



Recent trends in Management and Commerce

Vol: 2(4), 2021

REST Publisher

ISBN: 978-81-936097-6-7

Website: <http://restpublisher.com/book-series/rmc/>



Sentiment Analysis of Algorithms using VIKOR Method

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Abstract

Sentiment analysis in VIKOR Method. Sentiment analysis is a product or a positive about the topic, Negative or neutral opinion of the text Determines whether a part is expressive It is an automated process. Sentiment By using analysis, Survey responses, reviews, support to encode customer data like Companies put in endless hours No need to spend. In the predictive process, the invisible a feature to convert text into feature vectors Extraction is used, they are. From this analysis the VIKOR technique is the most accurate determines a worst-case-good solution, however, is variation these Distance is not taken into account. VIKOR the approach is Multi-Criteria Selection (MCDM) or Multicriteria selection is an evaluation technique. Alternative: Accuracy (%), Precision (%), Recall (%), Score (%). Assessment Option: KNN, Decision Tree, SVM, Logistic Regression, Naïve Bays, Random Forest, Google, Microsoft, Twitter. It is solved by using the VIKOR method. It is the data set of this paper. The result it is seen that Naïve Bayes got the first rank where as is the Logistic Regression is Very low rank. In this paper Naïve Bayes got the first rank whereas is the Logistic Regression is having the lowest rank.

Keywords: Sentiment analysis, VIKOR, SVM, KNN.

Introduction

Also known as sentiment analysis, sentiment mining It is called, the opinions of the people, feelings, evaluations, attitudes and systems of emotions manipulation is a field of study. Feelings, ratings, attitude and expressed in written text Analyzes their properties. Companies so on, feeling of different tasks analytics, opinion mining, Opinion analysis, opinion Extraction, sentiment mining, Subjective analysis, impact analysis, sentiment All of the Analysis and analysis mining now sense under the analytics umbrella are coming. As the field name suggests, Sentiment analysis is exclusively in the industry is used, whereas the concept education is used. In this book, words interchangeably I use Also, I'm commenting The word is a sense, estimate, estimate or the goal of attitude and opinion And like the person holding the opinion I am using the relevant information, Also using the term comment Denote a positive or negative feeling I use Comment Sentiment analysis mainly positive or negative Expressing or signifying feelings Focuses on concepts, which are everyday positive in language or and negative comments is called This type of concept of Attitude in Social Psychology is similar.

Sentiment analysis

SVM and artificial neural networks A between networks ANNs There is an empirical comparison. SVM in SA Widespread and successful they make this comparison because they are used did, at the same time inns emotion Small attention as an approach to learning have attracted. Have discussed both approaches are good Classification accuracy reach across requirements, resulting models, and contexts. Feature selection in traditional BOWs model and A popular oversight for weighting a consistent evaluation environment with methods They accepted. Their Tests show that Except for some unbalanced data situations, ANN gave better results to SVM. They tested three main data sets from amazon.com: Movie, GPS, Camera and Book reviews. That Proved tests on ANN movie reviews performed statistically significantly better than SVM.[1] Feature of the hotel. Sentiment analysis I am concerned with the main research problems I propose to solve them Some of the techniques used Revisiting, and then some Important ones, consciously useful areas, analysis today is used. Few in this field I conclude with open research issues. Due to limited space, complications and By me the whole matter of techniques Couldn't hide; But on this topic For some detailed reviews written See the reader. In this review, five focus on sect oral issues I will pay. Sentiment Analysis:

- Document-level sentiment analysis;
- Sentence level sentiment analysis;
- Feature-based sentiment analysis;
- Comparative sentiment analysis;
- Receiving a sense of consciousness; [2]

