AVIS DE SOUTENANCE DE THESE

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Mme (elle) **ELFAIK Hanane**

Soutiendra : **le Samedi 25/02/2023** à **10H00**
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Une thèse intitulée :
Contributions to Improving Emotion Recognition and Sentiment Analysis from Text Data Using Deep Learning

En vue d'obtenir le ***Doctorat***
FD : ***Sciences et Technologies de l'Information et de la Communication***
Spécialité : ***Informatique***

Devant le jury composé comme suit :

Nom et prénom	Etablissement	Grade	Qualité
Pr EL BEQQALI Omar	Faculté des Sciences Dhar El Mahraz, Université Sidi Mohamed Ben Abdellah, Fès	PES	Président
Pr MADANI Abdellah	Faculté des Sciences, Université Chouaib Doukkali, El Jadida	PES	Rapporteur & Examinateur
Pr MOURHIR Asmaa	Al Akhawayn University, Ifrane	PH	Rapporteur & Examinateur
Pr RIFFI Jamal	Faculté des Sciences Dhar El Mahraz, Université Sidi Mohamed Ben Abdellah, Fès	PH	Rapporteur & Examinateur
Pr MANSOURI Anass	Ecole Nationale des Sciences Appliquées, Université Sidi Mohamed Ben Abdellah, Fès	PES	Examinateur
Pr ZINEDINE Ahmed	Faculté des Sciences Dhar El Mahraz, Université Sidi Mohamed Ben Abdellah, Fès	PES	Examinateur
Pr MAHRAZ Mohamed Adnane	Faculté des Sciences Dhar El Mahraz, Université Sidi Mohamed Ben Abdellah, Fès	PH	Examinateur
Pr NFAOUI El Habib	Faculté des Sciences Dhar El Mahraz, Université Sidi Mohamed Ben Abdellah, Fès	PES	Directeur de thèse

Abstract:
With the advent of Web 2.0, Affective computing conjoins the research topics of sentiment analysis and emotion recognition and has recently attracted increasing attention. It has guided computers to recognise and convey emotions and intelligently react to human sentiments and emotions. It is necessary to develop a cognitive, intelligent system capable of recognising and comprehending people's sentiments and emotions and providing prompt, empathetic responses. As a result, affective analysis can avidly capture the affective aspects of individuals towards given world-level events, products, services, etc. In particular, Arabic affective analysis on social networks becomes a major concern regarding language uses, e.g., morphological richness, ambiguity, agglutination, dialectal variation and complexity, and therefore, the accurate recognition of affective aspects is more challenging task for valid and reliable affective analysis. Proposals in this context have not witnessed serious developments yet since the current state-of-the-art models achieved insignificant accuracy, whereas these models are so far unconsidered in human decision-making processes. The goal of this thesis is to study and address challenging issues in this area, focusing on both the design of efficient deep-based methods and well-distributed textual representation techniques, as well as on studying how these methods and techniques can be applied to help advance the state-of-the-art Arabic affective analysis and, hence, facilitate and aid the decision-making process. Thus, in this thesis, we propose three contributions. In the first one, we focus on the sentiment analysis task from Arabic text. The key objective is to overcome the limited ability of the feed-forward model by extracting unlimited contextual information by dealing with both forward and backward dependencies from the feature sequences of the Arabic sentence. In this regard, we have proposed a Bidirectional LSTM deep learning-based model with the ability of extracting the contextual information in order to predict the sentiment polarity from the Arabic text. The empirical results demonstrate the capability of the proposed deep-based model (1) to learn the context of each word in the text, (2) to access both preceding and succeeding contextual features by combining a forward hidden layer and a backward hidden layer, and (3) to discover richer semantic information and make full use of contextual information than LSTM. In the second contribution, we have addressed the affect analysis problem for Arabic tweets. The main intuition behind this proposal is to exploit context-aware embedding for Arabic emotion analysis and then forward them to a deep learning model designed especially for multilabel emotion classification. In particular, we have used the transformer-based model for Arabic language AraBERT as the semantic contextual embeddings and attention-based LSTM-BiLSTM as a multilabel emotion classification deep model. We first enriched the tweets by transcribing their embedded emojis to their corresponding Arabic words. Then, we performed extensive experiments using different versions of AraBERT and BERT Multilingual. In the last contribution, we aim to help advance the state-of-the-art performance of Arabic affect analysis models on Twitter. First, we have proposed a high-quality representation of Arabic tweets through a four-level fusion of different features to capture the polysemy, the semantic/syntactic information, and the conveyed emotional knowledge; and to deal with out-of-vocabulary words. Second, we propose an attentional bidirectional RNN-CNN deep model that uses two parallel sequence models, namely, LSTM and GRU networks in the bidirectional layer, in order to seize high-quality context features through processing the forward and backward directions. CNN was adopted to extract meaningful features, decrease the dimensionality of feature space, and learn the local patterns. The attention mechanism was employed to enhance the essential features further. Extensive empirical experiments were carried out on benchmark and well-known datasets tailored to the Arabic language from various domains in order to demonstrate the effectiveness of our contributions.

Keywords:
Affective Analysis, Sentiment Analysis, Emotion Recognition, Deep Learning, Text Classification, Arabic Language.