

An Examination of the Data Collected on Twitter Regarding Food Using a Machine Learning Classification Method

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Abstract- Most individuals use Facebook and Twitter to communicate globally. Twitter illustrates. Daily live news, ratings for brands, items, businesses, and locations, and user reviews develop community. This project removes bogus news from Kaggle's Twitter data sets and analyzes Twitter API sentiment. Why? Tokenize and remove stop words from Twitter data before processing. Feature extraction follows. These mechanisms evaluate each word. Testing several noisy data-trained models. Twitter sentiment analysis machine learning classifiers are tested. KFC and McDonald's provide data sets with over 14,000 tweets and more popular themes. Testing has 4,000 tweets and training 10,000. Our method analyzed these models' outcomes after modifying their parameters. Performance evaluations improve sentiment analysis.

Keywords- Sentiment Analysis, Twitter Data, Social Media, Machine Learning Classifier: Support Vector Machine (SVM), Decision Tree (DTs), RandomForest (RF).

I. INTRODUCTION

In recent year people in these days depending on microblogging sites like facebook instagram, tumblr, twitter youtube millions people share the posts, live news and express their opinion about different subjects such as a political affair, product review, educational, women issue and general topics, extracting knowledge from the twitter data [1]. Sentiment analysis is the mining of opinion and analysis of twitter data and that describe as a positive negative and neutral category which explore data from various social media platforms [2]. The aim of this analysis in research determining the subjectivity opinion.

Result of this analysis based on this sentiment analysis and review of tweets or classified opinions which are based on the data size and document type [4]. Twitter application is an excellent medium for creation of tweets presentations [5].

Twitter analysis is a popular topic for research. Such analysis is useful because it's gathering by crawler data which are used for collect to data from twitter and classified public opinion by analyzing of vast social media data [6]. The aims of this study that analyse the level of sentiment from the social media [7]

In this sentiment analysis we are using twitter API for extracting data then cleaning the data and after these processes fed data into three classified tweets on the basis of sentiment (new data) [8]. This Analysis helps to

understand the way of thinking about any research topic brands, products etc [9].

Through the advertisement campaign can see how people are reacting from this campaign in personal marketing. There is a way to analyze sentiment related to them.[10]. Use of the same campaign can be seen as reacting for Political parties and can be analyzed.

There are several reasons for sentiment analysis where we can choose twitter data as given below.

- On twitter more than 500 million numbers of tweets on daily bases and that is a vast level of data for sentiment analysis.
- On Twitter there is number of all age groups people, with a high percentage of business executives' people being present from many countries on social media.
- 50 million or more people download from many browser twitter applications.

In this study we have used of supervised learning Classifiers to analyze the sentiment of the people for this analysis. Such as Support Vector machine learning classifiers (SVM), Decision tree (DTs) and Random forest (RF). In this result we will compare all classifiers based on accuracy which gives the best result. Finally for this research we also used machine learning techniques.

In our work we introduced of score vector of tweets and our external features with n-gram of features and show that impact of SVM classifies on for improve our classification performance level. This piece of work pioneered the concept of opinion-based expression within the field of machine learning by making use of data from

Twitter's sentiment analysis. The proposed model makes use of a wide range of distinct approaches in order to achieve more accurate classification of tweets. A variety of approaches to data analysis are being used in an attempt to decipher the sentiments expressed by users of Twitter. The process of determining whether a person's feelings and thoughts are good, negative, or neutral is referred to as sentiment analysis. In the created model, supervised and unsupervised methods are employed interchangeably in various places. Following that, the data were incorporated into a supervised model with the intention of accurately testing and classifying an object. Using a machine learning classifier such as SVM, which has the highest accuracy, as well as random forest and decision tree, which are both fairly successful, the following conclusions were obtained.

