Arfa Karim
Technology Incubator

Generative AI Course Outline

Total Lectures : 24 **Instructor : Noor Ul Hassan**

Lecture 1-2: Introduction to Generative AI and Python Basics

- Overview of Generative AI and its applications
- Introduction to Python programming language
- Basics of variables, data types, and control flow in Python

Lecture 3-4: Python advance and Statistics

- Statistics using Python libraries (NumPy)
- Python Advanced like Functions,preprocessing
- Maximum Likelihood Estimation (MLE) using Python

Lecture 5-6: Introduction to Machine Learning with Python

- Basics of machine learning with Python (scikit-learn)
- Supervised vs. unsupervised learning
- Hands-on exercises with basic machine learning models

Lecture 7-8: NLP Fundamentals and Transformers

- Introduction to Natural Language Processing (NLP)
- Basics of tokenization, stemming, and lemmatization
- Overview of transformer architectures (BERT, GPT)

Lecture 9-10: GANs, VAEs, and Image Synthesis

- Introduction to generative models (GANs and VAEs)
- Image synthesis using generative models
- Hands-on projects with DALL-E and similar models

Lecture 11-12: Introduction to ChatGPT and Conversational AI

- Overview of ChatGPT and its applications
- How ChatGPT works
- Prompt engineering for generating specific responses

Lecture 13-14: Advanced NLP with Transformers

- In-depth study of transformer architectures
- Fine-tuning transformers for NLP tasks
- Hands-on exercises with transformer-based models

Lecture 15-16: Ethical Considerations in Generative AI and NLP

- Addressing bias and fairness in generative models
- Ethical considerations in NLP and AI systems
- Responsible AI practices in prompt engineering

Lecure 17-18: Generative AI in Healthcare and Art

- Applications of generative models in healthcare
- AI-generated art and creativity
- Hands-on projects in healthcare and art using generative models

Lecture 19-20: Generative AI in Text Generation and Summarization

- Text generation using generative models
- Abstractive and extractive summarization with NLP
- Project work on a text generation tasks

Lecture 21-22: Generative AI in Industry and Real-world Use Cases

- Real-world examples of successful generative AI applications
- Industry applications and case studies
- Challenges faced and lessons learned

Lecture 23-24: Final Project and Review

- Overview of the course project with Python implementation
- Review of key concepts and techniques
- Guidance on prompt engineering for final projects
- Q&A session, course wrap-up, and project Submission

This course structure combines foundational concepts, hands-on programming, and a deep dive into generative models, prompt engineering, and applications in various domains. The inclusion of models like DALL-E, ChatGPT, and advanced NLP with transformers adds a practical focus to the content. Students will have the opportunity to work on real-world projects, applying their knowledge to solve specific problems and challenges in the field of generative AI and NLP.