**MT to NMT Path (Option 3):   
Comparing Transformer-Based Models**

Abuchi Godswill Okeke

School of Computer and Information Sciences, University of the Cumberlands

MSAI532 - M51 Natural Language Processing

Dr. Toni Farley

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**Overview**

In the week 5 assignment 4, I worked on Option 3, where I set up an experiment to compare transformer models. For the experiment, I developed a comparative analysis program to evaluate two distinct translation methodologies: the Helsinki-NLP/opus-mt-en-fr model from Hugging Face's transformers library and the transformer-based Google Translate's API via the deep-translator python package.

The implementation processes a 100-word sample of English text (summary of my GNMT residency paper) through both translation systems from English to French language. To conduct a systematic analysis of the translations, I utilized Python's difflib library, which enables precise identification of commonalities and variations between the two outputs. My learning from this experiment is that this analytical approach provides a detailed examination of how each system interprets and translates the source text. Both systems translate effectively, but Google favors natural language while Hugging Face preserves technical terms. For example, in the comparison output file (.txt), it can be seen that Hugging Face kept the technical term "Neural Machine Translation” while Google translated it to "la traduction de la machine neurale". This shows the uniqueness of both models, and the user’s use case will determine which model to utilize.

All codes and files to the experiment have been added to my class [Git Repository](https://github.com/Buchiexplores/MSAI-532/tree/main)

**Python Script:**

<https://github.com/Buchiexplores/MSAI-532/blob/main/week5/translators_experiment.py>

**How to set up the Experiment:**

<https://github.com/Buchiexplores/MSAI-532/blob/main/week5/ReadMe.md>

**Run:** *pip install -r requirements.txt*