlock more potential research
- Wolfradt and Doll (2001) suggested that gender is a major factor to consider when researching Internet use or use of Social Networking Sites
- Geographical location was researched as a factor mainly in terms of access to the internet and the “digital divide”, that is the unequal access to computers and the internet (Dewan & Riggins, 2005); urban areas are more likely to have internet access than rural areas, even though this fact is rapidly changing. A study on Norwegian adolescents (Johansson & Götestam, 2004) showed that the frequency of problematic Internet use was relatively higher in small cities and rural areas than in large cities (more than 150,000 inhabitants).
- Lastly, the number of posts and the temporal analysis of the activeness of an individual could be a key measure as well, as the activity tends to drop a lot or shoot up a lot seeking attention if one falls into depression



FEATURE ANALYSIS



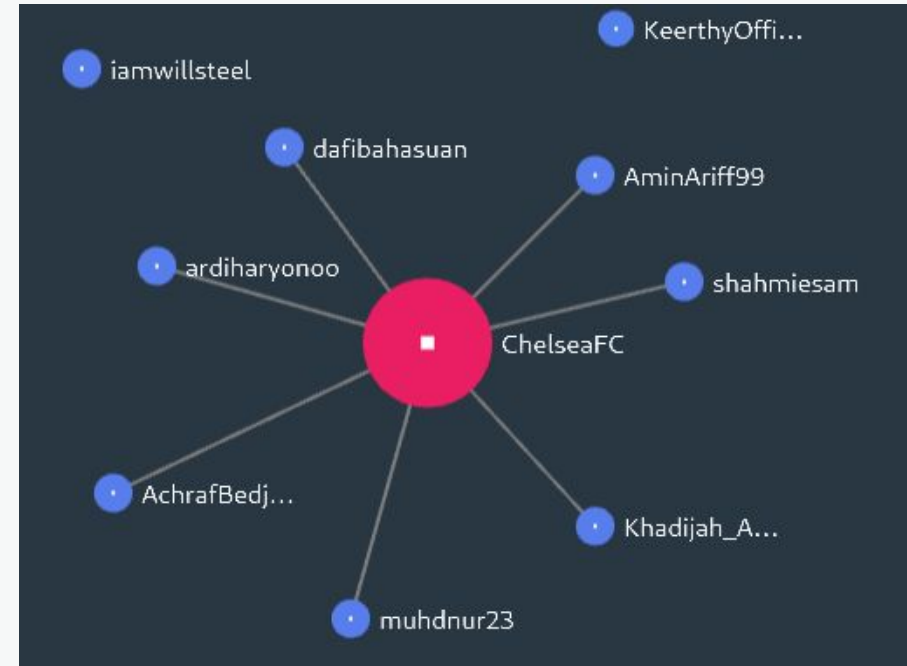
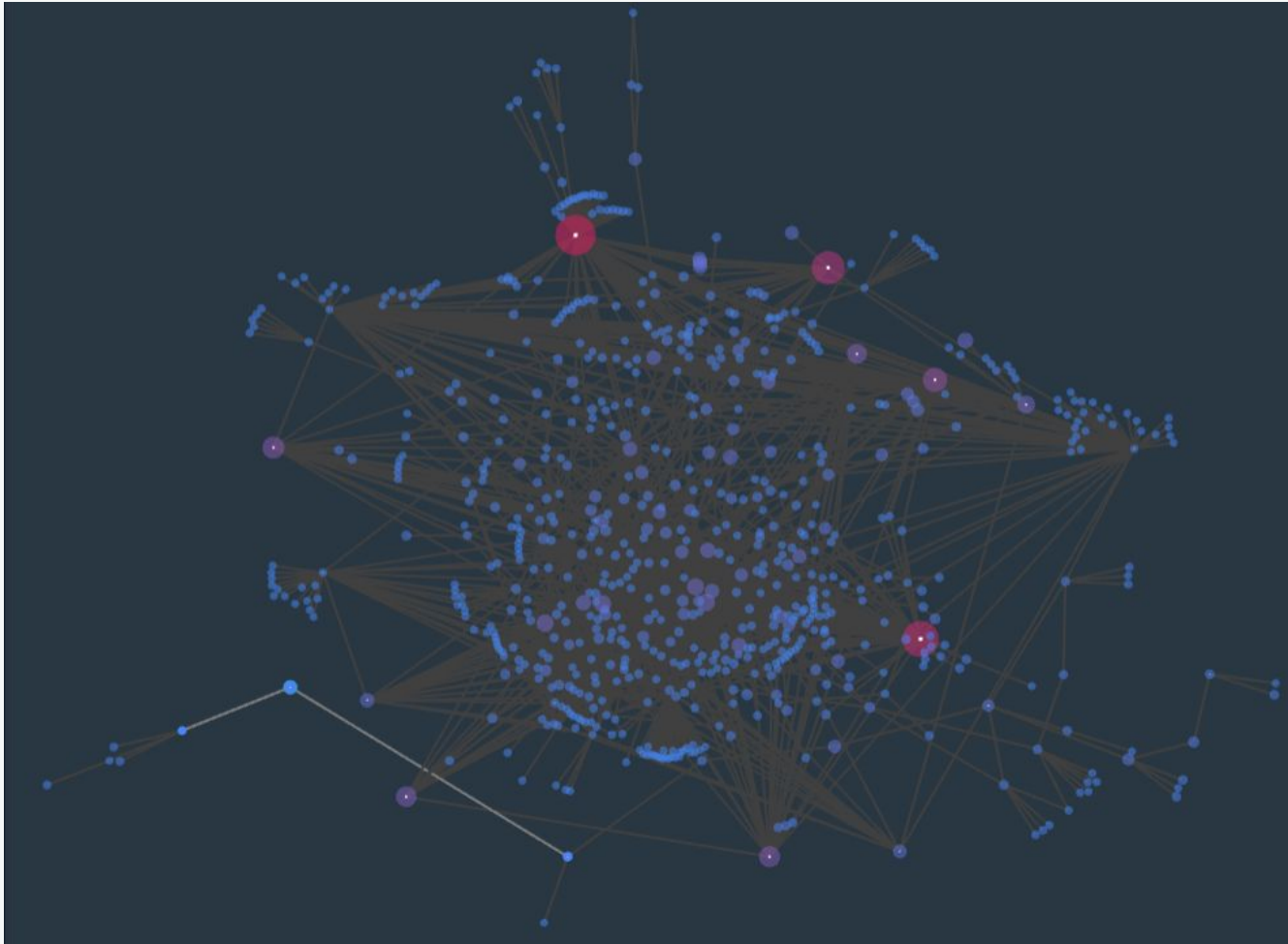
Linguistic Analysis

