Detecting negative reviews on Yelp : Detailed project outline

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Our project is centered on the Yelp open data set [1]. More specifically we will work on the reviews (with a focus on restaurants) data. We will add labels to this data corresponding to wether the review is considered positive or negative. More specifically a review will be positive it has 3 or more stars and negative otherwise. Our first goal is to obtain a machine learning model with a high negative predictive value. That is we want a ML model that identifies negative reviews well. To achieve this we will use 3 different embedding methods. First we will use the skip-gram word2vec [1] embeding method that we saw in class. We will then train a LSTM network on the [2]. We will also try a more classical approach with a bag-of-words embedding. We will use both CART and Random forest on this second embedding. Finally we will try train a bidirectional lstm [3] with it's own embedding layer. To evaluate the perfomances of the different models, we will divide the reviews data set in a train and test set, and use the negative predictive perfomance $= \frac{TN}{TN+FN}$ as a second metric the False discovery rate $= \frac{TP}{FP+TP}$.
Once this is achieved a subsequent goal would be to use the latter model to be able to give recommendations to businesses based on the words with the most predictive power. In particular this could be done using attention mechanisms [4].

References

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