World Academy of Science, Engineering and Technology
International Journal of Cognitive and Language Sciences
Vol:14, No:07, 2020

Deep Learning Based, End-to-End Metaphor Detection in Greek with Recurrent and Convolutional Neural Networks

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Abstract : This paper presents and benchmarks a number of end-to-end Deep Learning based models for metaphor detection in Greek. We combine Convolutional Neural Networks and Recurrent Neural Networks with representation learning to bear on the metaphor detection problem for the Greek language. The models presented achieve exceptional accuracy scores, significantly improving the previous state-of-the-art results, which had already achieved accuracy 0.82. Furthermore, no special preprocessing, feature engineering or linguistic knowledge is used in this work. The methods presented achieve accuracy of 0.92 and F-score 0.92 with Convolutional Neural Networks (CNNs) and bidirectional Long Short Term Memory networks (LSTMs). Comparable results of 0.91 accuracy and 0.91 F-score are also achieved with bidirectional Gated Recurrent Units (GRUs) and Convolutional Recurrent Neural Nets (CRNNs). The models are trained and evaluated only on the basis of training tuples, the related sentences and their labels. The outcome is a state-of-the-art collection of metaphor detection models, trained on limited labelled resources, which can be extended to other languages and similar tasks.

Keywords : metaphor detection, deep learning, representation learning, embeddings
Conference Title : ICCMEC 2020 : International Conference on Conceptual Metaphor and Embodied Cognition
Conference Location : Helsinki, Finland
Conference Dates : July 17-18, 2020