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A Popularity Prediction Model for Detection of the Trustable Content Over Social Media Network by Using Feature Selection

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Abstract— These days, people groups start acquiring and splitting the relational association content with no proof of its realness. In a couple of instances, the dependability of the data that gets divided between the customer's rests controversial because of the secrecy of the data makers. Popularity prediction models of online social networks (OSN) have been still a research area in OSN. This paper concentrates on the examination of five various popularity prediction schemes such as CVAR, Initial-copy routing behavior of OSN users, Identification of the false emotional state using EEG signals, Fuzzy-based trust detection algorithm, TF-IDF, and LDA theme modeling. These approaches have been analyzed and presented to address the limitations of the trending topic popularity prediction system such as feature extraction, feature selection, and evolution pattern, performance, error rate, time, overhead, throughput, delay, capacity, etc. In this paper, the simulator is used to implement the proposed method for improvement. It uses the dataset as an input and provides such dataset to the pre-processing unit and then, the pre-processed data is passed to the feature extraction after that the feature selection is used for the selection of features and the extracted feature is provided to the SVM. The output of the SVM is provided to the prediction model. A new model is developed named "Popularity Prediction using Feature Selection". To achieve such a powerful functionality model, the "Rapid Miner" simulator is used. This proposed method gives attention to recognize the prominent content in online media. This method provides great efficiency, performance, accuracy, error rate and requires less execution time to predict the data over a media network.

Keywords— *Competitive Vector Auto Regression (CVAR), Term Frequency Inverse Documents Frequency (TF-IDF) and Latent Dirichlet Allocation (LDA) theme modelling, User Trust, Fake Information, Online Social Network (OSN), Multilayer Perceptron (MLP).*

I. INTRODUCTION

A recently arising pattern in information investigation is to depend on online media information for prediction, where the events of independent internet clients can be appropriately combined to show the large-scale patterns. However, data from online media may suffer from noise and be sampled because of various factors and the biggest challenge is social media-based data analytics [1]. Online social stages through which individuals become acquainted with one another and share things around themselves. Within the sight of OSNs, gigantic substances, for example, recordings and news are sent by clients anytime and anywhere. OSN has become proficient media to spread substance like news and ads [2]. The current examination endeavours to recognize the false emotional condition of clients during their filtering of large social data over OSN. It presented a novel framework to prior detect the false emotion condition, which may come about because of devouring false news over online media utilizing EEG signals [3]. One of the major challenges on social media is to controlling misleading information and fake news. A fuzzy identification calculation is proposed to distinguish the prominent substance in online media. This procedure is assessed on Twitter online network stage [4]. Another structure which efficiently describes the Web sites and sorts the misleading and genuine news articles as well as examines the similarity and dissimilarity of the misleading and genuine news on the most valuable phrase of the news stories using TF-IDF and LDA theme scheme and it investigations the likeness between misleading, genuine, and hybrid news stories [5].

These trending subjects might be significant hotspots for peoples and business associations to calculate the online and offline consequents of the subjects [6]. It is vital and qualified to predict the future forecasting of online recordings due to the heavy followed characteristics for online video: most substances get a few perspectives, whereas only a few receive the bulk of the attention [7]. Analysts can construct amazing

models to foresee post prominence from different perspectives, like the picture, printed content, sequences, or even brand data. These structures consistently measure the popularity of a post from the perspective of the online media platform [8]. Policy data is a subject that ambitions to search powerful approaches to utilize records and computation to recognize and handle complicated online issues. Policy information popularity prediction becomes a critical factor in nowadays technology due to the fact the amount of information is continuously growing [9]. Popularity forecasting becomes a crucial point in today's era because the number of information is continuously rising. Clients get and burn through media substance to a social system, where clients contain the cell phones, which continually create data through an assortment of sensors like cameras, GPS, accelerometers, and so on, and portable applications thusly, transmit this procured information along with online media [10].

