Problem Statement Category:
University

Team ID | Name:
HMT_98 : CyberOtaku

Submission Category:
Idea Hack

Problem Statement ID:
HMWUS_014

Team Leader Name:
Deepak Pawade

Problem Statement

Stress, depression, and anxiety are major problems faced by students during college life. Depression can affect a student's ability to work, study, interact with peers, or take care of themselves. Can we recognize the signs of depression through technology?

Objective

To make a Software that detects the Stress, Depression and Anxiety level by various methods like the Verbal Estimation, by the human interaction with the smart phone for e.g. the way the person types, taps and scrolls, while using Mobile phone as well as by using the data from the Social Media Networks. This data is encrypted and analyzed remotely using machine learning, and the results are shared with the patient and the patient's parents or with the University if needed..

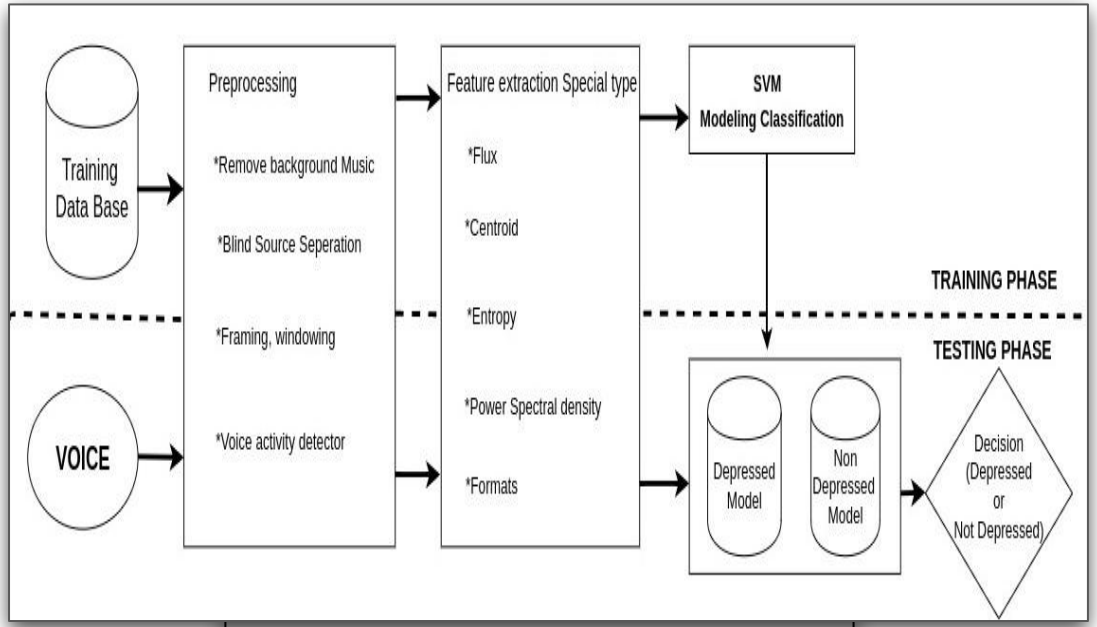
Sources For detecting the depression/Stress/Anxiety are as follows:-

1) Voice Estimation Technique (it is based on Meta-Regression method) :

The Dataset and the voice or frequency is given as the input to the filtering process and the output will be the prediction ,whether it is depressed or not

The filtering mechanism constitutes the system for preprocessing of the input where the aim is to provide the data set to the learning algorithm without any redundancies to make the better prediction.

This method can be used for the people who are neither on social Media nor have Smartphone.As the input for the filtering method is voice/ frequency.



