Generative AI Fundamentals Research Assignment

Generating Language Symbols using Diffusion Models

Overview

In the previous lecture, we explored the generation of Chinese characters using Diffusion Models. To build upon this, your next assignment will involve experimenting with similar models on a new set of symbols from different languages or symbol systems.

You will receive access to:

- A Google Colab notebook demonstrating the character generation process (accessible on course dashboard)
- The lecture recording (accessible on the course dashboard)

Task Description

Your assignment consists of the following steps:

Step 1: Select a language or symbol system from the list below (or any other language of your choice!):

- Japanese Kanji
- Korean Hanja
- Aztec symbols
- Egyptian hieroglyphs
- Latin
- Sanskrit
- English (challenging due to a limited set of alphabets)

Step 2: Convert the symbols into PNG image files and construct your dataset.

Step 3: Train and run a diffusion model using your dataset to generate new symbols.

Research Questions

As part of your exploration, you are expected to address the following questions:

Q1. What dataset size is necessary to generate high-quality symbols?

Q2. Does the diffusion model perform well on your selected language or symbol set? Are the generated symbols visually meaningful and high in quality?

Q3. Did you make any modifications to the diffusion model architecture or noise scheduling scheme to achieve better results?

Collaboration and Submission

- You may work in teams of up to **three students**.
- **Preliminary Results Discussion:** An in-class session on **19th April** will be held to discuss early findings. Please aim to have initial results ready by then.
- **Final Submission Deadline: 27th April**

Future Opportunity

Outstanding submissions across different languages will be selected and compiled to contribute towards a collaborative **research paper**.

All the best, and we look forward to seeing your creative results!