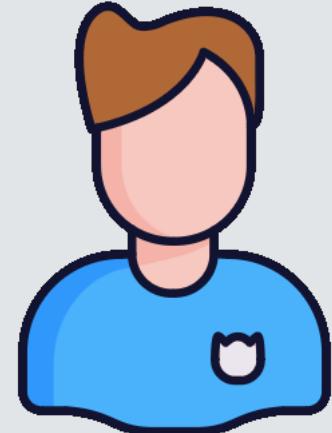


CHUQUR O'RGANISH: KIRISH

Ikboljon Sobirov © 2024

AGENDA

- Sun'iy zako (SZ) va hayotdan misollari
- SZ va chuqur o'rghanish nima?
- SZ tarixi
- Chuqur o'rghanish kirib kelishi
- Vazifalar turlari
- Neyron tarmog'i
- Birlashtirish neyron tarmog'i va Transformer tarmog'i



SUN'YIY ZAKO VA HAYOTDAN MISOLLARI

Real world applications of AI

From sources across the web

 Healthcare	 Agriculture	 Education
 Retail	 Security	 Social media
 Autonomous vehicles	 Chatbots	 Personalization
 Banking	 Customer service	 Entertainment
 Space exploration	 Transportation	 Face recognition
 Finance	 Navigation	 Human Resources
 Marketing	 Fraud detection	 Video game
 Digital assistants	 Manufacturing	 Supply chain optimization

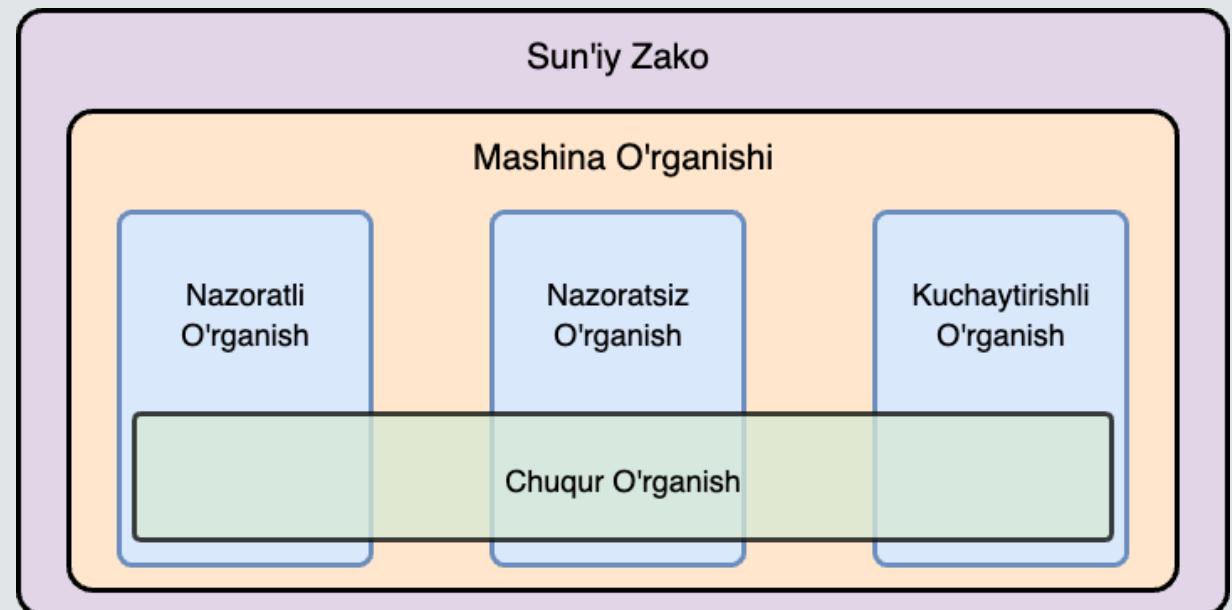
SUN'Y ZAKO VA TIBBIYOTDA MISOLLARI

- Tashxis qo'yish
- Prognoz qilish
- Dori kashfiyoti
- Shaxsiylashtirilgan tibbiyot
- Qaror chiqarish
- Genetik ma'lumot tahlili
- Tibbiy robotika
- V.h.k.

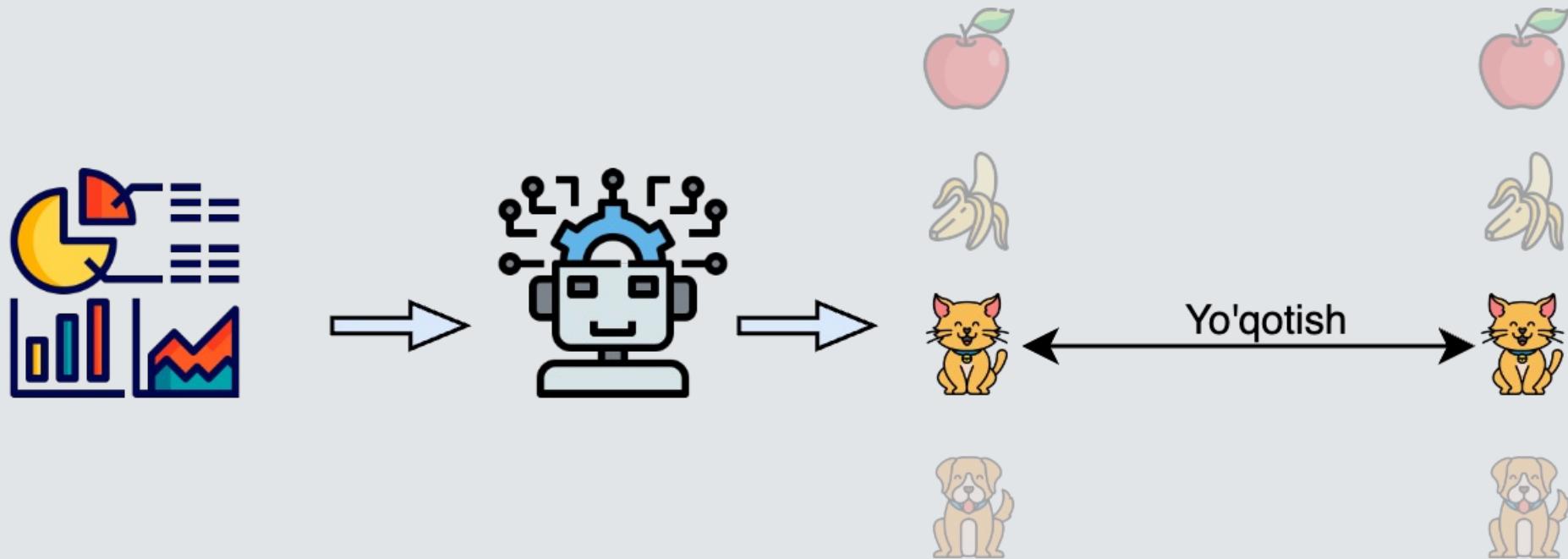


SZ VA CHUQUR O'RGANISH NIMA?

