Teaser

ChatGPT

DreamStudio

Most Famous AI/ML Applications

recommendations


chatbots


ChatGPT


autonomous driving


WAYMO

TESLA

translation


robotics


OCR


assistants (speech recognition)


and many more …

The Top 50 Gen AI Web Products, by Unique Monthly Visits

1. ChatGPT	11. IIElevenLabs	21. PhotoRoom	31. PIXAI	41. MaxAI.me
2. Gemini*	12. Hugging Face	22. YODAYO	32. ideogram	42. Craiyon
3. character.ai	13. Leonardo.Ai	23. Clipchamp	33. invideo AI	43. OpusClip
4. liner	14. Midjourney	24. runway	34. Replicate	44. BLACKBOX AI
5. QuillBot	15. SpicyChat	25. YOU	35. Playground	45. CHATPDF
6. Poe	16. Gamma	26. DeepAI	36. Suno	46. PIXELCUT
7. perplexity	17. Crushon AI	27. Eightify	37. Chub.ai	47. Vectorizer.AI
8. JanitorAI	18. cutout.pro	28. candy.ai	38. Speechify	48. DREAMGF
9. CIVITAI	19. PIXLR	29. NightCafe	39. phind	49. Photomyne
10. Claude	20. VEED.IO	30. VocalRemover	40. NovelAI	50. Otter.ai

*formerly Bard

Charts are for informational purposes only and should not be used for investment decisions. Past performance is not indicative of future results. None of the above should be taken as investment advice; see a16z.com/disclosures.

a16z Consumer

The Top 50 Gen AI Mobile Apps, by Monthly Active Users

1. ChatGPT	11. Photoroom	21. Beat.ly	31. Bobble AI	41. Chat AI
2. Microsoft Edge	12. Remove It	22. Photo AI	32. reface	42. ELSA
3. photomath	13. Evoke AI	23. Hypic	33. PhotoApp	43. AI ARTA
4. Bing	14. AI Chatbot: AI Chat Smith 4	24. AI Quran	34. Prequel	44. AI Chat
5. Remini	15. ChatBot	25. ArtMind	35. Mathway	45. Revive
6. BRAINLY	16. character.ai	26. SnapEdit	36. Poly.AI	46. LISA AI
7. NOVA	17. AI Mirror	27. Imagine	37. Genie	47. PIXELCUT
8. Chat & Ask AI	18. ChatOn	28. Question AI	38. Photoleap	48. AI Chat - Assistant
9. Facemoji	19. OANDA	29. ChatBox	39. Wonder	49. Poe
10. EPIK	20. Face Dance	30. DAVINCI	40. Copilot	50. dawn ai

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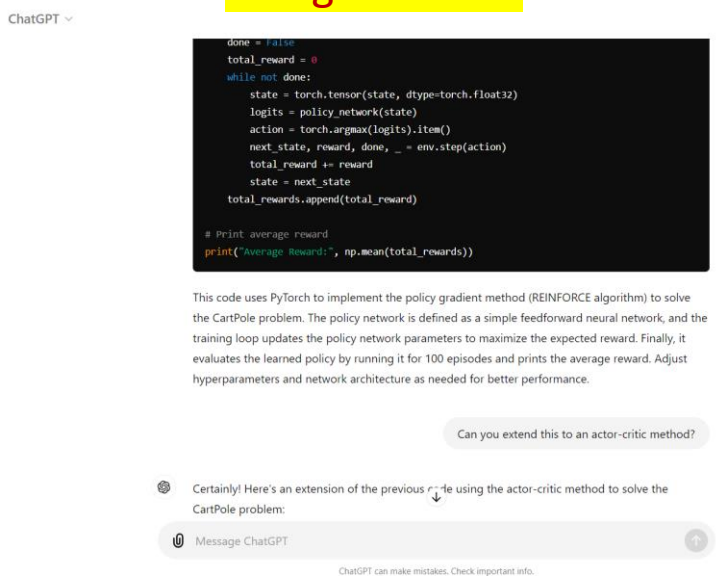
source

