

SARCASTIC COMMENT GENERATION

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ABSTRACT

This project aims to design and implement a sarcastic comment generation based on given context. The comments are in response to some parent comments. Our final model is a character-level seq2seq model with LSTM. We have also provided an interactive web interface.

1 INTRODUCTION MOTIVATION

Text generation has always been a hot topic in Natural Language Processing. With the advancements in Deep Learning methods, applications to achieve text generation tasks also have been developed. There are different types of text generation including Machine Translation. We would like to generate sarcastic texts which is arguably harder because sarcasm is very dependent on the context and also detecting sarcasm may be hard even for human beings.

This project aims to implement a state of the art text generator. More specifically the aim of this project is to implement a system that will give response to any given text and we would like these responses to be as sarcastic as possible given the parent comment.

2 DATASET

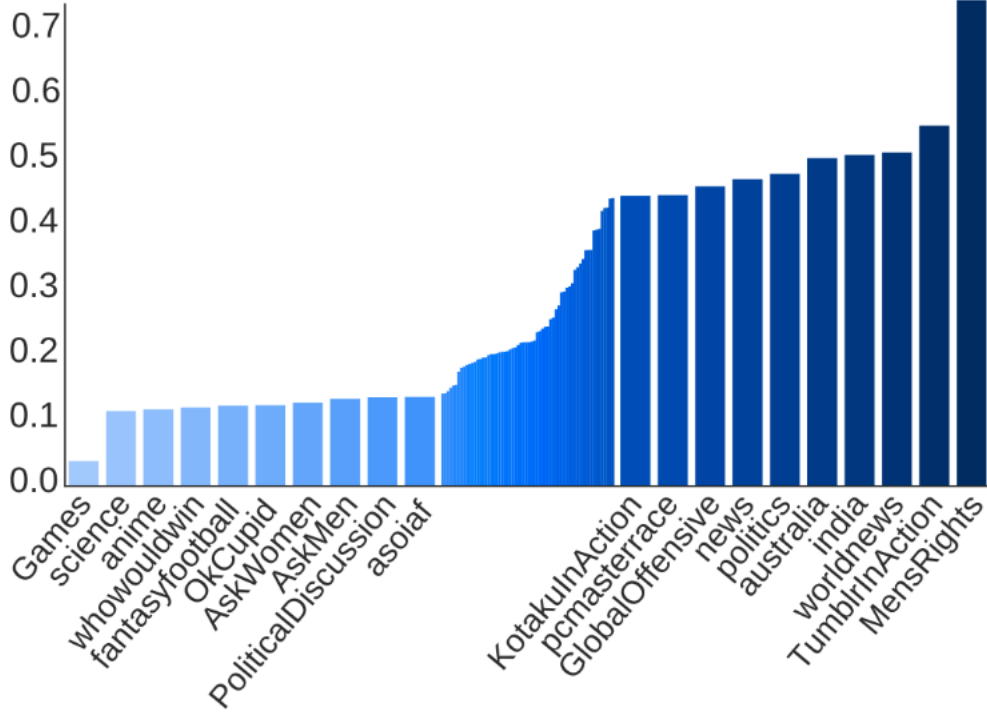
For our project, we used A Large Self-Annotated Corpus for Sarcasm by Khodak et al. (2018). This dataset has more than 500 million comments scrapped from the Internet commentary website Reddit. Reddit users have adopted a common method to indicate sarcastic comments which is adding the marker /s to the end of statements.

Dataset contains around 500 million comments from Reddit. However it is not balanced and only 1.3 million of the comments are sarcastic. Main purpose of releasing this dataset is classifying sarcastic comments. We needed sarcastic comments given in response to parent comments to generate them. In order to do this, we filtered non-sarcastic comments and comments with no parent, slightly more than 1 million comments were left.



In the dataset the comments are self annotated with /s for sarcastic and /r for otherwise.

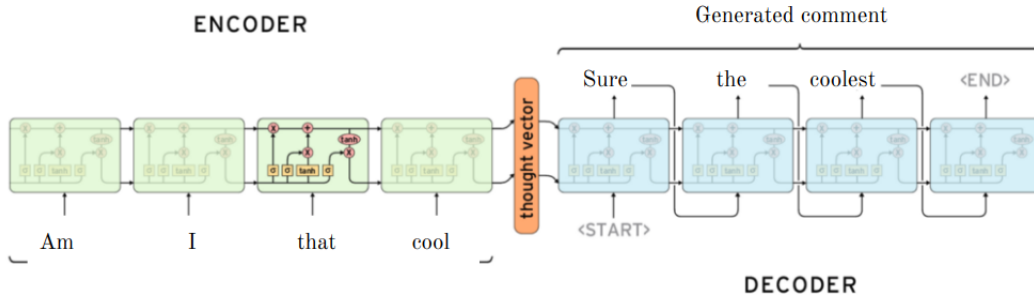
Another point to notice about the dataset is that topics are very diverse. This indeed poses a challenge and reduces risk of over fitting. Below is a histogram of distribution of sarcastic comments by topic.