Speech Filtration Method

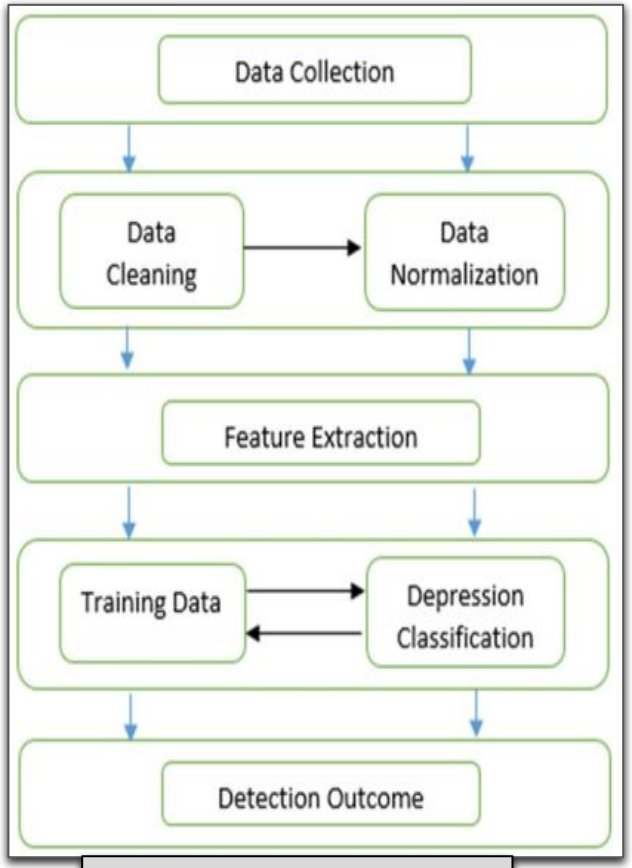
2) From Social Network Sites (Like Facebook, Twitter etc.)

By Using machine learning techniques could potentially find the unique patterns hidden in online communication and process them to reveal the mental state (such as ‘happiness’, ‘sad-ness’, ‘anger’, ‘anxiety’, depression).

In particular Facebook user’s comments is one which bear information on whether or not they could contain depression bearing content.

To tackle this issue we use NCapture for collecting data from Facebook among social networks’ users.

After collecting the raw data from Facebook, it was analyzed by using LIWC Software



Cleaning Method

Some Data Set Of Social Media Network

Examples	Response
I am currently having the problem of restlessness and needing to move but I also don't feel like moving	YES
I feel sad and con not concentrate in my studies	YES
I find faults in all the people around me and I feel lonely and alone	YES
My daughter started on depakote at age 16. She did ok but, when she started lithium things changed for the better. Even she recognized the change and gets upset if a Dr. Wants to take her off lithium. Everyone and every MD is different	YES
I hate the fact that I know some of my triggers but can't avoid them…I have to just keep up the exposure as I've been told this is better than isolating myself in fear	YES
I'm having a terrible day. Angry at everyone. Been so depressed now for more than 30 days in a row. Hiding in my bedroom away from people. Pushing my friends away. I'm trying to fix the urge to cut but fear I'm not strong enough to keep ignoring the call of the blade. Please I need help	YES
Put an alarm on your phone I need to again it works	NO
I use to use rubbing alcohol and worked whl younger but dint give a rats ass now still get teased by it by insecure men. But they can go fuck themselves	NO
Story of my life. I struggle with these things daily	NO
I take Latuda at night because it makes me sleepy and xanax throughout the day for anxiety	NO

Data from Comment Section of the Social Media

LIWC derived cues	Example word
Emotional process	
Positive emotion words	Happy, love, nice, sweet
Negative emotion words	Worthless, loser, hurt, ugly, 'nasty'
Sadness words	Worry, crying, grief, sad
Anger words	Stop, shit, hate, kill, annoyed
Anxiety words	Worried, fearful
Temporal process	
Present focus	Today, is, now
Past focus	Ago, did, talked
Future focus	Shall, may, will, soon
Linguistic style	
Articles	A, an, the
Prepositions	For, in, of, to, with, above
Auxiliary verbs	Do, have, am, will
Adverbs	Quickly, slowly, very, really
Conjunctions	And, but, whereas
Total pronouns	I, them, itself
Personal pronoun	I, them, her
1st person singular pronoun	I, me, mine
1st person plural pronoun	We, us, our
2nd person	You, your
3rd person singular pronoun	He, she, her, him
3rd person plural pronoun	They, their, they'd
Impersonal pronouns	It, it's, those
Verbs	Go, good
Negation	Deny, dishonest, no, not, never

Data by LIWC Software

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3) By Human interaction with Smartphone:

- The data collected on the participants' finger movement were used to calculate the common standard metrics used to assess biometric systems.
- The False Acceptance Rate (FAR) which indicates the probability of erroneously grant access to an intruder, and the False Rejection Rate (FRR) which is the probability which will wrongly deny access to a legitimate user. The point at which both FAR and FFR are equal is denoted the Equal Error Rate (ERR).
- We used the implementation of the Random Forest Classifier Algorithm.
- It done on the analysis of keystroke dynamics for identifying users as they type on a mobile phone can be found.

