

LLMs_ASSIGNMENT_1 (Q1)

❖ Project Explanation

Project Idea:

- **Project:** Text summarization using 'philschmid/flan-t5-base-samsum' template.
- **Objective:** Create a model for summarizing long texts into short, concise summaries, making it easier for users to quickly understand the main content.

Project explanation:

- **Problem:** In the information age, individuals have difficulty reading and understanding large amounts of long texts such as articles, reports, and research papers. Summarizing texts can help save time and effort by providing short summaries containing essential information.
- **Solution:** Use the pre-trained 'philschmid/flan-t5-base-samsum' model from the Hugging Face library to summarize long texts. We will load the summary model, prepare the data, train the model (if necessary), and evaluate its performance.
- **Sustainable Development Goals (SDGs):** This project supports Goal 4 (Quality Education) by improving access to information.

❖ Research and Setup

Hugging Face Transformers library:

- **Search the Hugging Face Transformers library:** The Hugging Face library provides a wide range of pre-trained models that can be used for different tasks such as translation, classification, and summarization. You can view the official documentation of the library to understand how to use it.

Model Selection:

- **Choosing Model:** We will use the "philschmid/flan-t5-base-samsum" template, which is considered an effective template for summarizing texts.

❖ Loading the Model

Load the model: We will load the 'philschmid/flan-t5-base-samsum' model using the transformers library.

```
from transformers import pipeline

# Load the summarization model
summarizer = pipeline("summarization", model="philschmid/flan-t5-base-samsum")

# Example text to summarize
text = """
Your long text goes here. It can be an article, a report, or any other long piece
of text that you want to summarize.
"""

# Summarize the text
summary = summarizer(text)

# Print the original and summarized texts
print("Original Text:", text)
print("Summary:", summary[0]['summary_text'])
```

❖ Data Preparation:

We will prepare a dataset containing long texts that need to be summarized.

- 1- Text about The Istanbul International Center for Private Sector in Development (IICPSD)
- 2- Long text on sustainable development goals (SDG)

❖ Test the model before fine-tuning:

We tested the model by summarizing the following text:

Original Text:

The Istanbul International Center for Private Sector in Development (IICPSD), established by the United Nations Development Programme (UNDP) in partnership with the Government of Turkey in 2011, serves as a global hub for leveraging the potential of the private sector to drive sustainable development and achieve the Sustainable Development Goals (SDGs). The center's mission is to engage businesses in development efforts by fostering innovative business models, partnerships, and practices that promote inclusive and sustainable growth. IICPSD focuses on several key areas, including the promotion of inclusive business models that integrate low-income communities into value chains as suppliers, distributors, retailers, or customers, thereby creating economic opportunities and improving livelihoods for marginalized populations. The center also facilitates the formation of public-private partnerships (PPPs) to address complex development challenges, bringing together governments, businesses, and civil society to leverage their collective strengths

and resources. Additionally, IICPSD supports the growth of impact investment, which seeks to generate positive social and environmental impacts alongside financial returns, by creating a conducive environment for impact investors and social enterprises. In times of humanitarian crises and natural disasters, the center plays a crucial role in mobilizing the private sector's resources and expertise, ensuring that contributions are effective and aligned with broader development objectives. Furthermore, IICPSD is dedicated to capacity building and knowledge sharing, offering training, research, and platforms to enhance the ability of businesses and other stakeholders to engage in sustainable development. By disseminating best practices, case studies, and innovative tools, the center helps foster a global community committed to inclusive and sustainable growth, ultimately contributing to a more equitable and resilient world.

Summary:

Istanbul International Center for Private Sector in Development was established by UNDP and the Government of Turkey in 2011. Its mission is to engage businesses in development efforts by fostering innovative business models, partnerships, and practices that promote inclusive and sustainable growth.

❖ Preprocess and Fine Tuning the model:

Fine-Tuning

When testing the summary, the text being summarized was short, so we adjusted the model to get good results. The model was modified with the following properties:

- **max_length:** This parameter specifies the maximum length of the summarized text.
- **min_length:** This parameter specifies the minimum length of the summarized text.
- **do_sample=False:** This parameter specifies whether the model will use sampling during summarization.
 - **do_sample=True:** This means that the model will use sampling, which may result in greater variation in the resulting summaries.
 - **do_sample=False:** This means that the model will use beam search instead of sampling, resulting in more stable and repeatable summaries.

Before

```
# Summarize the text
summary = summarizer(text, max_length=50, min_length=15, do_sample=True)
```

After

```
# Summarize the text
summary = summarizer(text, max_length=150, min_length=30, do_sample=False)
```

The maximum summary has been increased to 150 - and the minimum summary to 30. And do_sample=False has been set to get good summaries.

❖ Evaluation:

Evaluate the model: After adjusting the model, we got good summaries that were a little longer for greater benefit.

