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UNIVERSITY OF AHMED DRAIA ADRAR

FACULTY OF SCIENCES AND TECHNOLOGY

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

جامعة أحمد دراية.أدرار-الجزائر
Université Ahmed Draia.Adrar -Algérie

DEEP LEARNING REPORT

Major : Computer Science and Technology

Supervisor : Dr.CHERAGUI Mohammed Amine

Prepared and lectured by :

ABDEDAIEM Amin

Github link :

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Structur of the report

TITLE : (deep learinig)
this is a small report on what we will be seeing saturday insha allah on the topic of **deep-learning**

AIM : (the goal or the end benefits of this research)
we are going to find out what exactly is deep-learning and what is it formed of and how does it work and we will be seeing a small ***example on it***
also we will talk about its impact on our life and its scoop on other categories
e.g : medicines , educations … etc

Abstract

deep-learning with all of its types is counted as a very reacent technology since its a subset of mashine learning where it uses human like neurons in theory to simulate the human brain functionality.

The history of deep learning can be traced back to 1943, when Walter Pitts and Warren McCulloch created a computer model based on the neural networks of the human brain

and since then the devalopment of this field is growing quadroply none stop thanks to different new techniques and algorithms that are pushing it towards perfection ever so slightly .

Why this presentation?

1. to give us a clearer understanding about DL

2. examples of DL and the latests tech with a live demo

3. how does it work?

4. how to create a real network from scratch.

Introduction

Many companies will market their systems or services as "powered by AI" when it's not often the case. We will always find these instances of gimmicky marketing, so it is helpful to first understand what is AI and ML, and the different terms, as there are many relevant use cases of AI and ML in our world today.
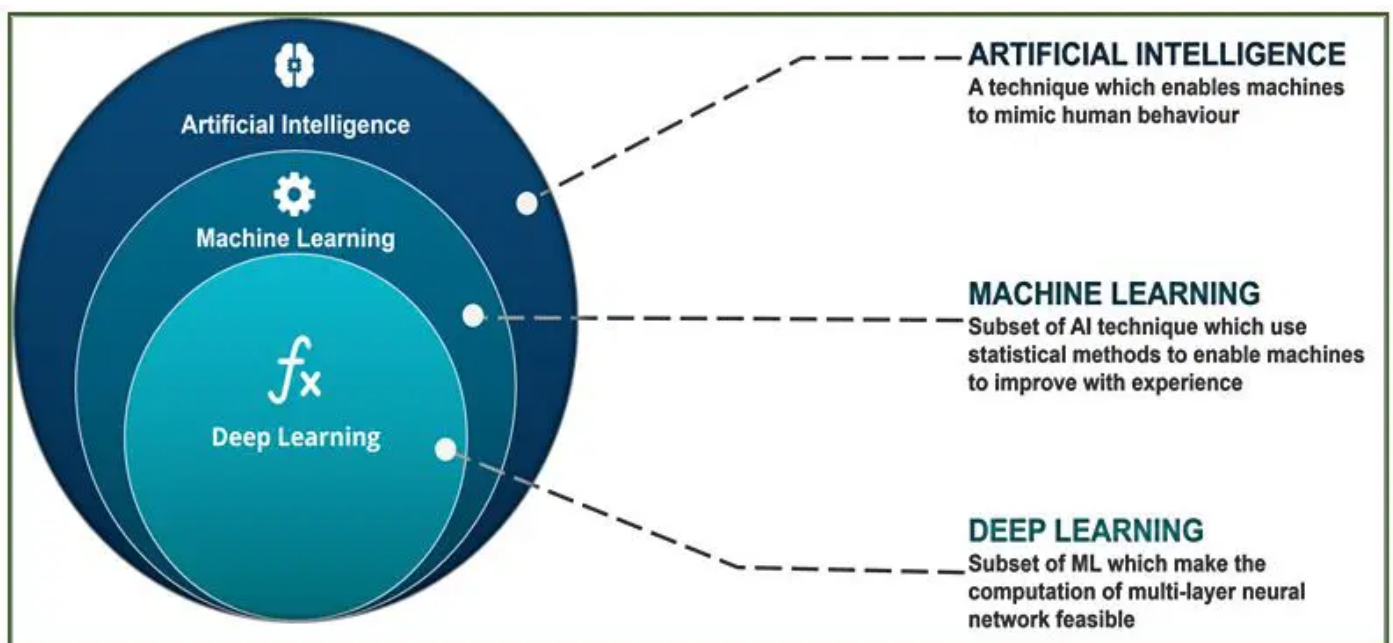

AI , ML and DL are all just the process of making mushines mimic the human way of thinking in solving problems and making decisions but still yet to learn

but the real QESTION is : what AI , ML , DL?

