Assignment 2

Q1: Text Generation Application

Overview

The **SDG Text Generation Application** is designed to generate coherent and relevant text based on prompts related to Sustainable Development Goals (SDGs). The application utilizes advanced generative AI models to help users explore and understand various SDGs by generating meaningful content.

Key Features

1. **Interactive Text Generation**: Users can enter prompts related to SDGs and receive text generated by AI models. This feature allows users to gain insights into SDGs through AI-generated narratives.
2. **Model Comparison**: The application evaluates and compares the performance of different AI models in generating text. This comparison helps identify the most effective model for generating relevant and high-quality text.
3. **User-Friendly Interface**: Built with Streamlit, the application offers an intuitive interface for users to interact with. It is designed to be simple and accessible, allowing users to easily input prompts and view generated text.
4. **Performance Metrics**: The models are assessed based on several metrics:
    - **Fluency**: How naturally and coherently the text is generated.
    - **Relevance**: How well the generated text aligns with the provided prompt.
    - **Diversity**: The variety of vocabulary used in the text.
    - **Readability**: How easy the text is to read and understand.
    - **Tone**: The overall sentiment or tone of the text.
    - **Topic Coverage**: The extent to which the generated text covers relevant keywords or topics.

Models Used

- **GPT-2**: Developed by OpenAI, GPT-2 is known for its strong text generation capabilities. It was selected for the final implementation due to its ability to produce high-quality, coherent text and its ease of integration into the application. GPT-2 is versatile and performs well across various prompts.
- **Bloom**: The Bloom model was also evaluated during the project. Although Bloom demonstrated strong capabilities, it was not selected for the final version of the application. The primary reasons for this decision were its higher complexity in integration and less consistent performance compared to GPT-2.

Installation and Usage

To set up and use the SDG Text Generation Application:

1. **Clone the Repository**: Download the project files from the provided GitHub repository.
2. **Run the Application**: Use the Streamlit framework to launch the application. The application can be started with a simple command that initiates the web interface.
3. **Interact with the Application**:
    - Enter a prompt related to an SDG in the provided input field.
    - Click the generate button to receive text generated by the AI model.
    - Review the generated text along with performance metrics to evaluate its quality and relevance.

Code Overview

- **Model Evaluation Notebook (model.ipynb)**: This Jupyter Notebook is used to assess the performance of different AI models. It includes functions to generate text, evaluate fluency, relevance, diversity, readability, and tone. The notebook helps in comparing models and understanding their effectiveness.
- **Streamlit Application (app.py)**: The core script of the application handles user interactions. It manages model loading, text generation, and displays the results. The script ensures that users can input prompts, generate text, and view the results seamlessly.
- **Requirements File (requirements.txt)**: This file lists all the Python packages needed to run the application, including Streamlit, Transformers, and PyTorch. It ensures that all dependencies are installed for the application to function correctly.

Evaluation

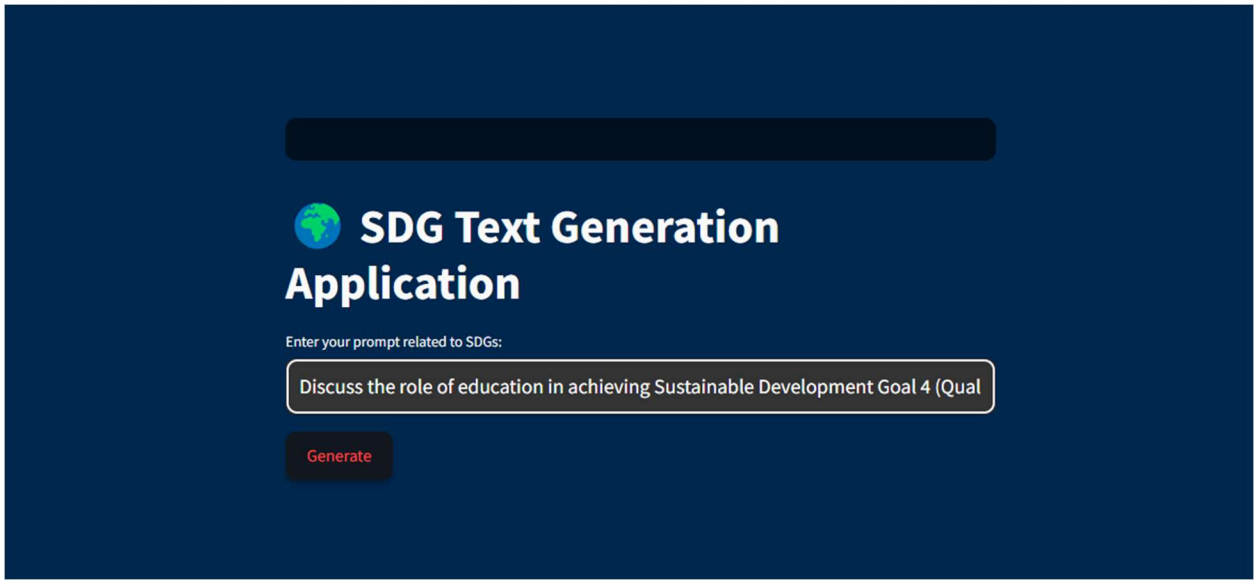
The models were evaluated based on the following metrics:

