RELATIONAL REASONING ON TEXT-BASED QUESTION ANSWERING TASK

Background Motivation

Deep learning has made it possible to do classification of objects in images and translation of languages, often with incredible accuracy. This is achieved due to the ability of neural networks to pick out important patterns, inconceivable to the human eye, from large quantities of labeled data. However, there are some tasks that, considered simple to humans, may be difficult or even impossible for the neural networks to perform. One of that is reasoning, where one uses prior knowledge to attain new information. For example, learning to reason that mother's husband is same as father is something that is challenging for neural networks to do. Thus, giving neural networks the ability to reason will allow us to learn new information from the data that is not obtainable from pattern recognition.

Therefore, we would like to investigate how the relational reasoning module allows the neural network to exhibit relational reasoning and its performance on the test-based question answer dataset.

Project Objectives

We propose to understand how Relation Network (RN), introduced by Santoro, A., et al in the paper "A simple neural network module for relational reasoning", solve question answering problems using relational reasoning. We would also like to understand how long short term memory (LSTM) works and is used to produce the objects fed into the RN. Lastly, we will replicate the experiments with the aim to verify its accuracy of the task on the bAbI dataset.

Project Plan Outcome

Stage	Description	Timeline	Lai Zhangsheng	Lim Jin Xing
1	Understanding of the relational networks (RNs) approach on text-based question answering	2 weeks	Individual readings and to discuss understanding with each other	Individual readings and to discuss understanding with each other
2	Data processing and understanding of model used in the paper	2 weeks	Joint work to analyse and process the data. To analyse the model together.	
3	Replicate model on the	3 weeks	Joint work to replicate the model and test	

	bAbI suite of tasks		for accuracy on test set.	
4	Write report	1 week	Draft assigned sections and collate	Draft assigned sections and collate

Expected Outcomes

We aim to understand and replicate the RN model introduced. As we might not have the availability of compute, we might not be able to enough finetune of our hyperparameters to achieve the accuracy that was reported in the paper. Thus we hope to minimally get a working implementation of the network with decent results.

Expected Risks

- RN and LSTM are new concepts to us, thus it might take up more time than expected to understand fully enough before being able to implement the model.
- Lack of familiarity with question answering task, thus need time to build up relevant knowledge.
- Might not be able to replicate the accuracy of the paper as implementation of RNs may not be as trivial as we thought it will be.