From this study, this biologically different optimization algorithms inspired Great ability to solve problems Great ability to solve problems we conclude that there is Feature engineering is the process, which directly to the performance of the method affects. This to get the optimal feature set By using the methods, of the sensory categorization process Document-level sentiment classification, feature based sense classification and Multi-class sensory classification Used for Classify text into

different classes, PSO with SVM Classification Use is among researchers That is the most popular approach We found It is sensitive to PSO Most popular for classification Makes one of the means, that Continued ACO. Less commonly used the algorithms are GSO, FPA and BA. [3]This essay sentiment analysis and a survey of classification algorithms providethis study is a sensory classification that is still an open area for research decides. For algorithms in that there are many opportunities. SVM and Naive Base are for sensory classification the most popular methods. Of tweets Sentiment analysis is very popular. Like Amazon, IMDB and Flipchart Broadly for analysis are used. Social Deep analysis of networks required. In many cases, consideration of context is critical. Hence more research is needed in this field. [4]Machine learning for sentiment analysis, Contains named tweets Begins with the collection of the dataset. This dataset can be confusing, Then various natural language processing Advance using (NLP) techniques to be processed. Sentiment analysis requires extracting relevant features, finally classifying them, and training and testing them on unseen data. [5]Sentiment analysis is natural language Processing is always growing is an auxiliary field. There are many research works SA's issues include Text, emoticon, images and audio or videos individually. For detecting emotions Very few studies on emoticons only made, also, text And SA with both emoticon Opportunity for further expansion in the field Existence related tasks section shows.

- Therefore, the objectives of this study are: Dual modes (text and emotion using emoticons). Analysis. Social media data.
- Creating an emoticon dictionary.
- Using ML and DL algorithms Classification accuracy of perception analysis improve.[6]

A preprocessing method useful for a particular algorithm and a specific dataset performance may also occur Sentiment analysis diminishes when Another Detest or used for the algorithm. Generally, both are Twitter sensations Full monitoring for analysis and Remote monitoring solutions Basically the text of Twitter messages Focuses only on information and Satisfactory performance cannot be achieved Unique characteristics of Twitter messages.[7] Sentiment analysis was based on feature level They considered two types of features They are called latent features and manifest features. Clear concept words and ambiguous concept words are then classified from feature words. Clustering features are performed from the identified latent features. Structures of features, related concepts and similarity of features are used to group features in their method.[8]Multi-sense analysis in this thesis Methods is discussed. In this area by various researchers we have several proposed documents However, more sentiment analysis Accurate and easy to understand there is a need. Various A lot of sentiment analysis in situations will be useful. But in human language this is due to the complexity involved it is a difficult process. It is grammar, many variations such as culture contains Humans "My order it's getting late. Very good". But that Difficult to understand. Similarly "thin" The word laptop positively can be taken, but its flat it can be negative when it comes to the wall.