**Named Entity Recognition**

**Introduction:**

Named Entity Recognition (NER) is a fundamental Natural Language Processing (NLP) task that requires locating and categorising entities (such as names of people, groups, places, dates, etc.) in text. For named entity recognition in this project, we will hone a BERT (Bidirectional Encoder Representations from Transformers) model using hugging face transformers. The objective is to create a model that can correctly classify and identify various entity kinds found in a given text

**Approach:**

*We have classify the problem into three section name:*

**Section A; Data Preprocessing**

Initially, we need to install specific libraries that are not readily accessible in Google Colab using the !pip install command. These libraries include "simpletransformers" for accessing the Named Entity Recognition (NER) model, and "gradio" for creating an application-like environment. With "simple transformers," we can utilise the NER model to analyse and identify named entities in text. Meanwhile, "gradio" allows us to build an interactive interface where users can input text, have it processed, and receive the output – essentially, it provides a platform for users to rephrase sentences.

**Section B: Training and Evaluation**

The training script involves the following steps:

* *Loading dataset and preprocessing it for the NER task.*
* *Fine-tuning the BERT model on the NER task using Hugging Face's Transformers library.*
* *Training the model using GPU hardware acceleration to expedite the training process.*
* *Evaluating the trained model's performance using standard NER metrics like precision, recall, and F1-score.*
* *Saving the fine-tuned model and associated metadata for later use.*

**Section C: Gradio Interface**

We have created a simple interactive demo application(Interface) using Gradio, a user-friendly library for creating UIs to interact with machine learning models. The demo app allows users to input a text and visualise the NER predictions made by our fine-tuned BERT model. The app highlights the recognized named entities in the input text and categorise them into predefined entity types.

The Gradio demo app served as a user-friendly interface to showcase the capabilities of our NER model. Users can input text samples, view the model's predictions, and get a better understanding of how the model performs on real-world examples

**Dataset:**

[Ner\_datset.csv](https://drive.google.com/file/d/1F3k7RchnrXQlqi1j-pIr-nOrxGD3DZKe/view?usp=sharing)  dataset from Hugging Face Datasets library will be employed for training and evaluating the NER model.

**Transformer Model:**

We employed a pre-trained BERT model as the foundational architecture. BERT's strong contextual understanding, enhanced by its transformer-based design, positions it effectively for NER tasks.

**Code snippet :**

[Google colab](https://colab.research.google.com/drive/1hV6FZJAM1SWoZ6eGjUhYW4zleJTOEG7Q?usp=sharing)

**Problems faced while writing:**

One of the unexpected error i got is

ValueError: 'use\_cuda' set to True when cuda is unavailable.Make sure CUDA is available or set use\_cuda=False. due to args

At first I didn't get it, I tried downloading the NVIDIA drawer but at the end of the day it was just clicks away.

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