Using GANs for Generating Text Representations of Ratings

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Abstract:

My proposal is to utilize the generative Convolutional GAN model to train a network that can classify a review's rating while also creating a generative model that can create a representative review given a seed rating. This would be helpful for proper classification of reviews since GAN's tend to generate very powerful classifiers while training as a generative model.

Research Context:

GAN networks are adversarial networks that are actually comprised of two separate networks trying to compete against each other. One network is a classifier that tries to classify the given input, while the other model is a generative, and tries to produce an output that tries to fool the classifier to classify its own output properly. This model is very powerful and has been used to generate completely novel images of landscapes, birds, and people that are very realistic and generated from an input of just noise. These networks can also be trained with a "seed" input, where instead of pure noise, some baseline vector is used to generate upon. This could be utilized to generate completely new reviews given just the rating as an input, providing insight into the word distribution and contextual makeup of an n-star rating.

Data / Design:

I would utilize restaurant reviews, split by star rating. Since 2 star and 4 star ratings can become a bit ambiguous, I would probably only train on 1,3 and 5 stars, since they represent a different class of rating (bad, ok, good).

Methods

I would implement a GAN architecture and experiment with different classifier and generative models to see which one can capture sequential text data best (LSTM and CNN are likely good choices). This network would be trained on generated document to matrix embeddings which can be converted back the text. The classifier would try to classify which rating was given for the inputted document matrix, and the generative model would try to produce a document matrix that fools the classifier into properly classifying it.

Significance

This would be significant in that it could help Yelp gain insight to the overarching structure of different review types. Also, the GAN architecture would generate a very powerful classifier that would be very effective in predicting ratings given only the text.

References

https://web.stanford.edu/class/cs224n/reports/2761133.pdf

https://arxiv.org/pdf/1706.01399.pdf