[9]Current in sentiment analysis in studies, most sentiment analysis Methods are of two types Perspectives. One is textual analysis According to subtlety, it is threefold divided into: document status, reporting level and feature level. Another step the principle of the method, which is mainly three Divided into categories: rule based, machine learning and Deep learning. However, the amount of information is increasing and the data collected what needs to be analyzed is huge, confusing and disorganized. This is such sentiment has brought more difficulties to the analysis Big data labeling and computing costs are high. Although while some of the traditional sentiment analysis methods there are advantages, and they are due to massive data Very little of practical use there are [10]The sensory strength detection task, the overall sense of the text is polarized and finding out both its strength or annotated with a numerical rating is to do. As mentioned above, a The basic machine learning approach is first Block texts into sets of words Converts short called features Phrases. The human consciousness of these texts Classifications follow. Which is it Feelings related to features Understand machine learning algorithms Used to teach, for example, Human classified An algorithm from examples Let's Learn "We Want" A strong positive feeling is good is indicative. Conversely, a lexical A Sentiment Analysis Algorithm, Sentiment Glossary of terms and their Also includes polarity.[11]Feature-stage sentiment evaluation Allows evaluation of fantastic and terrible elements An object. However, this kind of analysis is regularly area Specific. Includes feature-degree sentiment evaluation the subsequent are: (a) Identifying which features should be gift Analyzing, (b) Finding content that is opinionated approximately it the factor underneath evaluate, and (c) figuring out belief Polarity of perspectives expressed approximately an factor. Since we are constrained to film evaluations, the focal point are on we tried to examine domain-degree, characteristic-degree belief Analysis of movie critiques. It become the first step Find out the capabilities to bear in mind in a movie discipline. We carried out an in depth seek to discover Different movie awards, movie assessment web sites and Created catalogs of film magazines and functions [12].On the opportunity hand, sentiment evaluation can result in many challenges like semantic sentiment evaluation Evaluate and implement a modern-day semantic similarity metric to decide the impact content material of numerous words Dimensions10. We proposed a distance metric primarily based on Word Net to decide the semantic orientation of the community Network Data. The cause of this paper is to advise a way for predicting suicidal thoughts and predicting suicidal acts. Ideas the usage of statistics amassed from the network. In this art work, we use Weak as a records mining device to extract all the useful ones Information to categorisethis statistic in line with tool learning algorithms applied in Weak. Therefore, we gift our algorithm for calculating the semantic similarity among tweets accrued from Twitter. A semantic assessment aid-based totally education bundle deal using Word Net [13]. In addition to sentiment evaluation, attachment shape became used to expect the Swedish election result the evaluation was performed the usage of Twitter which blanketed politicians' conversations. For this reason, it was used Link-estimation shows that account reputation is understood through algorithmic and structural links more similarities with the effects of the votes. It additionally revealed a robust bias among the position of elected politicians and the consequences of popular elections

