DEEP LEARNING

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COMPUTERONIC – TEHRAN – IRAN

2022

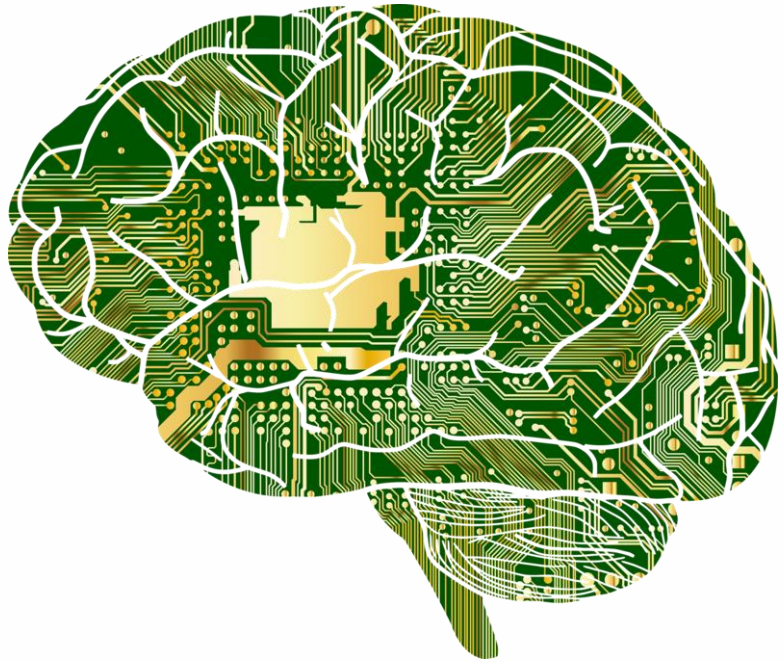
CHAPTER 1 : LET'S START ...

- I'm Mohammad Javad Passlar, I'm 28 years old and I'm married
- Master of Electronic Eng.
- R&D Expert at "Mositto Innovation center"
- Interested in Embedded systems, AI, Robotic and machine vision

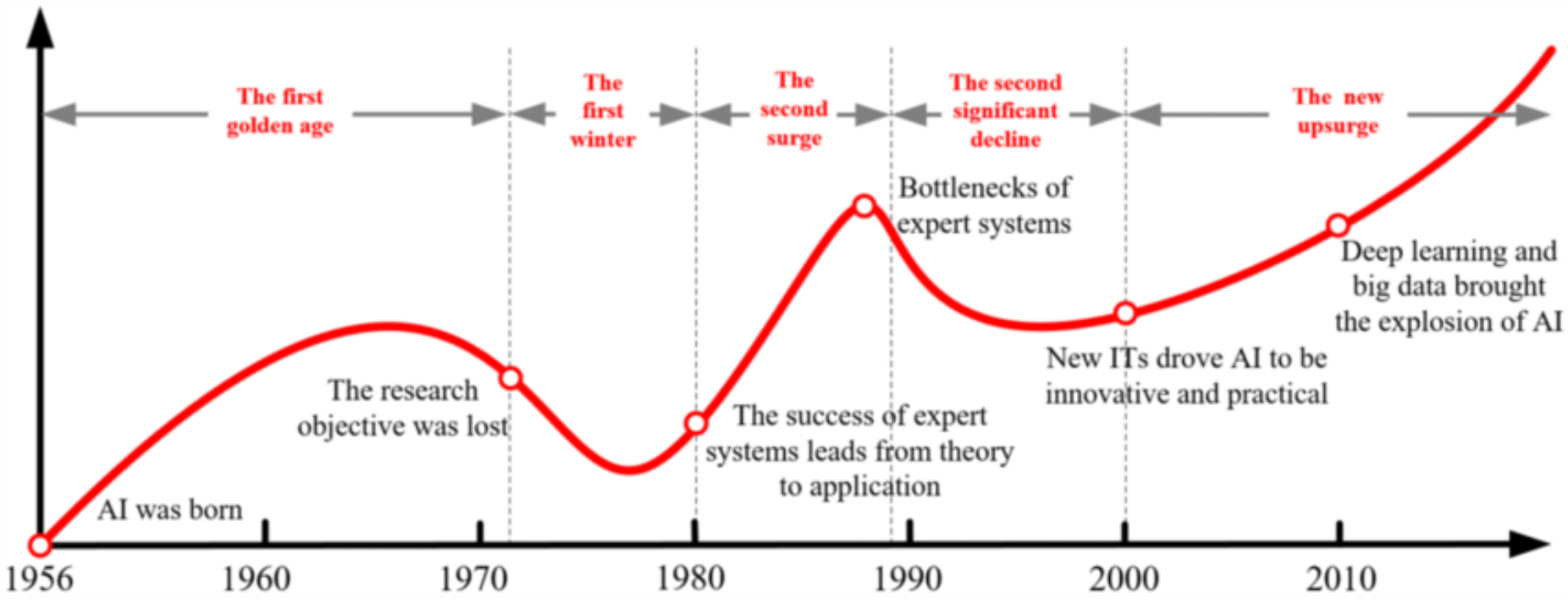
What's Artificial intelligence ?