The data transmitted on social networks can stay in the way of clips, pictures, between numerous others. Though maximum of the online content does not spread in many people and some content becomes trending and reaches thousands or even millions of people [11]. Recommendation Technologies (RT) in online networks attract good attention in current years, with the fast growth of data on the Internet. RT allows the customers to discover their favored items efficiently. Collaborative filtering (CF) advice set of rules is one of the maxima generally used advice algorithms [12]. The conventional manner of printing notices in revealed reproduction and its transmitting is an awful lot high priced than publishing online. Automatic social notices distinguish from conventional information are gradually increasing [13]. The aim is to model the active growth and it focusses on multiple forecasting popularity levels of social content. The prediction of popularity suffers from one of 4 stages, the four stages are mainly- burst, tall, rise and valley [14]. An approach is to simply calculate the online importance of posts utilizes the fashion studied from Twitter as online sensor of clip popularity [15].

The duty of predicting the popularity is achieved by sharing images over a social media. Such kinds of function are known as "Popularity Dynamic Prediction" [16]. In early social orders, individuals satisfy their requirements by collaborating. Trust is important to face the unspecified whether and that unspecified means another person [17]. The creator proposed online navigating propagation dynamics-based forecasting techniques does not need preparing stages and earlier information. Then, the discrete time chain markov system is presented to forecast the observing possibility of specific information's from the viewpoints of discrete people [18].

This paper discusses five different popularity prediction techniques such as CVAR, Initial-copy routing behaviour of OSNs Identification of the false emotional state using EEG signals, Fuzzy-based trust detection algorithm, TF-IDF, and LDA theme scheme. Those previous methods have few limitations, to reduce such problems, it enhances the version of the popularity forecasting scheme that is "Popularity Prediction using Feature Selection" model is proposed here that depend upon the feature selection.

II. BACKGROUND

Many studies on user trust over OSN have remained completed to create a popularity prediction model in the current previous centuries. Such models are:

The innovative scheme, termed as CVAR model, was used to construct a good forecasting framework for the American presidential voting's and American house race. The CVAR model is planned for a competition mechanism. The CVAR differentiates the multiple among numerous

participating competitors. CVAR can join visual data with text-based data from rich and multi-layered social interactive media, which helps to separate solid signals [1]. It investigates the specific connection among substance fame and a data boundary on OSNs, through observing a cycle over a substance spreading the feature. Particularly, the rank-based scheme is utilized to produce the social connection between clients by utilizing the geological data [2]. A novel framework is utilized for identifying the negative emotional level, which may come about because of devouring negative news across web-based media by utilizing EEG signals. SVM and MLP remained functional by way of the arrangement process. The proposed framework exhibited the genuine utilization of perceiving negative enthusiastic level throughout online broadcasting bulletin utilization that might assist a client since psychological disease hurt [3]. A fuzzy built trust identification system is presented to recognize the dependability over web-based broadcasting poles. A fuzzy recognition process is presented to recognize the prominent substance in web-based media. The presented strategy is assessed on Twitter social network stage. The projected fuzzy build prominence recognition process is assessed and an outcome is then related through additional state-of-art mechanisms [4]. Another structure that fully distinguishes the Web-sites advertisement and additionally sorted the false and genuine news stories, as well as examines the likeness and distinction of the false and genuine reports on the major expression terms of the news stories through TF-IDF and (LDA) theme demonstrating. It investigates the comparability between false, genuine, and mixed news stories. [5].

This paper introduces five popularity prediction schemes i.e. CVAR, Initial-copy routing behaviour of OSNs users, Identification of the false emotional state using EEG signals, Fuzzy-based trust detection algorithm, TF-IDF, and LDA theme modelling.

These are organizing as follows.

Section I Introduction. **Section II** discusses the Background. **Section III** discusses previous work. **Section IV** discusses existing methodologies. **Section V** discusses and analyses the attributes and parameters of the method and how these are affected by popularity prediction models. **Section VI** gives the proposed method **Section VII** gives the stimulation and possible results. **Section VIII** Results and Discussion **Section IX** Conclusion of the review paper. Finally, **Section X** gives future Scope.

III. PREVIOUS WORK DONE

In the research literature, many methods for Analysis of user Behaviour have been studied and improved the performance in terms of effectiveness, software reliability, accuracy rate, lower false alarm rate.

Quanzeng You et. al. (2015) [1] has proposed another system, known CVAR, to create a good prediction model for the American presidential voting's and the American house race. CVAR visual highlights improved the exhibition.

