



## Mental State Classification for Hypnotherapy Using Sentiment Analysis

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**Abstract**— *Our day-to-day life has always been influenced by what people think. Ideas and opinions of others have always affected our own opinions. As a result there has been an eruption of interest in people to mine these vast resources of data for opinions. Sentiment Analysis is the computational treatment of opinions, sentiments and subjectivity of text. In this proposed system, we take overall look at its working. The system features along with its functionalities are being touched upon. A supervised or data-driven technique to Sentiment Analysis like Support Vector Machine will be employed. A text document will be provided as input to the software. This will contain the sentiment of patient. This document will then be classified using SVM and report regarding the mental state will be generated.*

**Keywords**— *Sentiment Analysis, Classification, Hypnotherapist, Patient, Mental State*

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### I. INTRODUCTION

Sentiment Analysis is that field of IT wherein not only the technical aspect, but also the feelings and sentiments of an individual are taken into consideration, hence the name. Sentiment Analysis has attracted a great deal of attention in recent times due to its potential applications in information retrieval, question answering systems, helping them to summarize the opinions(positive/negative) of the people with respect to text written by them. By using Sentiment Analysis, we are trying to do this by proposing a system which will be an aid to a Hypnotherapist. The whole system revolves around taking the tags from the hypnotherapist for patients and classifying them on the scale of negativity.

Sentiment analysis (also known as opinion mining) refers to the use of natural language processing, text analysis and computational linguistics to identify and extract subjective information in source materials. Generally speaking, sentiment analysis aims to determine the attitude of a speaker or a writer with respect to some topic or the overall contextual polarity of a document. The attitude may be his or her judgment or evaluation (see appraisal theory), affective state (that is to say, the emotional state of the author when writing), or the intended emotional communication (that is to say, the emotional effect the author wishes to have on the reader).

A basic task in sentiment analysis is classifying the polarity of a given text at the document, sentence, or feature/aspect level — whether the expressed opinion in a document, a sentence or an entity feature/aspect is positive, negative, or neutral. Advanced, "beyond polarity" sentiment classification looks, for instance, at emotional states such as "angry," "sad," and "happy."

A different method for determining sentiment is the use of a scaling system whereby words commonly associated with having a negative, neutral or positive sentiment with them are given an associated number on a -10 to +10 scale (most negative up to most positive) and when a piece of unstructured text is analysed using natural language processing, the subsequent concepts are analysed for an understanding of these words and how they relate to the concept. Each concept is then given a score based on the way sentiment words relate to the concept, and their associated score. This allows movement to a more sophisticated understanding of sentiment based on a scale. Alternatively, texts can be given a positive and negative sentiment strength score if the goal is to determine the sentiment in a text rather than the overall polarity and strength of the text.

Another research direction is subjectivity/objectivity identification. This task is commonly defined as classifying a given text (usually a sentence) into one of two classes: objective or subjective. This problem can sometimes be more difficult than polarity classification the subjectivity of words and phrases may depend on their context and an objective document may contain subjective sentences (e.g., a news article quoting people's opinions). Moreover, as mentioned by Su results are largely dependent on the definition of subjectivity used when annotating texts. However, Pang showed that removing objective sentences from a document before classifying its polarity helped improve performance.

Computers can perform automated sentiment analysis of digital texts, using elements from machine learning such as latent semantic analysis, support vector machines, "bag of words" and Semantic Orientation — Point wise Mutual Information. More sophisticated methods try to detect the holder of a sentiment (i.e. the person who maintains that affective state). To mine the opinion in context and get the feature which has been opinionated, the grammatical relationships of words are used. Grammatical dependency relations are obtained by deep parsing of the text. The accuracy of a sentiment analysis system is, in principle, how well it agrees with human judgments. This is usually measured by precision and recall. However, according to research human ratters typically agree 79% of the time. Thus, a 70% accurate program is doing nearly as well as humans, even though such accuracy may not sound impressive. If a

program were "right" 100% of the time, humans would still disagree with it about 20% of the time, since they disagree that much about any answer. More sophisticated measures can be applied, but evaluation of sentiment analysis systems remains a complex matter. For sentiment analysis tasks returning a scale rather than a binary judgement, correlation is a better measure than precision because it takes into account how close the predicted value is to the target value.

The rise of social media such as blogs and social networks has fuelled interest in sentiment analysis. With this in the background, our system will work on the Support Vector Machine algorithm which will classify the sentiments on three scales of negativity. A detailed report will then be generated and will work as an output to the system.

## II. LITERATURE SURVEY

Sentiment analysis has several subtasks, all of them concern with tagging a given text according to expressed opinion. Work has been done in the field of sentiment analysis by professionals as well as students in order to understand emotions of people, to know about movie or any product review etc. They have mainly been implemented using either Word net or SentiWordNet lexicon. Lexicon is essentially a catalogue of a given language's words and grammar, a system of rules which allows for the combination of those words into meaningful sentences. Several research teams in universities around the world have focused on understanding the dynamics of sentiment in e-communities through sentiment analysis. In opinion mining of product reviews, the software's have focussed on classifying the reviews as to good or bad (Positive or negative). They help in determining the quality of a product. The result is produced as a summary of opinions based on product features/attributes which can be expressed by different people in different ways. Thus, similar words have been grouped in the same feature groups in those software's. Similarly work has been done in movie review case wherein one can analyse how good the movie actually is based on the reviews given to it. Some more examples of the work done in sentiment analysis includes determining text subjective objective polarity, which helps in deciding whether a given text has a factual nature or expresses an opinion on its subject matter. This amounts to performing binary text categorization under the category -Subjective and Objective. [1]