Artificial intelligence

Trying to gives machines the ability of thinking and making chooses .
(1950 to 1980)



AI Time line ...

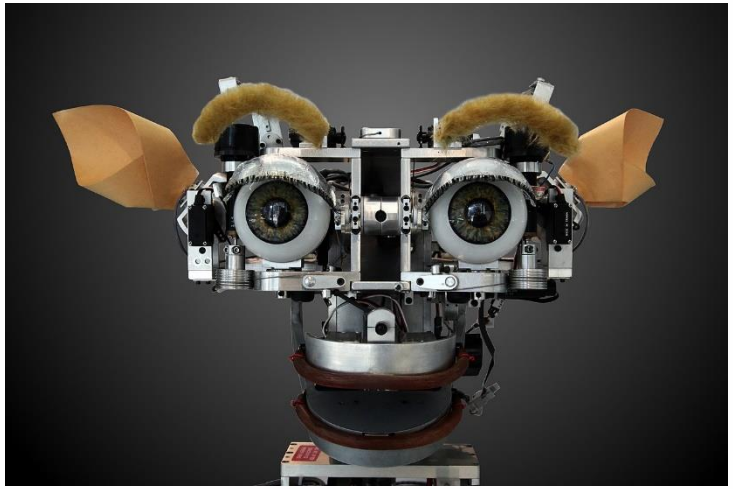

The first golden age
The first winter
The second surge
The second significant decline
The new upsurge
Bottlenecks of expert systems
Deep learning and big data brought the explosion of AI
New ITs drove AI to be innovative and practical
The research objective was lost
The success of expert systems leads from theory to application
AI was born
1956
1960
1970
1980
1990
2000
2010

What's Machine learning ?

