

To Enhance the Impact of Deep Learning-Based Algorithms in Determining the Behavior of an Individual based on Communication on Social Media



Sunayana Shivthare, Yogesh Kumar Sharma, Ranjit D. Patil

Abstract: *In this digitized world, the Internet has become a prominent source to glean various kinds of information. In today's scenario, people prefer virtual reality instead of one to one communication. The Majority of the population prefers social networking sites to voice themselves through posts, blogs, comments, likes, dislikes. Their sentiments can be found/traced using opinion mining or Sentiment analysis. Sentiment analysis of social media text is a useful technique for identifying peoples' positive, negative or neutral emotions/sentiments/opinions.*

Sentiment analysis has gained special attention by researchers from last few years. Traditionally many machine learning algorithms were used to implement it like naive bays, Support Vector Machine and many more. But to overcome the drawbacks of ML in terms of complex classification algorithms different deep learning-based algorithms are introduced like CNN, RNN, and HNN.

In this paper, we have studied different deep learning algorithms and intended to propose a deep learning-based model to analyze the behavior of an individual using social media text. Results given by the proposed model can utilize in a range of different fields like business, education, industry, politics, psychology, security, etc.

Keywords : *Deep learning, Machine Learning, Social Media, Sentiment analysis.*

I. INTRODUCTION

Nowadays we can consider the Web as a huge virtual space where people express their views and share individual opinions regarding any aspects of life. By just a click of a button lot, many things can be done with the help of the Internet and social media. Initially, social media were used as a medium of chat but later on with upgraded versions of social media it has become a tool for communication, interaction, entertainment, broadcast as well as for education. There are different social media available such as Facebook, Instagram, Whatsup, Twitter, LinkedIn, etc.

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Sentiment analysis is a powerful technique which can be implemented with the help of deep learning which is the environment of Artificial Intelligence. Nowadays different applications related to sentimental, emotional and behavioral analysis of people are developed using advanced concepts like maximum use of machine learning, deep learning, artificial intelligence, and neural network-based systems. It is a challenging task to handle huge, unstructured social networking sites data and to analyze it.

In present days Sentiment analysis is a very well-known topic among researchers which is mostly related to emotion detection from social media posts. Sentiment analysis gives positive, negative and neutral polarity from text and emotion analysis recognizes feelings from texts like anger, fear, disgust, happy, sad and surprise. Results of both can be used by many applications. Emotion analysis is one of the popular topics among researchers and can be used in different areas like security agencies can track different messages, emails, blogs, posts and can find suspicious activities.

II. GENERAL STRUCTURE OF BEHAVIOUR ANALYSIS

General Structure of Sentiment, Emotion, and Behaviour Analysis System is depicted in the diagram given below.

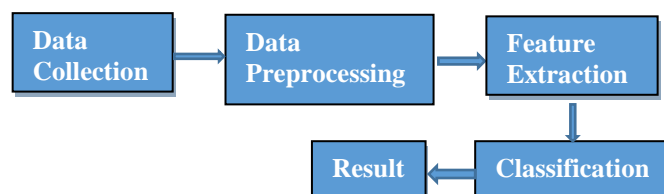


Figure 1: General Structure of Sentiment, Emotion and Behaviour Analysis System

III. TRADITIONAL APPROACH

Text classification is an important task in NLP which classify text in different categories by using textual content. NLP can be broadly used in sentiment analysis, tagging, spam, and intent detection. Different approaches for text classification are as follows

- A. Rule-based systems
- B. Machine Learning-based systems

C. Hybrid systems

A. Rule-based systems

Rule-based approaches define a set of linguistic rules to classify text into different groups. Every rule consists of a particular pattern or category. These systems can easily understood by human can be modified for better results. The pitfalls of this system are it requires deep domain knowledge for starters, time-consuming, defining rules for a complex system is quite challenging and difficult to maintain.

B. Machine Learning-based systems

In machine learning approach classification is done based on past observations, pre-labeled training data. Different text classification algorithms of machine learning are naive bays, support vector machines and deep learning.