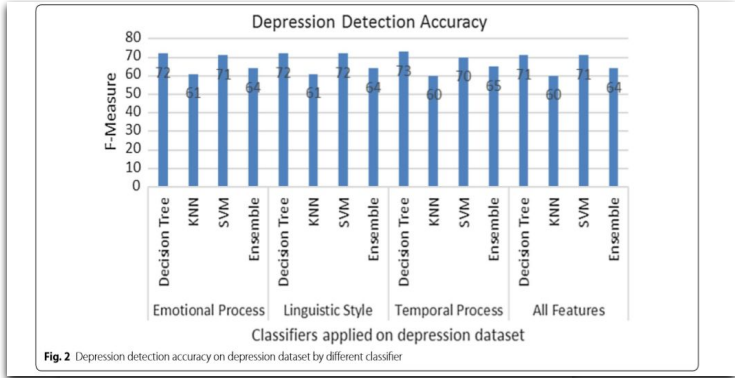
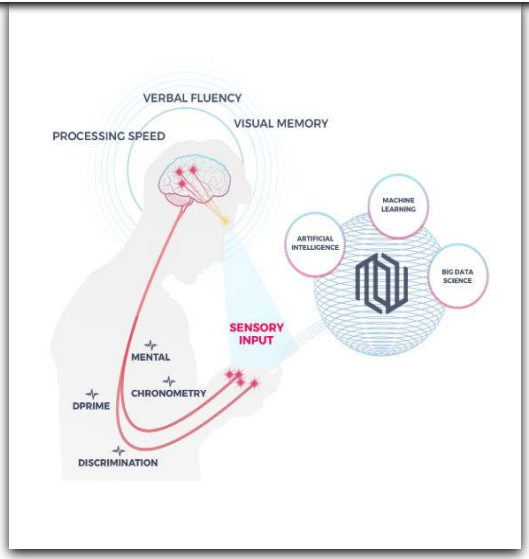


Fig. 2 Depression detection accuracy on depression dataset by different classifier



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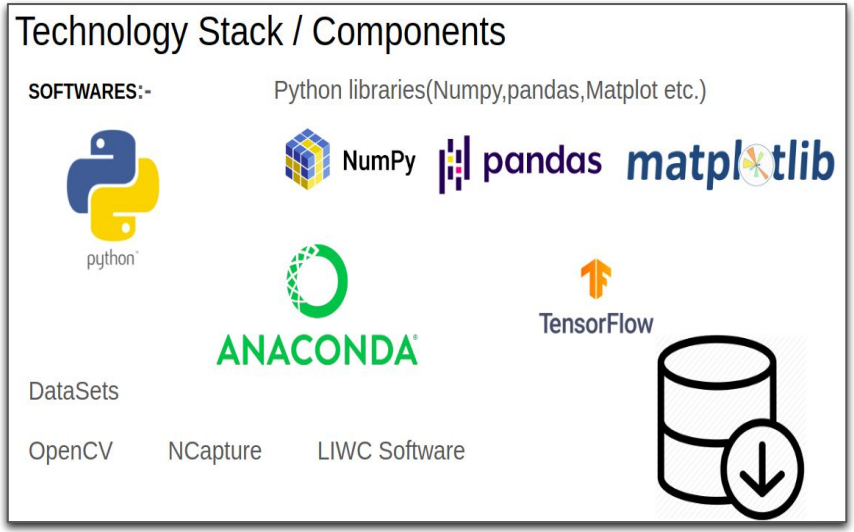
Technology / Methodology Used



The software can spot memory problems by tracking how fast you type on your smartphone, errors you make, how frequently you delete a character, and how fast you scroll down a contacts list.

Once at the server, the data collected by the softwarefi is analyzed by machine learning algorithms looking at five ‘biomarkers’ to understand your brain’s health.

Five Biomarkers: 1.Cognitive Control, 2.Execution Function, 3.Working Memory, 4.Processing Speed, 5.Emotional Valence.

We also identify that a Decision Tree classifier outperforms other classiflers (a SVM, KNN and Ensemble) for our dataset.

Finally, our work also shows the different ways of depression/Anxiety/Stress detection for mental disorder by using the technology.

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