School of Computing and Information Systems
The University of Melbourne
COMP90042
NATURAL LANGUAGE PROCESSING (Semester 1, 2022)

Workshop exercises: Week 7

Discussion

1. What are **contextual representations**?
2. How does a **transformer** captures dependencies between words? What advantages does it have compared to RNN?
3. What is **discourse segmentation**? What do the segments consist of, and what are some methods we can use to find them?
4. What is an **anaphor**?
   (a) What is **anaphora resolution** and why is it difficult?
   (b) What are some useful heuristics (or features) to help resolve anaphora?

Programming

1. In the iPython notebook `10-bert`, we provide an example on how we can use a pre-trained BERT model and fine-tune it for a sentiment analysis task. As we'll need a GPU to train BERT, we'll be running the notebook on colab, which provides one free GPU. So the first step is to go to: `https://colab.research.google.com/` and sign up or login to a Google account. Next go to "File > Upload Notebook" and upload the notebook (`10-bert.ipynb`) to colab.
   - Fine-tune the model with more epochs (e.g. 4), and take the best model (based on development performance) and measure its performance on the test set.
   - Modify the code so that you can freeze the BERT parameters from updating during fine-tuning. What performance do you now get?
   - If you're interested in using TPUs (which stands for tensor processing units, hardware designed specifically for neural network models) on colab, we've also provided `10-bert-tpu.ipynb` which modifies the code to use TPU.

Get ahead

- Extend the notebook `10-bert` for other tasks:
  - Sentence similarity (STS 2017): `http://alt.qcri.org/semeval2017/task1/index.php?id=data-and-tools`
  - Question answering (SQuAD v1.1): `https://rajpurkar.github.io/SQuAD-explorer/`