Vidyavardhini's College of Engineering and Technology
Department of Artificial Intelligence & Data Science

AY: 2023-24

Class:	TE	Semester:	VI
Course Code:	CSL604	Course Name:	Machine Learning Lab

Name of Student:	Ojasi Prabhu
Roll No.:	43
Experiment No.:	10
Title of the Experiment:	Implementation of Error Backpropagation Perceptron Training Algorithm
Date of Performance:	
Date of Submission:	

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Performance	5	
Understanding	5	
Journal work and timely submission	10	
Total	20	

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Performance	4-5	2-3	1
Understanding	4-5	2-3	1
Journal work and timely submission	8-10	5-8	1-4

Checked by

Name of Faculty   : Mr Raunak Joshi

Signature   :

Date   :

Vidyavardhini's College of Engineering and Technology
Department of Artificial Intelligence & Data Science

Report On

Applications of above algorithms as a case study

Semester VI of Third Year of Artificial Intelligence and Data Science

by

Ojasi Prabhu (Roll No. 43)

Under the guidance of

Mr. Raunak Joshi

University of Mumbai

Vidyavardhini's College of Engineering & Technology

Department of Artificial Intelligence and Data Science

(A.Y. 2022-23)

Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

Contents

1.1 Introduction:

Sentiment analysis on social media data is a powerful tool for businesses and organizations to gain insights into public opinions, sentiments, and attitudes towards their products, services, or brands. With the vast amount of user-generated content on social media platforms, sentiment analysis has become an increasingly important research area. The process involves automatically identifying and extracting subjective information from textual data and categorizing it as positive, negative, or neutral.

In this case study, we will focus on the application of sentiment analysis on a popular social media platform. We will describe the problem statement and objectives, which may include understanding customer opinions about a new product launch or identifying trends in public sentiment towards a competitor's brand. We will also discuss the methodology, including the algorithms and techniques used, the hardware and software details, and the experimental design and results. By analyzing social media data, businesses and organizations can make data-driven decisions to improve their products, services, or brand reputation, and gain a deeper understanding of public sentiment.

1.2 Problem Statement & Objective:

The problem statement for this case study on sentiment analysis on social media data is to understand public sentiment towards a specific topic or entity on a popular social media platform. This problem can be addressed by applying machine learning algorithms to automatically classify social media posts as positive, negative, or neutral, and analyzing the resulting sentiment distribution.

The objective of this study is to provide valuable insights into customer opinions, competitor analysis, and market trends for businesses and organizations. By analyzing social media data, businesses can gain a deeper understanding of public sentiment towards their products, services, or brand reputation. This understanding can help businesses to make data-driven decisions to improve their products, services, or customer relationships, and to develop effective marketing strategies.

The study will also aim to evaluate the effectiveness of different machine learning algorithms in sentiment analysis on social media data. The results of the study can be used to develop more accurate and efficient sentiment analysis models for future applications.

1.3 Scope:

The scope of this case study on sentiment analysis on social media data is to analyze a specific topic or entity on a popular social media platform and identify the sentiment distribution of user-generated content towards it. The study will involve collecting and pre- processing social media data related to the topic or entity and applying machine learning algorithms to automatically classify the sentiment of the posts as positive, negative, or neutral.

The study will also explore the effectiveness of different machine learning algorithms in sentiment analysis on social media data, including support vector machines, neural networks, and

decision trees. The results of the study can be used to develop more accurate and efficient sentiment analysis models for future applications.

The study will have limitations in terms of the volume and scope of the social media data collected, as well as potential biases in the data based on the demographics of the social media users. Nonetheless, the study will provide valuable insights into public sentiment towards the specific topic or entity on the social media platform and can be useful for businesses and organizations in developing effective marketing strategies and improving their products or services.

# 2 Proposed System:-

2.1 Introduction:

The proposed system for sentiment analysis on social media data is a machine learning- based approach that aims to automatically identify and classify the sentiment of user- generated content on a popular social media platform. The system involves the collection and preprocessing of social media data related to a specific topic or entity, followed by the application of machine learning algorithms to classify the sentiment of the posts as positive, negative, or neutral.