Artificial intelligence

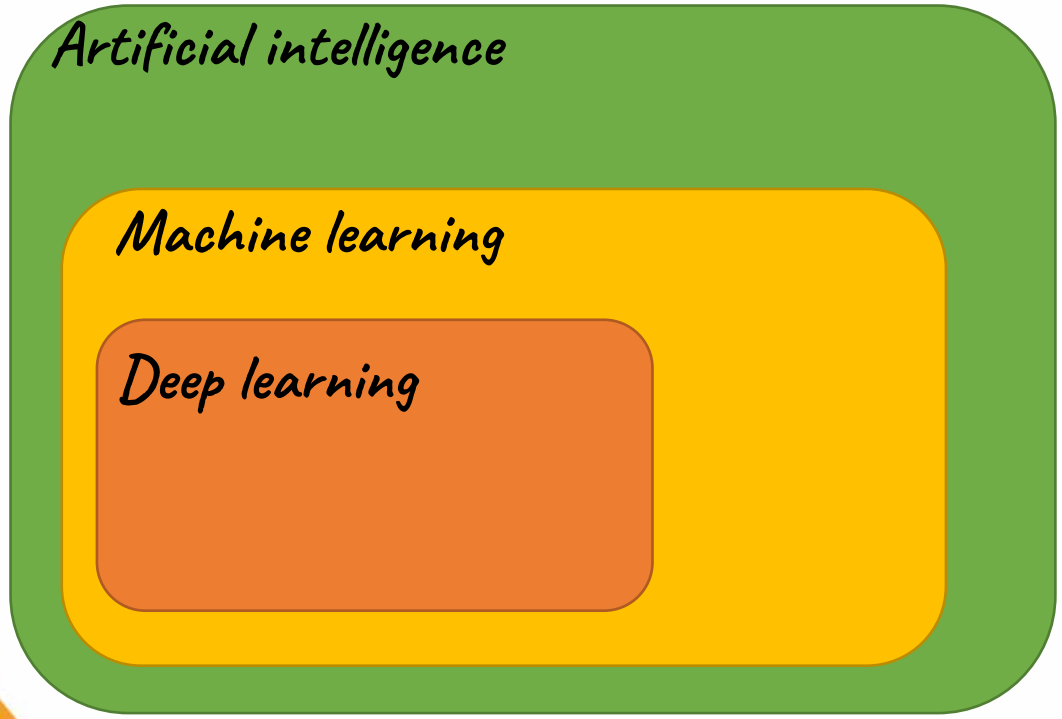
Machine learning

Teach machine how to thing and make a solution to solve defined problem.
(1980 to up-to-now...)

