# LLM Basics Training

Duration: **2 Day**

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## Overview

**LLM Basics – Fundamentals of Large Language Models** is an introductory training program that explores how Large Language Models (LLMs) work, how they are developed, and how they can be applied to natural language processing tasks.

Throughout the course, participants examine the fundamental concepts behind LLMs, learn how language models can be built with PyTorch, and explore their use for inference in language-related applications.

The program reviews the historical development of large language models and their position within the broader Artificial Intelligence (AI) and Generative AI landscape. It also introduces neural-network-based language modeling and examines how Recurrent Neural Networks (RNNs), Long Short-Term Memory networks (LSTMs), and Transformer architectures are applied to natural language processing.

By combining essential theory with practical exercises, the training helps participants become familiar with language model architectures and their use in AI-powered applications.

The LLM Basics course aims to introduce participants to the essential concepts of large language models and demonstrate how these models can be used for inference when developing AI-powered applications.

Through practical activities guided by an experienced instructor, participants will work toward the following objectives:

- Understand the fundamental principles of Natural Language Processing (NLP)
- Apply text preprocessing and tokenization methods with NLTK
- Explain word embeddings and the historical development of language models
- Work with RNNs and LSTMs to process sequential data
- Describe Transformer architectures and use important models such as BERT and GPT
- Recognize the risks and limitations associated with large language models
- Apply pre-trained models available through Hugging Face to NLP tasks
- Understand the fundamental concepts and architecture of Retrieval-Augmented Generation (RAG) systems

## Prerequisites

To follow the technical concepts and practical exercises effectively, participants should have the following knowledge and experience:

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- Proficiency in Python programming
- Familiarity with data analysis using the Pandas library

## Who Should Attend

LLM Basics is designed for individuals who want to understand natural language processing technologies and the fundamental principles behind large language models.

The course is particularly suitable for:

- **AI and Machine Learning Enthusiasts:** Individuals interested in exploring Natural Language Processing (NLP) and Large Language Models (LLMs).
- **Data Scientists and Data Engineers:** Professionals seeking to apply LLMs to inference and model fine-tuning tasks.
- **Software Developers:** Developers looking to gain introductory hands-on experience with NLP libraries and large language models.
- **Students and Other Professionals:** Learners who want to understand Transformer architectures and their role in powering modern AI models.

## What You Will Learn

Working with an engaging, hands-on learning environment, and guided by an expert instructor, students will learn the basics of Large Language Models (LLMs) and how to use them for inference to build AI powered applications.

- Understand the basics of Natural Language Processing
- Implement text preprocessing and tokenization techniques using NLTK
- Explain word embeddings and the evolution of language models
- Use RNNs and LSTMs for handling sequential data
- Describe what transformers are and use key models like BERT and GPT
- Understand the risks and limitations of LLMs
- Use pre-trained models from Hugging Face to implement NLP tasks
- Understand the basics of Retrieval-Augmented Generation (RAG) systems

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## Outline

### 1. Introduction to Natural Language Processing (NLP)

This module introduces the core concepts of natural language processing, methods for preparing text data, and the development of language modeling approaches. Participants explore the progression from traditional NLP techniques to neural-network-based language models.

**Topics Covered:**

- What is Natural Language Processing (NLP)?
- NLP fundamentals: Text preprocessing and tokenization
- NLP fundamentals: Word embedding techniques
- Introduction to traditional NLP libraries
- A brief history of language modeling
- Using PyTorch and Hugging Face for text preprocessing
- Neural networks and processing text data
- Developing language models with RNNs and LSTMs

### 2. Transformers and Large Language Models

This module examines the fundamental characteristics of Transformer architectures and their relationship to large language models. It covers inference with pre-trained models, Generative AI applications, model fine-tuning, and the principles of RAG systems.

**Topics Covered:**

- Introduction to Transformer architectures
- Performing inference with Hugging Face Transformers
- Large Language Models (LLMs) and Generative Artificial Intelligence
- Overview of available large language model options
- Fine-tuning GPT models
- Aligning large language models with human values
- Retrieval-Augmented Generation (RAG) systems