- SZ (sun'iy intellekt) – artificial intelligence
 - *Inson kabi o'rghanish va firkash qobiliyati*
- Mashina o'rganishi – machine learning
 - *Qo'lda yasalgan xususiyatlar bilan ma'lumotga asoslanib matematik modelni moslash*
- Chuqush o'rghanish – deep learning
 - *Avtomatik xususiyatlar bilan ma'lumotga asoslanib matematik modelni moslash*
- Nazoratli o'rghanish – supervised learning
- Nazoratsiz o'rghanish – unsupervised learning
- Kuchaytirishli o'rghanish – reinforcement learning



NAZORATLI O'RGANISH



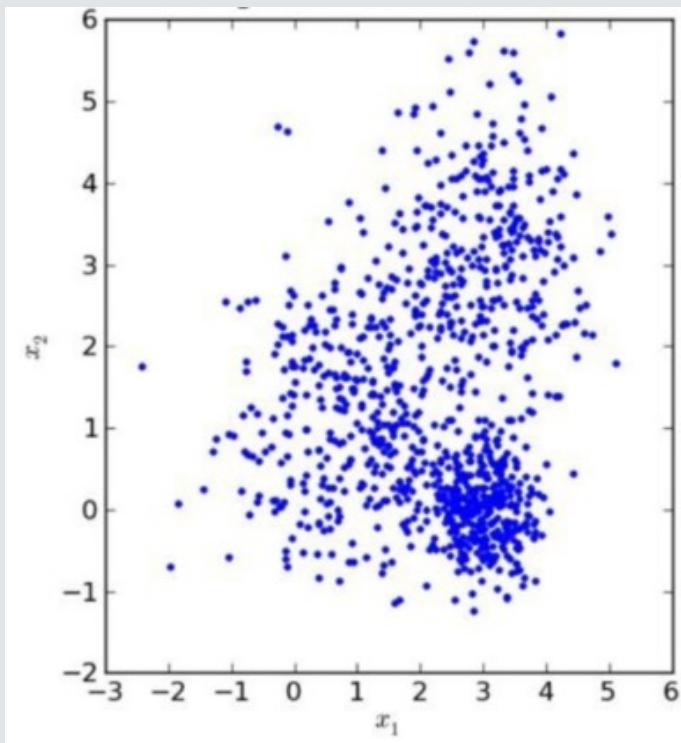
Belgili Ma'lumot

SZ Model

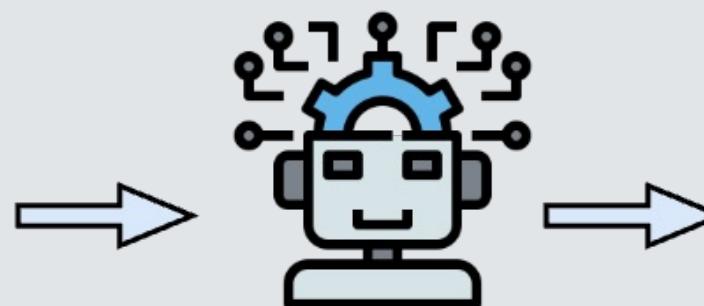
Taxmin / Bashorat

Asl Haqiqat (To'g'ri Javob)

