Gen AI & Designing LLM Products

-- Design in-company knowledge-based products --

FORE School of Management
New Delhi

About Generative AI & LLM Products

Generative AI is a type of artificial intelligence technology that can generate new content, such as text, images, audio, and synthetic data, based on the data it was trained on. It uses deep learning models to learn patterns and representations from massive datasets, and then leverages that knowledge to create novel outputs when given a prompt or input. Common examples include language models like GPT (text generation), DALL-E (image generation), and AI music composition tools. Generative AI has a wide range of applications across various industries. Some applications are: a) Content Creation: create articles, stories, scripts, and other written content from prompts or outlines; b) Software Development: code generation and translation between computer languages; c) Data Augmentation: Create synthetic data that resembles real data; this is useful for augmenting training datasets for machine learning models and generating diverse scenarios for training simulations (e.g. medical, driving); d) Customer Service and Marketing: Generating personalized content (ads, emails, chatbot responses); e) Summarizing customer interactions and providing intelligent recommendations; f) Creating marketing materials and localizing content for different languages.

This program covers Deep Learning and Generative AI technologies extensively. Students design knowledge-based products while studying LLM based applications.

1. Completely hands-on course--Students work with image, text and audio data from business & Industry
2. Students experiment with industry standard open-source LLM technologies—frequently used in most cloud platforms.
3. After the program concludes, we are open to a six-months free-consultancy in implementing a pilot-project on building LLM based knowledge products.

About the Course

We begin by introducing participants to python language and its libraries-numpy and pandas. The program requires programming and we prefer that a participant to the program has some prior programming background in any computer language (not necessarily in python). Students will develop applications on ready-to use LLM models available on Ollama and HuggingFace.

We have two primary modules: These are on (a) *Deep Learning Technology* and *b) NLP and Large Language Models (LLMs):* Under Deep Learning, we study deep neural architectures and recurrent neural networks. We learn different types of autoencoders, variational autoencoders—from simple to complex. We work with Generative Adversarial Networks (GANs), a powerful class of deep learning models. We cover vanilla GANs, Conditional GANs and StyleGANs. We work with two predominant AI libraries: tensorflow and PyTorch.

We then move on to study NLP and LLMs. We cover Attention mechanism and transformer architectures in detail. We work with different types of transformer models and also learn how to install and configure pre-trained LLMs on laptops. We learn two libraries: langchain and LlamaIndex for building LLM applications—chatbots and RAG, for example.

The course is predominantly practice/project based rather than theory dominated. We carefully avoid mathematics—techniques are explained conceptually and in depth. Immediately after a technique is explained, it is implemented through examples. Students perform a project on it with real world data. Thus, by the time a student finishes the course he has executed at the least four to five projects and published them on HuggingFace, Kaggle and on GitHub.

Program duration and venue

The complete program duration is 48-hours. Classes can be held online or in classrooms. In online mode, classes can be held either on appointed weekdays or on Saturdays and Sundays--each class is of 2-hour duration. In classroom mode full day classes are held and these can be held at FORE School of Management, New Delhi. We can also have a mix of offline and online classes.

Target Participants:

The program has applications in a large number of domains. Category of possible participants include Executives, engineers, decision makers, Data Scientists, Security Analysts, Business Analysts and Data Governance Teams.

Program requirements:

Students must have access to high-speed Internet (generally available now a days) and a lap-top with minimum of 16gb RAM. All software that we will work with are open-source and freely available. Students will also be provided with Virtual machines that have pre-configured software installed for experimentation.

Exercises and Projects

There is a heavy emphasis on exercises and projects. Students must experiment and implement systems themselves. Throughout the course students are to undertake several projects. We encourage students to use their organizational data to solve related problems.

Contacts

For any details please feel free to contact either the Program faculty, Prof Ashok K Harnal, at 8750893093 (WhatsApp) or Prof Asif Zameer, Chair, Executive Education at 9871053303 (WhatsApp).

Program Faculty

Prof. Ashok Kumar Harnal

Ashok Kumar Harnal has worked extensively at multiple facets of Big Data Systems--Machine Learning, Generative AI and LLM, Big-Data storage systems (Hadoop and NoSQL databases), Graph Databases, Streaming Analytics using Apache Spark, Apache Kafka, Confluent and Reinforcement Learning. He has been teaching Big Data technology since around last twelve years. Since last nine years Prof Harnal has been collaborating closely with University of California, Riverside, in a program on taking sessions on Big Data for Executives from around the World. We have trained officers from several organizations including RITES, NABARD, TechMahindra, Punjab National Bank, Central Bank of India and Union Bank of India Presently we are training officers in one another Bank. What is a matter of pride for us is that many of our students are at very high positions in Industry. My GitHub site is here. We have successfully conducted three programs on Healthcare Analytics; two programs were of three months duration and one of nine months duration. During his stay in Min of Defence, he has executed three country-wide projects on Information Systems: (a) *Raksha-Bhoomi* to computerize land records (as old as 150 years); (b) Knowledge Management of land-title related files/maps in all Defence Estates offices; and (c) Setting up of a Disaster Management organization: Archival Unit and Resource Center (AU&RC), at Delhi and Pune for safe storage of land-title related records in paper and digital forms. He has published two books (both by Tata McGraw-Hill); One on *How to program games on Computers* and the other on *Linux Administration and Applications*.

Prof. Amarnath Mitra

Dr. Amarnath Mitra is working as an Associate Professor in the area of Information Technology and Big Data Analytics at FORE School of Management, New Delhi. Prior to joining FORE, Dr. Mitra worked as Senior Quant Analyst at BioUrja Power LLC (Texas, USA). Dr. Mitra has over five years of industry experience as an analyst and researcher with substantial exposure of working with big & high frequency data and analytics. In academics, Dr. Mitra worked as full-time faculty for over six years in management institutes such as BML Munjal University Gurugram, IMI New Delhi and IBS Hyderabad. As guest/visiting faculty he has taught in several reputed institutions like SIBM Pune, NMIMS Hyderabad, IIIT Bhubaneswar among others. Dr. Mitra has taught subjects like Data Science, Predictive Analytics, Business Analytics, Quantitative Methods, Business Research Methods, Operations Research, Econometrics, among others.