Official celebration accounts and European election results. A method become advanced to test the Brazilian Municipal elections in 6 towns. In this system, sentiment analysis is considered with a stratified model of users to evaluate the characteristics of the findings Real citizens. [14]Feature stage sentiment evaluation a concept that carries a idea an emotion, nice or bad and a aim (idea) has 3 essential tasks. Extraction Web content is the first step in functions. Next step figuring out the polarity of the concept. The closing and very last task to group synonyms of capabilities. This form of class also exists Also known as word/word classification. Viewing feature status, the concept itself and does now not take language systems under consideration (documents, paragraphs, sentences, clauses or terms). This is based at the idea that an idea has a sense (superb or negative) and a goal. [15]

VIKOR

VIKOR's approach to conflicting standards hard and in the presence from faster alternatives in ranking and deciding Pays attention. It determines a compromise solution is ideal "majority" and minimal character distress to the "adversary." extended VIKOR method weight stability determines gaps and trade-offs. The VIKOR method is completely one-based aggregation feature that makes use of linear and represents "closeness to best". Normalization. use of Vector normalization, but it of the distance from those points does relative importance is not taken into consideration. A linear option Ranking by function gives similar results to VIKOR's ranking. S degree "representing grouping". Application". The effects of with linear "volley" criterion capabilities, are extraordinarily similar Results of VIKOR [1] Created the fundamentals Decision making with multiple targets to broaden understanding associated with selection making Developing strategies. Hwang et al. Reviewed the improvement of multi-objective decision making (MODM) strategies and its programs. Later, Cheng and Huang studied and documented Multiple characteristic selection making (MADM) techniques consisting of linear programming method Multidimensional Analysis of Preference (LINMAP), Elimination and Choice Expressing Reality. Additionally, currently; Mardani et al. Fuzzy MCDM and classical MCDM techniques based on high-quality of service are reviewed and labeled. In latest years; Very few studies have reviewed and summarized the role of the VIKOR technique and its software in various clinical fields. Therefore, this studies paper ambitions to file the role of VIKOR method and its programs in numerous fields of science. [2]An analysis of Weight stability intervals for a single criterion is achieved for all scalar functions with same (given) initial values of weights. In this manner, favored balance of the acquired compromise the answer may be analyzed using the VIKOR program. VIKOR is a helpful tool in multi-criteria selection making, specially in a situation the choice maker can't, or doesn't know explicit his choice at the start of laptop design. A compromise answer became acquired Because it could be regular by way of selection makers this affords the maximum "organization software" (min S, represented by means of Eq. (1)) of the "majority", and a Minimal non-public regret (mentioned by using min R) "of the adversary".[3] It makes a speciality of one-of-a-kind unit contrast Intimacy and compromise for the quality opportunity it means an settlement hooked up by means of keep away from numerical problems offering a compromise [4] the bushy VIKOR technique is evolved as a fuzzy MCDM approach to solve a discrete fuzzy multicriteria problem with mismatched and conflicting standards. This is given in. For this method background, aggregation, normalization, Option evaluation of DM and operations on fuzzy numbers Arguments are discussed as a study of reasoning, which in some manner justifies Shows the state of fuzzy VIKOR technique and its history In the literature on MCDM. This new approach makes a contribution to the practice of MCDM [5].The VIKOR approach uses an aggregation a feature that represents the space from the excellent answer. On pinnacle of that On the opposite hand, the TOPSIS technique makes use of a ranking index Distance from best factor and negative ideal factor. The closest ranked opportunity as determined by way of VIKOR Best answer. However, the best rating determined by means of TOPSIS is the high-quality based totally at the Alternative Ranking Index, that's that does not imply maximum team usage The VIKOR approach combines maximum group software with minimum Personal regret [6] have extended the TOPSIS approach to clear up selection-making issues with interval records. According to the comparative evaluation of VIKOR and through Oprikovic and Cheng the VIKOR method and TOPSIS the technique uses specific aggregation functions and one of a kind normalization strategy. The TOPSIS approach is primarily based on principle the highest quality point must be the shortest distance from the high quality best solution (PIS) and the farthest from the terrible best answer (NIS). Therefore, this technique is appropriate for cautious (risk averse) decision makers because the choice maker(s) may additionally want to choose that avoids not only the very best feasible income however additionally the highest threat. Possible. Besides, the calculation of the finest point in VIKOR is based totally on a certain degree of "closeness" to the PIS. Hence, it is suitable for conditions in which the choice maker desires to maximize earnings and threat Results count number much less to him. Therefore, we amplify the concept of the VIKOR technique to increase a technique MADM solves troubles with c program language period numbers. [7]In the regret theory primarily based VIKOR approach, the regret concept is included with the original VIKOR approach. In order to keep in mind, the concept of regret and happiness in the selection-making technique. In grief idea posits that human choice-making is every so often encouraged by using feelings. Emotions are modifications in mental and mental states, and are taken into consideration as one among them Key Reasons to Motivate Decision Making The centre idea of remorse concept is classical The software function is modified by incorporating the anticipated feelings of the decision maker assumed that a person's level of unhappiness or happiness depends only on difference Between the involuntary use of what could have been and the involuntary use of what could have been. The Non-desire application is the application a character might derive from a final result if he/she had it. It is experienced without desire and described independently of choices. Difference between VIKOR method and regret idea VIKOR technique defines remorse differently. Between alternatives and the great price of each criterion, and remorse concept defines remorse Application without selection. [8] The proposed technique for assessing the dangers of EA on this