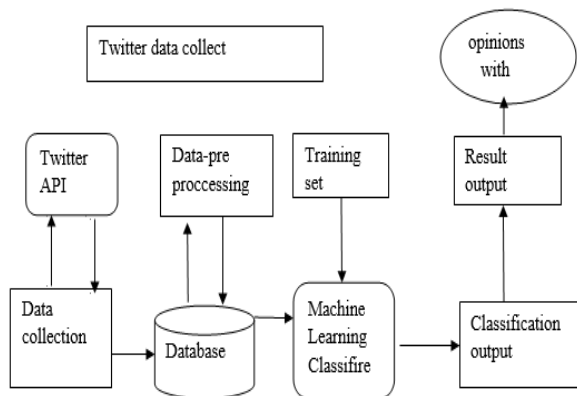


Fig 1. Working Architecture of Twitter classification.

II. LITERATURE WORK

Santhosh Kumar and colleagues, IEEE, 2016. The domains of data mining and analysis of views on Twitter data may analyse things coming from a range of social networks using machine learning methodologies. A "tweet" is a kind of communication in which a user submits information to be read by other users and subsequently publishes it. Their technique of spreading information and expressing ideas is via comments on other users' postings. These are some of the finest sites to promote other people's tweets and viewpoints. This model will take data from Twitter, eliminate any extraneous information, and then categorise the remaining information into one of three categories: good, bad, or neutral. For the purposes of this essay, we will use Twitter to get hotel data in order to do this analysis using machine learning methods. The results will then be discovered using a number of measures in order to get an accurate output result. Using a range of classifiers, analysis of tweets based on views with the purpose of producing accurate findings. This model incorporates both supervised and unsupervised machine learning approaches [9].

L. L. Bo Pang and others We employed a number of deep learning algorithms in this study to do a sentiment analysis

utilising Twitter data. Deep learning is a technique that, in addition to growing appeal among academics, can simultaneously answer a wide range of questions or do complex tasks. Deep learning algorithms can build the high-order features needed to make accurate predictions about an item on their own when it comes to feature extraction. This helps to foster a sense of reverence for the object in issue. Using Deep learning's characteristics enable it to handle large volumes of data, both organised and unstructured. Use two types of neural networks for image processing and natural language processing: convolutional neural networks (CNN) and recurrent neural networks (RNN). Both of these neural network types are beneficial. A number of embedded systems, such as a word2Vec or a global vector, may be used (GloVe).. In order to get the best point value for each model, many various combinations are tested out and their results are compared [10].

Twitter is a social media site where individuals share their knowledge and opinions in the form of tweets, and it is an ideal source for sentiment analysis. V. Lakshmi et al., in this study, we use microblogging sites like Twitter and Facebook to acquire data on public opinion in the present day. Positive, negative, or neutral are the three categories in which people's views may be classified. This aids in the examination of different sorts of opinions, which is one of the prerequisites for doing sentiment analysis. To eliminate unwanted information collected from social networking sites, data mining and text mining, both kinds of natural language processing, are utilised. The goal of this research is to classify tweets using machine learning approaches. The aims of this study are to improve sentiment analysis categorization outcomes while also increasing the efficacy and reliability of recommended approaches. Using decision trees, hybrid trees, and ad boosted trees, you may get the highest potential accuracy from the classifier. Two levels of preprocessing and one level of classification are included in the proposed model. The introduction of hybrid models may increase the accuracy of classifiers and associated f-measures [11].

M. Levy, M. Levy, M. Levy, M. Levy, M People use social networking sites like Facebook and Twitter to interact and share information with one another all around the world. Twitter is a social media platform that enables users to connect with members of different online communities. Where users may publish messages (also known as tweets) and read messages from other users. User-generated feedback on topics such as daily news, brands, and other locales. The purpose of this model is to gather real data from a Twitter account before doing sentiment analysis on it. In this project, we're working on a model that uses both supervised and unsupervised machine learning approaches. One of the approaches we employ for sentiment analysis is to get data directly from the Twitter API. After that, there's the data cleansing and discovery step. The models will be utilised for training purposes

when the data input procedure is completed. Each tweet was categorised into one of three groups based on the sentiment analysis results: positive, bad, or neutral. McDonald's and Kentucky Fried Chicken are the two topics for which data is being gathered.