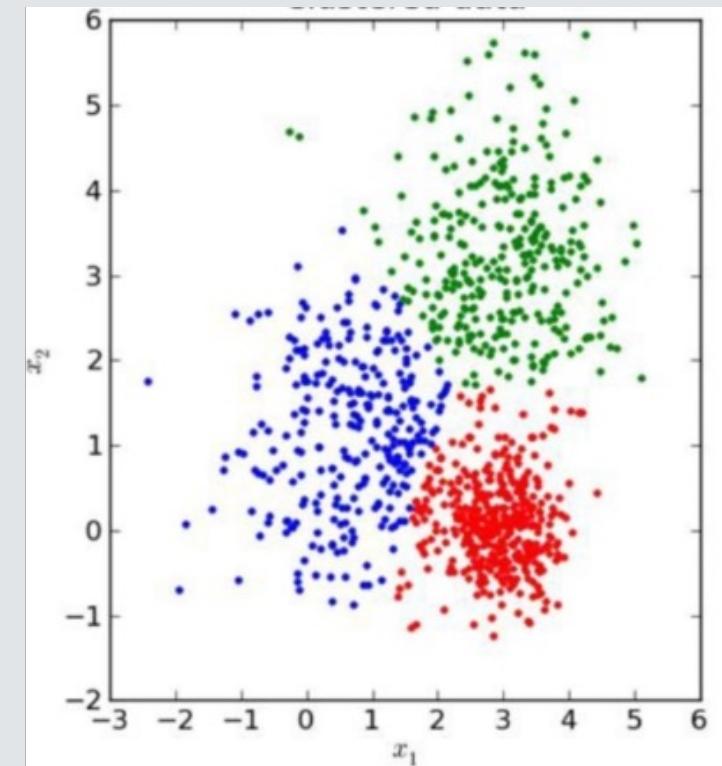
NAZORATSIZ O'RGANISH



Belgisiz Ma'lumot

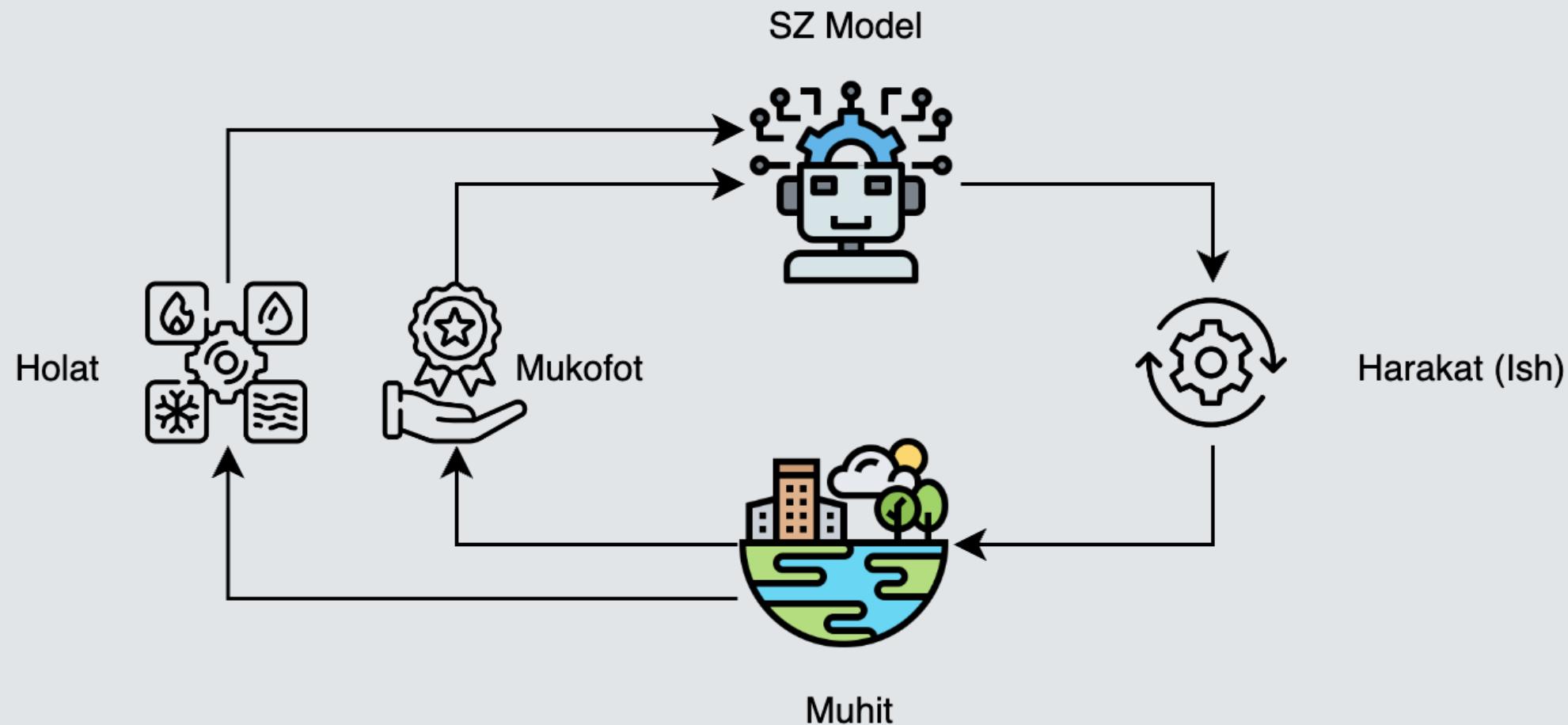


SZ Model

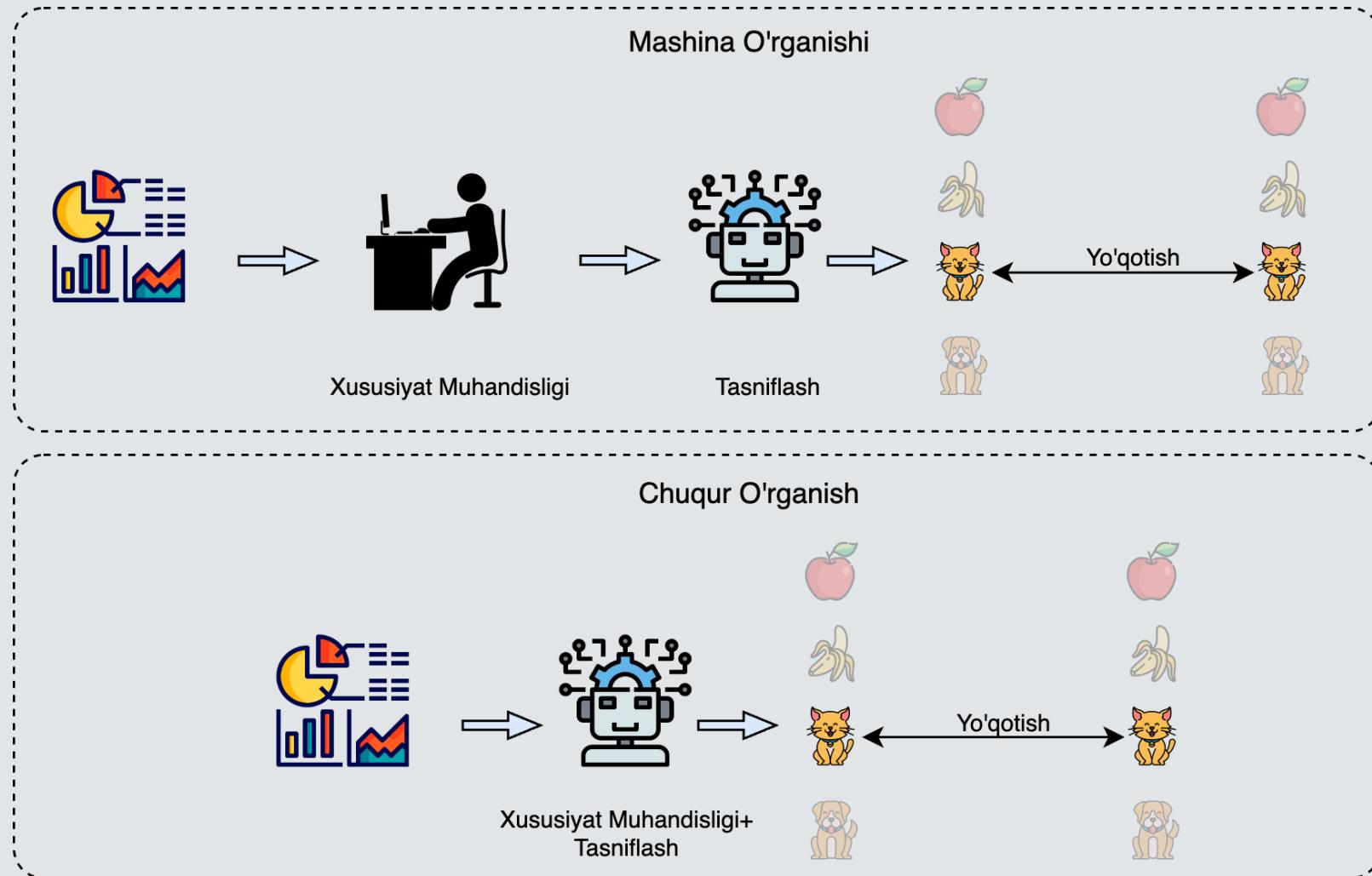


Guruhash

KUCHAYTIRISHLI O'RGANISH



CHUQUR O'RGANISH



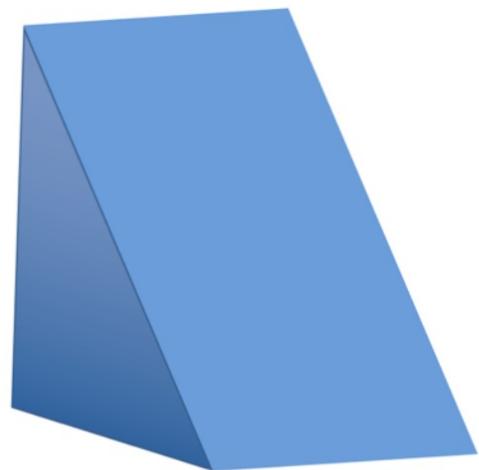
CHUQUR O'RGANISH

Bu yerga qanday kelib qoldik?

