



# MACHINE LEARNING TO ANALYZE TWEETS TO IMPROVE WOMEN'S SAFETY

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**Abstract:** The harassment of women today occurs in several cities. It starts with stalking, which leads to abusive harassment. The main focus of this paper is on how social media can be used to promote the safety of women in India, specifically Twitter, Facebook, and Instagram, which are all social media platforms that promote social safety for women.

A key component of this paper is the development of the common people's responsibilities in Indian cities in order to ensure the safety of women in the surrounding areas. Tweets contain text messages, audio files, videos, images, smiley faces, and hashtags.

Using social media to spread a message about women's safety in Indian cities, including pictures and text, may be a powerful way to educate Indian youths about the importance of punishing harassers of women and taking harsh actions. A major goal of this article is to create a women's safety index that can be used for comparing the safety of women across a few major cities, including Delhi, Mumbai, Pune, and Chennai.

The threat of violence and harassment against women and girls in public spaces in many cities ranges from stalking to sexual harassment and assault. There are a variety of statistical methods used to rank all cities based on distinct factors. This study primarily explores how social media can enhance women's safety in Indian cities.

**Keywords:** Twitter, Machine Learning, Architecture, Data, social media, Sentimental Analysis.

## 1. INTRODUCTION

As the ultimate microblogging platform in the world today, Twitter has over a hundred million users and over five thousand 'Tweets' sent each minute. The large number of people who have used Twitter allowed them to share their opinions and judgments on any current issue or topic on the internet; thus, Twitter has become an informative source for all sectors, including corporations, organizations, and institutions.

As Twitter's 140-character limit means a tweet can only be 140 characters long, users must condense their thoughts with acronyms, slang, shot forms, emoticons, and other methods to convey their thoughts. The sentiment underlying the tweet is derived from the tweet itself. Also, many people use polysemy and sarcasm to convey their views, which makes twitter language unstructured. An analysis of sentiment can be performed to retrieve this information. The sentiment analysis' findings can be used in a variety of ways

## 2. ANALYSIS OF DATA

An analysis of sentiments can be applied to a variety of situations, such as analyzing public sentiment toward a particular brand or product release, analyzing public opinion on government policies, and women's perceptions. Data obtained by Twitter has been studied extensively in order to perform the classification of tweets and analyze the outcome. The focus of our paper is on machine learning algorithm and its models. We also review some studies on machine learning in this paper, as well as research on sentiment analysis. The practice of staring at and making comments about women, which is a form of violence and harassment usually tolerated by urban people despite the fact that it is unacceptable, is

unacceptable. Sexual harassment and other practices have been reported in India by many women, according to many studies. According to studies, women also feel unsafe in unfamiliar environments in cities like Delhi, Pune, Chennai and Mumbai.

There is no limit to what people can say about Indian politics, society, and many other issues on social media. In the same vein, women can also share their experiences if they have been subjected to violence or sexual harassment, which enables innocent people to unite against such acts of violence and harassment. Using Twitter's tweet text collection, we were able to identify the people who harassed women as well as those women and innocent people who stood up against the violence of men or unethical behavior, making it difficult for them to walk freely.

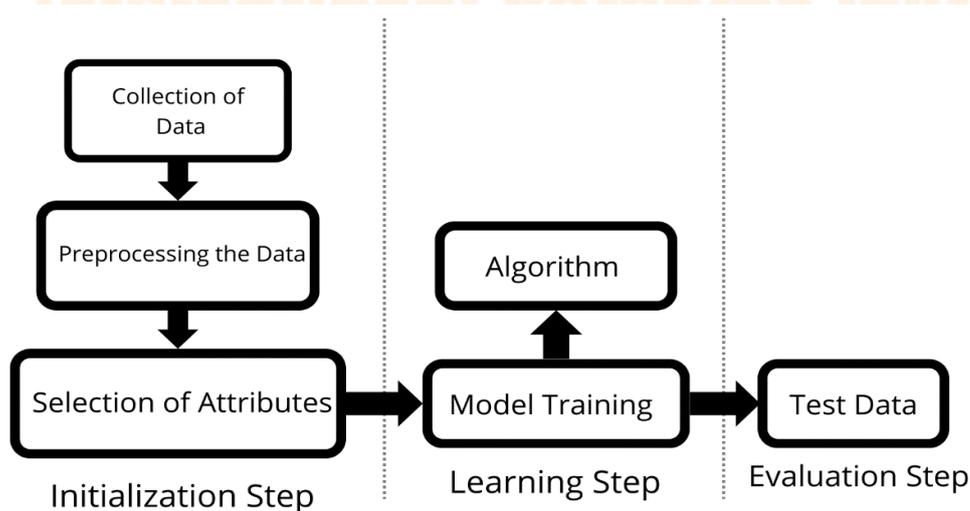
Machine learning algorithms and models will be applied to the tweet data set. As a result of this algorithm, zero values will be eliminated from the tweet data, allowing a method of analyzing tweet data and removing redundant data to be developed using Laplace and Porter's theory. In recent years, social media platforms like Twitter, Facebook, and Instagram have gained a huge following. Text messages, emoticons and hashtags are some methods of communicating sentiments about society, politics, females, etc. There are lexicon-based, machine learning, and sentiment analysis methods.