Which ones are the most well-known? You should employ a range of machine learning approaches for these models, and you should use cross validation, f-score, maximum entropy, and other testing metrics to determine the results. The similar method will be used in future studies in a number of sectors, such as detecting rumours on Twitter regarding the spread of diseases [12].

A hussan et al., The present epoch is known as the modern period, and it is characterised by the widespread use of the internet. Individuals in this day express their thoughts and opinions via numerous types of social media, such as microblogging sites, personal blogs, reviews, and so on.

Text mining involves a variety of procedures, one of which is sentiment analysis. Other people's views were analysed and categorised into favourable, negative, and neutral tweets. People's evaluations and attitudes stated in tweets were recognised utilising a search done with the assistance of a particular keyword in the research given here. Finally, the tweets were assessed to see whether they were typically positive or negative. The use of Naive Bayes classifiers (NBC) is capable of analysing the Polarity of sentiment in each tweet as well as testing the data and properties of words. Compare the accuracy and precision of three distinct machine learning classifiers: Random forest, Naive Bayes, and support vector machine. It is possible to boost both the estimated accuracy and the three characteristics of the number of tweets by employing Classifiers such as RF, NBC, and SVM. It's probable that more factors that are used to improve prediction accuracy may be presented in future research [13].

Sidharth, Darsini, and others on a daily basis, people all around the globe use different social media platforms to express their opinions and information. One of the most popular sites for expressing thoughts, reviews, comments, and specific topic issues is Twitter. It is also one of the most widely used platforms. Using the methodology presented, the major goal of this research was to conduct a sentiment analysis of people's attitudes and assess the social issues that women face. This is a major problem in many countries, and it affects every woman. A dataset may be built in Python programming using a twitter scraper to grab data from Twitter; this dataset can then be cleaned and noise eliminated. Text blob, a Python programming tool, is used to categorise each tweet utilising the technique. These are some of the tools that are employed. Depending on the polarity of the emotion, the Text Blob will label each tweet as positive, negative, or neutral. The #MeToo campaign and #Women When it comes to hashtags, there are two separate data sets. The

model may be used to test hypotheses using a number of machine learning approaches. After Results, each model's performance is compared to the tested data using a range of testing parameters such as precision, recall, and f1-score. Support vector machines are utilised to acquire a higher degree of accuracy with both hashtags (#Women's and #Metoo). The hashtag #women, which is more popular than #Metoo, is used to disseminate the content. This method has the potential to be used to a broad range of fields in the future, including product appraisal and sentiment analysis [14].

The purpose of Harpreet Kaur and her colleagues is to assess the polarity of the word and categorise tweets as positive or negative in this research. We employ two types of classifiers in this study: lexicon-based and machine learning classifiers. Machine learning approaches include the Support Vector Machine (SVM), Multinomial Naive Bayes (MNB), Logistic Regression (LR), and Recurrent Neural Network (RNN) (RNN). Two independent pre-existing data sets were employed in this study: the first, dubbed "Sentiment140," came from Stanford University. The first had 1.6 million tweets, while the second was dubbed "original" and comprised of all 13870 library data entries. Both of these data sets were categorised based on how they affected people's emotions. Both sets of data are subjected to a variety of different classifiers, and the results are compared. Using this model for measuring sentiment, make a prediction regarding new data. Text machine learning models will be used to teach and categorise data based on standard dictionaries [15].

