Introduction to Generative AI

Instructor: Kirtan Ramwani

This course offers an introduction to the core principles and real-world applications of generative artificial intelligence. Through visual demonstrations and hands-on practice with AI tools, students will explore the fundamental concepts behind generative AI. The course covers both text- and image-based architectures, including large language models (LLMs) and diffusion models, helping students build a solid understanding of how these systems generate content. Students will build practical skills in prompt engineering and learn multiple different techniques for crafting clear, effective, and context-aware prompts. The course also explores critical ethical considerations, such as bias, hallucinations, misinformation, and privacy concerns. Students will also reflect on the broader societal impacts of generative AI and learn principles for its responsible use.

Compulsory / Recommended Readings:

Dhamani, N., & Engler, M. (2024). Introduction to Generative AI. Simon and Schuster.
Phoenix, J., & Taylor, M. (2024). Prompt engineering for generative AI. O'Reilly Media, Inc.
Foster, D. (2019). Generative deep learning: teaching machines to paint. Write, compose, and play. O'Reilly Media Incorporated.

Weekly Schedule

Week	Topic
1	The AI landscape and generative AI.
2	Conceptual overview of generative models. Basics of text- and image generation.
3	Generative AI modalities: text, image, audio, video, and multimodal models.
4	Large language models (LLMs).
5	Prompt engineering (part 1): fundamentals of prompt design.
6	Prompt engineering (part 2): advanced techniques and multi-turn interactions.
7	APIs for generative AI (part 1): text-based models.
8	APIs for generative AI (part 2): image-based models.
9	Evaluating generative AI outputs. Hallucinations, coherence, and reliability.
10	Biases, risks, and safety. Misuse, prompt injection, and security issues.
11	Ethics, copyright, and regulation. Responsible use of generative AI.
12	Detection and authenticity of generated content.
13	Project defense.

Requirements

During the semester, students will be required to complete a project in a team of maximum 2 people. The completed project must be defended on the final week. In the case of a failed project defense, students may attempt to defend an improved version of the project during the first week of the exam period.