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# A Method of Deep Learning Tackles Sentiment Analysis Problem in Arabic Texts

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**Abstract**— Sentiment Analysis (SA) is a field of Natural Language Processing (NLP) whose goal is to extract the emotion, sentiment or more general opinion expressed in a human-written text. Opinions and emotions play a central role in human life. Therefore, there are many academic researches in this field for processing many languages like English. However, there is scarce in its implementation with addressing Arabic Sentiment Analysis (ASA). It is a challenging field where Arabic language has a rich morphological structure and there are many other defies more than in other languages. For that, the proposed model tackles ASA by using a Deep Learning approach. In this work, one of word embedding methods, such as a first hidden layer for features extracting from the input dataset and Long Short-Term Memory (LSTM) as a deep neural network, has been used for training. The model combined with Softmax layer is applied to turn numeric outputs from LSTM layer into probabilities to classify the outputs to positive or negative. There are two datasets that are used for training the model separately with each one. The first one is ASTD dataset as a dialectal Arabic type about different tweets from internet, the results with this dataset is compared with another academic work that used the same one. The results from this work outperforms through accuracy about 14.95% and F-score about 15.14% more than what performed in the previous work. The second one is HTL dataset as a modern standard Arabic type about opinions of reviewers on different hotels from several countries. This dataset is bigger in size than the first one to show the size effect on the results of this model. So, the accuracy increased about 11% and F-score about 10.8% more than what performed with the first dataset.

**Index Terms**— Arabic Sentiment Analysis, Deep Learning, Long Short-Term Memory, Natural Language Processing.