### 3.TWEET SENTIMENTAL ANALYSIS

Tweet sentiment analysis is a method for gaining information about the sentiment behind any statement or sentence. It can be thought of as a classification technique used to determine the sentiment behind a tweet.

A sentiment opinion can be used to formulate a sentiment that can then be used as a basis for sentiment classification. As sentiments are individual to each topic, we must decide what specifications will be formulated from them. With the programming model, the person performing sentimental analysis wants to find the entity class of tweets. It is important to consider the size of the sentimental class when determining the algorithm's efficiency.

There are two types of sentimental classifications for tweets - Positive and Negative - or three types of sentimental classification - Positive, Negative and Neutral. It is possible to categorize sentimental analysis approaches into two kinds, a machine learning-based approach and a lexicon learning-based approach. An approach to machine learning involves extracting features and programming models based on features obtained from datasets. Unlike lexicon learning-based approaches that use vocabulary and scoring methods to detect opinions, we use machine learning to identify opinions. To perform sentimental analysis, the basic steps are to collect the data, process it, extract features from the data, choose base features, detect sentiments and classify sentiments using machine learning algorithms or simple computations.



**Process of Analysis**

#### 3.1) Data extraction:

Getting data from social media sites such as Twitter is the first step in sentiment analysis. This allows us to extract the tweet message, but also extract additional information such as tweet likes and dislikes as well as comments.

### 3.2) Text Cleaning:

When the social media resources have been extracted as datasets, they must be sent to a classifier. In order to make sure non-textual stuff is recognized and removed before the analysis, the classifier cleans the dataset by removing unnecessary data such as stop words and emoticons.

### 3.3) Sentimental Analysis:

A classifier cleans up the dataset and readys it to be analyzed with sentiment analysis techniques such as machine learning, Lexicon-based learning, and hybrid learning. NLP (Natural Language Process) and NERO-Linguistic Programming are other techniques available. For a classifier to complete the algorithm, both training and testing data are needed. The machine learning algorithm requires both training and testing data. Classifiers can be trained using many algorithms, including maximum entropy, Naive Bayes classification, Bayesian Networks, and Network Support Vector Machines. Using the testing dataset, one can determine the efficiency of the sentiment classifier. When learning using Lexicon-based learning, the training dataset is not utilized. Using this method, words associated with human emotions are built into the vocabulary. Hybrid learning is the third approach to increasing the effectiveness of the classifier; it combines both machine learning and lexical learning

