Large Language Models

Aditya Singh

Roll Number: 22B1844

Mentor: Parth Pai

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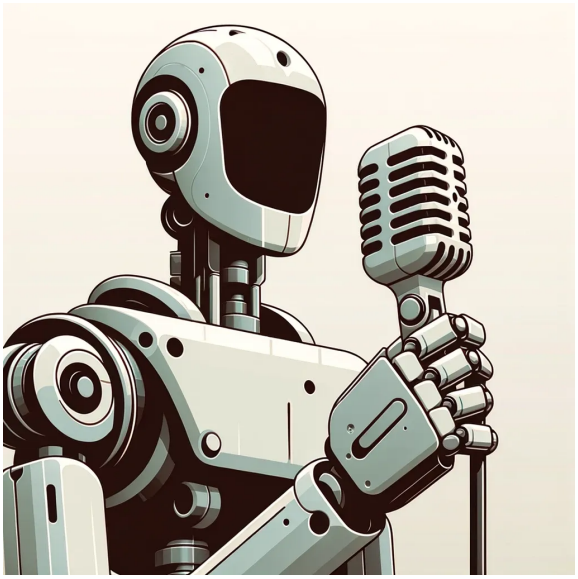

Objectives

The world is witnessing a rapid emergence of Large Language Models, with the swift creation of various GPTs and frameworks. In this project we are going to study about LLMs in detail. Throughout the project we implement our learnings in coding assignments to gain practical knowledge along with the theory. We begin with an introduction to Natural Language Processing and study Recurrent Neural Networks and Sequence Models. Then we proceed to Transformers and LLMs. Next we delve into Advanced topics in LLMs like Prompt Engineering and Multimodal Learning. Finally we learn about the Retrieval Augmented Generation method, the LangChain framework and LLaMa architectures, and in the end we implement all the learning in a final coding project.

References:

- Coursera Sequence Models Course
- Coursera Natural Language Processing with Attention Models
- Deep Learning Book by Ian Goodfellow, Yoshua Bengio and Aaron Courville
- Stanford CS224N Lectures
- Transformers Paper: Attention Is All You Need
- Multimodal Few-Shot Learning with Frozen Language Models Paper - https://arxiv.org/abs/2106.13884
- Language Models as Knowledge Bases Paper - https://arxiv.org/abs/1909.01066
- Various medium articles and blogs

Plan of Action

- **Week1**: Introduction to Natural Language Processing, Stanford CS224n Lectures 1-6, Coursera Sequence Models Module 1

- **Week2**: Recurrent Neural Networks etc. Stanford CS224n Lectures 7-12, Coursera Sequence Models Module 2

- **Week3**: Intro to Transformers, Hugging Face, Stanford CS224n Lectures 13-19, Coursera Sequence Models Module 3, NLP Course Module 1,2

- **Week4**: Introduction to Large Language Models, Decoding Strategies, Fine Tuning Pre-Trained LLMs, Coursera Sequence Models Module 4, NLP Course Module 3

MID SUMMER REPORT SUBMISSION

- **Week5**: Understanding Prompt Engineering and starting Multimodal Learning

- **Week6**: Finishing Multi-Modal Learning and Understanding Retrieval Augmented Generation(RAG)

- **Week7**: Understanding the Langchain framework, RAG and LLaMa architectures

- **Week8**: Implementing a project using all the knowledge gained in the SOS project.(The exact detils will be decided later based on the material covered)

SOS FINAL REPORT SUBMISSION