CATEGORIES OF MACHINE LEARNING

SUPERVISED / UNSUPERVISED / REINFORCEMENT LEARNING

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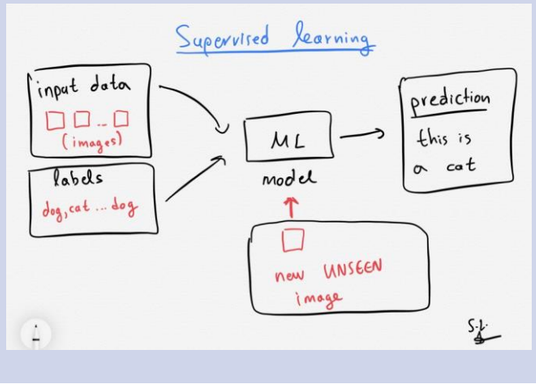
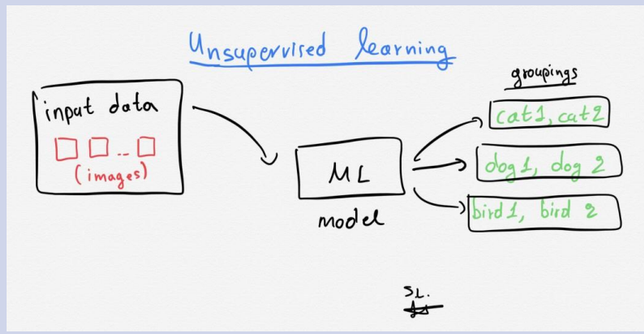
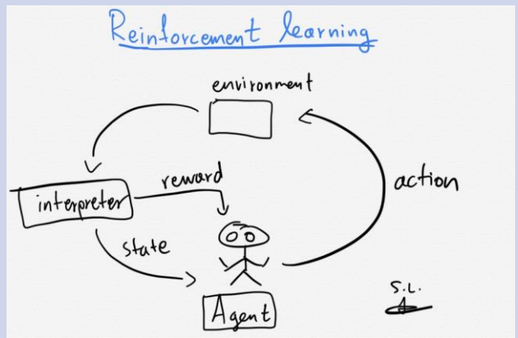
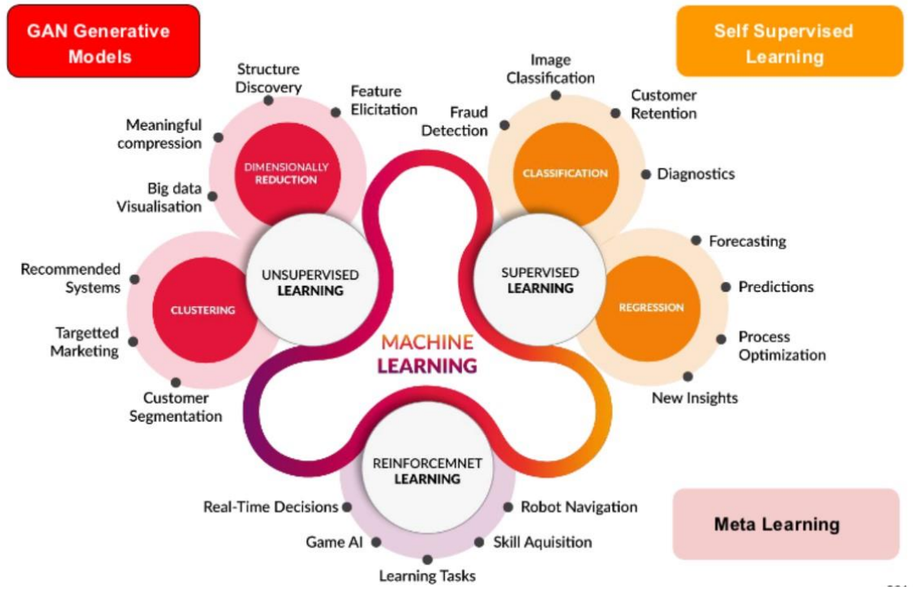
CONTENTS