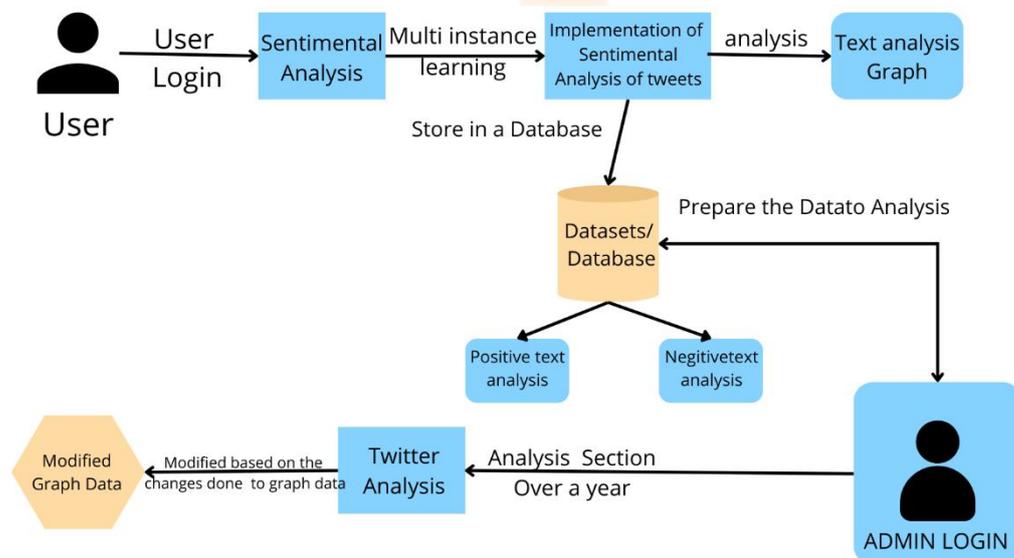
### 3.4) Sentimental Classification:

At this point, the dataset is ready to be classified. A subjectivity opinion is developed based on the evaluation of each tweet sentence. The objective expression sentences are discarded, while the subjective expression sentences are retained. A variety of sentiment analysis techniques are applied, including metagrams, negation, and lemmas. Positive and negative emotions can be divided into two broad categories. During this phase of sentimental analysis, each of the retained subjective statements receives a rating of excellent, bad, like, dislike, or positive and negative.

### 3.5) Output Result:

It is essential to perform sentiment analysis in order to extract relevant and usable information from raw data. A variety of graph forms can be used to show the results of the analysis after the method has been performed. The results can be presented in a variety of ways, including bar graphs, time series, and pie charts. A bar graph can be used to evaluate the positivity and negativity of tweets. In addition to measuring likes, dislikes, and average tweet length over time, time series can also be used to identify trending topics.

## 4. System Architecture



### Architecture

Users' credentials, tweets, retweets and tweet scores will all be stored in the database so that admins can monitor and analyze them. In order to monitor and confirm whether any tweets are abusive to women, sentiment analysis is used on the user data. The admin performs this analysis on each and every tweet of each user so women are safe. Sentiment analysis will be applied to the tweets of users stored in the database. Admin can now prepare the data to perform the analysis. All tweets sent by the application users will be used as input for the sentiment analysis, hence they will be the dataset in the sentiment analysis. Additionally, it is possible to see the text analysis graph. The admin will store the

filters in the database. Filters are keywords for which the tweet context is searched for in order to determine whether the tweet is abusive. There can be two types of filters - positive keyword and negative keyword. Positive keywords refer to words that are abusive or disrespectful to women. Negative keywords refer to words that are normal and won't hurt the women.

The database can contain 'n' number of positive and negative keywords. When the admin implements sentimental analysis, every word in the database is compared with each and every word in the user's tweet. Whenever a positive keyword appears in a tweet, it will be considered as a positive sentimental analysis and is abusive to women. It will be classified as negative sentimental analysis if negative keywords are found in the tweet, which will not be abusive to women. Hence, by this stage, there will be two types of sentimental analysis created based on the filter in the database. A list of all abusive tweets will appear under positive sentimental analysis. A list of clean and non-abusive tweets will appear under negative sentimental analysis. At each of the analysis lists, users' details will also be provided along with the tweet context.

## 5.CONCLUSION AND FUTURE WORK

We have discussed machine learning algorithms throughout the project. Machine learning algorithms assist in organizing and performing analysis of Twitter data, which includes millions of tweets and messages every day. In addition to SPC and linear algebraic algorithms, other algorithms provide categorization to large data sets and transform them into meaningful data sets. Therefore, we can process sentimental analysis using machine learning algorithms and make women more protected by spreading awareness.

Since only Twitter is considered in our project, we can extend these machine learning algorithms to other social media platforms as well like Facebook and Instagram for future enhancement. Currently, the ideology being proposed can be integrated into Twitter's application interface to reach a larger audience and to perform sentimental analysis on millions of tweets to provide greater safety.

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