TransArt - A Multimodal Application for Vernacular Language Translation and Image Synthesis

Prepared by Edison E

Problem Statement

The goal of this project is to develop a web-based application that translates text from Tamil to English and subsequently generates relevant images based on the translated text. The application showcases the integration of language translation and creative AI to produce visual content from textual descriptions.

Objectives

The application is designed to:

- Translate text inputs from Tamil to English using a neural machine translation model.
- Generate images based on the translated English text using a text-to-image model.
- Produce creative written content based on the same or separate translated text, enriching the multimedia content offering.

Business Use Cases

Educational Tools:

- **Scenario:** Students or educators input descriptive Tamil text and receive corresponding visual content in English to aid in understanding and retention.
- **Application:** Enhances learning experiences by combining linguistic and visual elements.

Creative Content Generation:

- **Scenario:** Content creators input Tamil descriptions of scenes or concepts, which are translated and then visually rendered.
- **Application:** Streamlines the creation of visual content for digital marketing, presentations, and educational materials.

Technical Approach

Step 1: Created Tamil to English Gradio App

- Developed a Gradio interface that accepts Tamil text inputs and utilizes a pre-trained translation model from Hugging Face, such as Helsinki-NLP/opus-mt-ta-en, to convert Tamil text into English.

Step 2: Created Text-to-Image Generation Gradio App

- Implemented a Gradio app to generate images from the translated English text using a reliable text-to-image model, like CompVis/stable-diffusion-v1-4.

Step 3: Content Generation from Text Given

- Integrated a text generation model, such as GPT-Neo, to produce creative content based on the translated English text. This enhances the multimedia output of the application.

Step 4: Used CSS and Hugging Face Models API for Image Generation

- Styled the application using CSS for better user experience. Incorporated Hugging Face API to call the models for both translation and image generation tasks.

Step 5: Deployed Gradio and Streamlit Apps in Hugging Face Spaces

- Successfully deployed both the Gradio and Streamlit applications in Hugging Face Spaces, making the multimodal AI application accessible to users.

Skills Acquired

- Deep Learning
- Transformers
- Hugging Face Models
- Large Language Models (LLM)
- Streamlit and Gradio

Domain

AIOPS (Artificial Intelligence for IT Operations)

f2a41028cc69e30eac.gradio.live

A Multimodal Application

Language Translation and Image Synthesis

Enter Tamil Text

இருண்ட காட்டில் குதிரை

Translated Text

The Horse in the Dark Forest

Creative Generated Text

The Horse in the Dark Forest

The Horse in the Dark Forest is a fantasy novel by American writer Robert Jordan, first published in hardcover by Ballantine Books in September 2000. It is the first book in the series The Wheel of Time, and the first book in the series to be published in hardcover.

The novel is set in the fictional world of the Wheel of Time, a fictional world created by Robert Jordan. The novel is set in the fictional world of the Wheel of

Generated Image

Generate

f2a41028cc69e30eac.gradio.live

A Multimodal Application

Language Translation and Image Synthesis

Enter Tamil Text

வானத்தில் பறக்கும் பறவைகள்

Translated Text

Birds flying in the sky

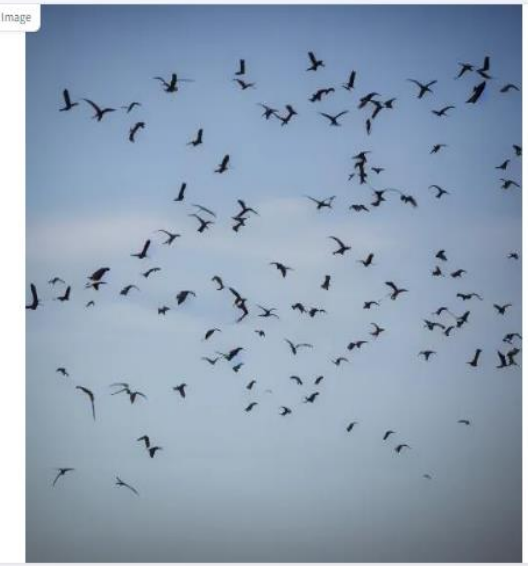
Creative Generated Text

Birds flying in the sky

Birds flying in the sky is a popular theme in children's books. The theme is usually associated with the birds of the British Isles, but it is also used in other parts of the world.

The theme is often used to illustrate the concept of flight, and is often used to illustrate the concept of flight in the context of the birds of the British Isles. The theme is also used in the context of the birds of the British Isles in the

Generated Image



Generate

localhost:8501

Deploy

A Multimodal Application

Language Translation and Image Synthesis

Upload a JPEG image for the background

Drag and drop file here
Limit 200MB per file • JPG, JPEG
Browse files

download.jpg 7.1KB

Enter Tamil Text

வானத்தில் பறக்கும் பறவைகள்

Generate

Translated Text

<pad> Birds flying in the sky

Creative Generated Text

<pad> Birds flying in the sky. <pad> I'm not sure if I'm supposed to be a bird or a bird. <pad> I'm not sure if I'm supposed to be a bird or a bird. <pad> I'm not sure if I'm supposed to be a bird or a bird. <pad> I'm not sure if I'm supposed to be a bird or a bird. <pad> I'm not sure if I'm

Generated Image

huggingface.co/spaces/Edisonpaul/Multimodal_Application

Spaces | Edisonpaul / Multimodal_Application | like 0 | Running | Logs | App | Files | Community | Settings

A Multimodal Application

Language Translation and Image Synthesis

Enter Tamil Text

இருண்ட காட்டில் குதிரை

Translated Text

The Horse in the Dark Forest

Creative Generated Text

The Horse in the Dark Forest

The Horse in the Dark Forest is a fantasy novel by American writer Robert Jordan, first published in hardcover by Ballantine Books in September 2000. It is the first book in the series The Wheel of Time, and the first book in the series to be published in hardcover.

The novel is set in the fictional world of the Wheel of Time, a fictional world created by Robert Jordan. The novel is set in the fictional world of the Wheel of

Generated Image

huggingface.co/spaces/Edisonpaul/Multimodal_Application_streamlit

A Multimodal Application

Language Translation and Image Synthesis

Upload a JPEG image for the background

Drag and drop file here

Limit 200MB per file • JPG, JPEG

Browse files

download.jpg 7.8KB

Enter Tamil Text

இருண்ட காட்டில் குதிரை

Generate

Translated Text

<pad> The Horse in the Dark Forest

Creative Generated Text

<pad> The Horse in the Dark Forest

The Horse in the Dark Forest is a fantasy novel by American writer Stephen R. Donaldson, first published in hardcover by Doubleday in October, 1989. It is the first of the "Dark Forest" series, which consists of the following novels:

The Horse in the Dark Forest (1989) The Horse in the Dark Forest (1990) The Horse in the Dark Forest (1991) The Horse in the Dark

Generated Image

Results

- **Functional Web Application:** A fully functional web application allowing users to interact with the translation and image generation features.
- **Scalable Deployment:** Leveraged Hugging Face Spaces for scalable deployment of the application.

- Refer:
- Hugging Face link :
  For Gradio app--
  https://huggingface.co/spaces/Edisonpaul/Multimodal_Application
- For Streamlit App -
  https://huggingface.co/spaces/Edisonpaul/Multimodal_Application_streamlit

Thank you