Adrian Badea et. al. (2015) [2] has proposed a framework for recognizing the client behavior in a network. This innovation gives a continuous investigation of safety cautions produced by applications and hardware networks.

Wang Andi et al. (2017) [3] has proposed an inconsistency identification technique for client behaviour and it is utilized to identify the inside treads within the dataset framework. By utilizing Discrete-time Markov Chains (DTMC), an irregularity

detection model of client behaviour is proposed, which identifies the inner attackers of the database framework.

Yi-Tung F. Chan et. al. (2009) [4] has introduced a novel strategy for client behaviour investigation in a semantic organization. Utilize the weight worth to analyze and record the client behaviour and afterward checks client behaviour record with the marks which are created by the Intrusion Detection System (IDS).

Saeideh Alimolaei et. al. (2015) [5] has proposed an intelligent framework that empowers recognizing the client's abnormal behavior in web-based banking. Since the client's behavior is related to vulnerability, the framework has been created dependent on the fuzzy hypothesis, this empowers it to distinguish user behavior and also distinguished the abnormal behavior with different degrees of power.

IV. EXISTING METHODOLOGIES

Numerous techniques have been carried out throughout the last most recent year while anticipating the popularity of online substance. Various approaches are carried out for predicting the fame of an online media network, they are as follows- Competitive Vector Auto Regression (CVAR), First-duplicate forwarding behaviour of OSNs clients and assault the conditions by a sensitive parcel of the organization, a framework to prior detect the unenthusiastic emotional level using EEG signals, A fuzzy-based trust detection methodology, TF-IDF and LDA theme system.

A) Competitive Vector Auto Regression (CVAR):

Another framework termed as CVAR model forms legislative expectation and associates online media with the genuine world. The objective of CVAR scheme is on the way to gain from experience and towards a forecast of improvement pattern. The CVAR scheme, where earlier information remains utilized towards demonstrates a race between the applicants. The CVAR can foresee democratic outcomes with high precision and rapidity. Additionally, significantly, CVAR gives a natural method to interpret the political decision forecast and it examines what are the significant elements in the official political decision [1].

B) Initial copy routing behaviour of OSNs users:

In this paper, a first duplicate forwarding behaviour of OSNs clients and assault the conditions by an elegant segment of the organization. The principal commitments of this paper can be summed up as follows. The creator inferred the specific connection between the substance prominence and the data boundaries inside OSNs. Results show that the data boundaries are simply identified with the sending possibility p and a quantity over friend's q of every client have. At the end of the day, in any event, a steady number of a friend of every client guaranteed to be ensured to have gotten the substance [2].

C) Identification of false emotional state using EEG signals:

In this investigation, it proposed a novel framework to detect the negative enthusiastic state, which may come about because of devouring adverse bulletin crosswise web-based broadcasting utilizing EEG signals. Some new examinations recommended which humanoid feeling stay strongly caught over chronological areas. SVM and MLP remained functional by way of arrangement calculations just as for perceived

feelings. Fundamentally, the proposed framework gives an initial caution throughout the utilization of negative bulletin that might keep them over enduring psychological issues [3].

D) A fuzzy-based recognition methodology:

In this paper gives a fuzzy build methodology where client faith factor UT are initially determined through as poles made using the client. At that point when dependable clients are available, formerly the poles ended through a client come to be off the record a solid pole. An authentication methodology, the pole, and the comments alongside supports finished to the present pole is concluded that the pole is dependable data. The calculation is grouped into two modules: one is to identify a client faith factor and the further is the estimate over the pole [4].

E) TF-IDF and LDA Theme Modelling:

In this paper, it investigates LDA subject demonstrating to catch the subjects of fraud, genuine, and mixture story collection, separately. The objective of the LDA theme displaying false and genuine report is to comprehend the distinction or likeness of themes between marked false and genuine reports. For every latent theme, the creator estimates the theme quality with the broadly utilized intelligibility score. The creator accepts that the proposed expectation strategy can be stretched out to constant model preparing and orders with dynamic preparing datasets which persistently incorporate the most recent reports with false or genuine names [5].

