Project 13: Variational Auto Encoder For Slang Generation

Motivation

Writing the perfect email is an artform. How formal should you be? Is this the correct wording? Can I use slang? Questions that have inspired the company Grammarly to use machine learning in order to help people write emails and résumés with appropriate formality [1]. What Grammerly does can be seen as a transformation/translation model that takes informal english and translates it into formal english. This raises the question "what lies between informality and formality?".

In this project we intend to create a VAE model that can embed sentences into a latent space and hopefully change the formality in this latent space. We then aim to be able to sample a corresponding message which is more or less formal i.e. consists of varying degrees of slang.

Background

There are many ways of embedding sentences to a latent space (word2vec, GloVe etc.) but since we wish to make samples from continuous change of formality we will implement [2] that uses a VAE approach to embed the sentences.

The dataset that we intend to build our model from was produced by Grammarly and based on Yahoo answers dataset L6 [3]. Sentences from L6 were manually either translated to informal or formal language by humans. Grammarly used the dataset (GYAFC)[4] to build a model that applies 'style transfer' to input sentences. The style transfer aims to take the sentence from informal to formal language. We intend to build a model that can sample sentences with more or less slang continuously from the latent space.

Milestones

1. Implementing method from [2], and testing on simple dataset
   (a) random generation with and without variable input size
   (b) experiment on simple dataset and setup baseline to track progress
2. Getting method to work on GYAFC dataset
   (a) Through [5] or if time permits [6]
3. Enrich GYAFC Datasheet with a slang vocabulary (eg urban dictionary)
4. Extend VAE Implementation from 2. (above) to use enriched GYAFC Datasheet
5. Benchmarking implementation

References

[1] Grammarly. *Under the Hood at Grammarly: Transforming Writing Style with AI.* `https://www.grammarly.com/blog/transforming-writing-style-with-ai/`. Accessed: 5-11-2019.

[2] Samuel R. Bowman et al. *Generating Sentences from a Continuous Space.* 2015. arXiv: `1511.06349 [cs.LG]`.

[3] Yahoo. *Yahoo datasets.* `https://webscope.sandbox.yahoo.com/catalog.php?datatype=l`. Accessed: 5-11-2019.

[4] Sudha Rao and Joel Tetreault. *Dear Sir or Madam, May I introduce the GYAFC Dataset: Corpus, Benchmarks and Metrics for Formality Style Transfer.* 2018. arXiv: `1803.06535 [cs.CL]`.

[5] Kihyuk Sohn, Honglak Lee, and Xinchen Yan. "Learning Structured Output Representation using Deep Conditional Generative Models". In: *Advances in Neural Information Processing Systems 28.* Ed. by C. Cortes et al. Curran Associates, Inc., 2015, pp. 3483–3491. URL: `http://papers.nips.cc/paper/5775-learning-structured-output-representation-using-deep-conditional-generative-models.pdf`.

[6] Harshil Shah and David Barber. *Generative Neural Machine Translation.* 2018. arXiv: `1806.05138 [cs.CL]`.