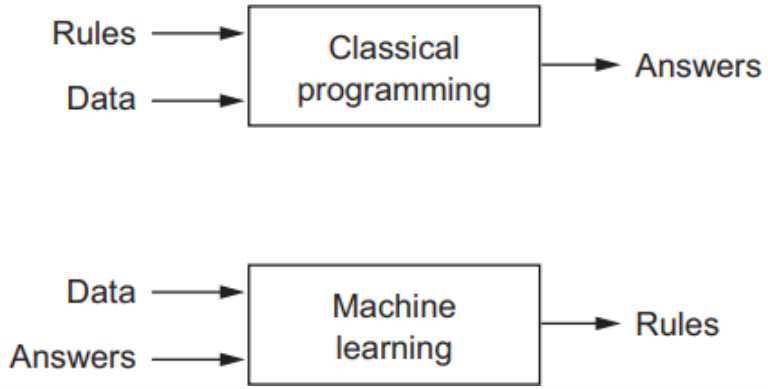


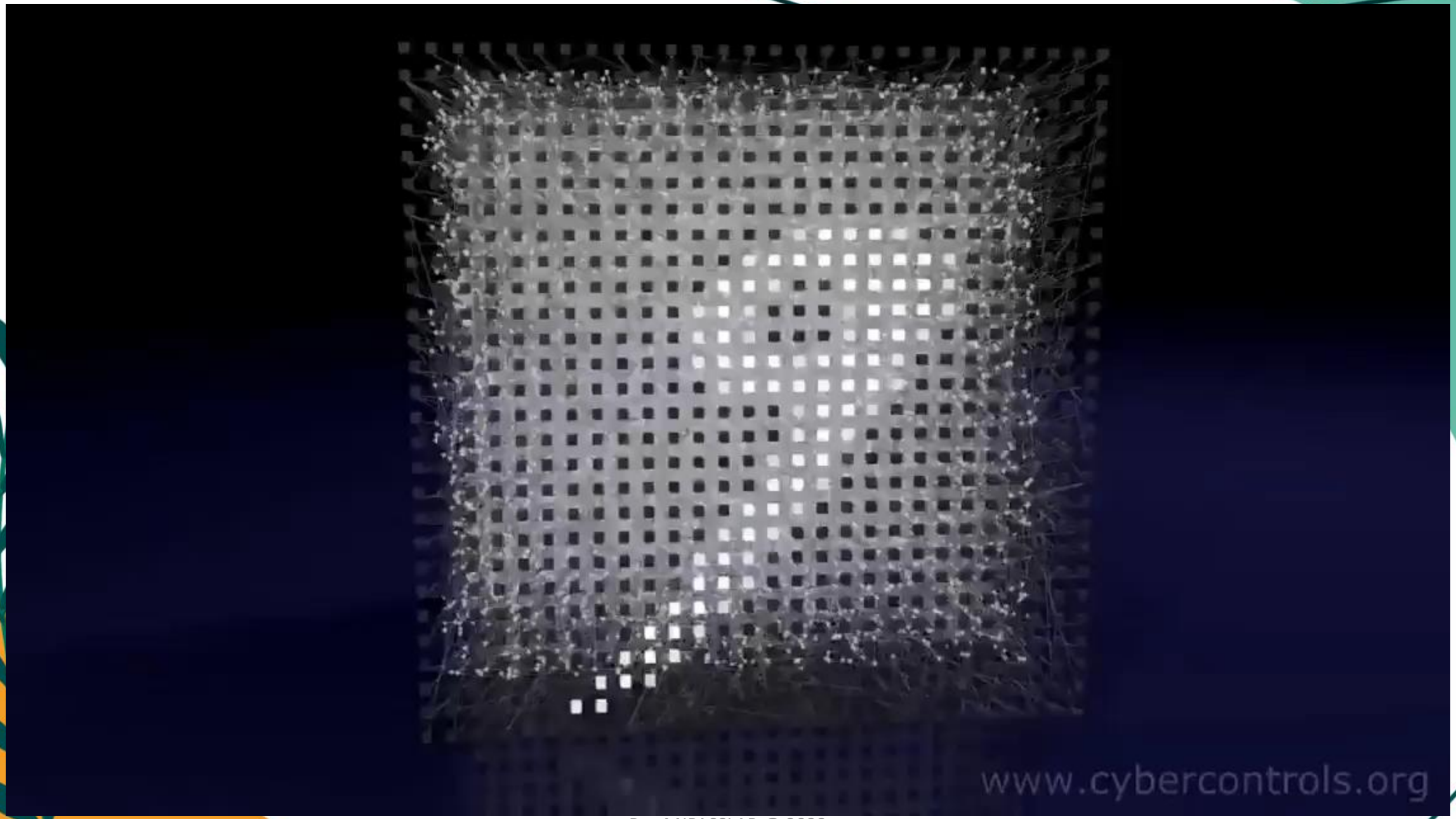
KISMET robot / 1990 / MIT

What's deep learning ?

