Efficacy of Mood Analysis Using Voice Markers in Medical Diagnosis

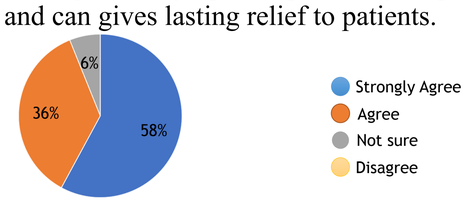
Participants : 302801, 302802, 302803

Introduction

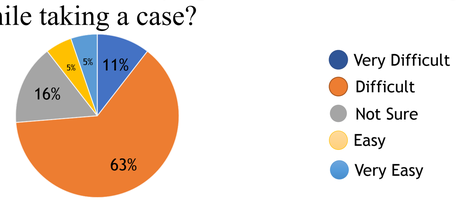
Intellectual health and physical health are greatly correlated. Peace, happiness, tranquility can create a positive impact on a person's well-being. In the same way, stress, trauma, anxiety, pressure, etc can all take a toll on a person's overall health. Clinical documents may reveal factual data about a patient's physical health, however to assess the true condition and to judge the impact of a medical condition on patient's well being we need an accurate sentimental and emotional analysis. They have an important role in accurate diagnosis of the patient of patient as a whole - mental and physical state. Thus the need for *Sentilyser,* a tool to accurately evaluate patient's mental emotions and mental state.

Need/Demand Survey

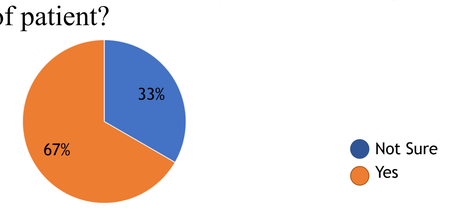
Correct interpretation of the symptoms of patients mind and a remedy prescribed using these symptoms positively impact the outcomes of case and can gives lasting relief to patients.



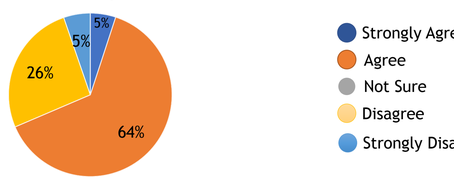
How difficult is it to elicit symptoms of mind during initial consultations while taking a case?



Would you like to use a voice analysis tool to help understand emotional state of patient?

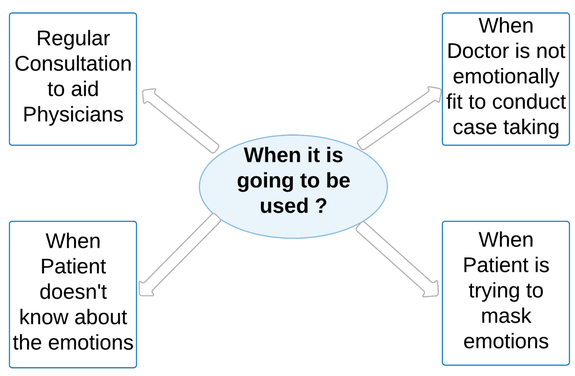


During first consultation patient may try to mask their emotions and share symptoms contrary to their current state.



Note: We shared our concept with about 400 healthcare providers to understand their perspective as to how *Sentilyser* can help in their clinical practice.

When to Use



Advantages

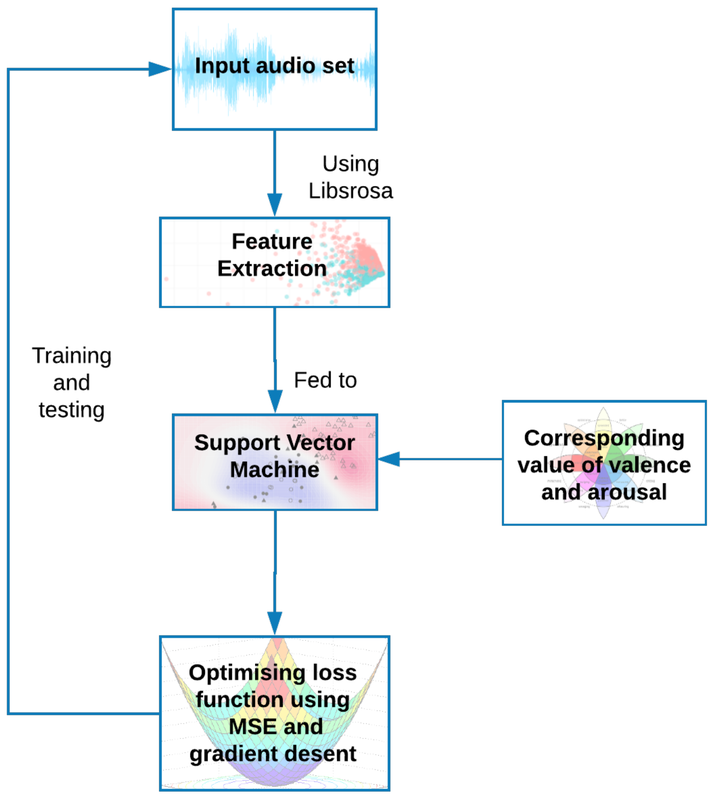
- We aim to analyse audio data sets directly.
- Regular approach is to convert Voice > Text > Emotion .
- Distance is no longer a handicap while taking a case taking in tele medicine.
- Never been used before in fields like Psycho Analysis, Homeopathy, etc. where evaluation of mental state of a patient is a primary requirement.

