

Project Writeup

BUAL 6710

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In their paper, 'Out of Order: How important is the sequential order of words in a sentence in Natural Language Understanding tasks?' Dr. Anh showed that Bert-based models do not consider the word order into consideration while making their prediction. But they only check this for Bert-based models.

Models – In this project, I would like to check this question for three other models –

1. Facebook-Bart - encoder-decoder based model
2. DeBerta – it tries to decouple the attention and explicitly feed the position information at the very last layer as well
3. XLNet – This model permutes the input sequence during pre-training objective

Datasets – The original paper focuses on 6 GLUE benchmarks. In this project, I am going to focus on 3 of the worst performing tasks, namely, **QNLI**, **SST-2** and **MRPC**.

Research Question – One of the takeaways of Dr. Anh's paper is that GLUE benchmark is not good enough to force the model to focus on the word order i.e., we need more complex tasks for our model to really understand the language and not cheat to make predictions. They only show this for Bert-based models.

After these models, there have been many new models which explicitly encode the position encoding (DeBerta) or which takes the word order into consideration during pre-training (XLNet). My question is this – Does these models also take word order into consideration? Are more complex tasks, training objectives the only way forward to learn more general language models?

This would help us figure out better future direction i.e., whether one should focus on incorporating these prior knowledges in the model architecture or simply have a complex task to train your model and it will automatically figure out the important properties.

My hypothesis is that architectural improvements are necessary and these priors are helpful as is also suggested by [Mr. Kohli here or Spec-consistent AI](#).

Tools – I have made sure that all the three models trained for the above-mentioned tasks are available on HuggingFace model hub.