V. ANALYSIS OF METHODS

The outcomes are as good as utilizing text-based attributes. It shows the consequences of VAR and CVAR and foresees the aftereffects of future five days at a various time focuses [1]. It presents the evaluations dependent on both the created information and the genuine OSNs topology and the outcomes show that few companions of every client choose to forward the substance and the substance can be spread to countless clients in OSNs [2]. It analyzes the average feeling index of more than 8 channels among false and impartial/true feelings over 10 topics. The MLP classifier accomplishes better execution in contrast with the SVM classifier [3]. The proposed calculation is assessed on the experiments and the exactness of the calculation in tracking down the false data of the experiments. It very well may be imagined that the calculation attempts to discover the greater part of the embedded false data. For additional investigation, the precision level of the calculation is determined and portrayed [4]. The false news distributors frequently briefly register sites to spread false news in a minimal time frame. The sites distributing genuine news have a lot bigger domain classifying than destinations distributing false reports over each of the three datasets. The big incessant 10 phrases removed from false and genuine reports collections, total all false and genuine reports over three datasets, also hybrid false and genuine reports collections [5].

TABLE 1: Comparison between different mobility schemes.

Prediction models and approaches	Advantages	Limitations
CVAR	Perform solid prediction for the American presidential voting's.	It tolerates the cross-section bias problem.
Initial-copy routing behaviour of OSNs users	Perform reliable forecasting. CVAR visual highlights improved the presentation.	The issue related to this method is information coverage.
Identification of the false emotional state using EEG signals	The leave-one-out cross-approval technique is utilized to construct a system better in real life applications.	Customer experience may dis-improve due to staff over-reliance on the system.
A fuzzy-based recognition methodology	Give better proficiency in distinguishing the false information.	Detecting misinformation on social media is one of the challenging problems.
TF-IDF and LDA Theme Modelling	Easily identifying the next rising star of online video. Simple to observe the similarity and dissimilarity of the false and genuine reports.	The false news relief is the issue of ideal point measure intervention in the network.

VI. PROPOSED METHODOLOGY

Forecasting the popularity of posts is a valuable and crucial task, as well as finding the fake information and the client prominent on the content of online media and discussion about various methods based on different parameters i.e. accuracy, performance, error rate, time, overhead, throughput, delay, capacity, fake news, user trust factor, etc. for different prediction models but, there are still some limitations which troubles in this area. A new popularity prediction algorithm called "Popularity Prediction using Feature Selection" is proposing here to overcome the problems of previous models. As this algorithm is depending upon feature extraction and selection, such functionality is used to improve the efficiency of the model to predicts the popularity forecasting. In this model, the 'Facebook' dataset is used to operate and this dataset is stored into collection of the data portion.

Then, the data is provided to the pre-processing unit to process data. Before delivering data to the next unit, the pre-processing unit applies the example filter and then, replaces the missing value operator is used for preparing the complete and meaningful dataset and then the meaningful dataset is providing to the next level. Later on, feature extraction uses the extract mode to extract the information from the dataset and the output of the extract mode is in the form of feature vector or attribute vector and provided to the feature selection. Feature selection unit uses the forward selection technique to extracts attribute vector. In the end, the classification technique is used to classify meaningful data. SVM classification technique is used to classify the extracted feature and the output of the SVM is located in the prediction model.