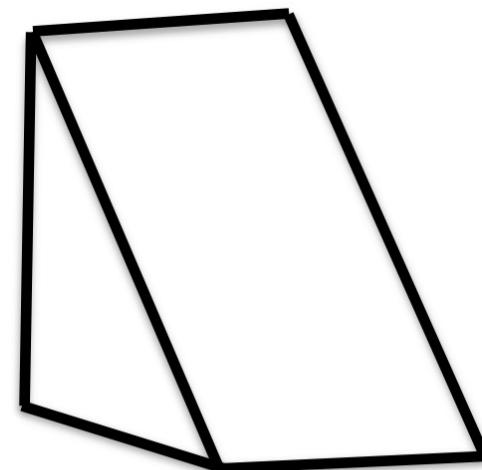
SZ TARIXI

- Bloklar dunyosi

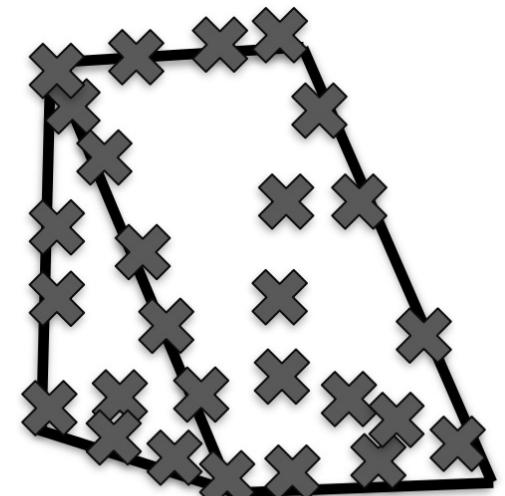
Larry Roberts, 1963



(a) Original picture



(b) Differentiated picture



(c) Feature points selected

SZ TARIXI

- Marvin Minsky, MIT Turing award, 1969
- Birinchi kurs talabalari va yozgi muammo:
- “Kamerani kompyuterga ulang va mashina nima ko’rayotganini aytib bersin.”

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

PROJECT MAC

Artificial Intelligence Group
Vision Memo. No. 100.

July 7, 1966

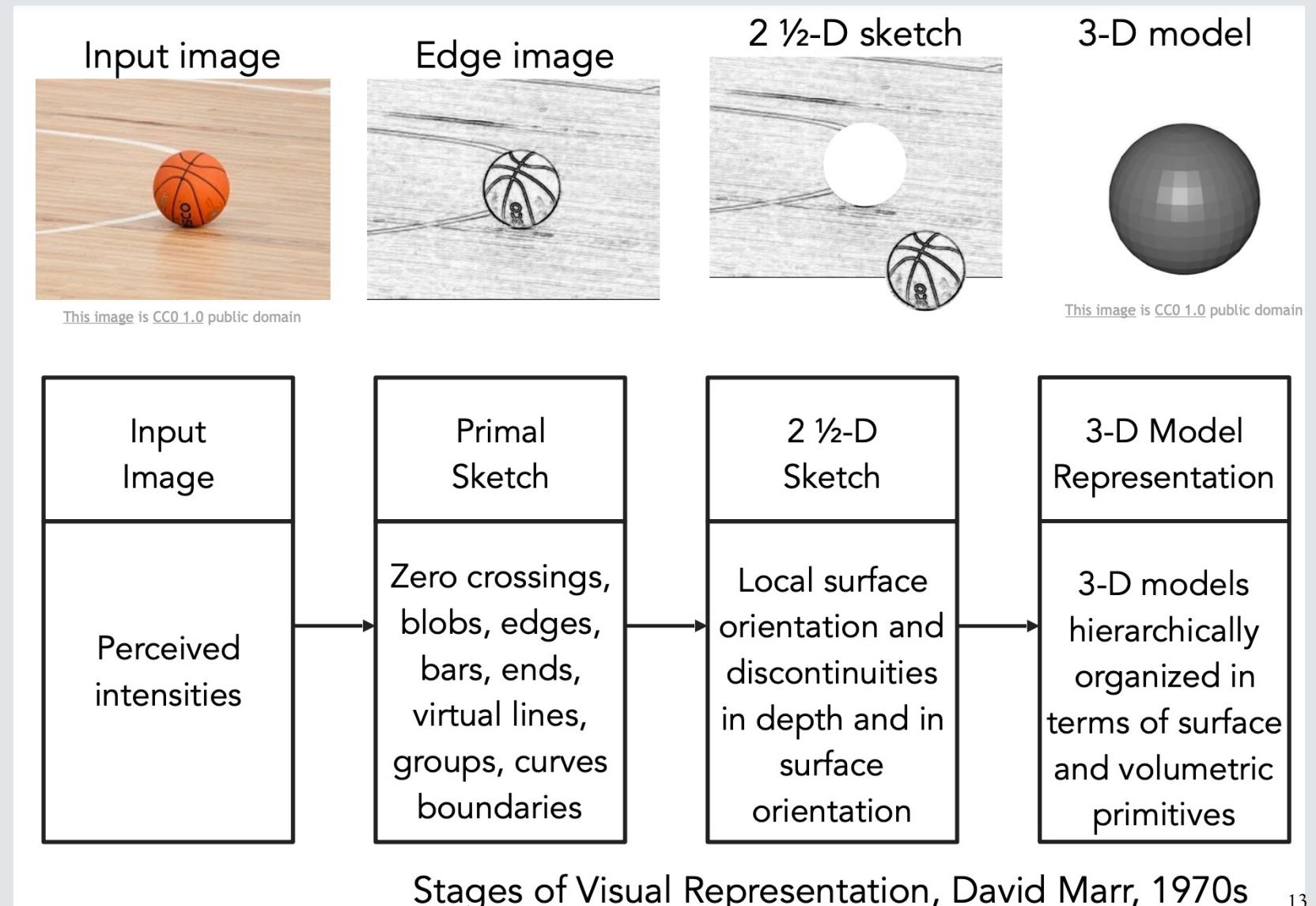
THE SUMMER VISION PROJECT

Seymour Papert

The summer vision project is an attempt to use our summer workers effectively in the construction of a significant part of a visual system. The particular task was chosen partly because it can be segmented into sub-problems which will allow individuals to work independently and yet participate in the construction of a system complex enough to be a real landmark in the development of "pattern recognition".