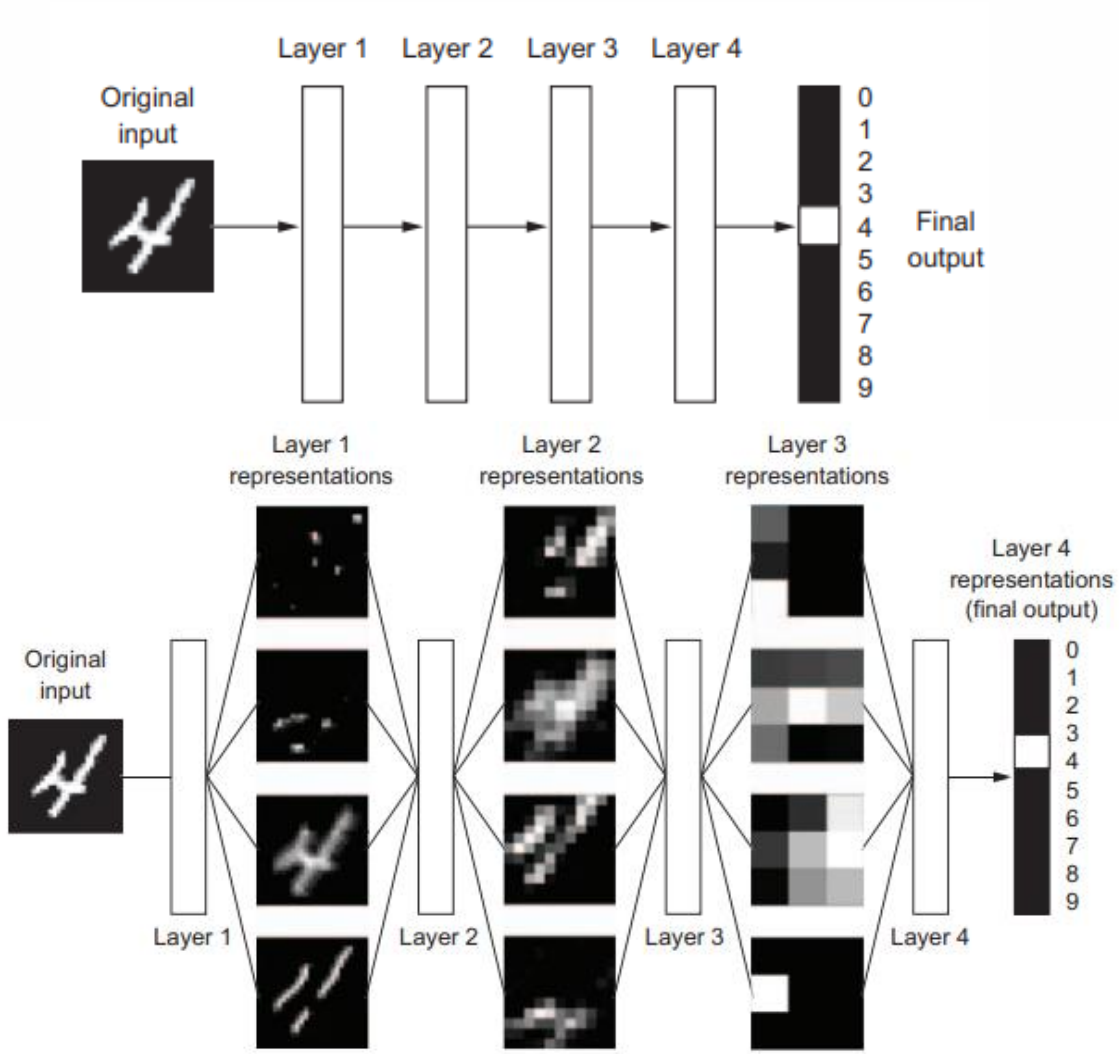


New method to Teach machines based on human brain(NN)(1997)