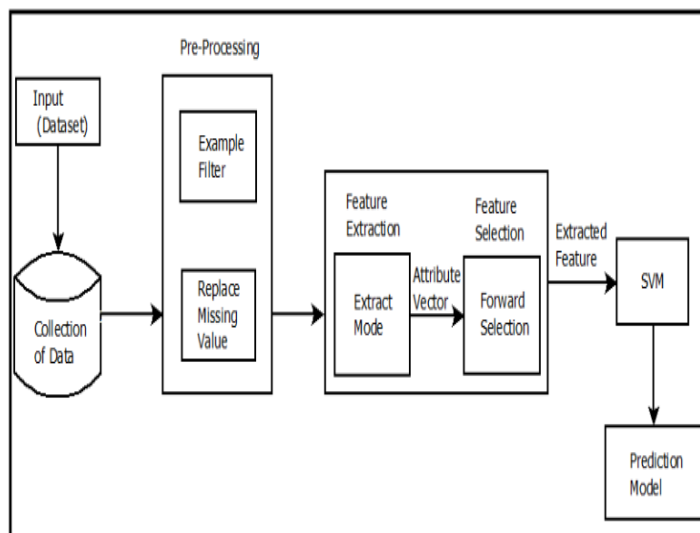


Fig. 1. Proposed Framework

VII. STIMULATION AND RESULT

In this way, the proposed method is evaluated on the dataset and the correctness of this system is dependent on how efficiently the model finds the popularity information from the dataset. It can be visualized that the method attempts to search the popularity of the data and for further observation, the correct ratio of the method is measured. Thus, the proposed technique is assessed on the input information (i.e., Facebook dataset) and then, the pre-processing unit uses the example filter along with replacing missing values operator for preparing the complete and meaningful dataset and such meaningful dataset is provided to the next level for feature extraction. The extract operator extracts data from the processed dataset and the output of the extract mode is in the form of attribute vector or feature vector and it passes to the selection unit. The output of the extract mode is provided to the feature selection for the selection of features. The extracted feature is provided to the SVM unit for classification and the output of the SVM classification technique is provided to the prediction model.

Row No.	time series	mode_order...	mode_order...
1	profile pic	1	0
2	nums/length ...	0	1
3	fullname wor...	1	0
4	nums/length f...	0	1
5	name==user...	0	1
6	description le...	0	1
7	external URL	0	1
8	private	0	1
9	att9	0	1

Fig. 2. Dataset Uploaded

In Fig.2 the social media datasets are uploaded in rapid miner tool.

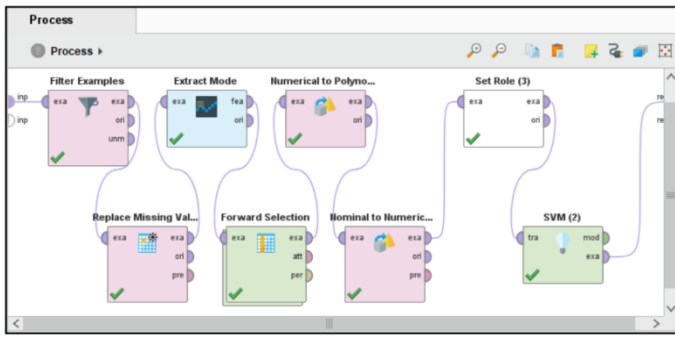


Fig. 3. Design of the proposed framework

The Fig. 3 shows that the construction and execution of the proposed method.

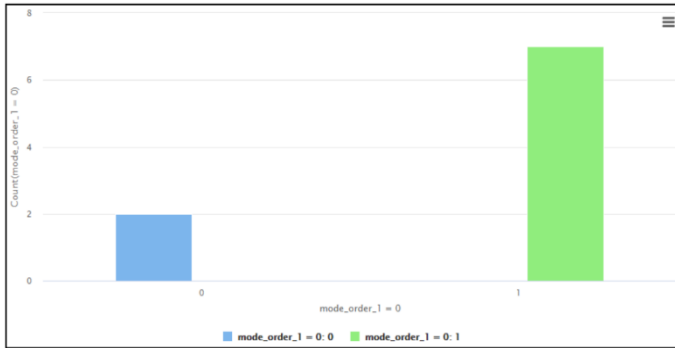


Fig. 4. The Output of the Selection Unit

The above Fig. 4 shows that the forward selection unit works over-extracted data and later on, it separates the data according to the effective features for predicting the popularity.