Classic ML vs Deep Learning

Generative vs Predictive Models

text generation



[ChatGPT]

image synthesis

Prompt: Epic anime artwork of a wizard atop a mountain at night casting a cosmic spell into the dark sky that says "Stable Diffusion 3" made out of colorful energy

[Stable Diffusion 3 — Stability AI]

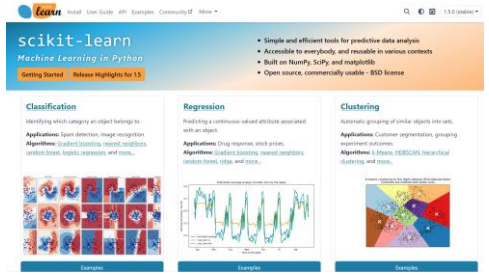
text-to-video

Prompt: A stylish woman walks down a Tokyo street filled with warm glowing neon and animated city signage. She wears a black leather jacket, a long red dress, and black boots, and carries a black purse. She wears sunglasses and red lipstick. She... +

[Sora | OpenAI]

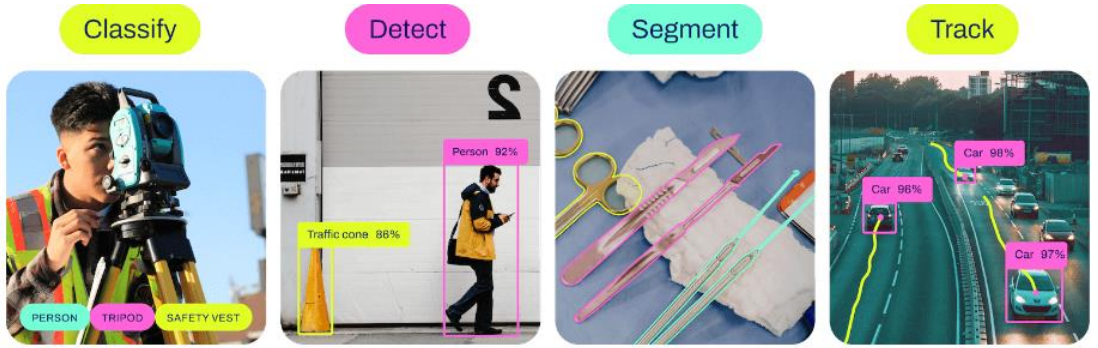
BERT family

tabular data



dmlc XGBoost

computer vision



[YOLO]

Literature

If you want to go a bit deeper …

- Deep Learning
- The Little Book of Deep Learning
- Understanding Deep Learning

Introduction AI/ML

Main Areas of Artificial Intelligence

from wikipedia

- **computer vision**

data: spatial structures (e.g., images), SOTA: Convolutional Neural Networks (CNN)

