What is the difference b/w → Artificial Intelligence
↓
→ Machine learning
↓
→ Deep learning

Artificial Intelligence: It's the playground to engineer

Computer science + data

machines → CPU
↓
→ **GPU**

empowering machines (CPU + GPU) by leveraging computer science & **data** to mimic cognitive functions of humans.

→ 256 Mb/month.   **data revolution**
↓
2024 → 2 Gb data/day (500-1000) unlimited data (30 - 50 mbps)

floppy disk
CD → DVD
500 GB (Hard drive)

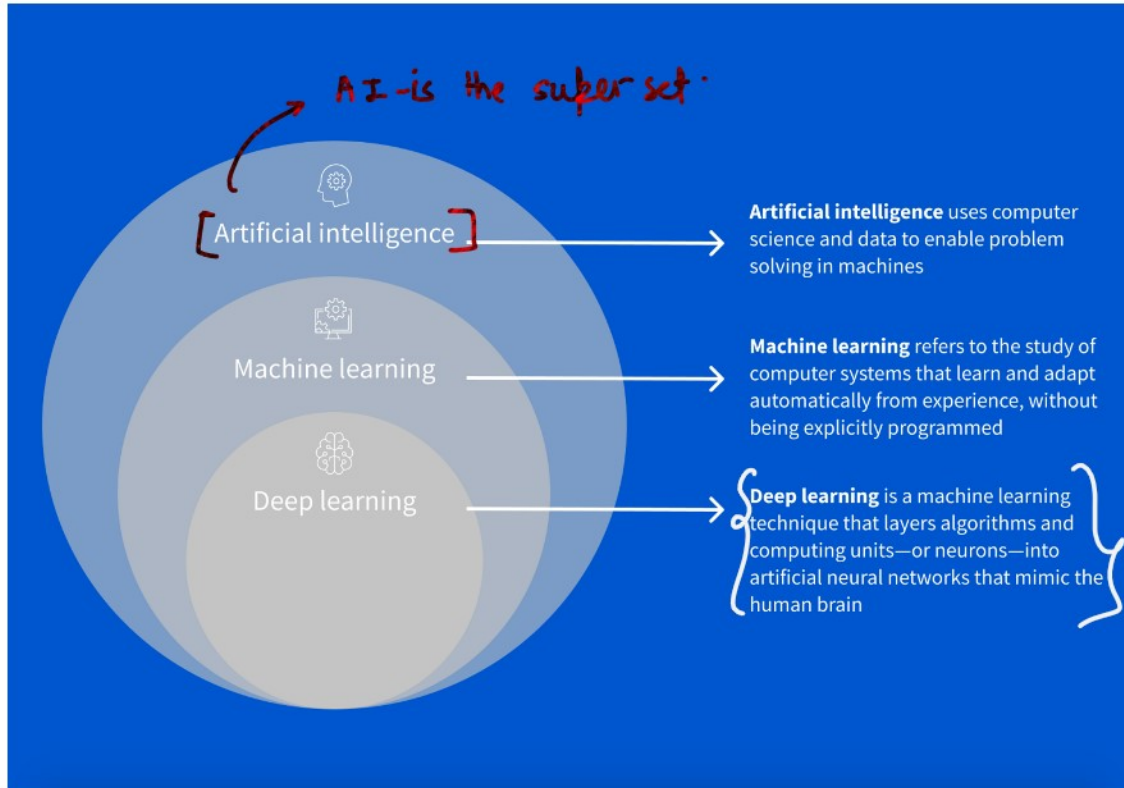$$\begin{bmatrix} 1\,TB - cloud - (20/month) \\ + \\ compute\ power \end{bmatrix}$$

16 Gb ram
↓
1 Gb files → 12 - 16 Gb   100 Gb files

chat GPT → [billions of nodes]

DATA IS THE NEW OIL

↓

(Data and AI)

AI - is the super set.

Artificial intelligence

Artificial intelligence uses computer science and data to enable problem solving in machines

Machine learning

Machine learning refers to the study of computer systems that learn and adapt automatically from experience, without being explicitly programmed

Deep learning

Deep learning is a machine learning technique that layers algorithms and computing units—or neurons—into artificial neural networks that mimic the human brain

What is machine learning and how's it different from software?