Mining opinions and sentiments from web sites is a popular application for social media systems. The paper Delta TFIDF: An Improved Feature Space for Sentiment Analysis presents Delta TFIDF technique to efficiently weigh words before they are classified. [2]

The problem of classifying documents not by topic, but by overall sentiment, e.g., determining whether a review is positive or negative has been done which uses movie reviews as data. Some machine learning methods which were employed (Naive-Bayes, maximum entropy classification) did not perform as well on sentiment classification as on traditional topic-based categorization. [3]

## III. SENTIMENT ANALYSIS

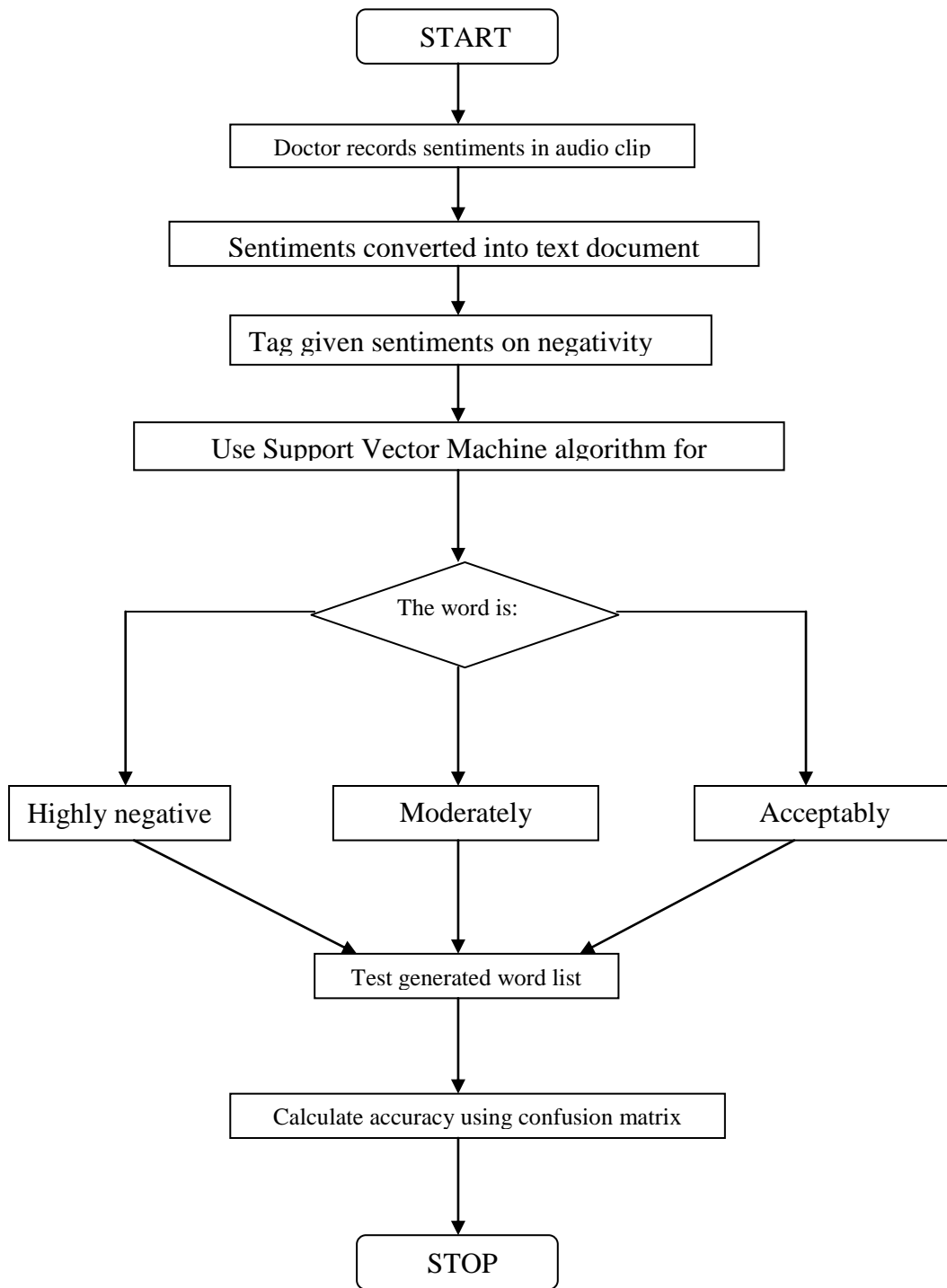
### 1. Working of Entire Sentiment Analysis.

Formula:

$$\text{Log} (Pt+0.0001/Nt+0.0001)$$

Where 0.0001 is used to avoid the indeterminate form.

Term List	f1	f2	f3	f4	f5
I am	3	7	8	2	4
Am very	4	1	0	2	3
Very depressed	1	2	0	0	1



SYSTEM FLOW DIAGRAM

2. Confusion Matrix

PRE GIVEN \	STRONGLY -VE	MODERATELY -VE	ACCEPTABLY -VE
STRONGLY -VE	10	2	1
MODERATELY -VE	2	10	1
ACCEPTABLY -VE	3	1	10

#### IV. CONCLUSIONS

Thus, the proposed system is able to collect useful information from the recorded answers and efficiently perform Sentiment Analysis on the data and predict the negativity in the minds of the patients. It even helps the hypnotherapist gain insight about the mental state of the patient. Also, the user friendly GUI makes this analysis efficient and easy.

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