

# Short Course in Artificial Intelligence

October 2023

## Lecture 3: Generative AI

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## Generative Artificial Intelligence

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- ◆ Generating complex and **realistic** data
- ◆ Recent progress
- ◆ Generative Adversarial Networks (Goodfellow)



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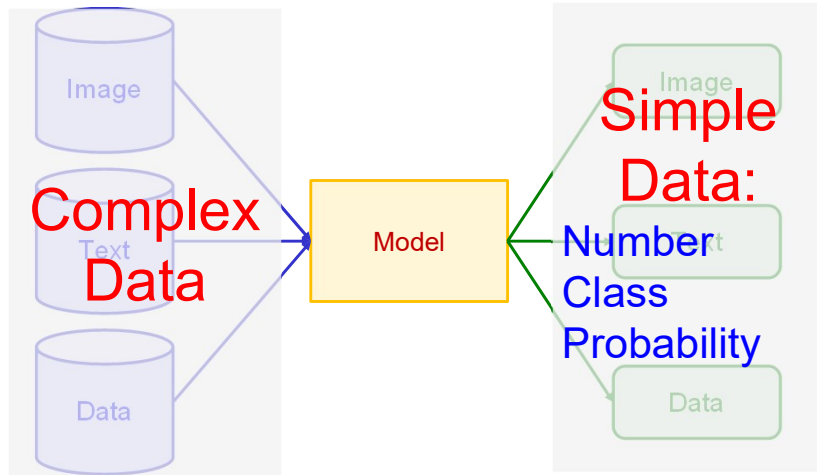
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## Generative Artificial Intelligence

### ◆ Discriminative AI



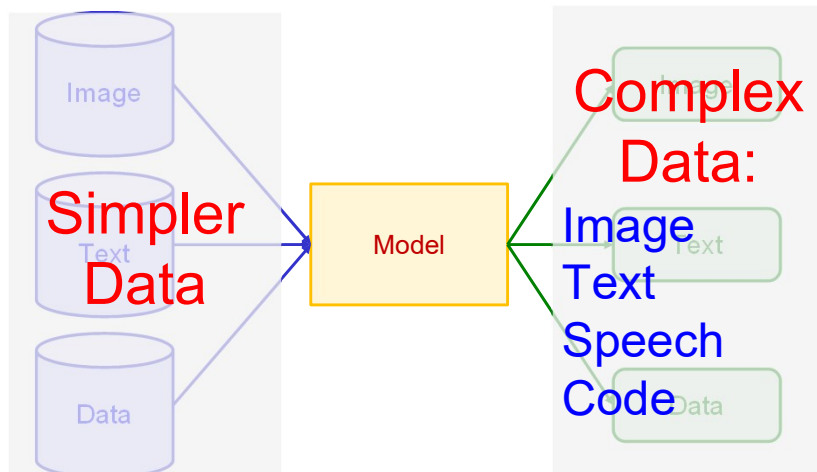
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## Generative AI

### ◆ Generative AI



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# Generative AI

## ◆ Applications

APPLICATION LAYER	Marketing (content)						
	Sales (email)	Code generation	Image generation				Gaming
	Support (chat / email)	Code documentation	Consumer / Social				RPA
	General writing	Text to SQL	Media / Advertising				Music
	Note taking	Web app builders	Design	Voice Synthesis	Video editing / generation	3D models / scenes	Audio
	Other						Biology & chemistry
	TEXT	CODE	IMAGE	SPEECH	VIDEO	3D	OTHER

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# Generative AI

## ◆ Tools

	TEXT	CODE	IMAGE	SPEECH	VIDEO	3D	OTHER
MODEL LAYER	OpenAI GPT-3	OpenAI GPT-3	OpenAI Dall-E 2	OpenAI	Microsoft X-CLIP	DreamFusion	TBD
	DeepMind Gopher	Tabnine	Stable Diffusion		Meta Make-A-Video	NVIDIA GET3D	
	Facebook OPT	Stability.ai	Craiyon			MDM	
	Hugging Face Bloom						
	Cohere						
	Anthropic						
	AI2						
	Alibaba, Yandex, etc.						