AI , ML and DL

Artificial Intelligence is a technique for building systems that mimic human behavior or decision-making.

Machine Learning is a subset of AI that uses data to solve tasks. These solvers are trained models of data that learn based on the information provided to them.
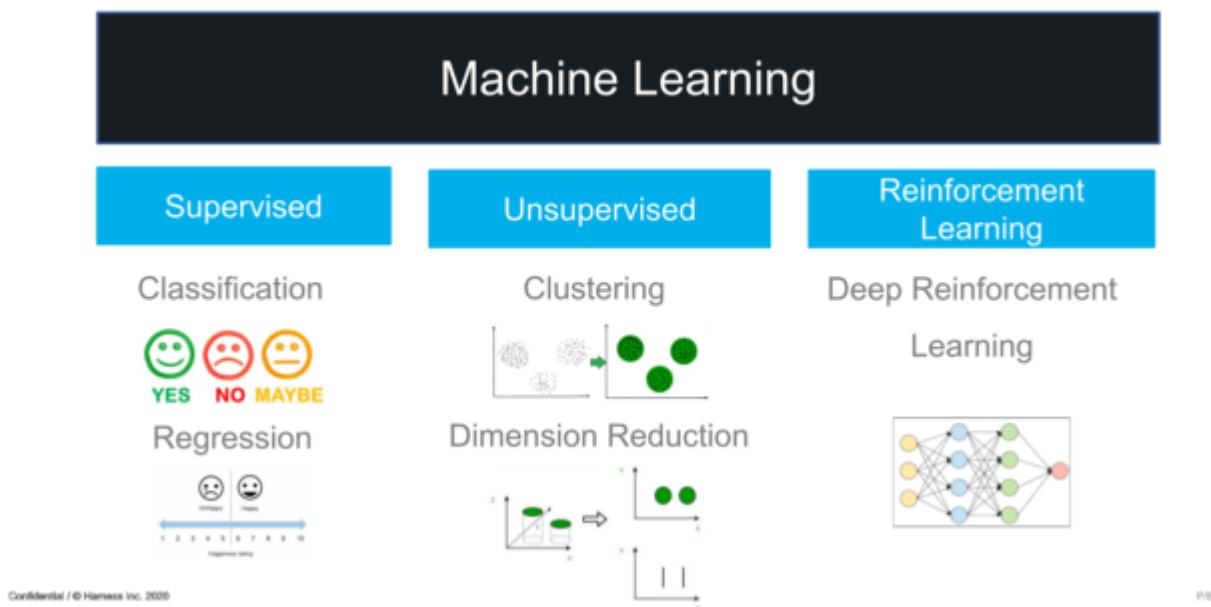
Reinforcement Learning(DL) is a subset of ML that uses human like neurons to learn a pattern and check it against outputs if found using whats called forward and backward propagation.

BUT HOW DOES A NEURON WORK?

Examples of DEEP-LEARNING powerded Achevments :

