Psychological Classification by Applying Deep Learning to Social Media Text

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Deep Learning has recently emerged as an effective machine learning technique that specializes in recognizing abstract patterns in large volumes of data. It has been very successful in various branches of machine learning, but its applications to Natural Language Processing have generally been limited to machine translation. By applying Deep Learning to social media, it is possible to determine abstract psychological traits based on an individual’s online profile. All words in tweets are first encoded as 100-dimensional relationship vectors through Tweet2vec, a neural network based on Skip-gram Word2vec with Negative Sampling. An eight-layer Deep Neural Network is then trained on profiles labelled with a specific psychological trait. The network is composed of six hidden layers and two bidirectional Long Short-Term Memory layers. In the experimental design, the algorithm was trained to identify extraversion on Twitter with training data collected from a voluntary survey of 3854 individuals with questions derived from the International Personality Item Pool. The algorithm classified extraverted and introverted people with 92.6% and 93% accuracies. This research is the first application of Deep Learning to text-based psychological classification and demonstrates its efficacy at recognizing implicit behavioral patterns. Moreover, the algorithm proved effective at distinguishing between Panera Bread’s and McDonald's target markets with 85.6% and 86.4% accuracies, illustrating its marketing application. It can also be applied to help find supporters for political campaigns and allow future Artificial Intelligence interfaces to recognize human emotion. It could even be used by government agencies to flag patterns of cyberbullying, threatening behavior, and extremism online.

Awards Won:

Second Award of $2,000

Oracle Academy: Award of $5,000 for outstanding project in the systems software category.