

**Emotion Recognition on Twitter: Comparative Study and Training a Unison Model**

**Abstract:**

Despite recent successes of deep learning in many fields of natural language processing, previous studies of emotion recognition on Twitter mainly focused on the use of lexicons and simple classifiers on bag-of-words models. The central question of our study is whether we can improve their performance using deep learning. To this end, we exploit hashtags to create three large emotion-labeled data sets corresponding to different classifications of emotions. We then compare the performance of several word- and character-based recurrent and convolutional neural networks with the performance on bag-of-words and latent semantic indexing models. We also investigate the transferability of the final hidden state representations between different classifications of emotions, and whether it is possible to build a unison model for predicting all of them using a shared representation. We show that recurrent neural networks, especially character-based ones, can improve over bag-of-words and latent semantic indexing models. Although the transfer capabilities of these models are poor, the newly proposed training heuristic produces a unison model with performance comparable to that of the three single models.