Computer vision

voice and sound recognition

medical dignosis an early detections

fake news detection

plagiarism detection

GOODS AND BADS

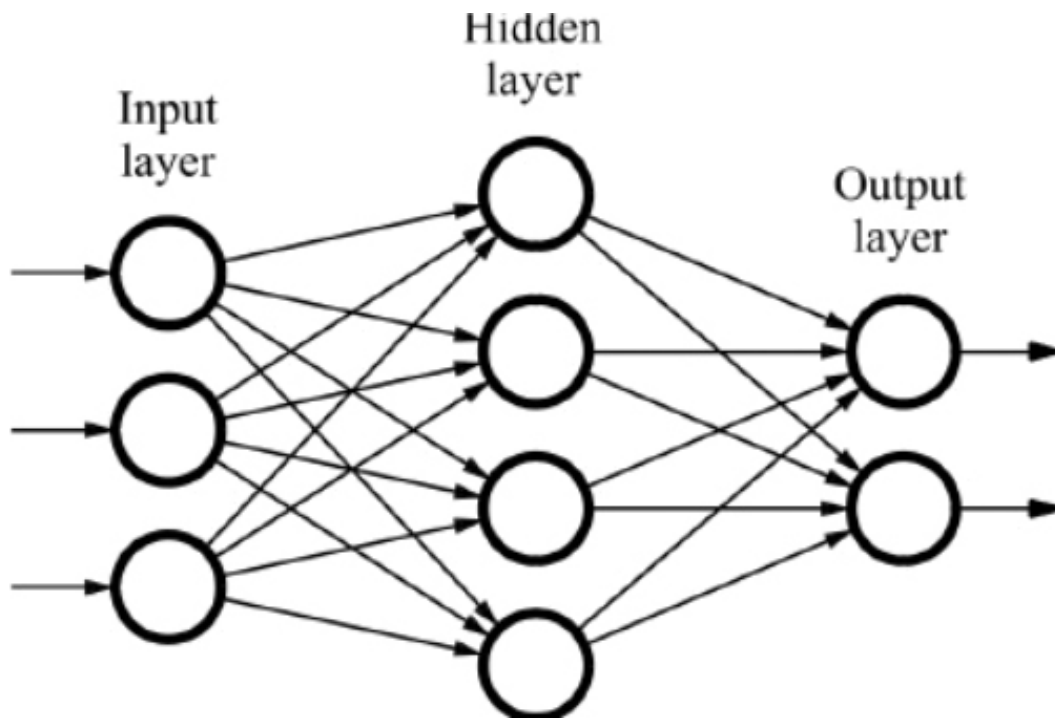deep-learning is full of good sides and bad sides

goods :

- medical care

- gaining time and costs

- taking effective decisions when time is not a valid option
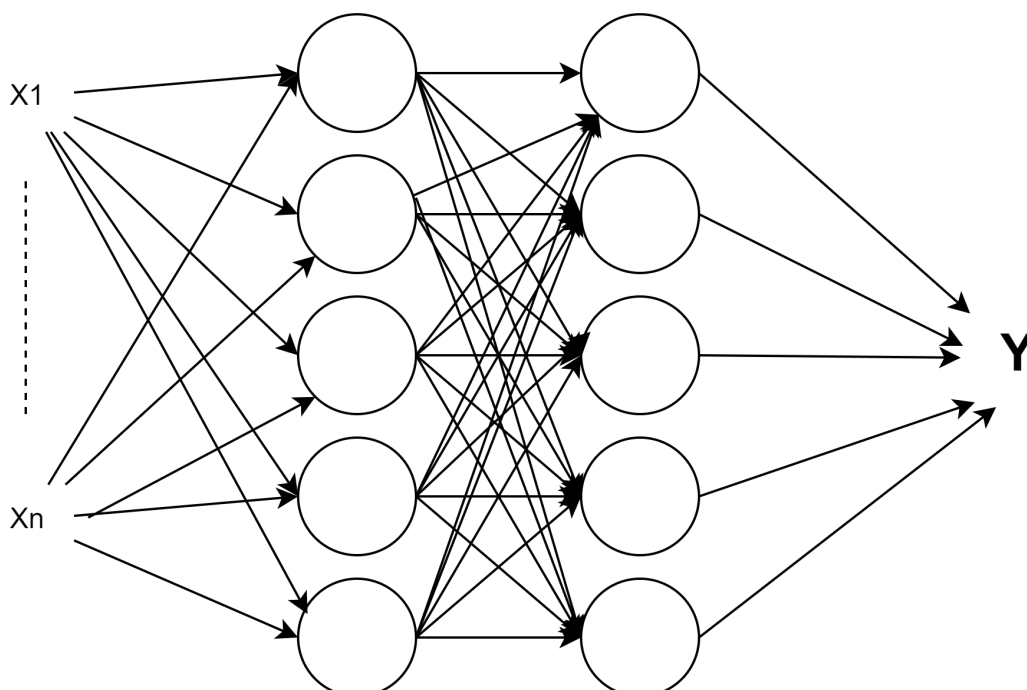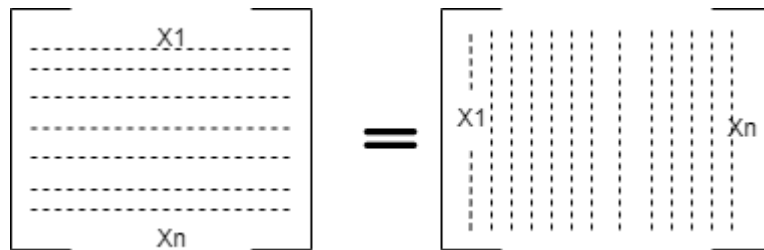
bads :