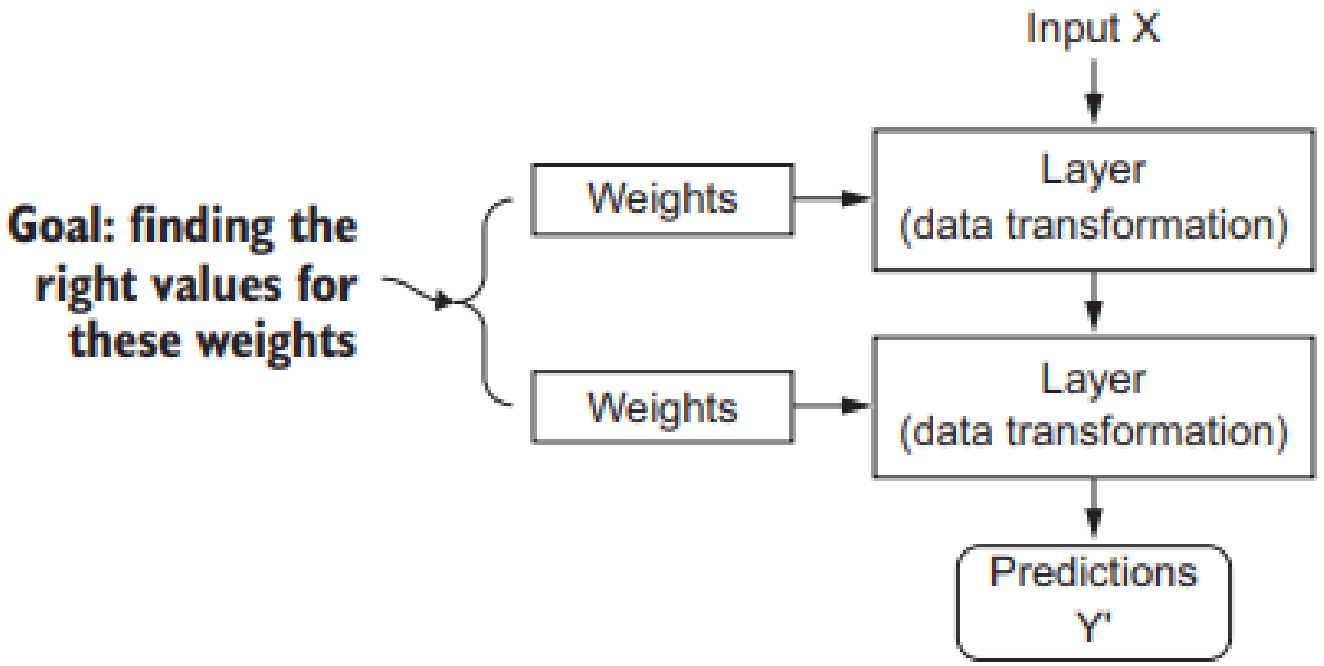


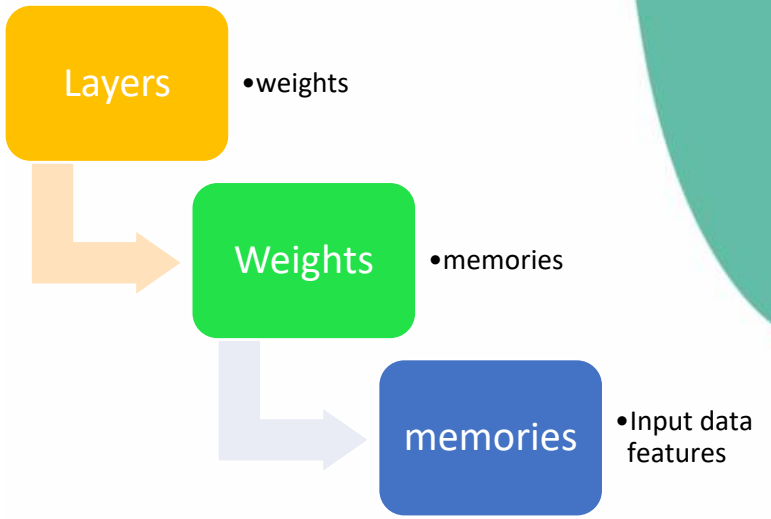

www.cybercontrols.org

Deep NN structure

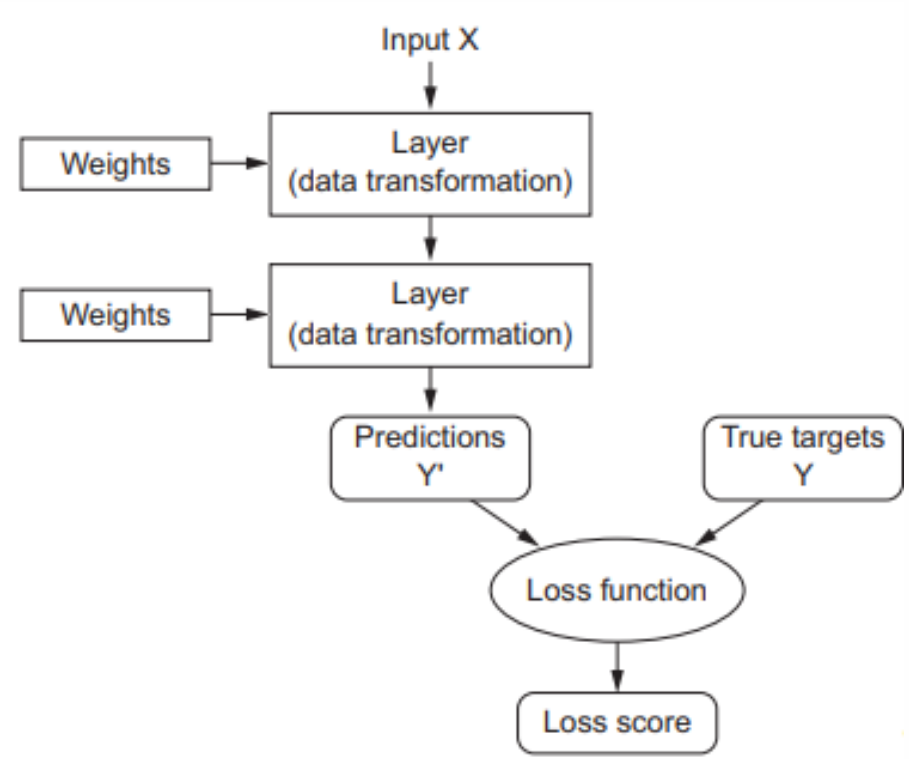


DNN Layers ...

