Introduction to Deep Learning and Reinforcement Learning

Project Proposal

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# Group Members

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# Statement of Problem

Our team has decided to compete in a superGLUE[1] task. The task we selected is **Choice Of Plausible Alternatives (COPA)** [2]. This task evaluates a model’s commonsense causal reasoning. It is tested with a series of questions where each question gives a premise and two plausible causes or effects. The correct choice is the alternative that is more plausible than the other.

# Approach

# Over the last year and a half there been major advancements in natural language processing. Most of these advancements come in the form a pre-trained transferred learning language model (LM). These pre-trained LM(s) provide feature-based extraction using contextual word embedding. One such LM is BERT [3], which stands for Bidirectional Encoder Representations from Transformers. The BERT LM has obtained new state-of-the-art results on eleven natural language processing tasks, including the GLUE and superGLUE benchmarks. Currently 5 of the top scores on the superGLUE leaderboard are using BERT based models.

# Our team proposes to use the opensource BERT pre-training language model as the basis of our implementation for the COPA task. Since the goal of this project is to compete on the superGLUE benchmark it makes sense to use a state-of-the-art approach.

# Goals and Objectives

* Obtain a competitive superGLUE score using state-or-the-art language models and pre-trained transfer learning approach.
* Gain a better understanding of Natural Language Processing problem space by competing in superGLUE tasks.
* Identify future research areas based on the experienced gained during this project.
* Once the project is complete perform a project retrospective. Identify what when well and what didn’t go well on the project. This will help use grow and develop their team work skills. It will also help them with future projects.

# Project Plan

**Sept 28th:** Project group formed.

**Oct 5th:**  First group meeting to review project choices.

**Oct 12th:** Second group meeting. Project Selection. Initial self-directed study topics identified.

**Oct 26th:** The team met to discuss 3 possible approaches for the COPA superGLUE task.

**Oct 26th - Oct 30th:** Project proposal created with additional research on the three approaches.

**Nov 1st:** Review project proposal with professor.

**Nov 1st – Nov 15th:** Implemented our model.

**Nov 16th – Nov 17th:** Our first submission to the superGLUE online benchmark.

**Nov 18th – Dec 1st:** Refine model and continue to submit to superGLUE.

**Nov 25th – Dec 2nd:** Create project poster.

**Dec 2nd – Dec 7th:** Create project report.

**Dec 5th:** Poster presentation

**Dec 8th:** Report due date

# References

[1] Alex Wang, Yada Pruksachatkun, Nikita Nangia, Amanpreet Singh, Julian Michael, Felix Hill, Omer Levy, and Samuel R. Bowman. SuperGLUE: A stickier benchmark for general-purpose language understanding systems, 2019. arXiv:1905.00537.

[2] Roemmele, M., Bejan, C., and Gordon, A. (2011) Choice of Plausible Alternatives: An Evaluation of Commonsense Causal Reasoning. AAAI Spring Symposium on Logical Formalizations of Commonsense Reasoning, Stanford University, March 21-23, 2011.

[3] Devlin, J., Chang, M.-W., Lee, K., and Toutanova, K. Bert: Pre-training of deep bidirectional transformers for language understanding .arXiv preprint arXiv:1810.04805, 2018