- Detecting email spam ??

— any email landing in my Inbox

Ham or   Spam

(not a spam)
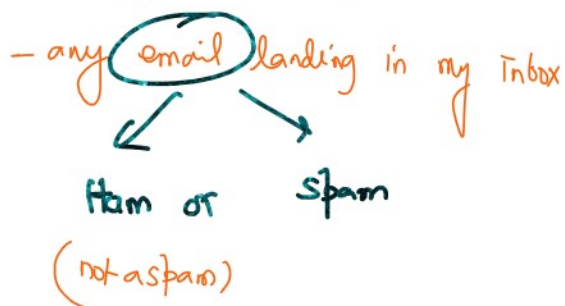
Traditional Software development

1) Does the email contain free, weight loss or lottery, jackpot.

(Keywords) → Rate ↓

(Keywords) → Rate 1 ↓ 10

2) Did it come from Known Spammer domain/ Ip addresses

(new keywords)

Machine learning Solution

x_1	x_2	x_3	x_4	x_5 - - - - - - x_n		Y	(Supervised learning)
			'I million of emails'				

Data

→ Training (TM) → | unseen email | → Spam or Not a Spam.

Gmail → ✉ → ?? → Ham / Spam

Feedback → user helps in training the model.

Traditional Programs: Define algo/logic to compute output

Input → Traditional Program → Output
Algo (Logic) ↗

If $x > 9$ and ≤ 99 ⇒ 2 digit num

Machine Learning: Learn model/logic from data

Training Input → ML Training → Model (Logic) → ML Inference → Output
Expected Output ↗   Input ↗

Supervised Learning
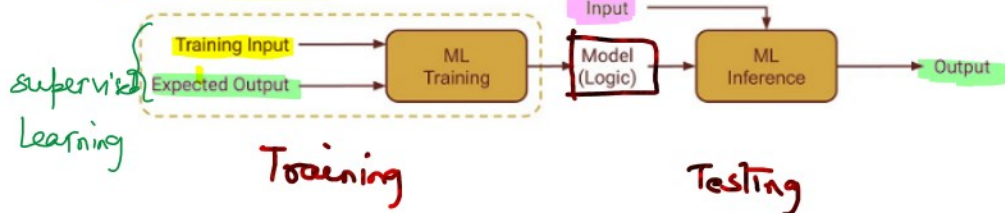
Training   Testing

Machine learning is the ability to perform tasks without explicit instructions while relying on underlying patterns in the data.

Deep learning   it is a subset of machine learning
which tries to mimic human brain (basically getting closer to working of
human brain but in artificial
way)

Artificial Neural Network

NEURON ANATOMY

Dendrite
Scwann Cell
Myelin
Nucleus
Axon Terminal
Axon
Cell Body
(Soma)
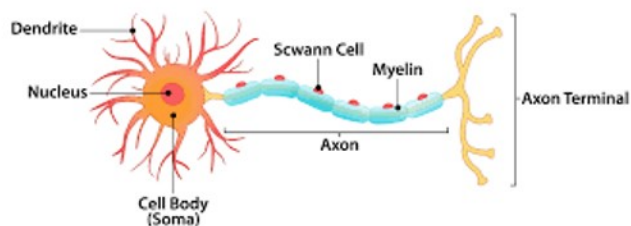
\# Smart Compose :
↳ Gmail

SUBJECT: Write ==emails faster== with Smart Compose in Gmail

May 08, 2018 · 1 min read

Paul Lambert
Product Manager, Gmail

< Share

## Taco Tuesday

Jacqueline Bruzek

Taco Tuesday

Hey Jacqueline,|

Email makes it easy to share information with just about anyone—friends, colleagues and family—but drafting a message can take some time. Last year, we introduced ==Smart Reply in== Gmail to help you quickly reply to incoming emails. Today, we're announcing Smart Compose, a new feature powered by artificial intelligence, to help you draft emails from scratch, faster.

