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Generative AI Programing

Build Foundational Skills and Knowledge - 2 DAYS

FA-0231 · 2 DAYS

Agentic & Generative AI

Introduction

Welcome to the Beginner Training Plan for Generative AI, a comprehensive introduction to one of the most groundbreaking fields in technology today. Generative AI has been transforming industries by creating new possibilities in content generation, creative applications, and automation.

From generating realistic images and videos to creating human-like text, the applications of generative AI are vast and growing rapidly. This course is designed for beginners who are eager to explore this exciting field. Led by an instructor with over 30 years of industry experience, the training will emphasize real-world skills and industry-relevant content, avoiding purely academic discussions.

By the end of this course, you will have a strong foundational understanding of generative AI, its tools, and how to implement basic models using popular frameworks.

Learning outcomes

By the end of this course, participants will be able to:

- Understand the fundamental concepts and scope of generative AI.
- Identify the key differences between generative AI and other types of AI models.
- Recognize and explain historical milestones in the development of generative AI.
- Comprehend basic neural network architectures and deep learning principles.
- Use and configure popular libraries and tools like TensorFlow and PyTorch.
- Build and experiment with simple generative AI models.
- Apply foundational knowledge to generate basic images or text using pre-existing libraries.

Prerequisites

- Strong understanding of programming concepts.
- Python programming experience.
- Fundamental knowledge of machine learning concepts is beneficial but not required.
- Enthusiasm for learning about AI and its applications.

Training outline

1. 1. Introduction to Generative AI

Definition and Scope of Generative AI

- What is Generative AI?
- Key capabilities and limitations.
- Differentiation from discriminative models.

Applications of Generative AI

- Overview of applications: Text, Image, Audio generation.
- Use cases in industries like entertainment, healthcare, and finance.

Historical Context and Evolution

- Key milestones in generative AI development.
- Evolution of models from early neural networks to GANs and beyond.

2. 2. Basic Concepts and Terminologies

Core Concepts

- Neural Networks: Structure and functioning.
- Deep Learning vs. Machine Learning: Differences and overlaps.
- Introduction to generative models: Autoencoders, GANs, and VAEs.

Key Terminologies

- Latent space: Concept and applications.
- Understanding noise and its role in generative models.
- Training data and epochs: Definitions and importance.

3. 3. Introduction to Tools and Frameworks

Popular Libraries and Tools

- Overview of TensorFlow, PyTorch, and Keras.

- Pros and cons of each framework for generative AI.

Setting up the Environment

- Installing Python and necessary libraries.
- Setting up Jupyter notebooks for easy experimentation.

Basic Usage

- Navigating through the documentation of popular frameworks.
- Loading datasets and basic manipulations using libraries.

4. 4. Building Simple Generative AI Models

Understanding the Basics of Model Building

- Architecture of a simple neural network.
- Building a basic autoencoder using Keras.

Implementing Simple Models

- Code walkthrough for building a Variational Autoencoder (VAE).
- Generating images using a simple Generative Adversarial Network (GAN).

Hands-on Exercises

- Generating simple images from noise.
- Text generation with a simple LSTM network.

Troubleshooting and Debugging

- Common errors in building generative models.
- Best practices for debugging and improving model performance.

5. 5. Evaluating and Interpreting Model Outputs

Model Evaluation Metrics

- Understanding loss functions and accuracy metrics.
- Introduction to qualitative evaluation of generated content.

Interpreting Results

- Assessing the quality of generated images or text.
- Adjusting parameters to improve outputs.

6. 6. Practical Application and Next Steps

Simple Project: Text and Image Generation

- Step-by-step guide to creating a small project.
- Integrating different models and tools learned in the course.

Future Learning Pathways

- Recommended resources for deepening knowledge.
- Overview of advanced topics like conditional GANs and transformers.

This beginner training plan aims to equip you with the essential skills to start exploring the field of generative AI confidently. You'll be introduced to industry-standard tools and frameworks, build your first generative models, and gain a deeper understanding of the fascinating world of AI.

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