- **natural language processing**

data: sequential structures (e.g., text), SOTA: transformers

- **automated decision making, robotics**

data: sequential actions (e.g., games), SOTA: reinforcement learning

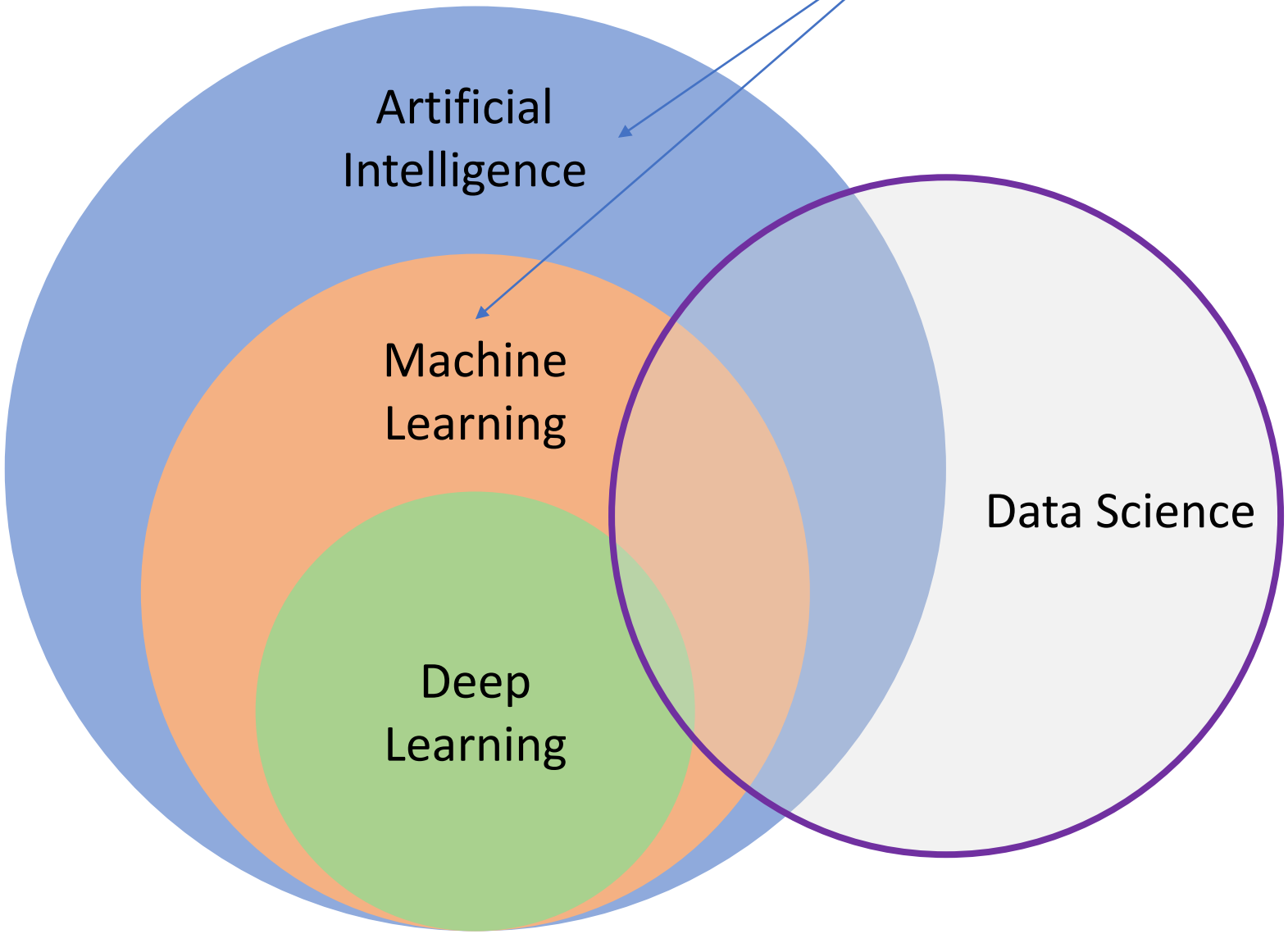
agency:
perception – thought – action

All of these are enabled by one key ingredient:

learning from experience/data (**Machine Learning**)

data can also be tabular (structured): columns as features, rows as independent samples

blend of diverse components from different domains (statistics, optimization, computer science, …)



Deep Learning:

special kind of ML algorithms using *deep* neural networks (e.g., CNNs, transformers)

Data Science:

extract knowledge from data (by means of ML, among other things)

ML: Learning from Experience/Data

mainly exploiting statistical dependencies with the aim of **generalization** to new (e.g., future) data (compare with human reasoning by analogies)

training (usually offline optimization):

ML algorithm + data = explicit algorithm (to be used at inference time)

→ reduction of complexity and much better generalizability compared to handcrafted algorithms

analogy: Humans do not hit the ground running (storage capacity of DNA limited) but have learning capabilities.