Draft emails quickly with confidence

From your greeting to your closing (and common phrases in between), Smart Compose suggests complete sentences in your emails so that you can draft them with ease. Because it operates in the background, you can write an email like you normally would, and Smart Compose will offer suggestions as you type. When you see a suggestion that you like, click the "tab" button to use it.
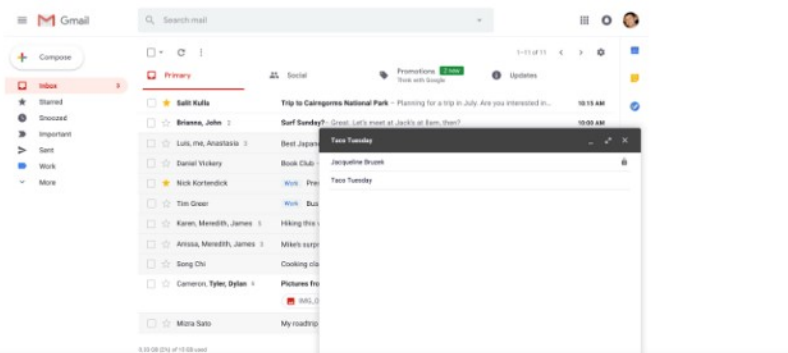
[==Please== let me know in case of any questions/concerns.] → to scroll

Typical Usecases / Example:

==Predictive analytics== → Forecasting → Statistical Models
  - Moving avg. method.
  - Single / Double Exponential Smoothing

==Predictive analytics== → Forecasting

- Moving avg. method.
- Single | Double Exponential Smoothing
- Croston's Method.
- ARIMA ⎫
- SARIMA ⎬ Time Series Model
- SARIMAX ⎭

Causal Models

- leveraging ==ML & DL algorithms==

an array of input variables including
causal features such as promotion, holidays,
price, weather, carbon emissions

Predicting | Estimating

==Forecasting== house price

<u>Boston House Prices</u>: Predict the price of the house based on several inputs.

(size, location, no. of rooms)
⎧ 1000 ⎫   ⎧ 2BHK 1RK ⎫
⎨ 2400 ⎬   ⎨ 3BHK   ⎬
sqft.   ⎩   ⎭

<u>Retail | FMCG</u>

<u>Sales Forecasting</u> : Quick commerce businesses

[Blinkit, Zepto, BigBasket, Swiggy etc.]

https://www.appsrhino.com/blogs/how-blinkit-works-business-model-revenue-model

https://whitelabelfox.com/blinkit-business-model/

<u>Business model:</u>

1Me

3-5 Kms

Transit Time: 15-20 mins

'delivery'

small place

Dark warehouse
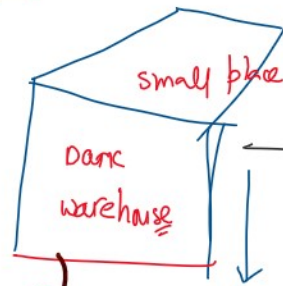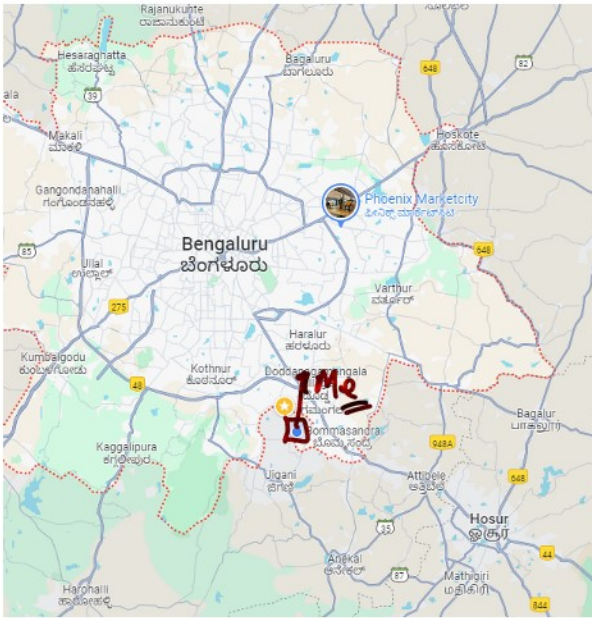
→ Not a Hypermarket

optimized stock for different groceries, veggies, fruits etc

Running forecasts every 4 hours

↓

what they need at what location

— running short on bread/ Knorr soups

7 days

12 PM → 4 PM

[Colgate Toothpaste + Tooth Brush]

group

Fast Movers

Curd + Milk + Bread + Butter + Paneer

'Planogram design'
+
'compliance'] Deep learning
+
Feature input in the model.