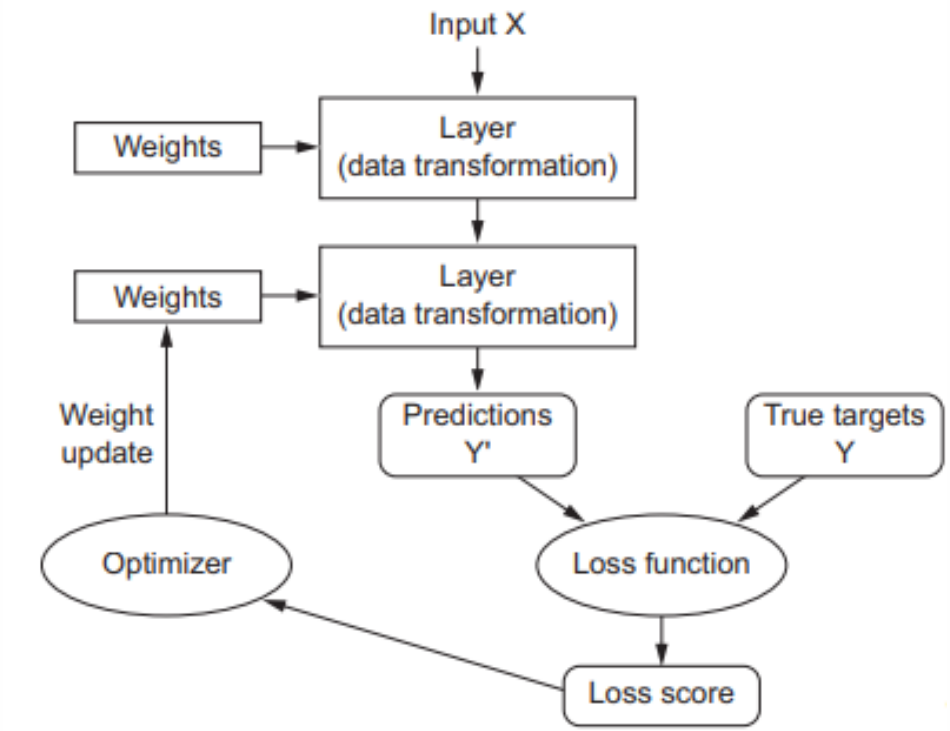

Input X
Goal: finding the right values for these weights
Weights
Layer (data transformation)
Weights
Layer (data transformation)
Predictions Y'


Layers
•weights
Weights
•memories
memories
•Input data features

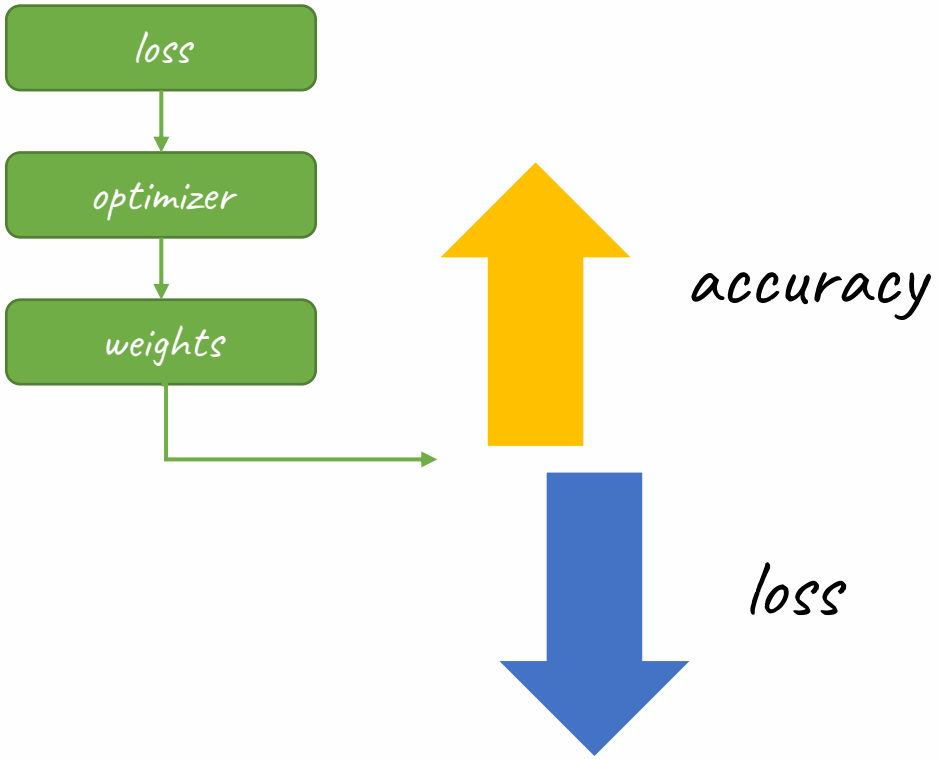
DNN loss functions ...



DNN Optimizer ...



