Intro to Generative AI

Google Developer Student Clubs

Indian Institute of Technology Kanpur

Overview of the Project:

This project focuses on imparting a foundational understanding of Generative AI using Python, with an emphasis on key libraries and frameworks such as OpenCV, NumPy, scikit-learn, and TensorFlow. The project is structured to cover essential concepts in Generative AI, from fundamentals and introduction to Large Language Models (LLMs) to hands-on experience with Generative Adversarial Networks (GANs). Participants will work with the MNIST dataset to implement a generative model that can generate numeral images (0-9).

Tech Stacks:

- **Programming Languages:** Python
- **Libraries and Frameworks:** opencv, numpy,, scikit-learn, Tensorflow
- **Tools:** Google Colab

Project Timeline:

- **Week 1:** Generative AI Fundamentals, Introduction to LLMs
- **Week 2:** Generative AI for Developers Learning Path : Transformers
- **Week 3:** Generative Adversarial Networks (GAN): Generators and Discriminators
- **Week 4:** Hands on Project: Generate 0-9 numerals using the MNSIT dataset using a generative model

All Resources to be Used and Delivered:

1. **Learning Materials:** Curated tutorials, articles, and documentation.
2. **Hands-On Exercises:** Practical coding assignments to reinforce learning.
3. **Projects:** Real-world projects to apply acquired skills.
4. **Interactive Sessions:** Live sessions for doubt resolution and discussions.
5. **Feedback Mechanism:** Regular feedback and assessment to track progress.
6. **Final Project:** A capstone project to demonstrate proficiency in machine learning concepts.

Prerequisite:

- Basic understanding of Python programming.
- Familiarity with machine learning concepts is beneficial and highly recommended. *Please do not opt for this project if you do not have any ML background.*
- Enthusiasm to delve into the field of Generative AI.

This project is designed to provide a structured learning path, starting with fundamentals and gradually progressing to hands-on projects. Participants will gain practical experience in implementing generative models and working with real-world datasets. The project timeline ensures a gradual and comprehensive learning experience, allowing participants to build a solid foundation in Generative AI.

Project Mentors:

Anushka Gupta
Paramveer Singh
Aniket

Video Playlist:

https://youtube.com/playlist?list=PL_fkUfeFmd2uQMfLQqw7ys-c1OiYEKzwq&si=m1176QBQip5WxJeM

Week 1:
https://www.youtube.com/watch?v=G2fqAlgmoPo
https://www.cloudskillsboost.google/paths/118/course_templates/536
https://www.cloudskillsboost.google/paths/118/course_templates/539
https://www.cloudskillsboost.google/paths/118/course_templates/556

Week 2:
Generative AI for Developers Learning Path
https://arxiv.org/pdf/1706.03762.pdf
The Illustrated Transformer – Jay Alammar
Session 2: Transformers & Attention, Introduction to Generative AI
Translation-transformer.ipynb
Session 1: Intro to Generative AI | Winter Project | GDSC IITK
Transformers | Natural Language Processing Demystified

Week 3:
Session-3.ipynb
Session 2: Intro to Generative AI | Winter Project | GDSC IITK
Assignment_Gen_AI

Additional Resources for the week(May be helpful in assignment)

- 4 Ways to Do Question Answering in LangChain | by Sophia Yang, Ph.D.
- Tutorial: Build Your First Question Answering System
- 🤗 Transformers

Week 4:

https://www.geeksforgeeks.org/generative-adversarial-network-gan/

[1406.2661] Generative Adversarial Networks

A Friendly Introduction to Generative Adversarial Networks (GANs)

https://colab.research.google.com/drive/1EyC7VW4V8fsyuMKMtWp0heoGaqjiMnrt?usp=sharing#scrollTo=2MbKJY38Puy9