Technology

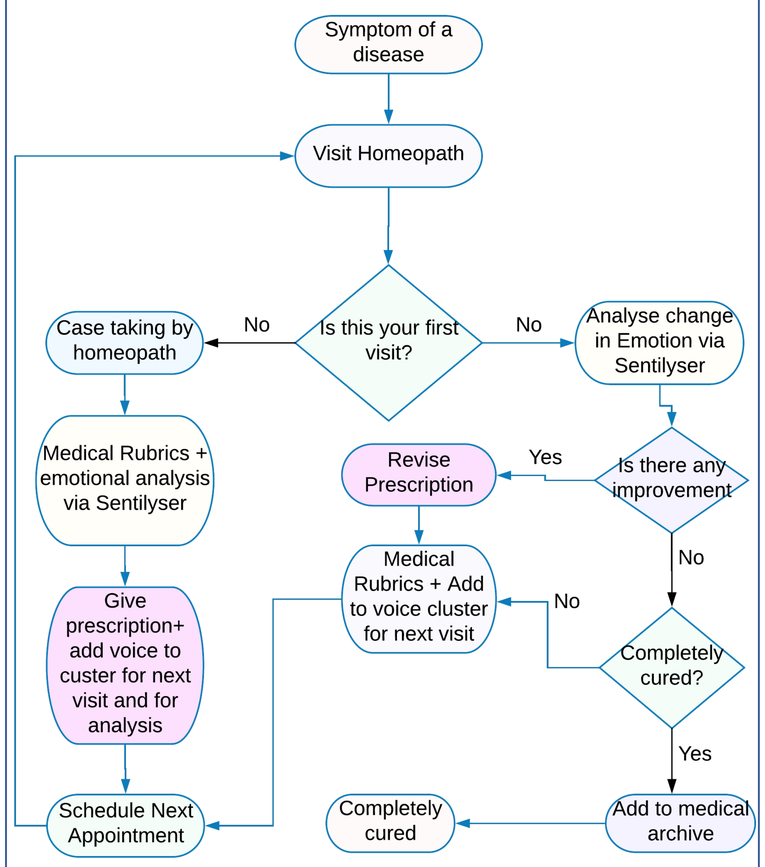
For the analysis of the current mood of a person, their audio clip is analysed.

- Features like pitch, frequency, pace etc of the speech are exploited.
- Using Librosa library in python, functions like Zero Entropy Rate, Spectral Coefficient, Chroma Vector, Chroma Deviation, Spectral Flux, etc are calculated.
- These values along with the corresponding values of arousal and valence for the given audio file are fed to the Support Vector Machine.
- These values are mapped and the SVM is trained.
- Error function Mean Square Error is optimised using Gradient Descent.
- When new audio file is fed to the SVM, we get the value for arousal and valence for that audio file.
- Using k-nn classifier, we find the 3 nearing sentiments that matches with the value of on the psychometric chart.

Training and Testing

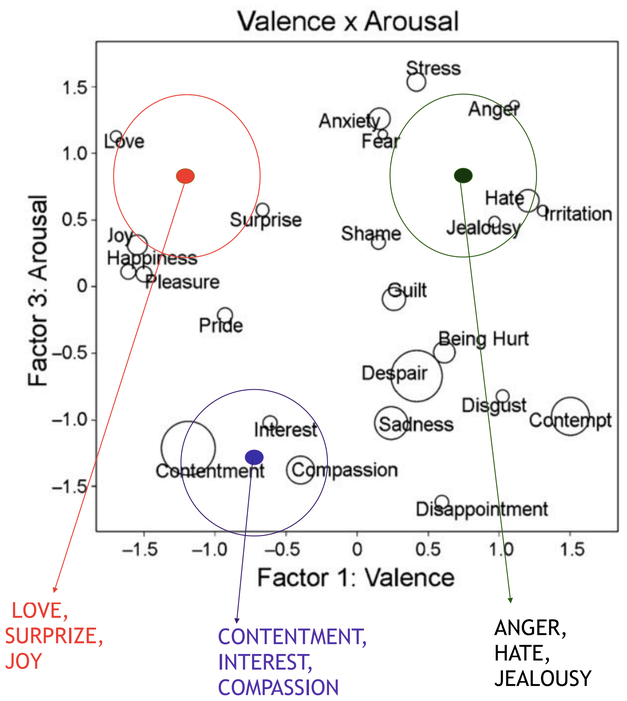


System Architecture



Note - The above is a use case of case taking in Homeopathy.

Results



Conclusion

Sentilyser uses voice analysis as a part of patient diagnosis, which will help the physician better understand patient's emotional state, plan treatment and evaluate response to therapy. *Sentilyser* role will be critical in cases where the patients themselves are unaware about their own psychological state.