Deep Learning – Autumn 2019

Assignment 2 – Academia & its industrial applications

PART A – Literature Review

The Brief:

Due to your great work in the previous tasks, you are certainly making an impact in your new role. So much so that the head of analytics has asked you to create a human-readable literature review on a chosen architecture. They have asked you to give a report on the key papers, people and technology in the lifetime of a particular architecture. They are also interested in what is happening *right now* and your thoughts on the future of this technology. You may select any architecture covered in class (CNN, RNN-LSTM-Attention, GANs, Reinforcement learning) or any other of particular interest. Other architectures must be approved by the subject coordinator prior to commencement of work.

The audience is therefore reasonably technical, switched on, data savvy and has seen some of your work in this space; though they don't deeply understand it.

This report should not be densely packed with mathematics but focus on intuitive explanations of the historical progress and applications of the chosen architecture. There may necessarily be the need to introduce formulas and maths to explain a key point or difference, but these should be used sparingly and be well explained.

It is important to not get bogged down in the minutiae of every single paper and the mathematics of the work and contributions otherwise you will quickly run out of words.

Top Tips:

- Citations will be a good indication of the impact of a particular paper.
- Learning which researchers were influential in the space may be a good starting point, to see their papers and go from there.
- A good activity is to 'paper hop' through literature. Take a famous recent paper and see what papers it references, hop back to those and see what they reference and continue (checking citations at each stage). You can 'hop forward' by seeing what cited the current paper. You will likely build up a mental (or technical!) map of the important papers and players through this process.
- Google Scholar and Microsoft Academic as well as paperscape may be useful sites for topics, papers or people.
- Start with the abstract, similar work and conclusion for papers before diving into the body of the works. It will take time for this knowledge to sink in so ensure you leave plenty of time for multiple exposures of the content.

Submission requirements:

- A written, referenced report with diagrams and appendices. PDF format is preferred.
- As noted in the assessment criteria, the word count should not exceed 1250.

PART B – Industrial Applications

The Brief:

This task is a reflective blog post. The assessment brief notes:

*A **reflective** blog that synthesises the information obtained in Part A for a specific industry problem. This reflection should outline the industry problem, scale & impact of the problem, how the particular technology can assist to solve this problem, challenges and (where possible) proposed solutions. Ideally students will choose an industry problem that draws from their own vocational experience.*

This task will draw on the work you completed in part A. You will find the research you do on current work and future directions to be particularly useful for this section.

Synthesis of available voices and research is good to have however one must stamp their own view into the mix. Inclusion of personal opinions and views is therefore expected, drawing on your research, vocational and personal experiences and beliefs.

You may deal with several related problems or sub-problems of a major problem if this makes sense. Though caution is advised with discussing too many problems and only giving each shallow treatment in your work.

If you wish, you may pick a different architecture than what you researched in part A. However, this is not recommended given the additional effort that will be required to get yourself to the level of understanding and knowledge to provide well-thought out discussion on an industry application.

You may also choose an industry different to yours if you wish and you cannot see any good applications for deep learning in your industry. However, caution is also advised in taking this path as it will not be enough to simply google 'Industry applications for Y architecture in X industry' and summarise some other authors' blogs or reports.

Submission requirements:

- A written report with diagrams and appendices. PDF format is preferred.
- Full references for all papers and other media sources should be included.
    - It is reasonable to include other media sources than just academic papers in this task.
- As noted in the assessment criteria, the word count should not exceed 750.