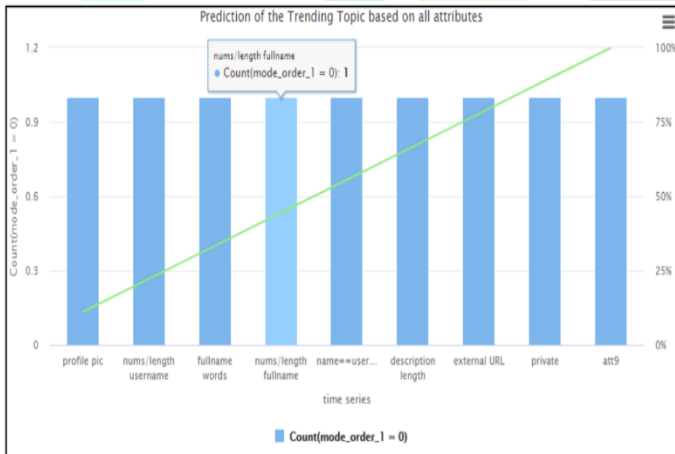


Fig. 5. Prediction of the Trending Topic based on all attributes

The Fig. 5 shows that the prediction of the dataset depends on all the attributes presents in the dataset. Feature by feature popularity graph is changed and increases so, according to the feature it forecasts the popularity of the contents.

VIII. RESULT AND DISCUSSION

This proposed method achieves great results in terms of exactness, forecasting of popularity while simultaneously it exhibits striking effectiveness in terms of time taken to build the system inside a small timeframe.

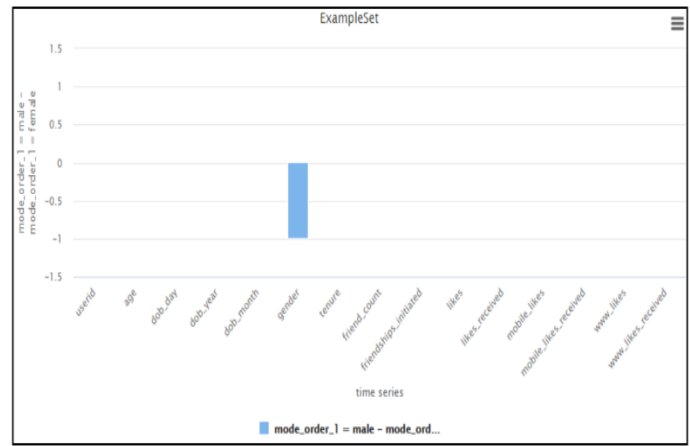


Fig. 6. Analysis of Mode_Operator_1 (Male & Female) with respect to Age

Fig. 6 shows that the mode operator consists two attributes i.e. male and female with respect to the time series factor age using 'Range (column)' graph technique. The above graph predicts the accuracy of the popularity using gender (male & female) attribute with respect to age.

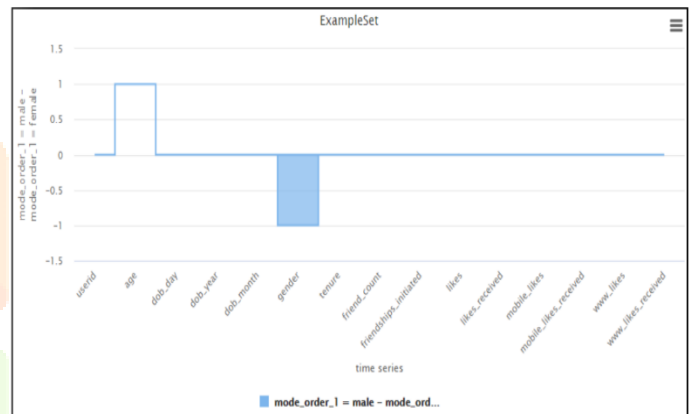


Fig. 7. Analysis of Male & Female Attributes vs Age

The Fig. 7 shows that the mode operator consists two attributes i.e., male and female with respect to the time series factor age using 'Range (step)' graph technique. The above graph predicts the accuracy of the popularity using gender (male & female) attribute with respect to age.

