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DEEP LEARNING REPORT

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Structur of the report

TITLE : (deep learninig)

*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 recent technology since it's a subset of machine 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

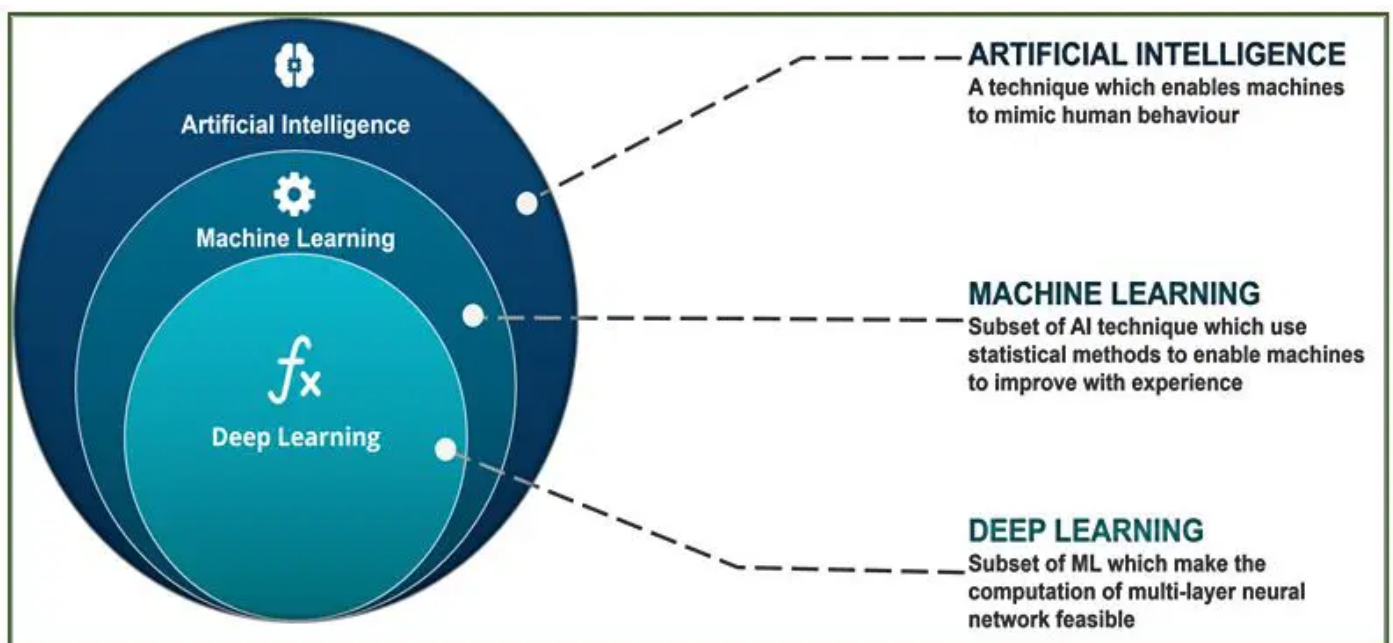
and since then the development of this field is growing quadruply non-stop thanks to different new techniques and algorithms that are pushing it towards perfection ever so slightly .

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.