Walmart did data mining to reveal that sales of beer and diapers were correlated on Friday nights.

Diapers   Beers

Wives

400m – 1000m

Walk

Beer Sales

sky-rocketed

Ad

Friday

50m

https://canworksmart.com/diapers-beer-retail-predictive-analytics/
https://theweek.com/articles/461001/7-tricks-walmart-using-make-buy-more-beer
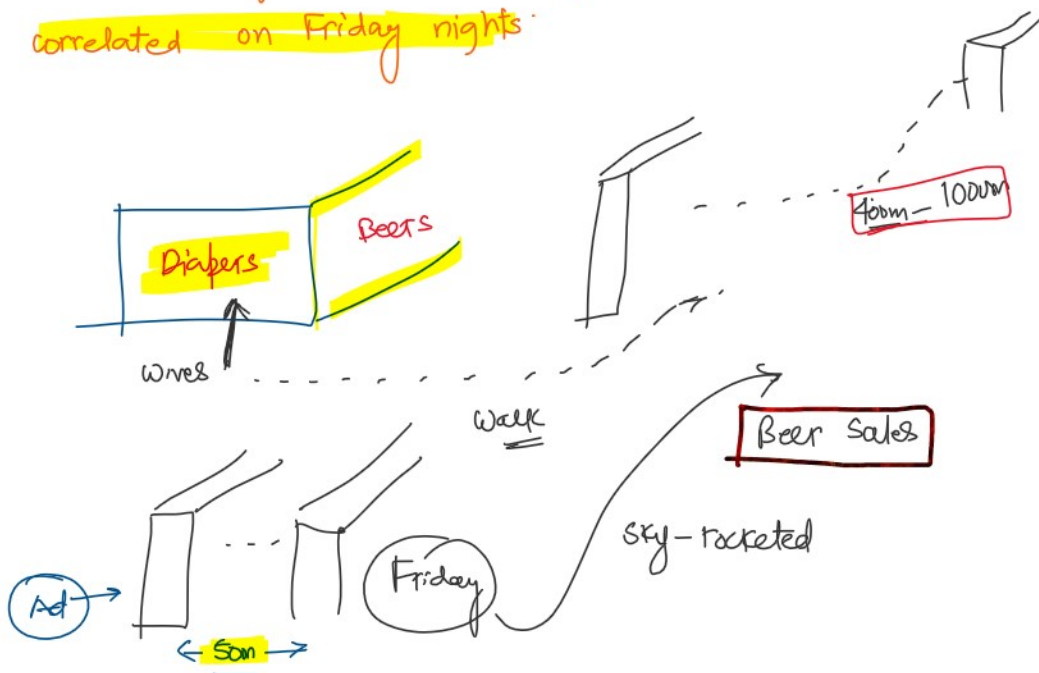
Planogram

Google I/O

Use of AI in medical sciences.

SAMSUNG Presents FE BUDGET 2024 MODI 3.0 Associate Partner GRANTHM

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News / Health And Wellness / Google AI tool for retinal scan can predict cardiovascular risk
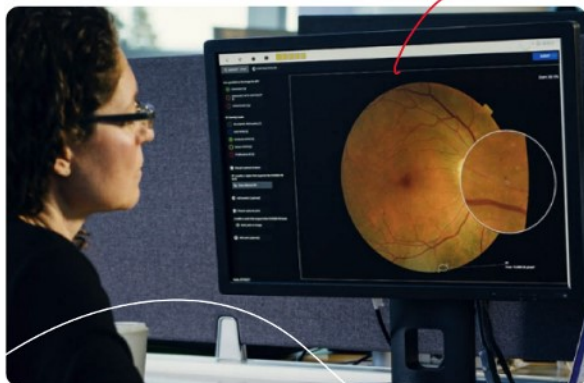
🛒 Premium

Google AI tool for retinal scan can predict cardiovascular risk

The technology could reveal the heart's health condition after matching the eye scans with a matrix for cardiovascular risks. The algorithm has proved to be correct in 70 per cent of the cases where it has been tested so far.