paper includes the fuzzy VIKOR, which has now not been used before to evaluate EA dangers. The VIKOR technique has been drastically accomplished by means of researchers to offer choice making problems with extra correct solutions. This consists of Using handiest VIKOR On the opposite hand, the country of the art of approach. [9] A compromise answer is acceptable to all selection makers as it offers most "organization application as nicely at the least of ``opponent's private remorse". This method is not handiest a compromise foundation for mutual verbal exchange, negotiation and war control, however also a bridge to attain an settlement amongst choice makers. In addition, multidimensional attention of excessive and coffee overall performance opinions of ability options can help choice makers avoid making beside the point decisions. This is the reason VIKOR approach is selected for this observe. As health facility provider first-rate perceptions are derived from the attitude of different patients' linguistic norms and their possibilities, consequently, this trouble have to be handled as unsure and ambiguous. [10]Although some strategies were advanced to remedy optimizing simultaneous multiple-reaction troubles, they forget about the version in relative satisfactory losses various answers. Suboptimal thing-degree blending can produce random quality loss Answers which can be unacceptable to clients. A formal a multi-reaction optimization system is provided right here to resolve this trouble. VIKOR technique in MCDM was used to increase a multiple-reaction solution trouble [11] this take a look at establishes a ranking version that uses affected person scores, along with textual facts and numerical statistics, to rank physicians. The proposed model integrates IFS with TF-IDF and VIKOR, for solving the MCGDM hassle. We use TF-IDF to handle textual information and get the criterion weights. IFSs are used to explain emotional involvement. Finally, we endorse VIKOR method for fixing the MCGDM hassle. Additionally, through using the ranking case of physicians, we conclude that our proposed version has sturdy stability and operability while fixing incompleteness MCGDM troubles thinking about sparse records and user privacy. This study contributes to provide correct opportunity ranking for users over present strategies based on sparse records and user privacy. From realistic utility, performance Textual information enriches the assessment, that could assist improve the accuracy of rating. The criterion weights obtained by means of TF-IDF assist to lessen subjectivity in estimation. [12]The rank of the prolonged VIKOR approach is received by evaluating the interval To make comparisons among numbers and periods, we introduce v as the self belief stage of the decision maker in this paper. Senate et al. Proposed a hierarchical MCDM model primarily based on fuzzy set principle and VIKOR method for handling dealer. Selection problems in supply chain machine. Chen and Wang presented a rational and systematic process for improvement Best opportunity and compromise answer underneath each of the choice criteria the use of Fuzzy VIKOR method. Of the study the finding presents a crucial reference for fixing fuzzy multi-criteria decision-making problems. Vadnais et al. Offered the c language-valued fuzzy VIKOR technique, aimed toward solving MCDM problems in which the weights of criteria are unequal, using c language-valued fuzzy set ideas. San Cristobal used the VIKOR method in choosing renewable a power project associated with the renewable strength project released by using the Spanish authorities. Method is connected weighing the importance of numerous standards with the AHP (Analytic Hierarchy Process) method allows Decision makers must assign these values based totally on their options [13]. Alternatives to ELECTRE are primarily aid of Huang and Yong. In an accumulative method that signifies "closeness to an appropriate". It is advanced via compromise programming. These are the 2 techniques introduce exclusive kinds of integrating function Rank and eliminate one of a kind styles of normalization gadgets scale characteristic. Whereas VIKOR selected scale [14].Within the VIKOR machine, compromise may be ranked via comparing the importance of Proximity to the nice opportunity through movement proof, maximum decision-making techniques involve more than one and conflicting evaluation standards. VIKOR approach is a beneficial can not specify Options amongst numerous effects. However, within the selection-making method, easy Data isn't always sufficient to offer the actual the state of affairs, from human focus [15].

TABLE 1.Sentiment analysisin Determination of best and worst value

	Determination of best and		
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	worst value		Recall (%)	Score (%)
	Accuracy (%)	Precision (%)		
KNN	0.24	0.95	0.75	0.23
Decision Tree	0.32	0.81	0.67	0.11
SVM	0.19	0.79	0.93	0.27
Logistic Regression	0.25	0.93	0.72	0.14
Naïve Bayes	0.37	0.66	0.86	0.26
Random Forest	0.16	0.72	0.81	0.31
Google	0.21	0.65	0.72	0.24
Microsoft	0.41	0.81	0.86	0.16
Twitter	0.36	0.99	0.95	0.36
Best	0.16	0.99	0.95	0.11
worst	0.41	0.65	0.67	0.36

Table 1 shows the Determination of best and worst value Sentiment analysis shows the Accuracy (%) it is seen that Microsoft the highest value for Random Forest is showing the lowest value. Precision (%) it is seen that Twitter is showing the highest value for Google is showing the lowest value. Recall (%) it is seen that Twitter of ideas is showing the highest value for Decision Tree is showing the lowest value. Score (%) it is seen that the Twitter is showing the highest value for Decision Tree is showing the lowest value. Alternative: Accuracy (%), Precision (%), Recall (%), Score (%). Assessment Option: KNN, Decision Tree, SVM, Logistic Regression, Naïve Bays, Random Forest, Google, Microsoft, Twitter. It is solved by using the VIKOR method. It is the data set of this paper.