Ladder of Generalization

shallow learning:

representation encoded in features

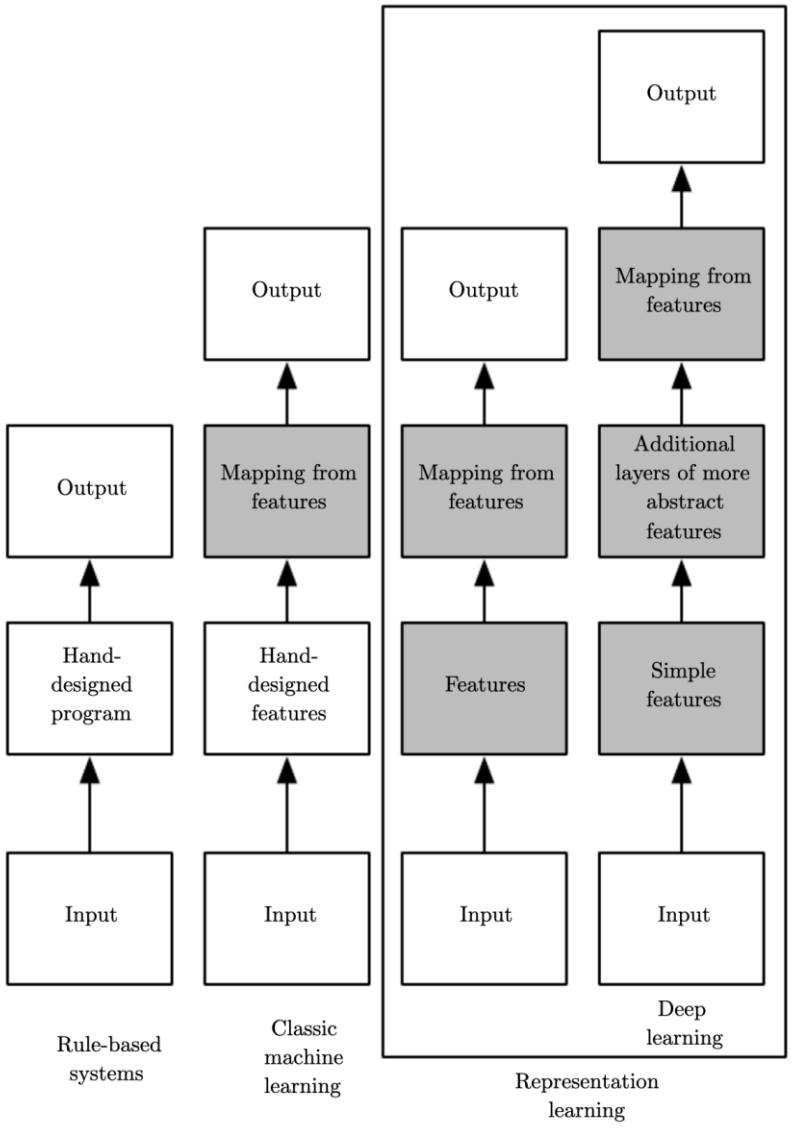
→ feature engineering

deep learning:

representation encoded in network

→ feature/representation learning

(hierarchy of concepts learned from raw data in deep graph with many layers)