According to B. O'Connor et al., sentiment analysis has become increasingly popular on Twitter in recent years. We focused on ordinal regression as part of our analysis of tweets. The goal of this research is to do sentiment analysis on tweets using machine learning algorithms based on ordinal regression. The feature extraction approach is applied to the tweets that have been preprocessed in this manner, resulting in the generation of a useful feature. It may be used in a variety of classes to add scoring elements and balance the game. Multinomial logistic regression (MLR), support vector machines (SVM), decision trees (DsT), and random forests are among the supervised learning classifiers used in this work (RF). For the development of this system, we utilised the NLTK corpora resources and the Twitter data collection, both of which were made publicly available. Using a variety of machine learning techniques.

The discovery that ordinal regression detection gives the maximum level of accuracy for experimental work.

However, using the Decision tree rather than the other strategies will give you the best outcomes. The decision tree, when combined with the Mean Absolute Error and the Mean Square Error, displays a high accuracy of 91.81 percent. In order to improve techniques, bigrams and

trigrams will be utilised in combination with a range of deep learning algorithms in preparation for future work. [16].

III. PROPOSED METHODOLOGY

In this study, a number of datasets have been applied for training purposes as well as testing using the support vector machine learning algorithm and then compute the polarity of each sentiment or reviews.

The sentiment analysis techniques contained various steps and these steps are:

- **Input data:** Input data is the twitter data in the first steps which is given as a real time data using a twitty application which is extracted through the various social networking sites and microblogging websites.
- **Pre-processing:** In the preprocessing phase twitter stream will extract all twitter data which is an unstructured form of data that is given as input. tweets will be preprocessed with tokenizations and stop words will be removed from data.
- **Feature Extraction:** Third step of feature extraction after use of this algorithm the pre-processed data will be given as input where n-gram algorithm has been applied and then assigned to priority of each word which is needed to classify.
- **Classification:** In this paper classification will be using three classification algorithms/techniques for this sentiment analysis. Classification can be applied after application of feature extraction algorithm for this sentiment analysis. work of this study, SVM, random forest, decision tree can be applied for this sentiment analysis.

1. Pseudo code of N-gram algorithm.

Input: Tokenized strings TS, Matched Strings MS

Output: Similarity list (CS)

1. Construct dictionary of N-gram based on TS
2. Traverse the input query string S into the candidate the N-gram list TS
3. Set the MS matched strings = 0;
4. For each input string belongs to Ts
 1. Find the input string from each words TS
 2. For each input string belongs to TS
 3. Frequency = frequency + 1;
 4. If (frequency > threshold)
 5. Put the input string in candidate list (CL)
5. For each Z belong to the candidate list CL do.
6. Calculate similarity (input string Z).
7. **Results:** calculate similarity (CS).

2. Pseudo code of SVM classifier:

Input: Calculated similarity list (CS)

Output: Classified data

1. Weight=0 bias=0 input=0
2. $R = \max(x)$
3. While the whole data get classified into two classes in the for loop do
4. For $i=1$ to $Cs(n)$ do
5. If $Y_i(<W_iX_i>+bias) < 0$ then
6. $W_{k+1} = W_k + Y_iX_i$
7. $K=K+1$;
8. End if
9. End while
10. Return Classified data K, is the number of the classes and x is the data in the classes

3. Pseudo code of Random Forest classifier:

Datasets (tweets) that will be used for both training and testing

The output consists of classification results for Accuracy, Precision, and Recall, as well as the F-measure.

begin

The preliminary processing and standardisation of the data;

Pertaining to the Training data set to carry out

The calculation of the attributes Select K data points at random from the beginning of the given training set. Using these K value parameters, determine the decision trees that correspond to this dataset. Then, we determine the amount of trees, N, that we will plant in our forest. Following this, we assign the previously selected data points to the trees with the most votes. Now, gather the predictions made by the created decision trees for the new data points.

Develop your own classifiers;

end

Make use of the value of the attributes for each individual tweet, and carry out the aforementioned technique for every record in the testing data collection.