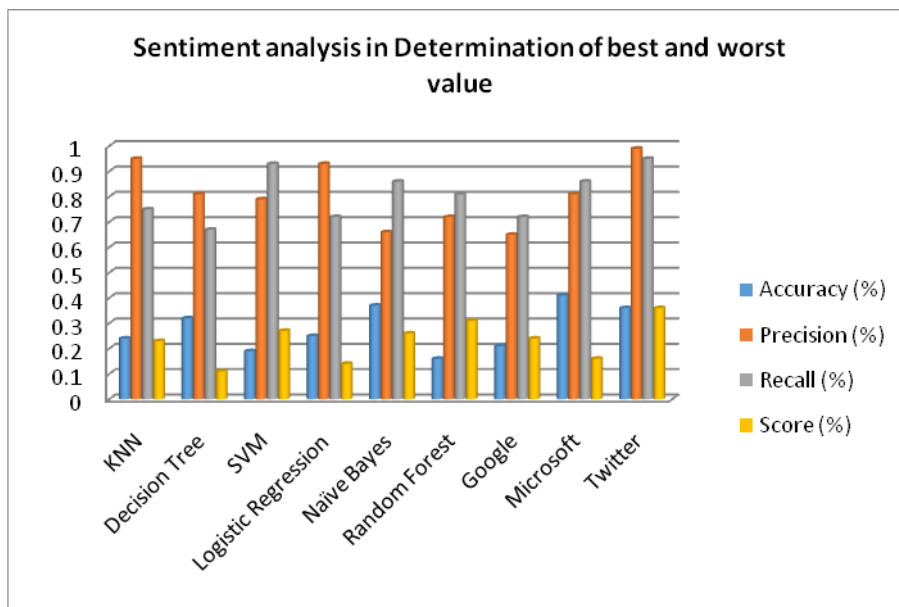


FIGURE 1. Sentiment analysis in determining the best and worst value

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TABLE 2. Sentiment analysis in Calculation S_j and R_j

	Calculation S _j and R _j					
					S _j	R _j
KNN	0.08	0.029411765	0.178571	0.12	0.407983	0.178571
Decision Tree	0.16	0.132352941	0.25	0	0.542353	0.25
SVM	0.03	0.147058824	0.017857	0.16	0.354916	0.16
Logistic Regression	0.09	0.044117647	0.205357	0.03	0.369475	0.205357
Naïve Bayes	0.21	0.242647059	0.080357	0.15	0.683004	0.242647
Random Forest	0	0.198529412	0.125	0.2	0.523529	0.2
Google	0.05	0.25	0.205357	0.13	0.635357	0.25
Microsoft	0.25	0.132352941	0.080357	0.05	0.51271	0.25
Twitter	0.2	0	0	0.25	0.45	0.25

Table 2 shows the calculation of the S_j and R_j, it is calculated.

TABLE 3. Sentiment analysis in Calculation S_j and R_j and Q_j

	Calculation Qj		
	Sj	Rj	Qj
	0.706555	0.407983	0.188901
	0.792353	0.542353	0.484794
	0.674916	0.354916	0.074428
	0.604832	0.369475	0.022187
	1.075651	0.683004	1
	0.923529	0.523529	0.595413
	1.015357	0.635357	0.863356
	0.81271	0.51271	0.461237
	0.95	0.45	0.511467
S+ R+	0.604832	0.354916	
S- R-	1.075651	0.683004	

Table 3 shows the Sj,Rj,Qj by using the previous tabulation it is the sum of the value. Sj and Rj using the S+ R+ Minimum formula, S- R- Maximum formula.

