**Introduction**

A transformer is essentially a model that transforms one type of data to another. A GAN is an example of a transformer model. With the rise of NLP tools like ChatGPT, a transformer has slowly moved to refer to a model that transforms textual input to textual output. An NLP transformer consists of a multi-headed attention network to enable the model to understand sequential data and extract the more important aspects of the data. Other transformers like GANs make use of convolutional embeddings of images to be able to draw upon and expand the important features of an image. A transformer is very important to AI to address a variety of use-cases. The fields include, NLP, Computer Vision, Speech Recognition, Graph Analysis, Prediction, Anomaly Detection etc. NLP allows a transformer to provide custom emails, speeches, reports, and solve academic problems. Computer Vision and Speech Recognition are areas where Deepfake is prevalent. Being able to both create deepfakes and identifying deepfakes are major milestones in AI. Otherwise, transformers can also provide genetic and protein analysis through graph analysis, provide emergency predictions, utilize anomaly detection to identify issues occurred or predict issues to occur. Overall, transformers have only yet scratched the surface in their importance to AI.

**Experiment Summary**

I used the GPT2 model for text generation with the help of the transformers library. I tried a prompt for the beginning of an article: 'In the future, education will', I tried a prompt of an article headline: 'The impact of AI on the future of work', I tried a prompt for the beginning of a story: 'Once upon a time, there was a kingdom', and I tried a creative fantastical prompt: 'Dragons vs AI', which gave the most interesting results. I tried both randomizing the max\_tokens and temperature of the pipeline model and setting and adjusting them manually to understand their impact.

**Observations**

The most interesting results were given by the prompt 'Dragons vs AI'. I will show three prompts that were generated at different temperatures.

The first one (at 0.1) was:

The AI is a very powerful tool that can be used to create a very powerful AI. It is very easy to use, and it is very easy to use.

This is a very straightforward response addressing only half of the prompt and focusing solely on AI. The response is well structured but does not seem relevant to the prompt.

The second one (at 0.5) was:

I can't think of a better way to describe the AI game of "AI vs. humans". The AI is the human-controlled machine, and then the human-controlled machine is the AI. The AI is the human-controlled machine, and then the AI is the AI.

This seems to slightly better address the prompt, it was able to gather the concept of vs. But, the response itself seems to be written poorly and very repetitively. The first sentence is not properly expanded upon and the response seems a little weird

The third one (at 0.9) was:

Dragons vs AI: We Are A Game That Needs That

We already saw the first big reveal of the final chapter of the epic game, The Witcher 3: Wild Hunt, and we've been working tirelessly on a whole slew of new things to make it even better.

The Witcher 3: Wild Hunt is a full game in which the player takes to the battlefield to deal with dangerous creatures such as wolves, dragons, and other ferocious beasts.

It doesn’t seem complete but it is both a well structured response and seems to address the prompt perfectly. Though the response does seem to loose focus and talk about Witcher 3 instead, it can be attributed as a ‘relevant detail’ to the ‘game’ Dragons vs AI.

**Reflection**

Every generation was different to the same prompt. This was very surprising to me since it is different from traditional deep learning models whose outputs depend upon predefined mathematical calculations. I learnt that the response of a transformer also depends upon the ‘level of hallucinations’ or temperature we provide it. We can adjust the creativity of the outputs accordingly. One big limitation I found was that there were a lot of repetitions of sentences within the same response. Maybe a guardrail could be added to avoid providing repetitions and only the relevant output to be given.

**Notebook Link:** <https://github.com/Kartik-Tyagi/CognizantExternship/blob/main/GenAI/transformer.ipynb>