Naive Bayes is the popular statistical-based algorithm of ML which can be useful for text classification. It gives better results but in the case of a small amount of data only. This algorithm computes the probabilities of occurrences of text and accordingly categorizes it. Support Vector Machines gives more accurate results than Navie Bayes. It needs more computational resources. It is a supervised machine learning algorithm.

C. Hybrid Systems

Hybrid systems are a combination of machine learning approach and rule-based system. These systems are used for better accuracy in results. Different rules can be added for conflicting data using a hybrid system which can't be done by classifier.

IV. DEEP LEARNING APPROACH

Deep learning is one of highlighted area of Machine learning which consists of a set of various algorithms and techniques which can be useful in complex text classification. Deep learning algorithms have the potential to provide high accuracy. Convolutional Neural Networks (CNN) and Recurrent Neural Networks (RNN) are two architectures of deep learning used for text classification. Deep learning algorithms provide better accuracy even for the data which grows exponentially as compared to traditional machine learning approaches such as SVM and NB.

Convolutional neural network (CNN) is the popular category of neural network which mainly used for classification for structured data like image, videos. It is well suited for spatial data. Applications of CNN are image recognition, video processing, recognition of face and object detection and many more. It gives better results than RNN.

Recurrent neural networks have taken reference of David Rumelhart's work in 1986. It is well suited for temporal or sequential data. It is used in text and speech analysis. When compared with CNN it gives less feature compatibility.

V. DEEP LEARNING BASED PROPOSED MODEL FOR BEHAVIOUR ANALYSIS

In this paper, authors have intended to propose a deep learning-based model. In which SM Data Extraction, Data Pre-processing, Feature Extraction, Classification and Pattern analysis & Result generation has been done.

The step by step working is as follows:

Step 1: The initial step is to extract the posts of individuals from different social media like Facebook, Twitter, and Instagram.

Step 2: After extraction of posts it is stored in the database separately. These posts are studied for analysis of patterns of individuals for predictions.

Step 3: The predictions are based on the patterns of sentiment analysis, emotion analysis, and behavior analysis.

Step 4: Finally results are displayed in percentages and graphs.

Authors intended to apply different deep learning-based methods, frameworks, architecture, and packages in the model.

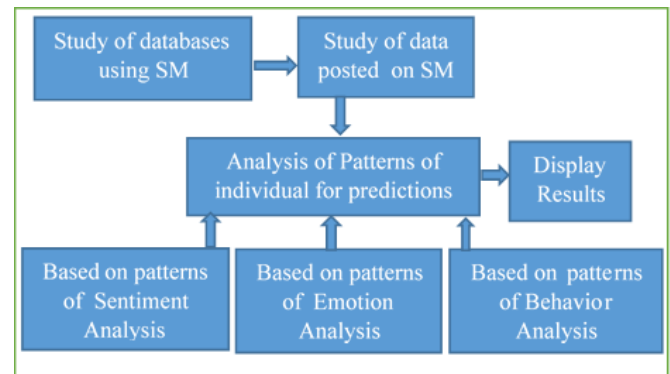


Figure 2: Architecture of Proposed Model

VI. FUTURE SCOPE

The proposed model can be implemented by using different deep learning algorithms, methods, frameworks, architecture, and packages which can give behavioral pattern of an individual. Results given by the proposed model can be useful to teachers, parents, psychiatrists, doctors.

VII. CONCLUSION

In today's scenario as data is growing exponentially on social networking sites its challenging job to analyze it with better accuracy. Deep learning-based algorithms provide better accuracy in case of complex classification of data as compared to traditional machine learning algorithms.

The results given by the proposed model can be preferred in different areas by different people.

- In this era of the Internet, there are various distortion available for the students in the form of SMS, online games, online forums, online communities, etc.
- It's difficult for parent's school teacher to analyze the mindsets of students for doing so in the form of sentiments, emotion and behavior study undertaken will help to understand.
- The outcome of the study undertaken may help parents, teachers, psychologists, doctors to analyze the problems raised related to the students in the form of behavior, sentiments, etc.
- The outcome of the study can also help the analyst or some IT forms for preparing Psychometric test/tools.

- Authors are targeting to study their sentiment, emotion, and behavior based on some of the algorithms. So accuracy of results may vary from algorithm to algorithm.

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