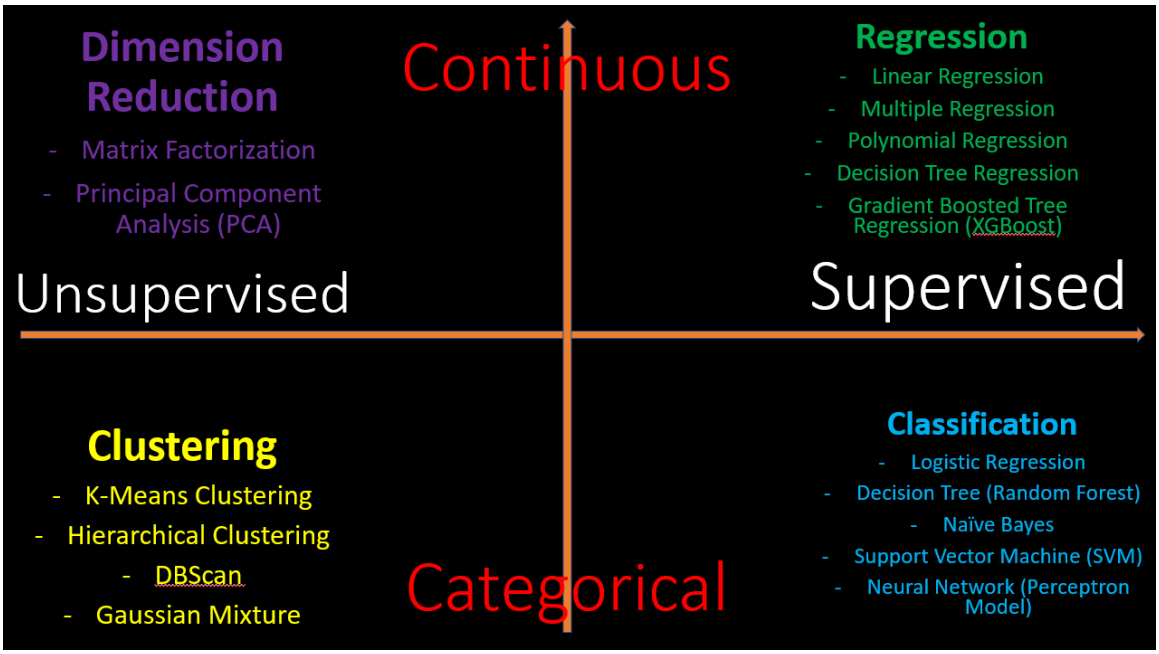
	Supervised	Unsupervised	Reinforcement
Definition	**Machine Learns using Pre-labeled Data.**	**Machine is trying to Cluster/ Categorize Unlabeled data (without any guidance).**	**An agent interacts with its environment by performing actions & learning from errors and rewards.**
Approach			
Is there a Physical Environment?	**No**	**No**	**Yes**
Types of Data	**Labeled Data**	**Unlabeled Data**	**No Predefined Data**
Examples of Data Input Types	**E.g. Spreadsheets with labels…. Images with labels…** **Basically just "1-dimensional"…**	**E.g. Spreadsheets without labels… Images without labels…** **Basically just "1-dimensional"… meaning**	**E.g. Robots… Self Driving Cars…** **Data input is complex where Audio and Video could be a**

	meaning if its images, its just images, not combined with audio.	if its images, its just images, not combined with audio.	combination (of both)
Types of Problems	Regression + Classification	Association + Clustering	Reward-Based
Training	External Supervision	No Supervision	No Supervision
Objective	Calculate Outcomes	Discover Underlying Patterns	Learn a Series of Action