Written by Anonna Dutt
Updated: July 2, 2023 12:31 IST   ✅ NewsGuard

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01 0 1

EXPRESS Shorts

Salman Khan does a little dance with Govinda at Dharmaveer 2 trailer launch

Deep learning → Image → X-ray
                  → video   → MRI
                            → CT scan → images

Developing a diabetic retinopathy screening solution

In research published in JAMA, Google's artificial intelligence accurately interpreted retinal scans to detect diabetic retinopathy. To do this, Google worked with a large team of ophthalmologists who helped us train the AI model by manually reviewing more than 100,000 de-identified retinal scans. This led to a development of an AI-based application called Automated Retinal Disease Assessment. This application can help doctors expand high-quality diabetic retinopathy screening programs in countries without enough eye specialists, such as India and Thailand.

Supporting 200k+ screenings and counting

Our solution is being used to detect diabetic retinopathy in India and the European Union. With almost 3k new screenings supported by ARDA weekly, we're continuing to expand access to diabetic retinopathy screening at scale. The solution is currently being evaluated in clinical studies in the United States as well as in Thailand. We are working with multiple partners to make this solution available around the world, especially in the areas which have lower access to specialist care.

https://health.google/caregivers/arda/

https://www.linkedin.com/pulse/why-should-google-tie-up-aravind-eye-hospital-madurai-jagan-n/

Why should Google tie-up with Aravind Eye hospital, Madurai? ✓
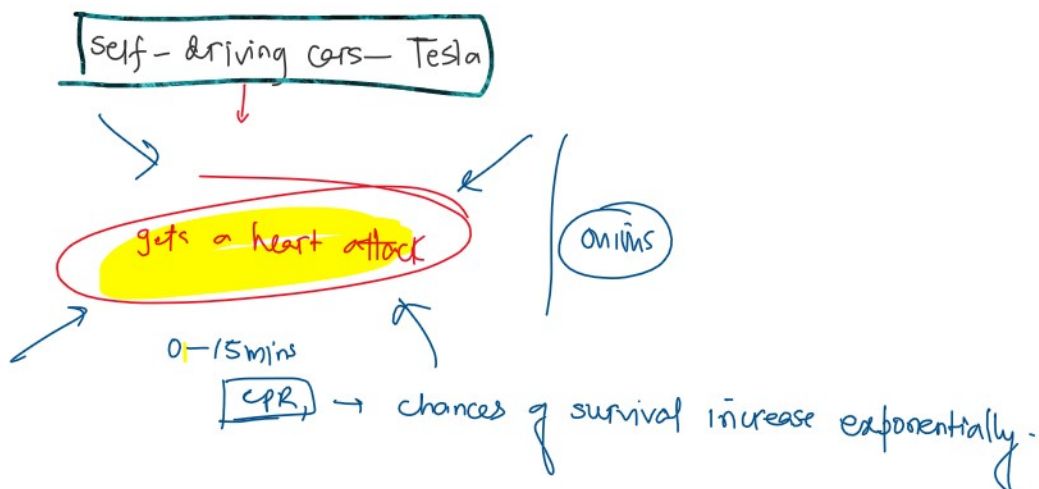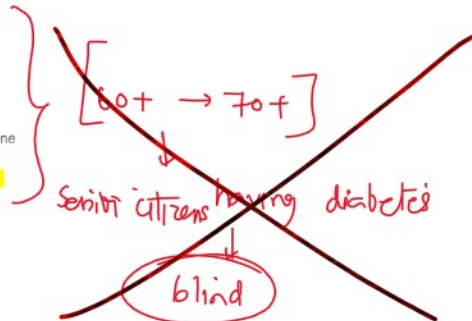
Jagan N
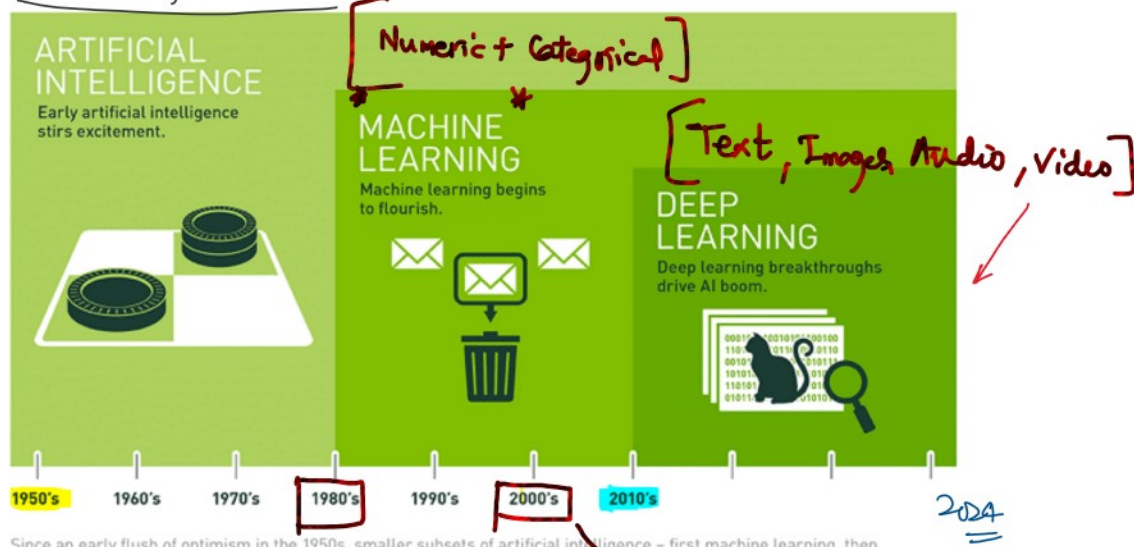Learn → Teach → Grow

