

Social Interaction Question Answering

Social IQA



Mentor : Pratyay Banerjee

Mentees:

Sai Srujan Jalgama

Bhavya Talluri

Nivethan Nadaraj Kumar

Akshay Kumar Gunda.

Introduction

- Human language offers a unique unconstrained approach to probe through questions and reason through answers about social situations.
- Humans are social experts, they understand that people's actions are directed at goals and are driven by intentions (Ganaie and Mudasir, 2015).
- Social IQA requires a commonsense reasoning for such social situations. A major challenge in Social IQA is the matching of answers with respective questions using Social Intelligence.
- Social intelligence is an aggregated measure of self and social awareness, evolved social beliefs and attitudes, and a capacity and appetite to manage complex social changes, i.e. it is the core nature of the people and how they act in the social system.

An example of the Social IQA dataset:

Context: Bailey was tired of her husband beating her so she filed for divorce today.

Question: how will this make others feel?

Options: (a) happy (b) downhearted (c) frightened

- In this example, as Bailey is getting hit by her husband, others have sympathy towards bailey. When she files divorce, others feel happy as she won't get hit by her husband again. This kind of interpretation is easy for humans as they know what marriage is and what does beating mean and what happens when people get divorce as they trivially acquire these social reasoning skills, but this can't be taught to a machine directly.

Progress so far

Implementation of Social IQA:

- We can induce common sense logic into the system by using the following approaches (Pratyay and Baral, 2020)
 - Use a pretrained model like BERT, RoBERTa and fine-tune the model with the dataset.
 - Induce external knowledge into the model and classify based on that.
 - Combine both the methods, i.e. first fine-tune the pretrained model with the dataset and then add external knowledge based on the problem domain into the model.

Fine Tuning BERT with Social IQA dataset:

- The Social IQA dataset is in the form of a Json file with context, question, answerA, answerB and answerC as its labels. The input dataset is tokenized to a format with which the BERT was pre trained by using “bert-large-uncased” and then CLS tokens are generated from the formatted input dataset. These CLS tokens are fine-tuned with the BERT model which will be used in classification.
- Though BERT does a faster Fine-tuning with the dataset. It’s bidirectional approach (MLM) converges slower than left-to-right approaches (because only 15% of words are predicted in each batch) but bidirectional training still outperforms left-to-right training after a small number of pre-training steps. But only using pre-trained model for the Social IQA dataset may result in many misclassification errors.

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Analysis of Social IQA Dataset:

- Using BERT without any external knowledge gave us the accuracy of around 60%.
- SocialIQA Dataset consists of positive and negative answers. Negative answers are the options which are generated from the same context but they are correct answers for a different question. These cannot be handled by the regular models as there is a lot of similarity between all the answer choices and regular models cannot differentiate between them. So, we need additional knowledge to handle such problems.
- The main misclassifications that occurs when using pre-trained models like BERT ,RoBERTa and ELMo are
 - The questions are drawn out of the context.

Context: Bailey sorrowfully confessed to cheating on Jan.

Question: Why did Jan do this?

Options: (a) wanted to humiliate Bailey (b) wanted to make amends (c) wanted to apologize to Jan

Answer: wanted to humiliate Bailey

Analysis: The context only tells about the action done by bailey. But the question asked about the action done by Jan.

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- The incorrect choices are more similar to the context than the correct choice.

Context: Carson liked Cameron enough to ask them to play video games with them.

Question: How would Carson feel afterwards?

Options: (a) Like they want to play games (b) a good person (c) a friendly person

Answer: a friendly person

Analysis: Context tends to favor option a according to the similarity than option c which is the correct answer.

- The following may also cause the misclassification error in BERT:
 - The choices are not similar with the context.
 - The context has a multiple occurrence of a word with multiple meanings (problem due to masking in BERT).
- To decrease the misclassification error caused by BERT, RoBERTa can be used. As RoBERTa iterates on BERT's pretraining procedure, including training the model longer, with bigger batches over more data, removing the next sentence prediction objective, training on longer sequences and dynamically changing the masking pattern applied to the training data.

Conclusion and Next steps

- Social IQA is a common sense reasoning task for social situations. We have used a pre trained model of BERT for the classification, but using only this model is not completely efficient.
- We need additional external knowledge even though the pretrained models such as BERT, RoBERTa are trained on huge common sense data because most of these models are trained on the data obtained from BookCorpus and English Wikipedia, which may not be sufficient to train the model to possess knowledge of social situations.
- After analyzing different approaches of inducing external knowledge like using Knowledge Repositories and using the web to scrap the required knowledge, we have concluded that using elasticsearch can be a better choice to do this task. We have started the implementation of BERT using elasticsearch. After analyzing the results of the Elastic search we will be making changes such that the model performs well on the Social IQA task.

Thankyou