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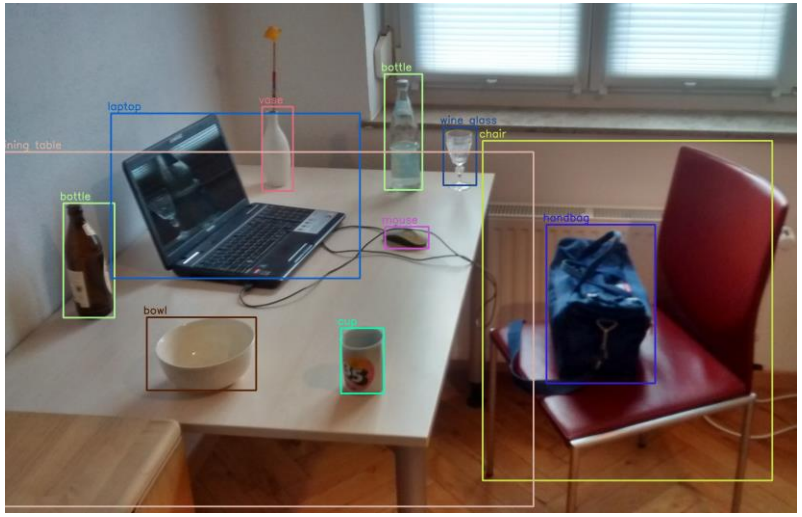
When to Use ML (= Learning from Data)

automation

too complex for rules



from wikipedia

object recognition, chat bot, …

complexity / uncertainty

too complex for humans

AlphaFold

protein structure predictions, demand forecasting, …

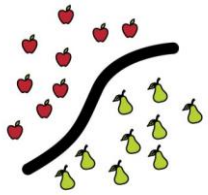
more scientific use cases: medicine (imaging, diagnosis, drug design), particle physics (analysis of collider experiments), material science (material properties and design of new materials), …

MACHINE LEARNING

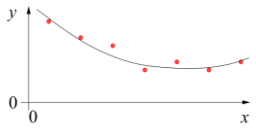
training target available (labeled or past data)

SUPERVISED

CLASSIFICATION



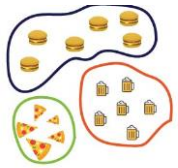
REGRESSION



data not labeled in any way

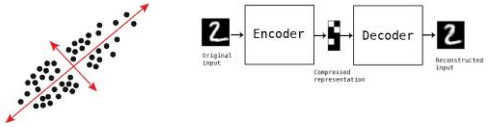
UNSUPERVISED

CLUSTERING



ASSOCIATION

DIMENSIONALITY REDUCTION



GENERATIVE MODELS

no supervision, but goal-based interaction with environment

REINFORCEMENT LEARNING

LEARN STATE OR ACTION VALUES

LEARN POLICY DIRECTLY

learning by teacher
(high-dimensional curve fitting)

learning by observation
(pattern recognition)

learning by trial-and-error
(sequential decision making)

unsupervised and reinforcement learning can both be cast as supervised-learning setup

Supervised Learning

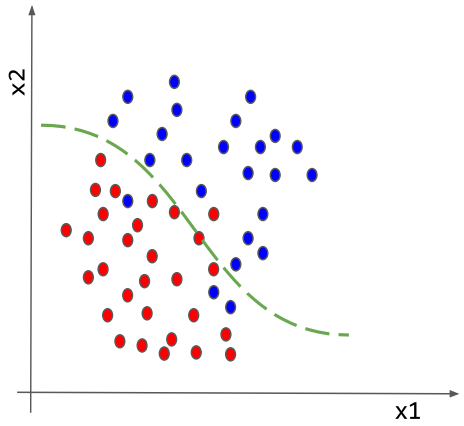
learning by teacher → usually rather narrow tasks (passive approach)

Target Quantity

- **known in training**: labeled samples or observations from past
- to be **predicted** for unknown cases (e.g., future values)

Features

input information that is
- correlated to target quantity
- known at prediction time



Example: Spam Filtering

Classify emails as spam or no spam

*use accordingly **labeled emails as training set***

use information like **occurrence of specific words** or **email length** as **features**

features x1 and x2
spam, no spam

But Before: Data Processing

environment:

WSL, Python, virtualenv, pip

scientific Python stack:

NumPy, pandas, matplotlib

coding example: stock market data