- **Fluency**: GPT-2 exhibited superior fluency in text generation compared to Bloom, producing more natural and coherent text.
- **Relevance**: GPT-2 provided better relevance to the prompts, aligning more closely with the requested content.
- **Diversity**: Both models showed similar levels of diversity in their generated text.
- **Readability**: GPT-2's generated text was more readable, scoring higher on the readability metrics.
- **Tone**: Both models were capable of generating text with a positive tone, but GPT-2 did so more consistently.

Conclusion

GPT-2 was selected for the final implementation of the SDG Text Generation Application due to its ease of integration, high-quality text generation, and consistent performance across various evaluation metrics. Bloom, despite its strengths, was not chosen due to its integration complexity and less reliable results in the context of this project.

User Interface



Generated Text:

Discuss the role of education in achieving Sustainable Development Goal 4 (Quality Education). The following is a list of key issues that need to be addressed before we can achieve our goal. The first issue, which needs addressing right now and will become more important as time goes on, involves ensuring schools are equipped with appropriate training for students who have not yet completed their degree requirements or if they do so would require further study at an accredited university such Asperger's Institute where there may also be additional resources available including courses from other universities but this should only take place once you've been certified by your school authorities within three years after graduation into high quality teaching positions under guidance provided through local government departments like Schools Councils etc.. This means it must include all aspects of learning skills needed during these four-year periods - reading comprehension; writing/writing ability; problem solving abilities; social interaction capabilities; language development capacity; communication capability; mathematics proficiency; English speaking competence; maths knowledge level 2+2 = 3rd grade

(1) In order ensure pupils receive adequate support when required: • Ensure teachers provide sufficient information about what has happened since last year – whether any specific events occurred prior to those incidents being reported online via email messages sent out over phone calls between staff members• Provide feedback regarding how well each teacher was doing throughout his work week while he worked day hours working alone without

achieve our goal. The first issue, which needs addressing right now and will become more important as time goes on, involves ensuring schools are equipped with appropriate training for students who have not yet completed their degree requirements or if they do so would require further study at an accredited university such Asperger's Institute where there may also be additional resources available including courses from other universities but this should only take place once you've been certified by your school authorities within three years after graduation into high quality teaching positions under guidance provided through local government departments like Schools Councils etc.. This means it must include all aspects of learning skills needed during these four-year periods - reading comprehension; writing/writing ability; problem solving abilities; social interaction capabilities; language development capacity; communication capability; mathematics proficiency; English speaking competence; maths knowledge level 2+2 = 3rd grade

(1) In order ensure pupils receive adequate support when required: • Ensure teachers provide sufficient information about what has happened since last year – whether any specific events occurred prior to those incidents being reported online via email messages sent out over phone calls between staff members• Provide feedback regarding how well each teacher was doing throughout his work week while he worked day hours working alone without supervision because some were unable access classroom materials due concerns raised against them having too much control Overcome difficulties relating directly related to student behaviour outside class activities If possible make sure every pupil receives proper instruction immediately upon arrival home From my experience I am very aware many parents feel uncomfortable dealing with children coming back late one night whilst sitting down next door looking bored despite knowing exactly why things went wrong. It seems often times kids come up early thinking 'I'm going away', even though most people don't realise just then something really bad had gone horribly awry!!! We know sometimes young boys get upset around homework assignments especially given recent changes made towards grading systems And although no matter whom comes across problems here usually isn´t always someone else involved! So please remember everyone gets along fine!