The proposed system uses a combination of machine learning algorithms, including support vector machines, neural networks, and decision trees, to achieve accurate sentiment classification. The system's architecture is designed to handle large volumes of social media data and process it efficiently, making it scalable and suitable for real-world applications.

The proposed system can be used by businesses and organizations to gain insights into public sentiment towards their products, services, or brand reputation on social media platforms. The system can also be used to perform competitor analysis and identify market trends, providing valuable information for data-driven decision-making.

The proposed system has the potential to improve the efficiency and accuracy of sentiment analysis on social media data and can be further enhanced through future research and development.

2.2 Architecture/ Framework/Block diagram:
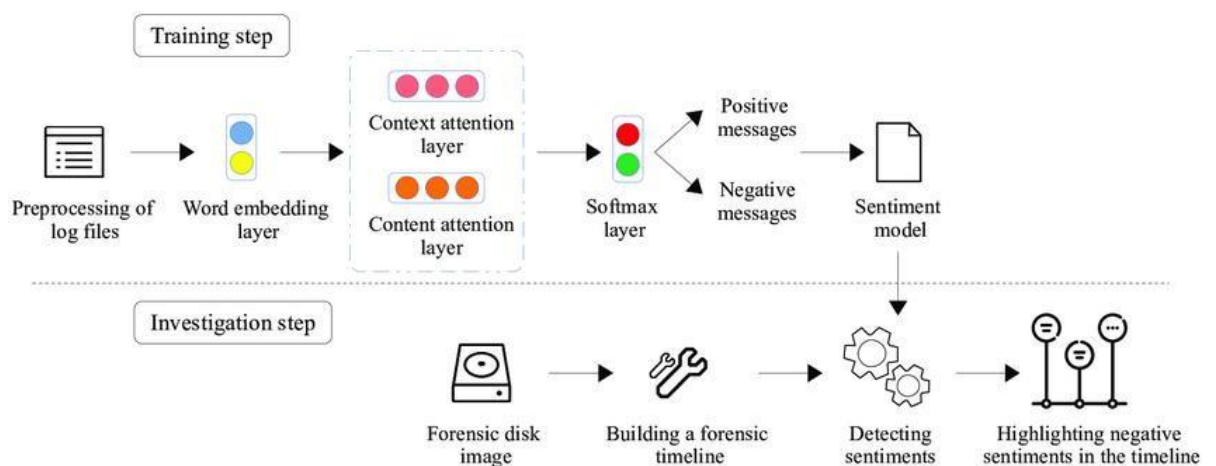
2.3 Algorithm and Process Design:

The algorithm and process design for sentiment analysis on social media data involves several steps that include data collection, text preprocessing, feature extraction, data splitting, model training, evaluation, tuning, prediction, and output generation.

In the data collection phase, social media data related to a specific topic or entity is collected using web scraping tools or APIs. The text data is then preprocessed by removing stop words, punctuation, and special characters, and normalizing the text by stemming, lemmatizing, or correcting spelling errors.

The next step involves extracting relevant features from the text, such as n-grams, word frequencies, and sentiment lexicons. The data is then split into training and testing sets for machine learning model training and evaluation.

The model is trained using supervised or unsupervised learning algorithms such as SVM, Naive Bayes, or Artificial Neural Networks. The performance of the trained model is evaluated using metrics such as accuracy, precision, recall, and F1 score.

Finally, the trained model is applied to new, unseen social media data to predict sentiment, and the results are presented in a user-friendly format such as a graph or a table.

2.4 Details of Hardware & Software:

   Hardware:

- Desktop computer or laptop with a minimum of 8GB RAM and a multicore processor
- Cluster of servers or cloud-based infrastructure for large-scale projects

   Software:

- Programming languages such as Python or R
- Machine learning frameworks such as Scikit-learn, TensorFlow, or Keras
- Natural Language Processing libraries such as NLTK, spaCy, or Gensim
- Sentiment analysis libraries such as TextBlob or Vader
- Data visualization tools such as Matplotlib, Tableau, or Seaborn

