AN EFFICIENT SENTIMENT ANALYSIS OF TWITTER DATA USING DEEP LEARNING AND HYBRID OPTIMIZATION TECHNIQUE

A THESIS

Submitted by

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ABSTRACT

In the era of developing world, media have received more attention nowadays. People are directly associated to share their personal opinions with others through the use of social media. Business people can share information over social media about their products and services. The number of users on social media has been increasing day by day. Social media hold more amount of data in different domains. These data should be converted into useful data for a business organization to improve the business. Manual processing and analysis of these data are not possible, due to their sizes. The concepts of machine learning (ML) and artificial intelligence have been introduced to extract useful information from these data and it is called as Data Mining or Sentiment Analysis.

Developing a Sentiment Analysis (SA) model is the prime goal and it is used to computationally know the customers' sensitivities. In this research, an ML algorithm of Multiclass Support Vector Machine classifier has been proposed for sentiment analysis. The performance of the classifier is further improved by applying Simulated annealing-based optimization to tune the hyperparameters. The proposed ML model is applied to a Twitter data set for sentiment analysis. The proposed model outperforms in terms of Precision, Recall, F1 Score and accuracy compared to other models.

Deep Learning (DL) has been developed as a powerful ML approach that learns multiple layers of representations or features of data and it produces better classification results. DL is also widely used in the field of sentiment analysis. In the first contribution, a DL model of Bi directional Long Short-Term Memory (LSTM) combined with hybrid optimization has been used for sentiment analysis. Unlike standard feedforward neural networks,

LSTM has feedback connections for improved performance. The hyperparameters of the Bi-LSTM model are tuned using combined simulated annealing and grey wolf optimizer. Experimental results tested on the Twitter data set show that the proposed model has achieved better results in terms of all performance parameters.

Recommender systems have been used to process the personalized Information for predicting the user favorites to specific items by applying filtering technique. Recently, recommendation system is very popular in the field of product purchase, medical drugs and restaurant etc. Recommender systems are rapidly becoming an essential tool to quicken the cross-selling and strengthen the customer constancy. In the second contribution, a Multi feature fusion model-based recommendation model has been proposed. The features extracted from different classifiers of SVM, Multi Convolutional Neural Network and BiLSTM are combined to develop this recommendation model. The strategy of attention mechanism is used to select useful features for classification. The proposed recommendation system outperforms other models in terms of all performance parameters.