SZ TARIXI

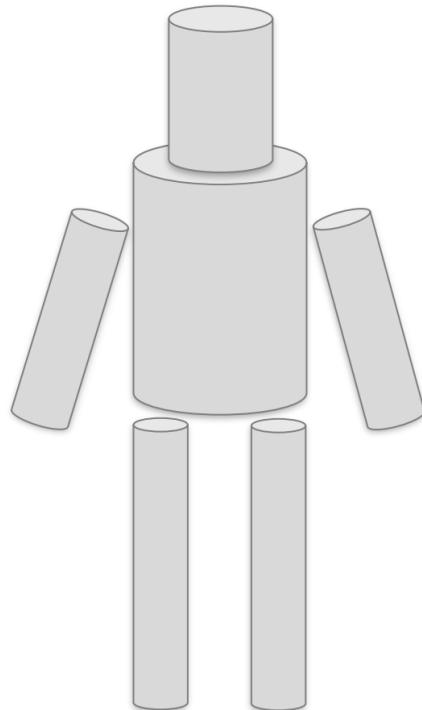
- David Marr, 1970 yillar



SZ TARIXI

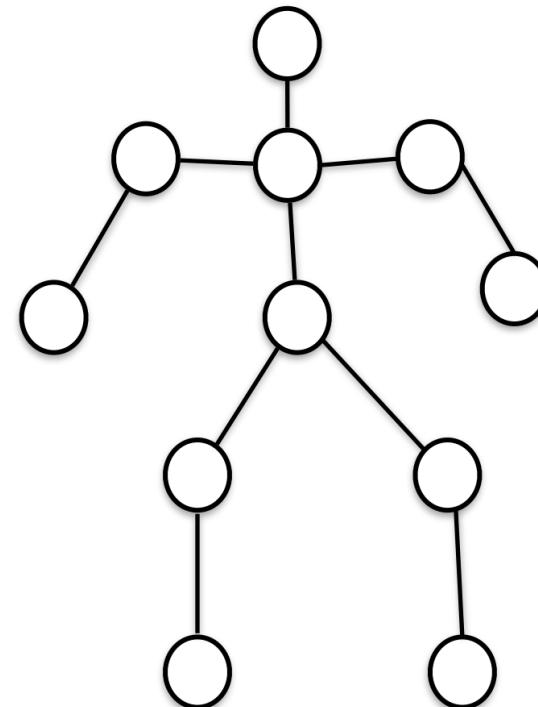
- Generalized Cylinder

Brooks & Binford, 1979



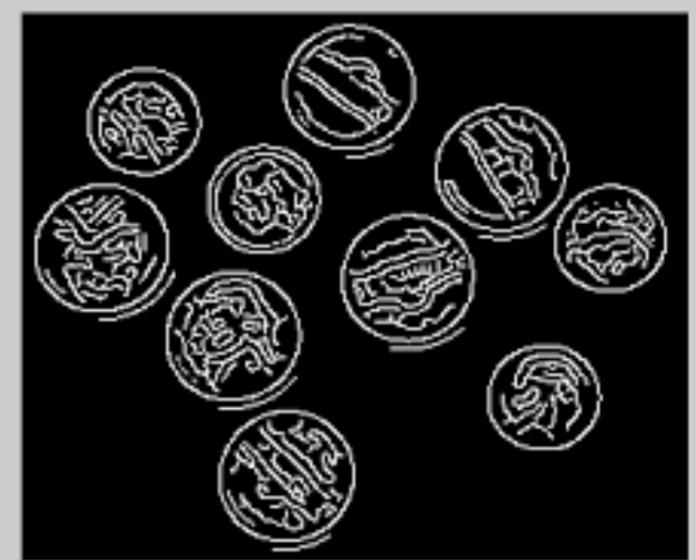
- Pictorial Structure

Fischler and Elschlager, 1973



SZ TARIXI

- David Lowe, 1987



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SZ TARIXI

Normalized Cut (Shi & Malik, 1997)

[Image is CC BY 3.0](#)



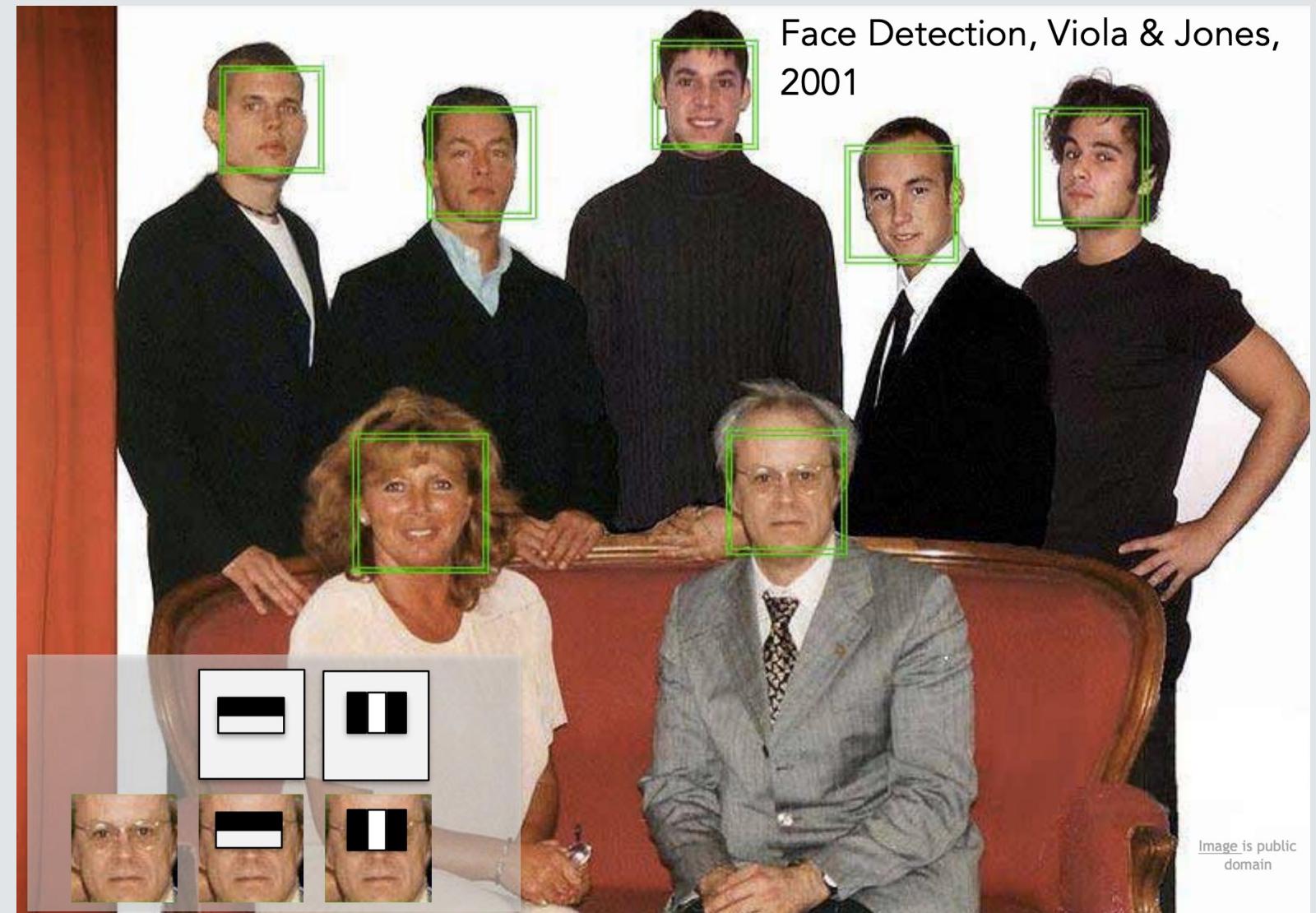
[Image is public domain](#)



