
A Study on Emotion Detection & Classification from Text using Machine Learning

Ms. Pinal Solanki*

*Assistant Professor, Vimal Tormal Poddar BCA College Gujarat, India

Corresponding Email: [*pinalsolankip17@gmail.com](mailto:pinalsolankip17@gmail.com)

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Abstract: *Humans are using online social networks to share their opinions and thoughts on a variety of subjects and topics with their friends, family, and relations through text, photographs, audio and video messages and posts. On specific social, national, and global topics, humans can share their thoughts, mental states, moments, and viewpoints. Given the variety of communication options available, text is one of the most popular mediums of communication on social media. The study described here aims to detect and analyses sentiment and emotion expressed by people in their messages, and then use that information to generate suggestions. Humans collected comments and replies on a few specific topics and created a dataset with text, sentiment emotion, and other data.*

Emotion identification from Text is a new topic of research that is closely related to sentiment analysis. Anger, disgust, fear, happiness, sadness, and surprise are examples of emotions that may be detected and understood by the expression of texts using Emotion Analysis. Emotion Detection focuses on feature extraction and word recognition because pre-processing techniques improve accuracy of classification.

Keywords: *Sentiment Analysis, Natural Language Processing, Emotion Detection(ED), Text-Based Emotion (TEM), Social Network, Social Media , Feature extraction, Pre-processing, Word Embedding.*

1. INTRODUCTION

Emotion is a complex, multidimensional feature that represents a person's attitudes and behavioral characteristics. Humans express their emotions about a variety of situations, events, people, the environment, and even the smallest things in their daily lives. They communicate their feelings to others through a variety of techniques. Speech and facial gestures are the most common ways to communicate feelings to others. Humans now are expressing their emotions to their friends through various forms of social media posts as technology and social networks improve. Given the fact that new technologies have allowed users of social networking platforms to express themselves through "audios" and "videos,"



text continues to be a common mode of communication in social networks. People use social media to communicate their thoughts (status updates, comments, blogs, micro - blogs, and so on)

Literature Review

Table 1 Comparison of Existing Work

Sr. No.	Title	Authors	Journal Name & Year	Technology/ Methods/ Algorithm	Features selection	Data source	Accuracy
1.	Emotion Detection from Social Media Using Machine Learning Techniques: A Survey	Vijaya Ahire Et al. [1]	Springer 2022	Lexicon-based and Machine learning techniques	Pre-classified data	What's App Chats	72.9%
					Sub word-LSTM	Twitter	65.8%
2.	A review on sentiment analysis and emotion detection from text	Pansy Nandwani Et al. [2]	Springer 2021	Machine Learning-based Techniques Naive Bayes, support vector machine (SVM), decision trees,	N-gram	Twitter	71.4%
3.	A Survey of Textual Emotion Recognition and Its Challenges	Jiawen Deng Et al. [3]	IEEE 2021	Word embedding technique	Word2Vec, Glove & FastText	Facebook & Twitter	-
4.	Transformer models for	Francisca Adoma	Springer	Machine Learning	Bidirectional Encoder	General chat	77.5 %



	text based emotion detection: a review of BERT based approaches	Acheampong Et al.[4]	2021	technique	Re-representation from Transformers (BERT)	Emotion push	86.3%
5.	Sentiment Analysis in Social Media Data for Depression Detection Using Artificial Intelligence: A Review	Nirmal Varghese Babu Et al.[5]	Springer 2021	SVM	Term Frequency Inverse Document Frequency (TF-IDF), Bag-of-words (BOW) Word2Vec	Twitter	81.2%
				Naive Bayes			74.2%
6.	Attention-Emotion-Enhanced Convolutional LSTM for Sentiment Analysis	Faliang Huang Et al. [6]	IEEE 2021	Support vector machines (SVM), Naive Bayes	BOW and N-gram	IMDB and Yelp2014	-
7.	Decoding Emotions in Text Using GloVe Embeddings	Piyush Gupta Et al.[7]	IEEE 2021	GloVe Embeddings	N-grams, POS tags	Twitter	93.0%
8	Selective shallow models strength integration for emotion detection using GloVe and LSTM	Aditya Vijayvergiya Et.al [8]	Springer 2021	Support vector machine	GloVe and LSTM	Twitter	86.16 %
9.	Relationship Identification Between	Saira Qamar Et al. [9]	Springer 2021	Supervised machine Learning	KNN (k-nearest neighbor),	Movie dialogues	85%



	Conversational Agents Using Emotion Analysis				NN (neural networks), and DT (decision trees)		
10.	Combining Context-aware Embeddings and an Attention Deep Learning Model for Arabic Affect Analysis on Twitter	Hanane ELFAIK Et al. [10]	IEEE 2021	AraBERT and an attention-based LSTM-BiLSTM deep model	Contextualized embeddings	Twitter	53.82%
11.	Emotion Detection of Twitter Post using Multinomial Naive Bayes	Nazia Anjum Sharupa Et al. [11]	IEEE 2019	Naive Bayes	Unigram model	Twitter	67.5%
					Unigram with POS tag Model		72.25%
12.	Topic specific emotion detection for retweet prediction	Syeda Nadia Firdaus Et al. [12]	Springer 2019	TF-IDF technique	Tree based classifier Random Forest	Twitter	81%
					Rule based classifier JR ip		82%

2. PROPOSED RESEARCH METHODOLOGY

Methodology

Emotion detection is the process of classifying text into different stages. The stages described here are used.



1. Data Collection

Data for Emotion Detection is collected from many social networks at this stage. Twitter tweets, Face book comments, news reviews, movie reviews, and so on.

2. Text Preparation

Data Pre-processing is another name for this stage. The data from the previous stage is pre-processed in this stage. Tokenization, stop words removal, stemming, and other techniques are used to do this. Text preparation enhances detection accuracy.