- military robots

- is of negativity (twitter example)

- the japanese AI store incidence

what is a neural network?

a set of neurons connected between each other with various levels of connectivity receiving an input and a bias that modifies the end of every neuron to give a better result.

with weights that are calibraited back and forth after every training run.

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forward propagatino

in the first step (1) , we just transform the matrics so its easier to parse throught

1-

in this second step (2) we are drawing the neuron and just defining how many layers we need just for demonstration

2 -

these are the different equations to calculate the output of the first layer and defin which neuron gets to be actiated using the ReLu function.

then for the second layer we are going to use the function called softmax which lean down the out put into probabilities of how much it think the input is simulare to the output.

3 - $Z[1] = W[1] A[0] + b[1]$

   $A[1] = g(Z[1]) = ReLu(Z[1])$

   $Z[2] = W[2] A[1] + b[2]$

   $A[2] = Softmax(Z[2])$

4 -

$$\begin{bmatrix} 1.3 \\ 5.1 \\ 2.2 \\ 0.7 \\ 1.1 \end{bmatrix} \implies \frac{e^{Z_i}}{\sum_{j=1}^{K} e^{Z_j}} \implies \begin{bmatrix} 0.02 \\ 0.90 \\ \vdots \\ 0.01 \\ 0.02 \end{bmatrix}$$

after the softmax give's us its outputs , it check against the results that it should have , and if its not true , it goes into a second step which is called backward propagation, which is just a serious of error functions where we test every single weight and bias and see by how much was the bias off , and then try to fix it, then change the weight according to how much every single feature is relevant to the neuron.

5 - $dZ^{[2]} = A^{[2]} - Y$

$dW^{[2]} = \dfrac{1}{m} dZ^{[2]} A^{[1]}$

$db^{[2]} = \dfrac{1}{m} \Sigma dZ^{[2]}$

$dZ^{[1]} = W^{[2]T} dZ^{[2]} * g'(Z^{[1]})$

$dW^{[1]} = \dfrac{1}{m} dZ^{[1]} X^{T}$

$$db^{[1]} = \frac{1}{m} \sum dZ^{[1]}$$

finally we re going to use these set of functions to update every single weight and bias for every single layer then try again and start the training process over again , and the neuron will keep iteratinng until it hits the right answer , there where it think its ready to predict.

6 - $\quad W^{[1]} = W^{[1]} - \alpha dW^{[1]}$

$\quad b^{[1]} = b^{[1]} - \alpha db^{[1]}$

$\quad W^{[2]} = W^{[2]} - \alpha dW^{[2]}$

$\quad b^{[2]} = b^{[2]} - \alpha db^{[2]}$

NOTE : where α is the learning rate

tools you need for DL

1. pandas
2. tensorflow
3. numpy
4. keras
5. pytorch
6. pillow
7. open-cv

and all the above is a python library which means that python is the best language to learn if u want to do anything from web dev using django to data science (ML , DL , AI , DATA MINING etc) .

Conclusion

deep-learning is increasingly accessable and popular due to its wide field of research and capabilities which makes it one of the biggest scientific fields in this century.

and despite the needs for it it can have its own complexities and its hard implementation and hardware needs to train masive models of the likes of google assistant that can pul out ur pics of thousands and can guess the song from ur very very bad singing skills.

Refrences

[charts] made by me

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[my github link]

https://github.com/amincoding/DEEP_LEARNING_presentation

THANK YOU …