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## Generative AI

- ◆ Generative AI will impact your work



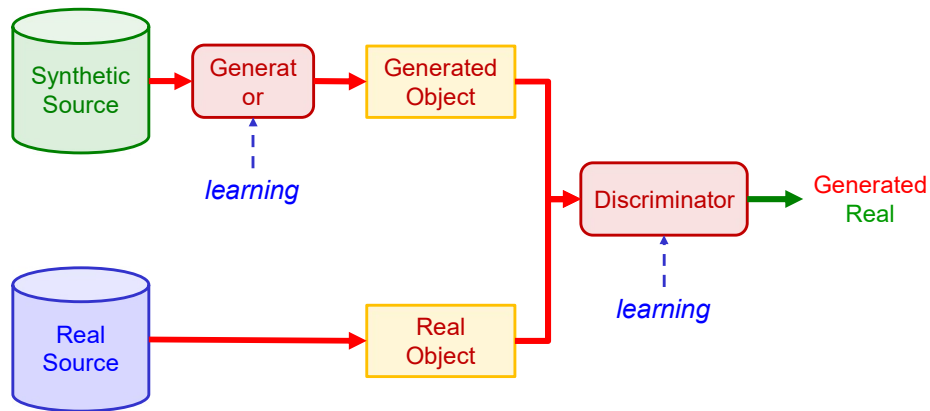
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## Generative AI

- ◆ Generative Adversarial Networks GAN



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## Generative AI

### ◆ ChatGPT

- chatbot, article writer, code writer by OpenAI
- one of the most famous **LLM** (Large Language Model)
- 175,000,000,000 parameters
- Trained on 570 GB of data
- Cost of training: 65M US\$
- Number of users:
  - **December 2022** – 1 Million
  - **January 2023** – 57 Million
  - **February 2023** – 100 Million
  - **June 2023** – 1.6 Billion

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## Generative AI

### ◆ DALL-E

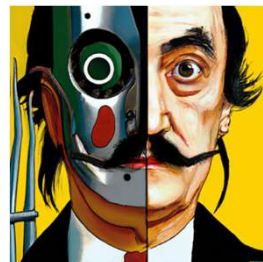
- Text-to-image model by OpenAI
- Variety of applications



Illustration



Design



Art

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## Generative AI

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### ♦ New skill: prompt design

#### “Introduction to prompt design

Prompt design is the process of creating prompts that elicit the desired response from language models. Writing well structured prompts is an essential part of ensuring accurate, high quality responses from a language model. This page introduces some basic concepts, strategies, and best practices to get you started in designing prompts.

Prompts can include one or more of the following types of content:

- ♦ Input (required)
- ♦ Context (optional)
- ♦ Examples (optional)

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## Generative AI

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### ♦ Generative AI for Software Development

- ♦ Code generation
- ♦ Code update
- ♦ Code debugging
- ♦ Code documentation
- ♦ Some AI tools for developers:
  - ♦ ChatGPT
  - ♦ Google Bard
  - ♦ GitHub Copilot
  - ♦ Amazon CodeWhisperer
  - ♦ Tabnine

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## Ethics in Artificial Intelligence

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- ◆ Realistic fakes
- ◆ Copyright issues
- ◆ Privacy

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RECAP IN VIETNAMESE

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## Trí tuệ nhân tạo sinh sản

- ♦ Tập trung vào việc tạo ra dữ liệu mới, phức tạp và thậm chí có thể trông giống với dữ liệu thực tế.
- ♦ Generative AI sẽ gây tác động mạnh mẽ đến thị trường lao động

=> Cần có kỹ năng prompt:

- Dữ liệu đầu vào - Input (bắt buộc)
- Ngữ cảnh (có hoặc không đều được)
- Các ví dụ (có hoặc không đều được)

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## Vấn đề đạo đức trong Trí tuệ Nhân tạo

- ♦ Phát triển và sử dụng các bản nhái thực tế
- ♦ Vấn đề về bản quyền
- ♦ Quyền riêng tư

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## Practice 4: Generative AI

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(ideas)

- ◆ Use a generative AI system (chatGPT or like)
- ◆ Ask to generate code
- ◆ Run the code to see if correct
- ◆ Ask for updating
- ◆ Introduce a bug and ask to find it