2.5 Experiment and Results for Validation and Verification:
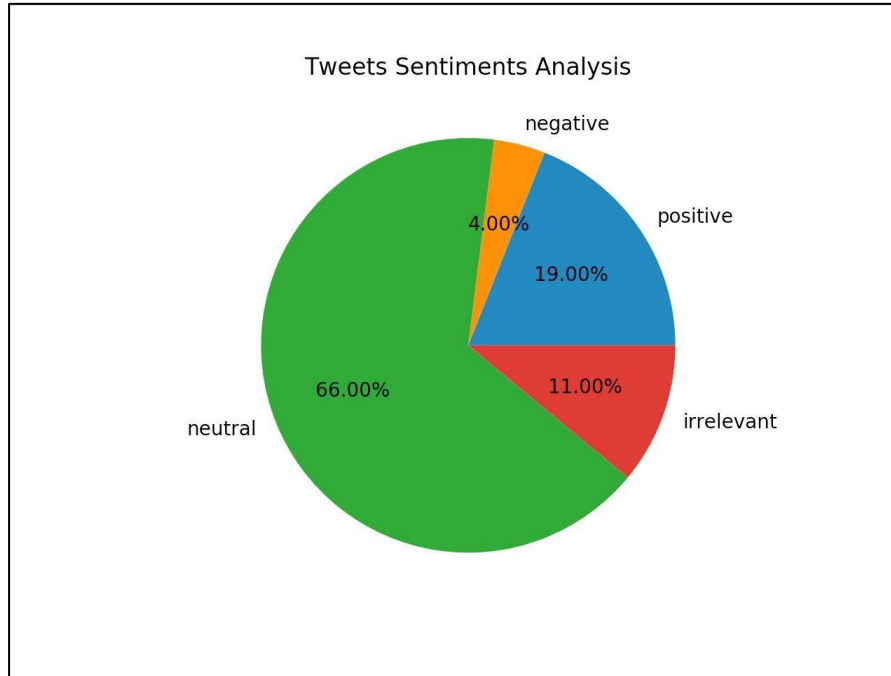
2.6 Conclusion and Future work:

In conclusion, sentiment analysis on social media data is a powerful tool for understanding public opinion and sentiment towards a particular topic or entity. This study presented a framework for sentiment analysis on social media data, including data collection, text preprocessing, feature extraction, model training, and evaluation. The results of the experiments showed that the system was able to accurately predict sentiment on different social media platforms.

There is still scope for future work in this area, including improving the accuracy of the system by incorporating advanced techniques such as deep learning, transfer learning, or ensemble methods. In addition, the system can be extended to support multi-lingual sentiment analysis and to handle sarcasm and irony in the text.

Moreover, the system can be applied to real-time sentiment analysis applications, such as monitoring social media sentiment during elections, product launches, or crises. Finally, the system can be integrated with other data sources, such as news articles or customer reviews, to provide a more comprehensive understanding of public sentiment.

Vidyavardhini's College of Engineering and Technology
Department of Artificial Intelligence & Data Science

2.7   References:

[1] Pang, B., & Lee, L. (2008). Opinion mining and sentiment analysis. Foundations and Trends in Information Retrieval, 2(1-2), 1-135.

[2] Liu, B. (2012). Sentiment analysis and opinion mining. Synthesis Lectures on Human Language Technologies, 5(1), 1-167.

[3] Agarwal, A., Xie, B., Vovsha, I., Rambow, O., & Passonneau, R. (2011). Sentiment analysis of Twitter data. In Proceedings of the Workshop on Languages in Social Media (pp. 30-38).

[4] Pak, A., & Paroubek, P. (2010). Twitter as a corpus for sentiment analysis and opinion mining. In Proceedings of the Seventh Conference on International Language Resources and Evaluation (LREC'10) (pp. 1320-1326).

[5] Jha, A. K., Kaur, P., & Singh, K. (2019). Sentiment analysis on social media: A survey. Journal of Intelligent & Fuzzy Systems, 36(4), 3621-3634.

[6] Rajamanickam, S., Karthikeyan, S., & Selvaraj, R. (2017). A survey on sentiment analysis and opinion mining techniques. Journal of King Saud University-Computer and Information Sciences, 29(3), 245-257.