October 15, 2023

In the recent Google I/O, there was an announcement about Google's tie-up with Aravind Eye hospital in Madurai to develop and deploy machine learning and artificial intelligence capabilities to help eliminate needless blindness.

ARAVIND
EYE CARE SYSTEM

We are collaborating with Aravind Eye Hospital in India, in our development and deployment of machine learning and artificial intelligence capabilities for ==retinal imaging==, with a focus on ==diagnosing diabetic retinopathy==, to help ==eliminate needless blindness.==

[60+ → 70+]

Senior citizens having diabetes

blind

Self - driving cars — Tesla

gets a heart attack

onions

0—15mins

CPR → chances of survival increase exponentially.

Time line for AI

ARTIFICIAL
INTELLIGENCE
Early artificial intelligence
stirs excitement.

[Numeric + Categorical]

MACHINE
LEARNING
Machine learning begins
to flourish.

[Text, Images, Audio, Video]

DEEP
LEARNING
Deep learning breakthroughs
drive AI boom.

| 1950's | 1960's | 1970's | 1980's | 1990's | 2000's | 2010's | | 2024 |

Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then
deep learning, a subset of machine learning – have created ever larger disruptions.

2012 → R Programming
↓
2015 → Python.

Transition → (AI)

2010 onwards

Unstructured vs structured data

→ Tweets on X
↓
[social media]

→ Whatsapp data

→ log files (in general)

→ Python errors.

sales data

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structured data: is highly organized and easily accessible within databases.
    – it follows certain schema (stringent) and typically
      stored in tabular formats (rows & columns)
                ↓
              spreadsheet

SQL: structured Query Language.

Unstructured data:

- it doesn't have pre-defined schema or any organized format
  — no fixed schema.

- it can come in various formats such as text, images, audios and videos files.

- Traditional SQL queries are not suitable

- MongoDB, Cassandra # NoSQL databases are used to store unstructured data