

## **Proposal for A.4 Fourth Research/Programming Assignment**

For the fourth research/programming assignment I would like to propose a deep dive into an LSTM-based network that is designed to generate text for technology-focused blog posts. The primary goal of the approach would be to not only achieve the best performance possible (and hope to create a post that is coherent), but to dive into what the LSTM cells are using to determine their activations in regards to the input data. Using the visualization of CNN layers as inspiration, I would then visualize the LSTM cell activations against the input data to determine what of the input each cell is focusing on to determine the generated text. The end-state architecture of the network would be a result of tuning the network's structure and hyperparameters.

I would approach the assignment by first conducting research to see what else has been created using an LSTM-based network for generating text documents, understanding that there may be many approaches to this problem (including the growth around transformer-based architectures). A mixture of blog posts, articles, and research papers will be used to determine the best approach to defining a network for this scenario.

The research will start with data collection, scraping data from blog posts within a specific technology domain (cloud computing). This data will need to be processed as to remove unnecessary symbols/words, while also being aware as to not remove too much information that may result in a poor generator. Word embeddings will also be used, initially starting with learned embeddings and gauging model performance. However, part of this research will be to explore the use of using pre-trained embeddings (such as GloVe) to aid in boosting model performance. The library used would be TensorFlow's implementation of Keras, creating all code within a Jupyter notebook.

With the main intention to be visually reviewing input data against what the LSTM cells are using for their activation, the results will be mostly focused on creating different versions of the model to determine how the activations differ. The hope is to be able to visualize what pieces of a document a cell may be looking at, determining if more complex architectures make more predictable patterns found from the LSTM cells. However, overall performance of the model is still top consideration, using different versions of the model to compare overall performance, taking the best model for visualization.

I then plan to wrap up the research recapping what the goal of the research was, including applications of text generation and what it is being used for 'in the real world'. Interesting information found throughout the testing will be explained, potentially alluding to why LSTM's are (mostly) being outperformed by transformer models for text generation tasks.