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SZ TARIXI



SZ TARIXI

- “SIFT” & Obyektni Aniqlash, David Lowe, 1999

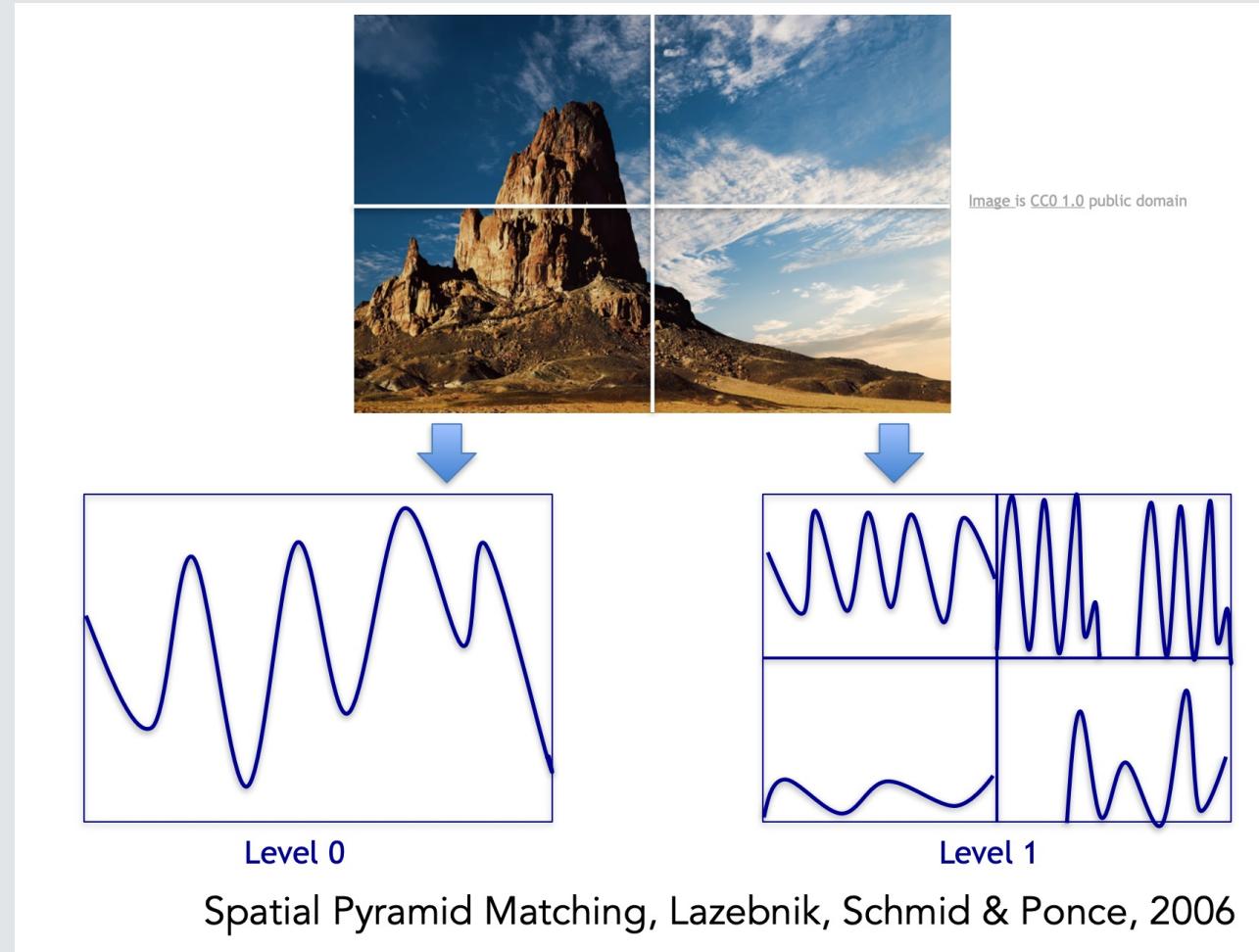


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SZ TARIXI



SZ TARIXI

- PASCAL ma'lumotlar to'plami
- Obyektni aniqlash musobaqasi
- Everingham et al. 2006-2012

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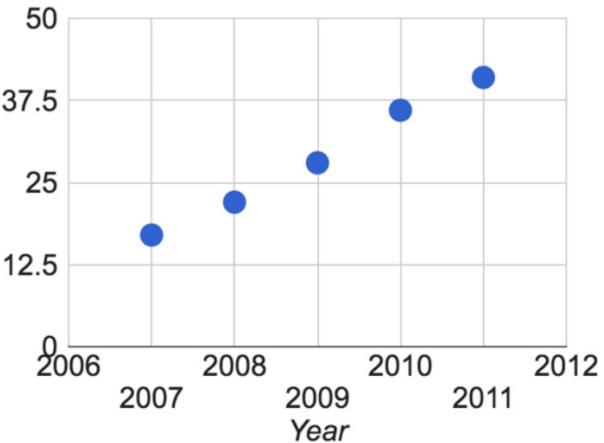
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Mean Average Precision
(mAP)