Original Text:

The Istanbul International Center for Private Sector in Development (IICPSD), established by the United Nations Development Programme (UNDP) in partnership with the Government of Turkey in 2011, serves as a global hub for leveraging the potential of the private sector to drive sustainable development and achieve the Sustainable Development Goals (SDGs). The center's mission is to engage businesses in development efforts by fostering innovative business models, partnerships, and practices that promote inclusive and sustainable growth. IICPSD focuses on several key areas, including the promotion of inclusive business models that integrate low-income communities into value chains as suppliers, distributors, retailers, or customers, thereby creating economic opportunities and improving livelihoods for marginalized populations. The center also facilitates the formation of public-private partnerships (PPPs) to address complex development challenges, bringing together governments, businesses, and civil society to leverage their collective strengths and resources. Additionally, IICPSD supports the growth of impact investment, which seeks to generate positive social and environmental impacts alongside financial returns, by creating a conducive environment for impact investors and social enterprises. In times of humanitarian crises and natural disasters, the center plays a crucial role in mobilizing the private sector's resources and expertise, ensuring that contributions are effective and aligned with broader development objectives. Furthermore, IICPSD is dedicated to capacity building and knowledge sharing, offering training, research, and platforms to enhance the ability of businesses and other stakeholders to engage in sustainable development. By disseminating best practices, case studies, and innovative tools, the center helps foster a global community committed to inclusive and sustainable growth, ultimately contributing to a more equitable and resilient world.

Before

Summary:

Istanbul International Center for Private Sector in Development was established by UNDP and the Government of Turkey in 2011. Its mission is to engage businesses in development efforts by fostering innovative business models, partnerships, and practices that promote inclusive and sustainable growth.

After

Istanbul International Center for Private Sector in Development was established by UNDP and the Government of Turkey in 2011. Its mission is to engage businesses in development efforts by fostering innovative business models, partnerships, and practices that promote inclusive and sustainable growth. IICPSD promotes the promotion of inclusive business models that integrate low-income communities into value chains. The center also facilitates the formation of public-private partnerships to address development challenges.

```
# Summarize the text
summary = summarizer(text, max_length=400, min_length=100, do_sample=False)
```

Original Text:

The Sustainable Development Goals (SDGs), adopted by the United Nations in 2015, represent a comprehensive framework aimed at addressing the most pressing global challenges by 2030. These 17 goals are designed to be interconnected, recognizing that progress in one area often depends on advancements in others. The overarching aim of the SDGs is to improve the quality of life for all people, ensuring that no one is left behind. This holistic approach has profound implications for enhancing the well-being of individuals and communities worldwide. One of the primary ways the SDGs improve quality of life is by addressing poverty and hunger. By aiming to eradicate extreme poverty and ensure food security, the SDGs tackle the fundamental barriers to a decent standard of living. When people have access to sufficient resources to meet their basic needs, they are better positioned to pursue education, maintain good health, and contribute productively to society. This creates a virtuous cycle where improved economic conditions lead to better health and education outcomes, which in turn foster further economic growth and development. Health and well-being are central to the SDGs, with a specific goal dedicated to ensuring healthy lives and promoting well-being for all at all ages. This includes reducing maternal and child mortality, combating infectious diseases, and addressing non-communicable diseases and mental health issues. Access to quality healthcare services is fundamental to improving life expectancy and quality of life. When individuals are healthy, they can work, learn, and participate fully in their communities, driving social and economic progress. Education is another critical area where the SDGs aim to make a significant impact. By ensuring inclusive and equitable quality education and promoting lifelong learning opportunities, the SDGs recognize education as a powerful tool for personal and societal transformation. Education empowers individuals with the knowledge and skills needed to improve their lives and contribute to their communities. It also promotes gender equality by providing girls and women with the same opportunities as boys and men, leading to more balanced and inclusive societies. Gender equality is a cornerstone of the SDGs, as it is both a goal in itself and a means to achieve other goals. Empowering women and girls has a ripple effect on families, communities, and economies. When women have equal access to education, healthcare, and economic opportunities, they can contribute more effectively to their families' well-being and the broader economy. Gender equality also leads to more inclusive decision-making processes, which are essential for sustainable development. The SDGs also emphasize the importance of sustainable economic growth and decent work for all. By promoting sustained, inclusive, and sustainable economic growth, the SDGs aim to create jobs and improve living standards. Decent work conditions ensure that individuals can earn a living wage, work in safe environments, and have access to social protection. This not only improves individual quality of life but also contributes to economic stability and growth. Environmental sustainability is another critical aspect of the SDGs. By addressing issues such as climate change, biodiversity loss, and pollution, the SDGs aim to protect the planet for future generations. Sustainable management of natural resources ensures that ecosystems can continue to provide the services that humans rely on, such as clean air and water, fertile soil, and a stable climate. This is essential for the health and well-being of all people, as environmental degradation can lead to food and water shortages, increased disease burden, and displacement. The SDGs also focus on building sustainable cities and communities. Urbanization presents both opportunities and challenges for sustainable development. By promoting inclusive and sustainable urbanization, the SDGs aim to create cities that are safe, resilient, and inclusive. This includes ensuring access to affordable housing, improving public transportation, and enhancing urban planning to reduce environmental impact and improve quality of life for urban residents. In conclusion, the SDGs represent a comprehensive and integrated approach to improving quality of life globally. By addressing the root causes of poverty, inequality, and environmental degradation, the SDGs aim to create a world where all people can thrive. The interconnected nature of the goals ensures that progress in one area supports advancements in others, leading to a more sustainable, equitable, and prosperous future for all.

Summary:

The Sustainable Development Goals (SDGs) were adopted by the United Nations in 2015. They aim to address the most pressing global challenges by 2030. The overarching aim of the SDGs is to improve the quality of life for all people. They address poverty and hunger, education, gender equality, environmental sustainability, and decent work for all. They also focus on building sustainable cities and communities and urbanization. The interconnected nature of the goals ensures that progress in one area supports advancements in others.