Investigate the level of accuracy that the model has; stop # Instruction and Examination

end

4. Pseudo code of Decision Tree classifier:

Input: Dataset (tweets) for training and testing
Output: Classified result intern of Accuracy, Precision, Recall, and F-measure.

```

begin
  Preprocessing and normalization of data;
  for Training data set to do
    Calculation of features
    Apply Decision Tree training;
    Build classifiers;
  end
  Use the value of features for respective tweet;
  for all records in testing data set to do
    Check accuracy of the model;
  end
end
  
```

5. FlowChart of Proposed Work:

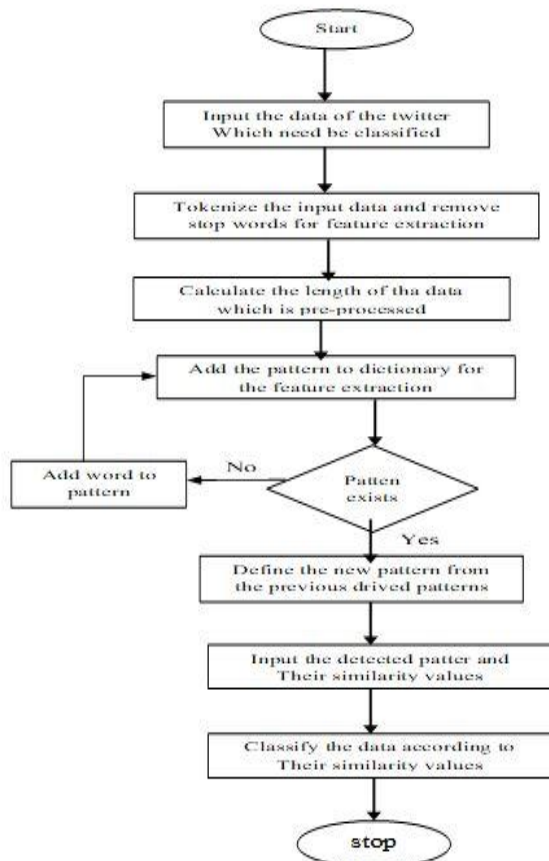


Fig 2. Proposed Flowchart.

IV. IMPLEMENTATION

The Evaluation of Proposed Methodologies for Twitter Analysis: This section comprises the details of the tests we ran to evaluate the proposed technique in the context of twitter analysis. These tests were performed to see if the approach was suitable for the work at hand. We ran experiments using the Twitter data set provided by Kaggle. Data set based on the KFC and McDonald's AI - Algeria competition. The task is to develop a system that can identify between joyful and sad tweets. We now have a check that determines whether or not a tweet is correct. For our study, we retrieved 14,000 tweets from the KFC and McDonald's databases. A total of 10,000 tweets will be used for training and 4,000 tweets will be used for testing. The URL to the data set is provided below. Figures 3 and 4 were created using data from <https://www.kaggle.com/mcdonalds/nutrition-facts>.

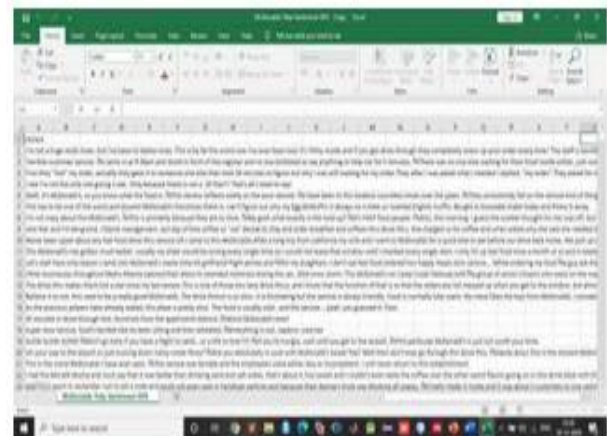


Fig 3. Without the Use of Processed Data.