Pascal VOC 2007





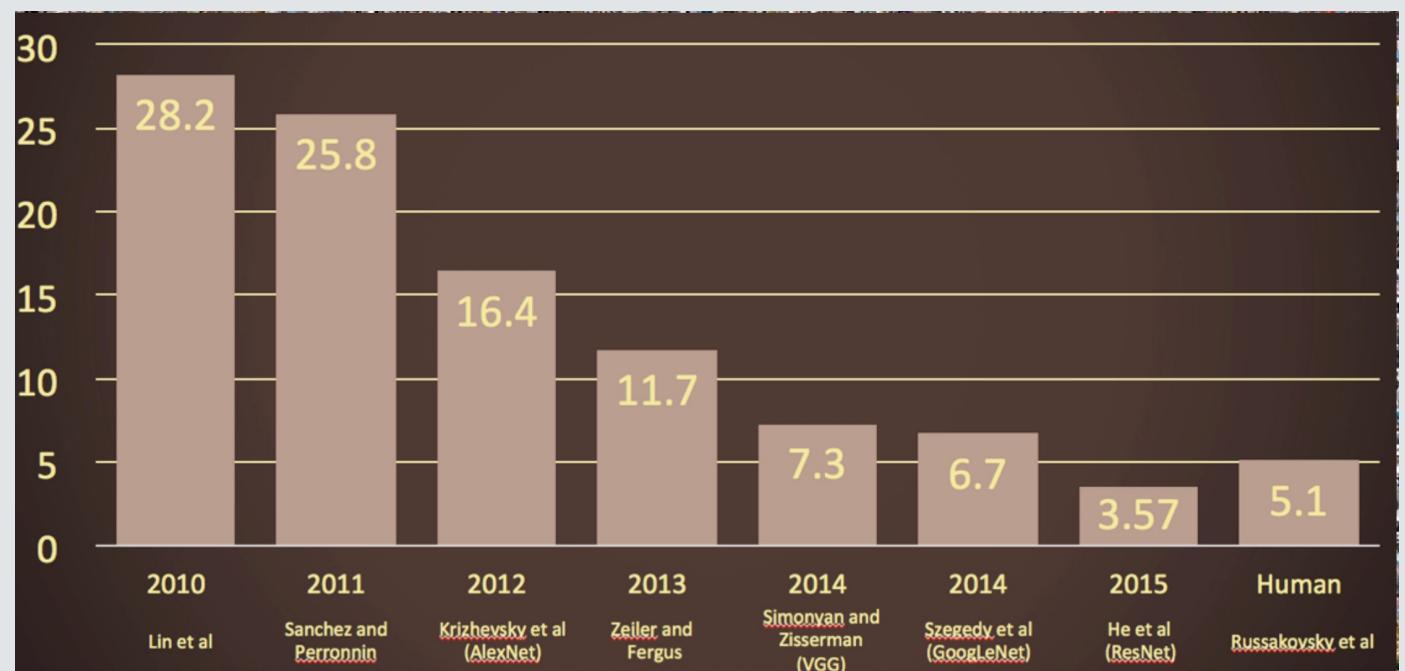
www.image-net.org

22K categories and 14M images

- Animals
 - Bird
 - Fish
 - Mammal
 - Invertebrate
- Plants
 - Tree
 - Flower
 - Food
 - Materials
- Structures
 - Artifact
 - Tools
 - Appliances
 - Structures
- Person
- Scenes
 - Indoor
 - Geological Formations
- Sport Activities

SZ TARIXI

- ImageNet ma'lumotlar to'plami
- Rasmlarni tashniflash musobaqasi
- 1,000 obyekt sinflari
- 1,431,167 rasmlar



SZ MUVAFFAQIYAT SABABLARI - 2012

- Ma'lumotlar to'plamlari – Katta ma'lumot
 - *ImageNet, PASCAL*
- Kompyuter hisoblash kuchi
 - CPU, GPU, TPU
- Algoritm larning rivoji
 - *Chuqur o'r ganish ommalashishi*
- Ochiq manba
 - *GitHub, Konferensiyalar*

CHUQUR O'RGANISH KIRIB KELISHI

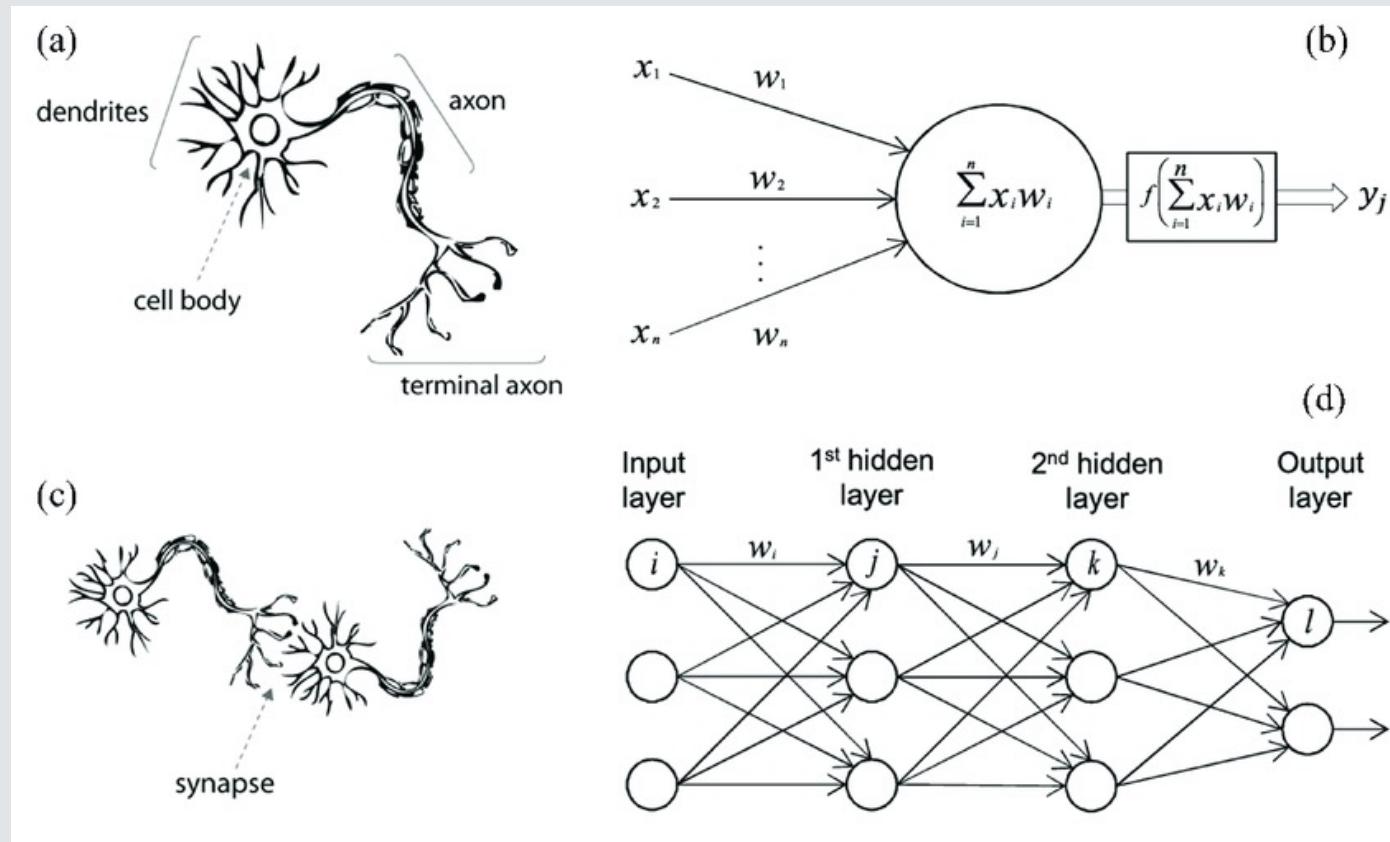
- AlexNet – Krizhevsky 2012
- LeNet – Szegedy 2014
- VGG – Simonyan 2014
- ResNet – He 2015
- U-Net – Ronneberger 2015
- NAFAS OLAMIZ
- Transformerlar – Vaswani 2017
- GPT – Radford 2018
- Ko'rish Transformerlari – Dosovitskiy 2020
- ChatGPT – OpenAI 2023

VAZIFALAR TURLARI

- Tasniflash – Classification
- Regressiya – Regression
- Obyektni aniqlash – Object detection (Note: recognition vs detection)
- Semantik (ma'noviy) ajratish – Semantic segmentation
- Yakkalikda ajratish – Instance segmentation
- Tabiiy tilga ishlov berish – Natural language processing
- Nutqni aniqlash – Speech recognition
- Ma'lumot yaratish – Data generation
- Noodatiylikni aniqlash – Anomaly detection