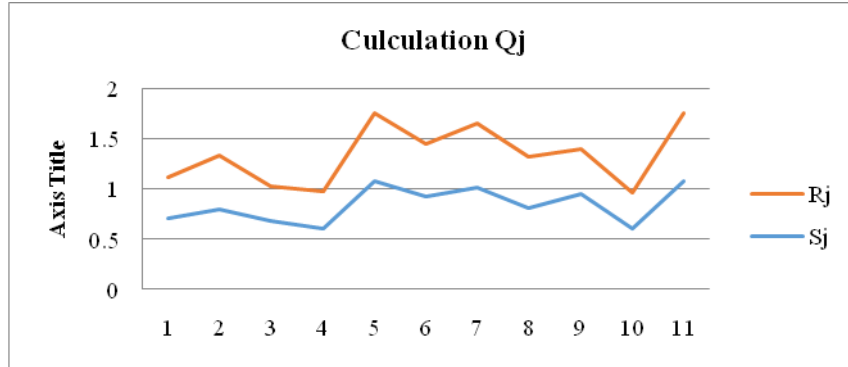


Figure 2 shows the graphical view of Calculation Sj and Rj values. The emphasis on friendship is high for Rj, while the emphasis on friendship is low for Sj. Respect for other employees is low for Rj, while respect for other employees is high for Sj.

TABLE 4. Sentiment analysis in Rank

	Rank
KNN	7
Decision Tree	5
SVM	8
Logistic Regression	9
Naïve Bayes	1
Random Forest	3
Google	2
Microsoft	6
Twitter	4

Table 4 shows the final result of this paper. Twitter is in 4th rank, Google is in 2nd rank, Random Forest is in 3rd rank, Decision Tree of ideas is in 5th rank, Naïve Bayes is in 1st rank, Microsoft is in 6th rank, KNN is in 7th rank, SVM is in 8th rank, Logistic Regression is in 9th rank. The final result is done by using the VIKRO method.

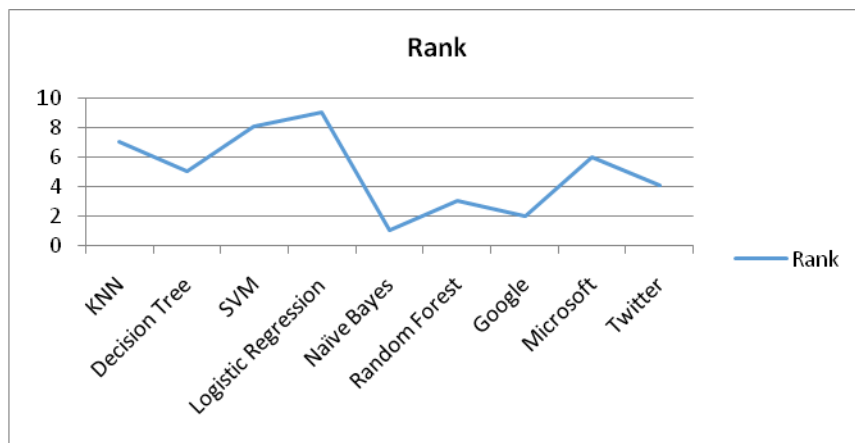


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Conclusion

In addition to sentiment evaluation, attachment shape became used to expect the Swedish election result the evaluation was performed the usage of Twitter which blanketed politicians' conversations. For this reason, it was used Link-estimation shows that account reputation is understood through algorithmic and structural links more similarities with the effects of the votes. It additionally revealed a robust bias among the position of elected politicians and the consequences of popular elections Official celebration accounts and European election results. A method becomes advanced to test the Brazilian Municipal elections in 6 towns. In this system, sentiment analysis is considered with a stratified model of users to evaluate the characteristics of the findings Real citizens. The VIKOR approach uses an aggregation a feature that represents the space from the excellent answer. On pinnacle of that on the opposite hand, the TOPSIS technique makes use of a ranking index Distance from best factor and negative ideal factor. The closest ranked opportunity as determined by way of VIKOR Best answer. However, the best rating determined by means of TOPSIS is the high-quality based totally at the Alternative Ranking Index, that's that does not imply maximum team usage The VIKOR approach combines maximum group software with minimum Personal regret

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