

عنوان مقاله:

An Optimized Deep Model for Bi-lingual Sentiment Analysis of Medical User Reviews

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خلاصه مقاله:

Sentiment analysis of online doctor reviews helps patients to better evaluate and select the related doctors based on the previous patients' satisfaction.— Although some studies are addressing this problem in the English language, only one preliminary study has been reported for the Persian language. In this study, we propose a new evolutionary deep model for sentiment analysis of Persian online doctor reviews. The proposed method utilizes both Persian reviews and their English translations as inputs of two separate deep models. Then, the outputs of the two models are combined in a single vector which is used for deciding the sentiment polarity of the review in the last layer of the proposed deep model. To improve the performance of the system, we propose an evolutionary approach to optimize the hyperparameters of the proposed deep model. We also compared three evolutionary algorithms, namely, Ant Colony Optimization (ACO), Genetic Algorithm (GA), and Gray Wolf Optimization (GWO) algorithm, for this purpose. We evaluated the proposed model in two phases; In the first phase, we compared four deep models, namely, long shortterm memory (LSTM), convolutional neural network (CNN), a hybrid of LSTM and CNN, and a bidirectional LSTM (BiLSTM) model with four traditional machine learning models including Naïve Bayes (NB), decision tree (DT), support vector machines (SVM), and random forest (RF). The results showed that the BiLSTM and CNN models outperform other methods, significantly. In the second phase, we compared the optimized version of two proposed bi-lingual models in which either two BiLSTM or two CNN models were used in parallel for processing Persian and English reviews. The results indicated that the optimization of the CNN using ACO and the optimization of BiLSTM using a genetic algorithm can achieve the best performance among other combinations of two deep models and three optimization algorithms. In the current study, we proposed two deep models for bi-lingual sentiment analysis of online Persian doctor reviews. Moreover, we optimized the proposed models using ACO, genetic algorithm, and gray wolf optimization methods. The results indicated that the proposed bi-lingual model outperforms a similar model using only Persian or English reviews. Also, optimizing the parameter of proposed deep models using ACO or genetic algorithms improved the performance of the models.

کلمات کلیدی:

Medical Reviews, Online Doctor Reviews, Persian Sentiment Analysis, Bi-lingual Sentiment Analysis, Deep Learning, Evolutionary Optimization

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