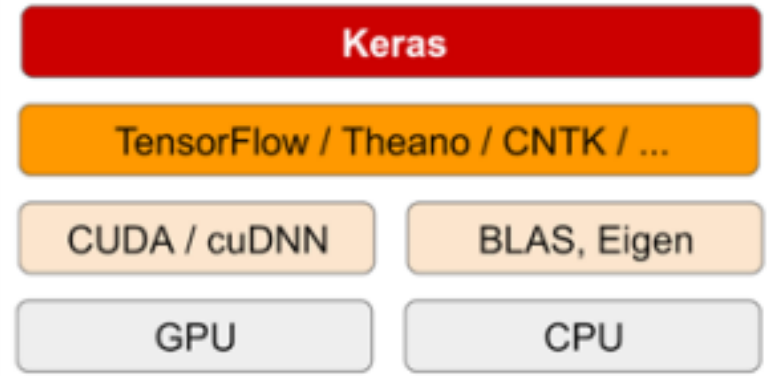
Update layer's weight to minimize loss and maximum accuracy

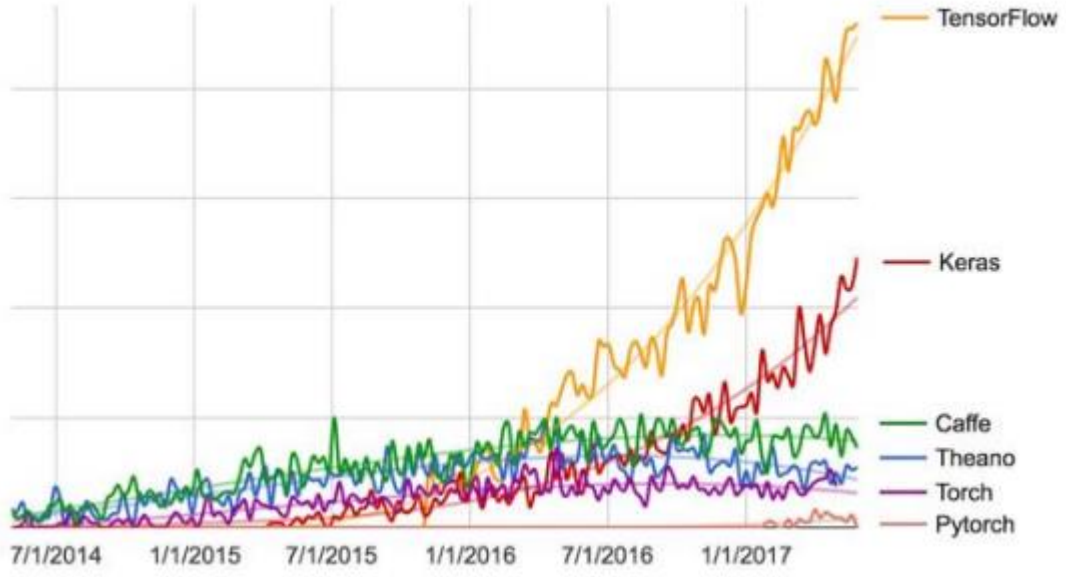


Why DNN is trend now ?

Hardware	Data sets	Algorithm	A new wave of investment
• GPU • TPU	• Image data set • Video data set • Sound data set • Test data set	• Better loos function • Efficient activation function • New NN structures	• 2011-> 19M$ • 2013 ->400M$ • 2014 -> 500M$ • And so on ...

Lest set-up workspace ...





LB-prosessnig vs CB-prosessing

- You have two options to run tensorflow :
  - Use your PC (LB- processing) -> anaconda
  - Use cloud base processing(CB-processing) -> google-corlab

How to use ANACONDA ?

- Download anaconda for your OS (https://www.anaconda.com/)
- Install and run anaconda.exe
- Run anaconda prompt
  - run below commands :
    - For CPU :

```
conda create -n tf tensorflow
conda activate tf
```

    - For GPU :

```
conda create -n tf-gpu tensorflow-gpu
conda activate tf-gpu
```

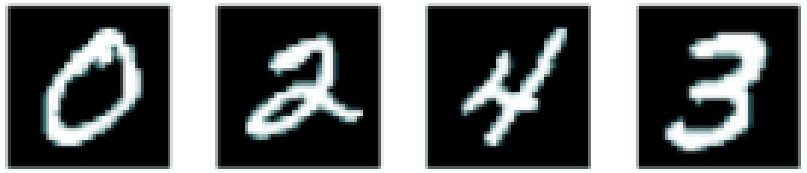
How to use  ?

- Join to your google account.
- Go to google colab website (https://colab.research.google.com/)
- Create new project and use in !

Lest run the first DNN code ...

- MNIST classification problem is a problem of classifying digits numbers in 9 classes.

- MNIST data-set :



- Code on Colab :

https://colab.research.google.com/github/keras-team/keras-io/blob/master/examples/vision/ipynb/mnist_convnet.ipynb