

Roadmap To Learn Gen AI



1. Grasp the Basics of AI

- Understand the difference between AI, ML, DL
- Learn the types of AI: narrow, general, super
- Explore real-world AI applications

2. Learn Python for AI

- Master Python fundamentals
- Use libraries like NumPy, Pandas, Matplotlib
- Learn basic data preprocessing

3. Master Machine Learning Concepts

- Supervised vs Unsupervised Learning
- Regression, classification, clustering
- Overfitting, underfitting, bias-variance tradeoff

4. Dive Into Deep Learning

- Neural Networks: forward & backpropagation
- Activation functions, loss functions
- Use TensorFlow or PyTorch

7. Get Started with GPT Models

- Learn how GPT-2, GPT-3, and GPT-4 work
- Explore OpenAI Playground
- Experiment with ChatGPT

6. Explore Language Modeling

- Learn tokenization & embeddings
- Understand masked vs causal language models
- Study next-token prediction

5. Understand Transformers

- Learn about self-attention mechanism
- Key parts: encoder, decoder, positional encoding
- Study the original "Attention Is All You Need" paper

8. Learn About BERT and Encoder-Based Models

- Understand masked language modeling
- Use BERT for classification, QA tasks
- Explore Hugging Face Transformers

9. Dive Into Generative Models

- Study GANs: Generator vs Discriminator
- Learn about VAEs and Diffusion Models
- Understand their use cases: image, audio, video

10. Practice Prompt Engineering

- Use zero-shot, few-shot, and chain-of-thought prompting
- Learn how prompt structure affects model output
- Experiment with different prompt styles

13. Create Real-World GenAI Projects

- Build AI content writers and chatbots
- Try text-to-image and text-to-code apps
- Use pre-built APIs to accelerate development

12. Work With LangChain

- Learn how to build AI pipelines with LangChain
- Use agents, memory, tools, and chains
- Connect LLMs with external data sources

11. Build With OpenAI & Hugging Face

- Use OpenAI API (ChatGPT, DALL-E, Whisper)
- Learn about Hugging Face Spaces & Models
- Deploy simple GenAI apps

14. Learn RAG (Retrieval-Augmented Generation)

- Understand how LLMs retrieve and generate answers
- Use tools like LlamaIndex and Haystack
- Connect with vector databases (e.g. Pinecone)

15. Experiment with Fine-Tuning

- Learn difference between fine-tuning and prompt-tuning
- Try LoRA, PEFT for efficient training
- Use domain-specific datasets

16. Explore Multi-Modal GenAI

- Work with tools like GPT-4V, Gemini, and LLaVA
- Learn image-to-text and text-to-image models
- Understand use cases in design, vision, and more

20. Stay Updated & Keep Experimenting

- Read research papers from arXiv & ML conferences
- Keep testing new APIs, tools, and models
- Continuously build and share your work

19. Join AI Communities

- Engage on Hugging Face, Discord, Reddit, and Twitter
- Follow top researchers and projects
- Contribute to open-source tools

18. Build AI Agents & Workflows

- Use tools like Auto-GPT, CrewAI, or OpenAgents
- Learn task delegation, memory, and planning
- Create autonomous agents for real-world tasks

17. Study Ethics & AI Safety

- Understand AI bias and fairness
- Explore safety practices in GenAI systems
- Learn about responsible AI deployment

8 Types of LLMs used in AI Agents