3. Feature Extraction

To determine sentiment score, feature extraction and identification are necessary. This approach detects emotions by collecting features from data. Filter-based, wrapper-based, embedding, or combination feature selection techniques can be used to assess specific features or subsets of features. Filter-based methods are quick and flexible, makes them perfect for detecting tweet sentiment because their speed matches the huge volume of examples and large number of features related with this domain. In this domain, filter-based subset analysis, wrapper-based techniques, and combination algorithms, on the other hand, demand much greater processing resources. Embedded methods are specific to a classifier and do not apply when working with a large number of different classifiers.

4. Classification

The computer system automatically analyses the connection between each text and many types of categories, then assigns the text to one of the categories, according to the basic principles of text classification based on supervised learning algorithms. Anger, disgust, fear, happiness, sadness, and surprise are only few of the emotions that can be classified. SVM, NB, K-NN, and NLP are just a few of the techniques available.

5. Presentation of Output

In text classification, three criteria are commonly used: recall, precision, and accuracy.

Research Gap

As per Emotion Detection and Classification from Text in English Statement, Comments and Replies there are multiple approaches used for Supervised Learning algorithm like Naive Bayes, Decision Tree, K-NN and SVM. As per my review there are some common challenges in Emotion Sentiment analyses like:

1. In a communication, text is commonly displayed with unclear and incorrect spelling.
2. So that a single comment in different languages can have multiple meanings.
3. There are no limits on language. Words can be created by named things, user errors, and improper misspelling.
4. Some sentences may be sarcastic, resulting in an improper outcome.
5. Many times, sentiments are unclear due to the presence of multiple points of view on the subject.



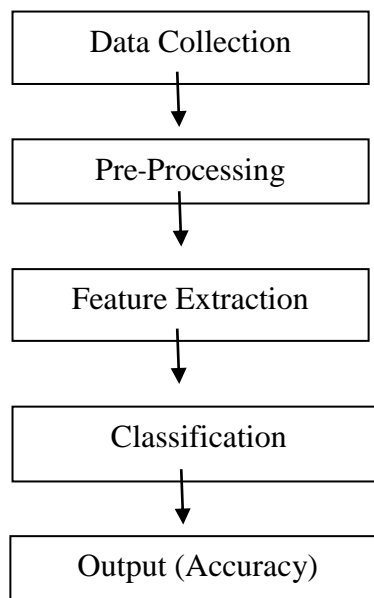
Proposed research will try to create classification in category like Anger, Disgust, Fear, Happiness, Sadness, and Surprise are examples of emotions that may be detected and understood by the expression of texts using Emotion Analysis.

Research Objective

Emotions have an effect on human decision-making and help us communicate more effectively with the entire world. The process of identifying a person's different emotions or moods is known as emotion detection for example Happiness, Sadness, and Surprise etc.

A. Proposed System

The proposed model for our study effort is represented in the diagram below. The proposed model has many stages, which are given below.



B. Proposed Algorithm

1. Create Dataset
2. Perform Pre-Processing using NLP technique
3. Feature Extraction
4. Data/Text classification using Supervised learning algorithms.
5. Model Evaluation.



Application

Emotion Detection is extremely useful in social media monitoring as it allows us to gain an overview of the wider human emotion or opinion behind certain topics. Being able to quickly see the emotion behind everything from social network posts to news articles means being better able to strategies and plan for the future.

Emotion Detection analysis is a Natural Language Processing (NLP) technique used to Classification in different category or label like Anger, Disgust, Fear, Happiness, Sadness, and Surprise etc.

3. CONCLUSION

This study utilizes a variety of methods to classify emotions based on text. It's not based on the first word in the sentence; it also analyses the surrounding words before displaying the answer. Based on a study, the proposed study found that SVM and TF-IDF are more accurate. As a result, researchers can detect text with high accuracy using better feature extraction/word embedding techniques and a supervised learning algorithm. The most useful feature extraction techniques may help to increase classification accuracy.

4. REFERENCES

1. Vijaya Ahire et al. "Emotion Detection from Social Media Using Machine Learning Techniques: A Survey", © Springer 2022.
2. Pansy Nandwani Et al. "A review on sentiment analysis and emotion detection from text", © Springer 2021.
3. Jiawen Deng Et al. "A Survey of Textual Emotion Recognition and Its Challenges", © IEEE 2021.
4. Francisca Adoma Acheampong Et al. "Transformer models for text based emotion detection: a review of BERT based approaches", © Springer 2021.
5. Nirmal Varghese Babu Et al. "A Sentiment Analysis in Social Media Data for Depression Detection using Artificial Intelligence: A Review", © Springer 2021.
6. Md Faliang Huang Et al. "Attention-Emotion-Enhanced Convolutional LSTM for Sentiment Analysis", © IEEE 2021.
7. Piyush Gupta Et al. "Review of Decoding Emotions in Text Using GloVe Embeddings", © IEEE 2021.
8. Aditya Vijayvergia Et.al. "Emotion Selective shallow models strength integration for emotion detection using GloVe and LSTM" © Springer 2021.
9. Saira Qamar Et al. "Relationship Identification Between Conversational Agents Using Emotion Analysis", © Springer 2021.
10. Hanane ELFAIK Et al. "Combining Context-aware Embeddings and an Attentional Deep Learning Model for Arabic Affect Analysis on Twitter" © IEEE 2021.
11. Nazia Anjum Sharupa Et al. "Emotion Detection of Twitter Post using Multinomial Naive Bayes", © IEEE 2019.
12. Syeda Nadia Firdaus Et al. "Emotion Topic specific emotion detection for retweet prediction", © Springer 2019.