URLs, unique usernames, unusual characters, and repeated phrases and symbols are all present. Then we must eliminate any Hashtags denoted by the # sign, as well as all special characters, URLs, personal usernames, and repetitive text.

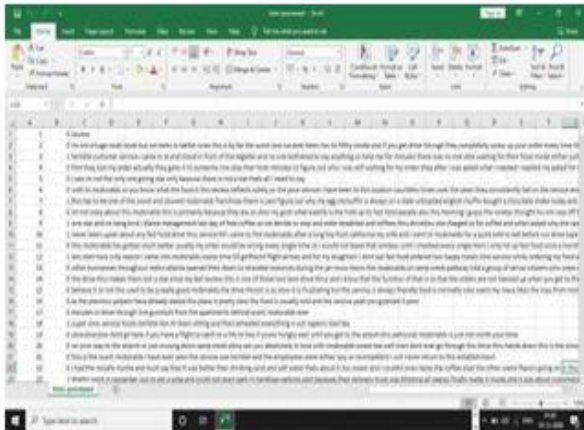


Fig 4. After the Data Have Been Processed.

V. RESULT

The following parameters were used to assess our suggested method:

Recall, Precision, Accuracy, F1-Score

Table 1. Conduct an analysis of the metric using the contingency table.

| | | Prediction | |
|---------|-------------------|---------------------|---------------------|
| | | Predicted Negative | Predicted Positive |
| Reality | Actually Negative | True Negative (TN) | False Positive (FP) |
| | Actually Positive | False Negative (FN) | True Positive (TP) |

$$\text{recall} = \frac{tp}{tp+fn} \dots\dots\dots (1)$$

$$\text{precision} = \frac{tp}{tp+fp} \dots\dots\dots (2)$$

$$\text{accuracy} = \frac{tp+tn}{tp+tn+fp+fn} \dots\dots\dots (3)$$

5.1 Recall:

The function known as "recall" analyses the amount of positive class expectations that were derived from each and every positive model included within the dataset. The recall may be determined by applying equation 1 to the data.

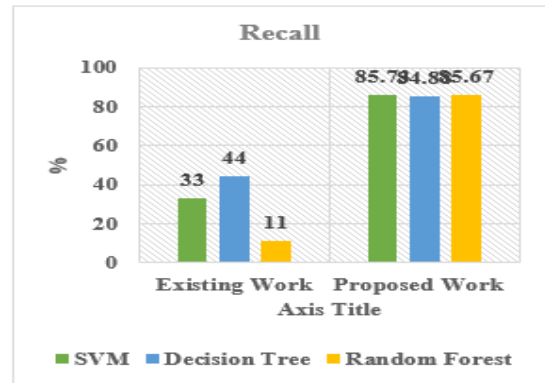


Fig 5. Keep in mind the contrast between the present and new jobs.

Figure 5 illustrates, for the Existing Work and Proposed Work categories, how we determine the recall value for each algorithm. A diagram illustrates the results. According to our data, the proposed technique has a higher true positive rate than collaborative and content-based tactics.

2. Precision:

Precision is a metric used to measure how many favourable class expectations really exist. Used to determine accuracy using equation 2.

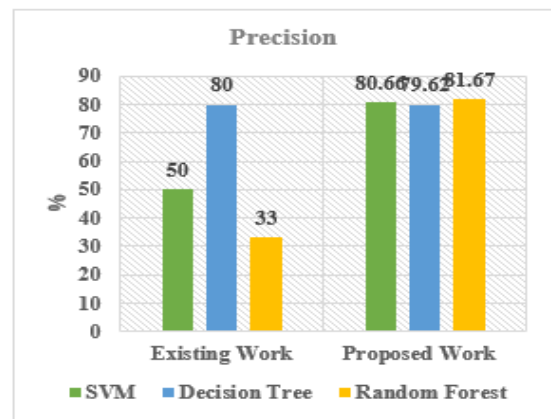


Fig 6. A Detailed Comparison of the Existing Work and the Proposed Work.

