

Generative AI Bootcamp

Welcome & Orientation: The AI Revolution

Week 0, Day 1, Session 1

November 13, 2025

Welcome to the Bootcamp

- Organizer: Umana & Ennova Research – Data & AI Division
- Duration: 6 weeks, full-time immersion
- Focus: From software engineering to autonomous LLM agents

This Session's Learning Objectives

- Understand the structure and goals of the bootcamp
- Trace the evolution of AI up to the Generative AI era
- Recognize key areas impacted by AI today



Bootcamp Structure

Component	Description
Theory	4 hours daily lectures
Labs	4 hours daily practice
Projects	2 capstone projects (LLM + deployment)



Bootcamp Journey

Week	Subject	Topics
1	Software Engineering for AI	Python Microservices
2	Databases and Data Pipelines	DBs, ETL Pipelines, Querying
3	Generative AI Concepts	LLMs and Prompt Design
4	Generative AI Concepts	Agents and Tools
5	Deployment and Enterprise AI	Google's Vertex AI, IBM's Watson X



This Week: Preliminaries

- The AI Revolution
- Enterprise AI Architectures
- Foundational Model APIs

What Is Artificial Intelligence?

- Simulating human reasoning, learning, and creativity
- Rule-based → Machine Learning → Deep Learning → Generative AI

(A Short, Biased) History of AI

1950s	1980s	2010s	2020s
Symbolic AI and Expert Systems	Neural Networks (first wave)	Deep Learning revolution	Generative models and LLMs

Generative AI: Core Idea

Train DL models to *re-generate* existing information: hide a part of it, learn to predict what's missing.

- For text: given first n words, predict the word $n + 1$.
- For images: given image at resolution n (blurred), predict how it looks like at resolution $n + 1$ (not so blurred).

Enabling Technologies

- Transformers and Attention Mechanisms
- Diffusion Models
- Compute Power (GPUs)
- ...The Internet (huge amounts of data!)

And the Result?

- Assistants virtually indistinguishable from human experts: ChatGPT, Gemini, Claude, Copilot...
- Professional image and video generation / edition based on natural language input: Dall-E, Midjourney, HeyGen, Sora 2...

| AI as a productivity multiplier: from “tool” to “collaborator”

The AI Revolution Today

- 30+ OpenAI customers have already burned through over *trillions* of tokens *each*...
- Gartner's saying AI spending will hit around \$1.5 trillion this year and over \$2 trillion next year.

Some trillion token companies: Duolingo, OpenRouter, Indeed, Salesforce, CodeRabbit, iSolutionsAI, Outtake, Tiger Analytics, Ramp, Abridge, Sider AI, Warp.dev, Shopify, Notion, WHOOP, HubSpot / Dashworks, JetBrains, Delphi, Decagon, Rox...

The Impact of Generative AI

Domain	Example
Software Engineering	Code assistants
Education	AI tutors
Marketing	Content generation
...	

Legal? Healthcare? Public administration? You bet...

What can Possibly go Wrong?

- Stargate consortium plans to spend \$500 billion to build 10 GW of data center capacity. Within the next two years, AI is expected to consume 12% of all U.S. electricity

Italy's GDP: ~\$2.4 trillion in 2025. Italy's total installed electricity generation capacity was 118.40 GW in 2022.

- Adam Raine, 16, killed himself in April after ChatGPT allegedly helped him explore suicide methods and draft a note. Sewell Setzer III, 14, died in February 2024 after a Character.AI bot told him to "come home" moments before his death.
- ...

Key Concepts Moving Forward

- Foundation Models
- Prompt Engineering
- Model APIs and Orchestration
- Responsible & Ethical AI

Session Summary

- The AI revolution spans decades of innovation
- Generative AI is transforming creativity and productivity
- This bootcamp will help you build, deploy, and reason about AI systems

Next Session

Session 2: Icebreaker & Setup Lab

Hands-on: environment setup and API connectivity tests.