The dataset does not include the original post. We only have its parent comment which is the one with a level above in the conversation hierarchy. Not knowing the post title and subject causes missing information about the context that are commented to.

3 MODEL

We have used a sequence to sequence model(Sutskever et al. (2014)) which was initially designed for machine translation but it can be used for any task that requires sequence generation from other sequences.



The encoder part takes the parent comment as input and the decoder part tries to predict the sarcastic response. We have used character-level LSTM-based Seq2Seq model.

Encoder works as follows:

$$h_t = f(x_t, h_{t-1})$$

$$c = g(\{h_1, h_2, \dots, h_{T_x}\})$$

where h_t is a hidden state and x_t is an input embedding vector at the time t . c is a context vector that represents input of the model.

Decoder works as follows:

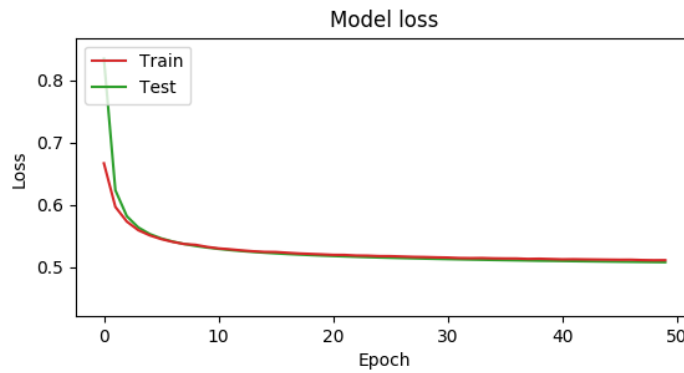
$$p(y_t | \{y_1, y_2, \dots, y_{t-1}\}, c) = g(y_{t-1}, s_t, c)$$

$$p(\mathbf{y}) = \prod_{t=1}^T p(y_t | \{y_1, y_2, \dots, y_{t-1}\}, c)$$

where y_t is a generated output embedding vector at the time t . c is a context vector which represents input of the model produced by encoder.

4 RESULTS

We have trained this model for 50 epochs with categorical cross-entropy loss function. Our validation-training loss figure indicates that our model learns without overfitting the training dataset.



You can see some examples below:

Examples	
Type	Sentence
Parent	you must throw some raging parties.
Prediction	Shocking.
Real	Man I throw some boss beer pong parties.
Parent	That's the same logic that Trump and his supporters use.
Prediction	So, that happens in social racism
Real	Having fun sitting on your high horse, eh? I'm sure you're perfectly nice and reasonable all the time yourself.
Parent	to be honest, he is not that great as a candidate unless your a -wealthy, white, man who owns his own home. yuck
Prediction	I was just supposed to see the rest of the world and not a sink for the ball title. How dare I get the best way to compromise before you can buy the state at a poster when you get a problem with this at
Real	I love how wealthy none white people who own there home are out of luck! sucks to suck, suckers!!!!
Parent	and sports clubs? and rsas? and educational charities? ffs
Prediction	Yes, it will be a problem with a game to the world of reddit strikes. She would get any racist community talks.
Real	Yep, clearly what they meant

5 CONCLUSION

Our model has been successful for learning words and making sentences but produced sentences lacked of the context. This is partially because our data is from a vast variety of topics ranging from gaming to politics. Yet the model produces nice and sometimes actually related sentences, composed of real words. Our tests suggest that the longer your comment is the better results you may expect.

The model has learned to use quotes and braces. To our surprise we also have seen that the model uses punctuation like exclamation points successfully.

We believe that a new dataset should be gathered for this specific task because the dataset by Khodak et al. (2018) has several flaws:

1. Context of sarcastic comments are not included in the dataset.
2. Lots of false positive pairs in the dataset.

REFERENCES

- Mikhail Khodak, Nikunj Saunshi, and Kiran Vodrahalli. A large self-annotated corpus for sarcasm. In *Proceedings of the Linguistic Resource and Evaluation Conference (LREC)*, 2018.
- Ilya Sutskever, Oriol Vinyals, and Quoc V. Le. Sequence to sequence learning with neural networks. *CoRR*, abs/1409.3215, 2014. URL <http://arxiv.org/abs/1409.3215>.