In both the Existing Work and Proposed Work categories, Figure 6 illustrates the results of a calculation that determined the accuracy value for each technique for each category. And the outcomes are shown using a diagram. According to our research, the suggested strategy has a better true positive rate than collaborative and content-based strategies.

3. Accuracy:

Accuracy refers to the fraction of correctly predicted categories, including both true positives and true

negatives, compared to the whole Test Dataset. To compute the precision, Equation 3 is used.

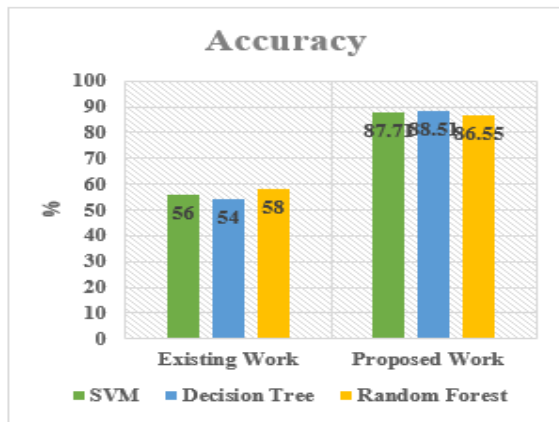


Fig 7. Shows accuracy comparisons between the current work and the planned work.

Figure 7 illustrates the outcomes of a computation that established the accuracy value for each approach in the Existing Work and Proposed Work categories. And the results are shown using a diagram. According to our data, the proposed technique has a greater percentage of true positives than the collaborative and content-based methods.

4. F1-Score:

The F1 measure is an expression of how accurate the test is, and it is used most often in the binary classification process. Both the accuracy and the recall are taken into account in the process of computing the F1 measure.

All of the samples that should have been marked as positive in accordance with the F1 Score shown in Figure 8, which is computed as follows:

$$F1 \text{ Score} = 2 * ((\text{precision} * \text{Recall}) / (\text{precision} + \text{Recall}))$$

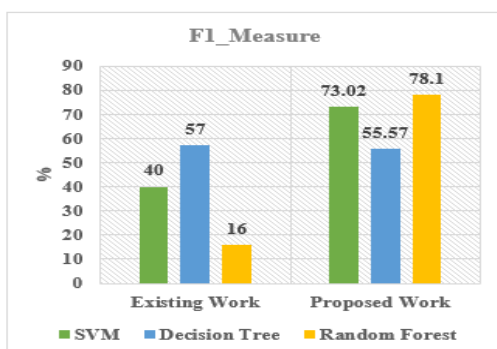


Fig 8. Compares the current work's F1 Score values to the proposed work's.

Figure 8 illustrates how the effectiveness of the proposed technique may be deduced from the previous results. Furthermore, by keeping the greatest feasible degree of suggestion quality, the overall running time may be

reduced. This illustrates that the proposed technique is scalable and capable of being applied to a big data set.

VI. CONCLUSION

In this paper analysis of different opinion based expression using machine learning techniques based such as Support vector machines (SVM), Random Forest (RF), Decision Tree (DTs) and so on in the social media. Through several methods to enhance accuracy of classification of our proposed models into tweets positive, negative, neutral. After fed data into supervised model for training and testing of new data sets that using this model we get a highest accuracy of classifiers. In our proposed model included supervised and unsupervised both algorithms. We have also used of various testing parameter or machine learning classification algorithms have used for tested and trained data sets or evaluate performance of the classifiers such as SVM, DTs, RF.

Show that in result SVM has a greatest accuracy for both subjects KFC and McDonald's which are more popular in the term of Recall, F1-score.

In future work use the same methodology in various fields like detecting rumors and use of different tweets with different data sets. We get the highest accuracy with highest performance for the best result.

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