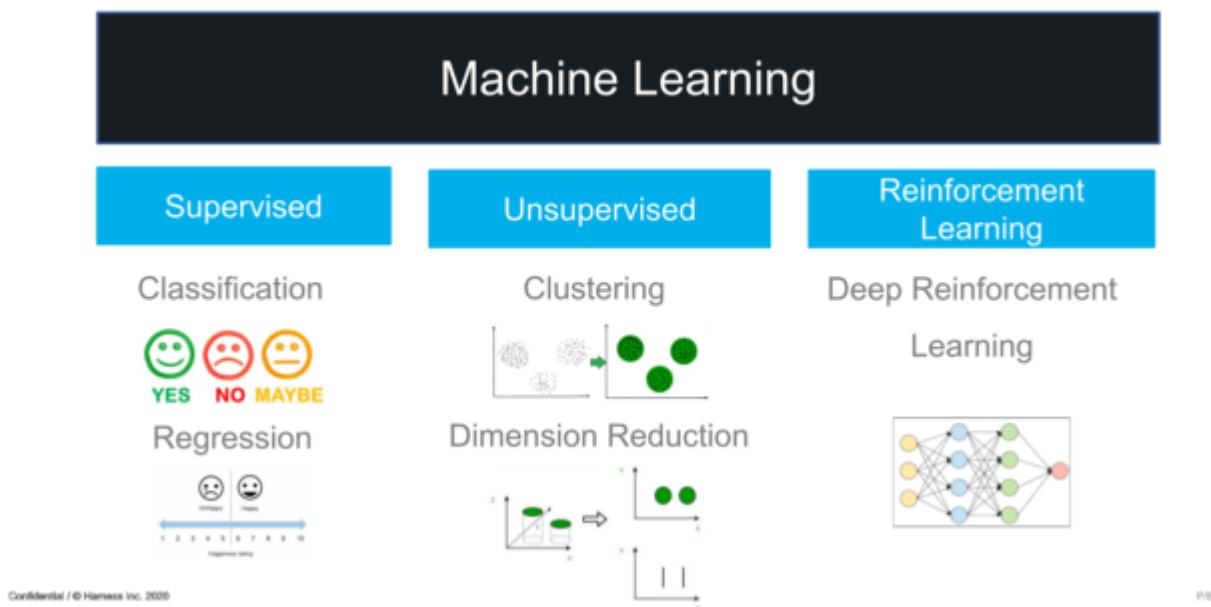
AI , ML and DL are all just the process of making machines mimic the human way of thinking in solving problems and making decisions but still yet to learn

but the real QUESTION 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 powered Achievements :

Computer vision

voice and sound recognition

medical diagnosis and early detections

fake news detection

plagiarism detection

GOODS AND BADS

deep-learning is full of good sides and bad sides

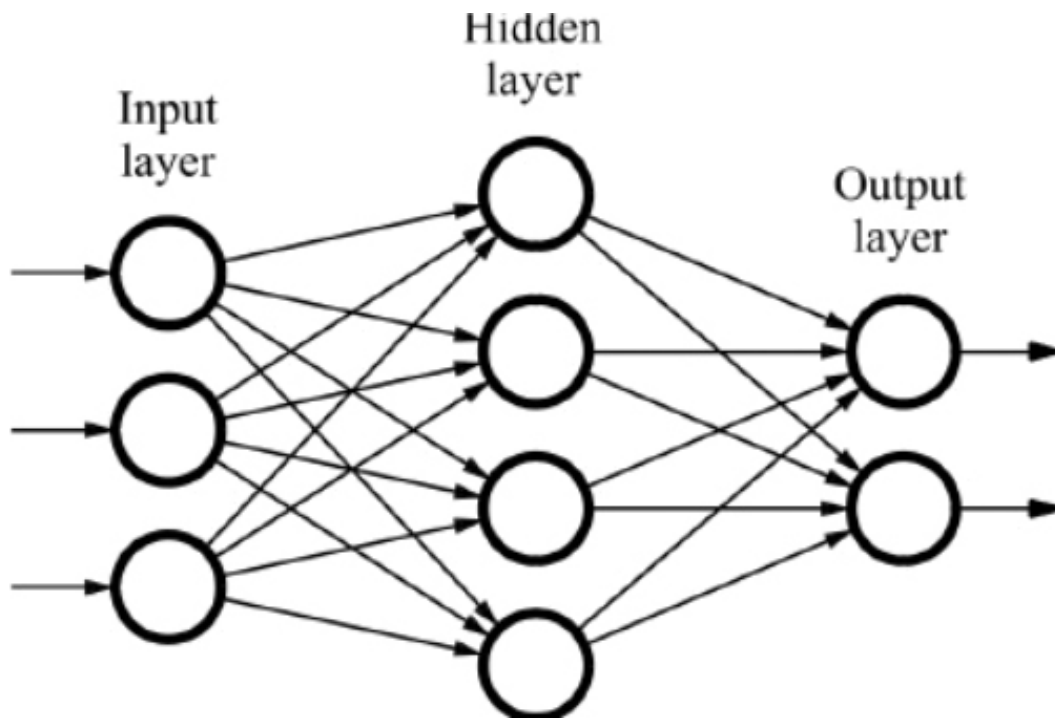
goods :