Table 2. Classification using Execution Time

Sr. No.	Name of the Method	Execution Time (Sec)
1.	CVAR	2422.8
2.	Initial-copy routing behaviour of OSNs users	38
3.	Identification of the false emotional state using EEG signals	1473
4.	A fuzzy-based recognition methodology	23
5.	Proposed Method	1

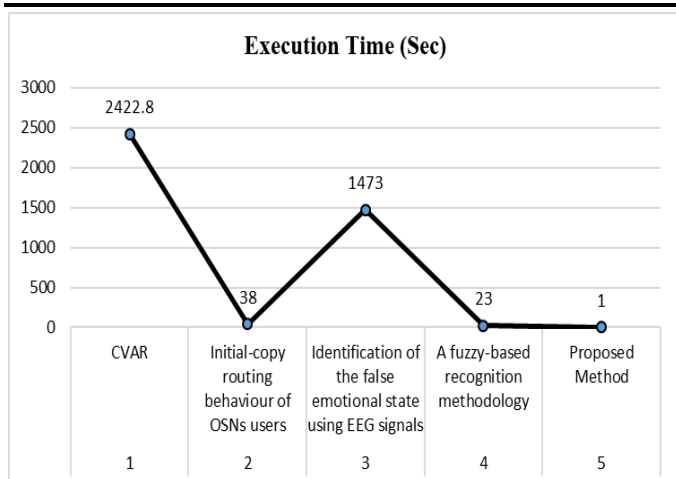


Fig. 8. Analysis of Execution Time

Table 2 and Fig. 8 show the execution time of previously proposed methods along with the new proposed framework, and the results show that the proposed framework takes less time for execution and provides higher accuracy.

Table 3. Error Rates of Various Classification Methods

Classification Methods	Parameter Evaluation	
	Accuracy	Error Rate
K-Nearest Neighbour	80.97%	19.03%
Random Forest	82.63%	17.37%
K-Means	78.68%	21.32%
Sequential Minimal Optimization	86.23%	13.77%
Support Vector Machine	93.44%	6.56%

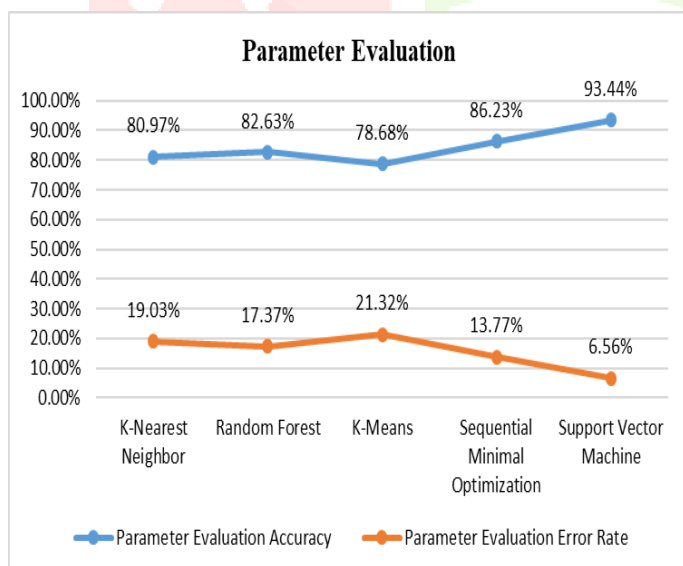


Fig. 9. Analysis of Error Rate

Table 3 and fig. 9 show the error rate of previously used classification technique along with the classification techniques used in proposed framework, and the results show that the proposed framework takes less time for execution and provides higher accuracy.

IX. CONCLUSION

This paper presents the analysis of various popularity prediction models i.e., Competitive Vector Auto Regression, Initial-copy routing behavior of OSNs users, Identification of the false emotional state using EEG signals, Fuzzy-based trust detection algorithm, TF-IDF, and LDA theme process. This paper is focused on forecasting the popularity of social media networks. In previous methods, there are some limitations in detecting the popularity, so this proposed method improves the accuracy of the data by analyzing the source of the data. It uses the Facebook dataset as an input and provides such dataset to the pre-processing unit and then, the pre-processed data is passed to the feature extraction after that the forward selection is used for the selection of features and the extracted feature is provided to the SVM. The output of the SVM is provided to the prediction model. This method provides great efficiency, performance, accuracy, error rate and require less execution time to predict the data over media network. It can be relevant in online media marketing, brand checking, and political group's prominence prediction. This model achieves better efficiency while detecting the popularity of online social media.

X. FUTURE SCOPE

As a further improvement, the model will be implemented on continuous true information and the forecast precision of the model will be completed. The proposed trust detection proof and false data identification methodologies will be of incredible assistance in controlling web-based media.

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