- We can use pre-existing vocabulary packages for deep and detailed analysis of the text like the LIWC.
Psycholinguistic features LIWC is a psycholinguistic vocabulary package made by psychological analysts to perceive the different affective, intellectual, and etymological parts that lie on the user's verbal or written correspondence. It returns more than 70 different factors with a higher level of psycholinguistic features.
- Identify Depressive symptoms using evidence keywords taken from a lexicon of nine groups of depressive symptoms in the Diagnostic and Statistical Manual of Mental Disorders (DSM-V)
- Analyze the sentiment of the posts as depressed people tend to have negative polarity in their posts
- Identify Ruminative thinking patterns as depressed people tend to have repetitive thoughts
- Looking at the POS (Part of Speech) level in their writings as their writing style tends to contain a different distribution of nouns, verbs, and adverbs and the complexity of sentences (Gkotsis et al., 2016)

II. PSYCHOLOGICAL PROCESSES

Social Processes	talk, us, friend	455
Friends	pal, buddy, coworker	37
Family	mom, brother, cousin	64
Humans	boy, woman, group	61
Affective Processes	happy, ugly, bitter	915
Positive Emotions	happy, pretty, good	405
Negative Emotions	hate, worthless, enemy	499
Anxiety	nervous, afraid, tense	91
Anger	hate, kill, pissed	184
Sadness	grief, cry, sad	101
Cognitive Processes	cause, know, ought	730
Insight	think, know, consider	195
Causation	because, effect, hence	108
Discrepancy	should, would, could	76
Tentative	maybe, perhaps, guess	155
Certainty	always, never	83
Inhibition	block, constrain	111
Inclusive	with, and, include	18
Exclusive	but, except, without	17
Perceptual Processes	see, touch, listen	273
Seeing	view, saw, look	72
Hearing	heard, listen, sound	51
Feeling	touch, hold, felt	75
Biological Processes	eat, blood, pain	567
Body	ache, heart, cough	180
Health	clinic, flu, pill	236
Sexuality	horny, love, incest	96
Ingestion	eat, swallow, taste	111
Relativity	area, bend, exit, stop	638
Motion	walk, move, go	168
Space	Down, in, thin	220
Time	hour, day, o'clock	239

EXAMPLE



Example of an egonet network (An ego network is defined as a portion of a social network formed of a given individual, termed ego, and the other persons with whom he/she has a social relationship, termed alters.)

CONCLUSION

AND FUTURE WORK



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THANK YOU