- medical care
- gaining time and costs
- taking effective decisions when time is not a valid option

bads :

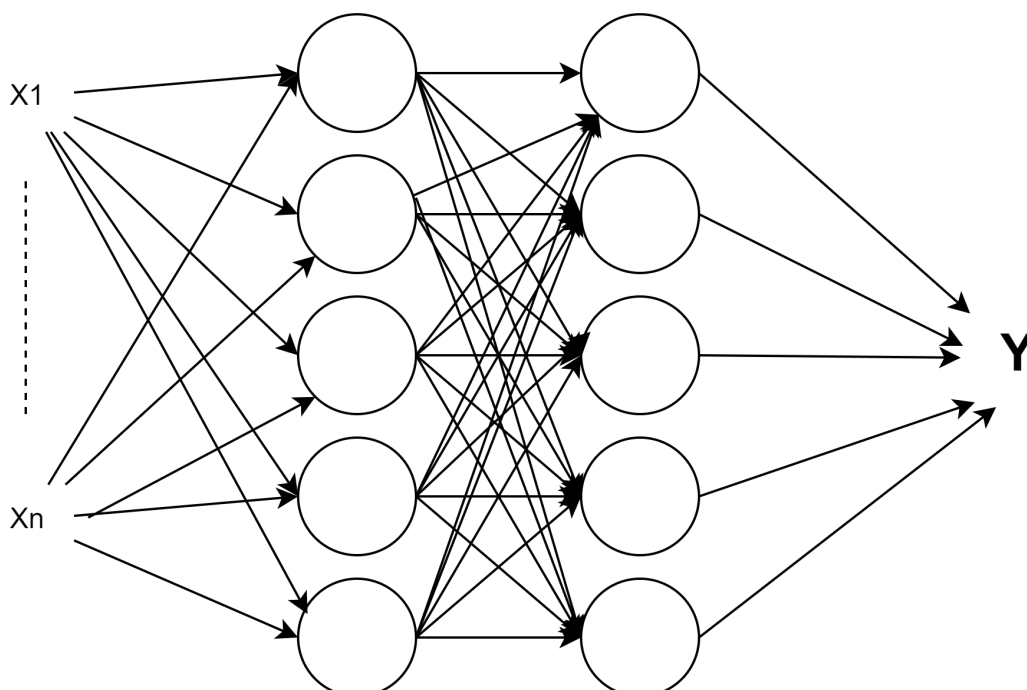
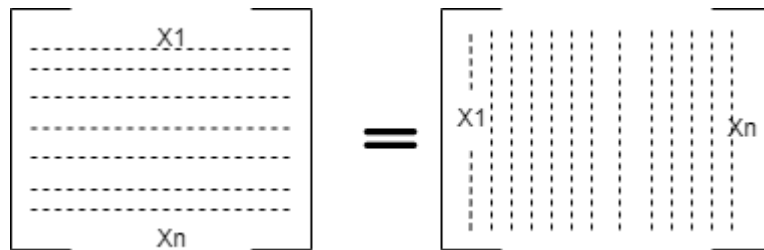
- military robots
- is of negativity (twitter example)
- the japanese AI store incidence

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 calibrated back and forth after every training run.



these are the different equations to calculate the output of the first layer and define which neuron gets to be activated 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.

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

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

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

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

4 -

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

backward propagation

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.

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

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

$$db^{[2]} = \frac{1}{m} \sum dZ^{[2]}$$

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

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

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

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.

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

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

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

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

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 accessible 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.

References

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THANK YOU ...