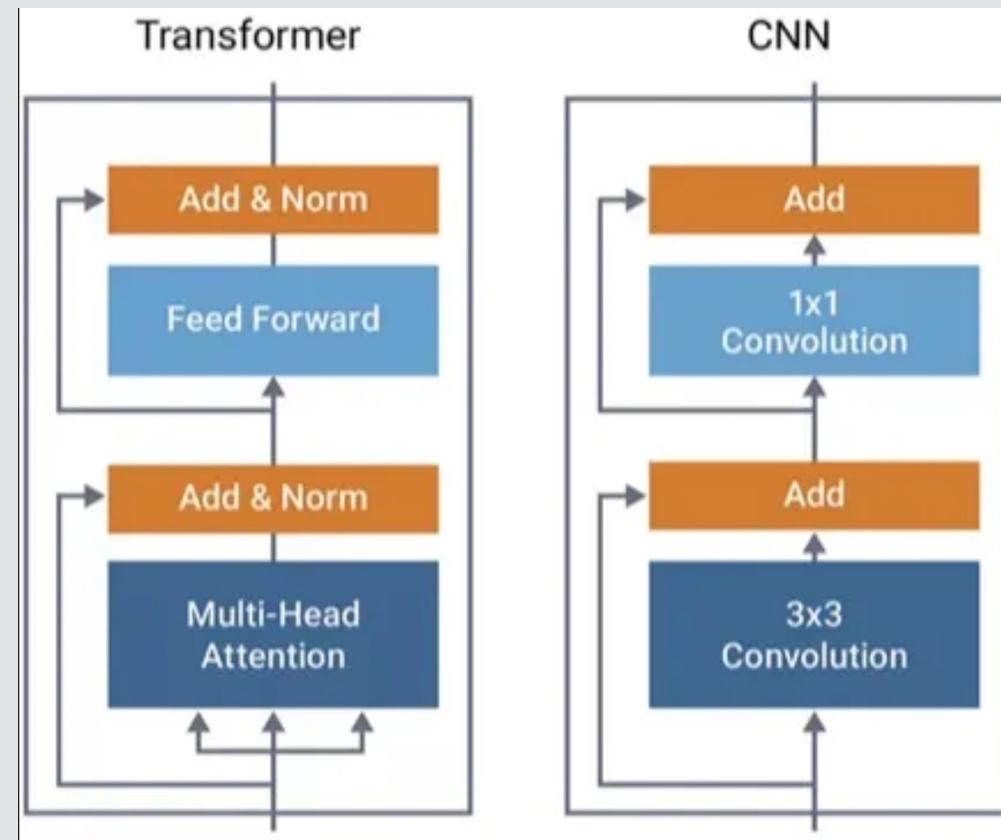
NEYRON TARMOGLARI

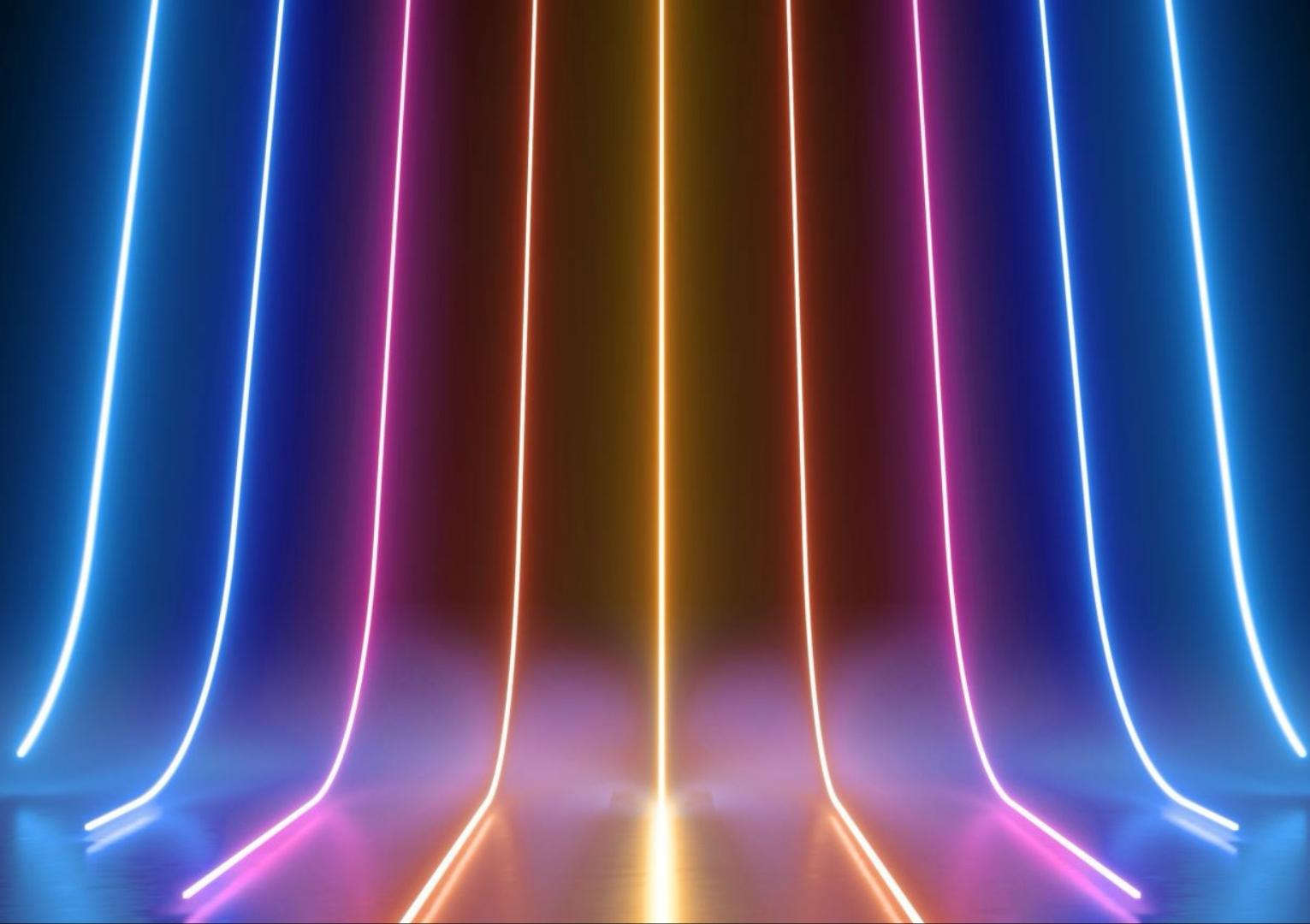
- (Sun'iy) neyron tarmog'i – (artificial) neural network



BNT VA TT

- Birlashtirish neyron tarmog'i (BNT) va Transformer tarmog'i (TT)





RAHMAT

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