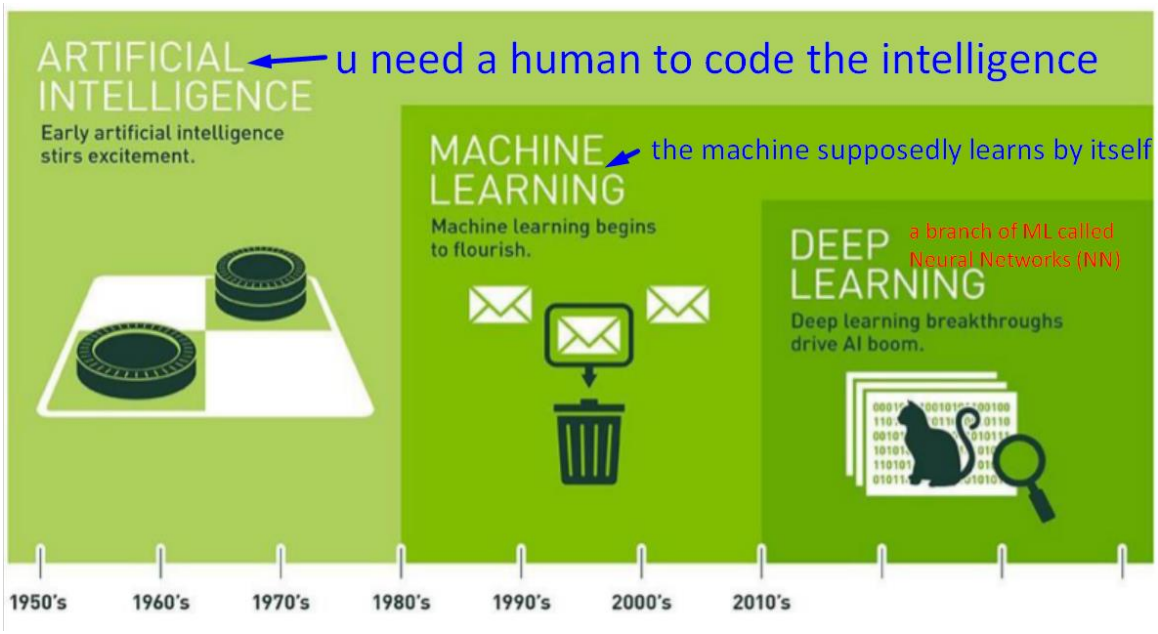
II. SUPERVISED VS UNSUPERVISED

Below shows the various Machine Learning Algortihms.



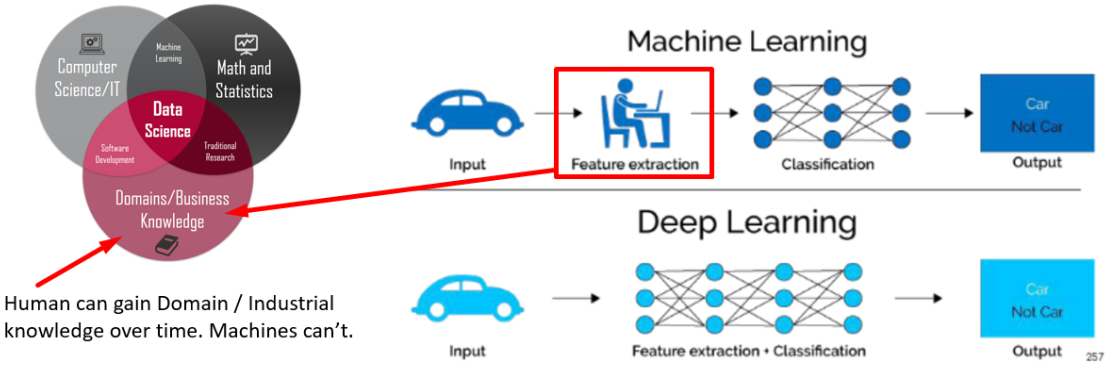
Note:

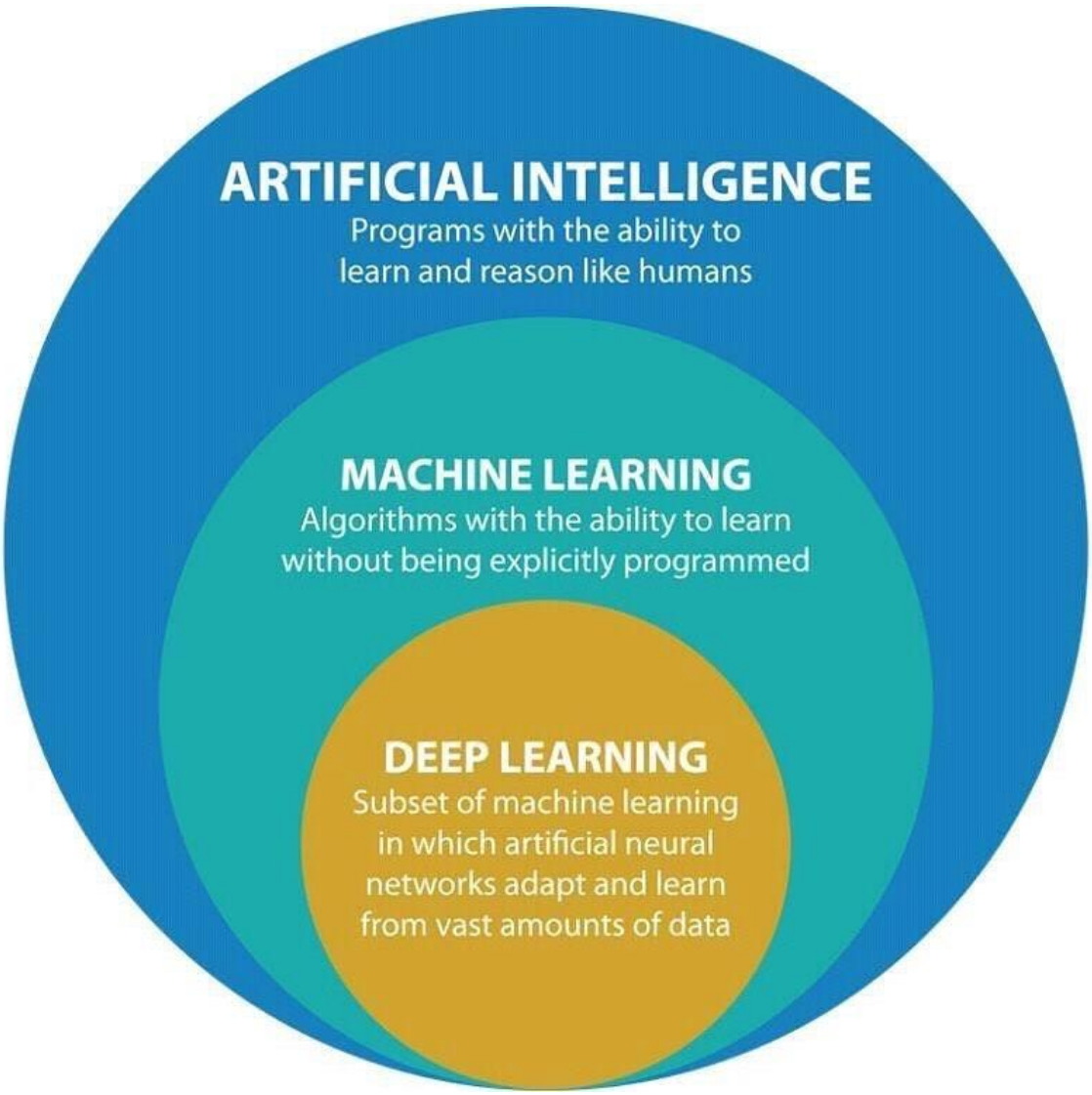
- Deep Learning = Neural Network
- Thus, Deep Learning is a subset of Machine Learning.

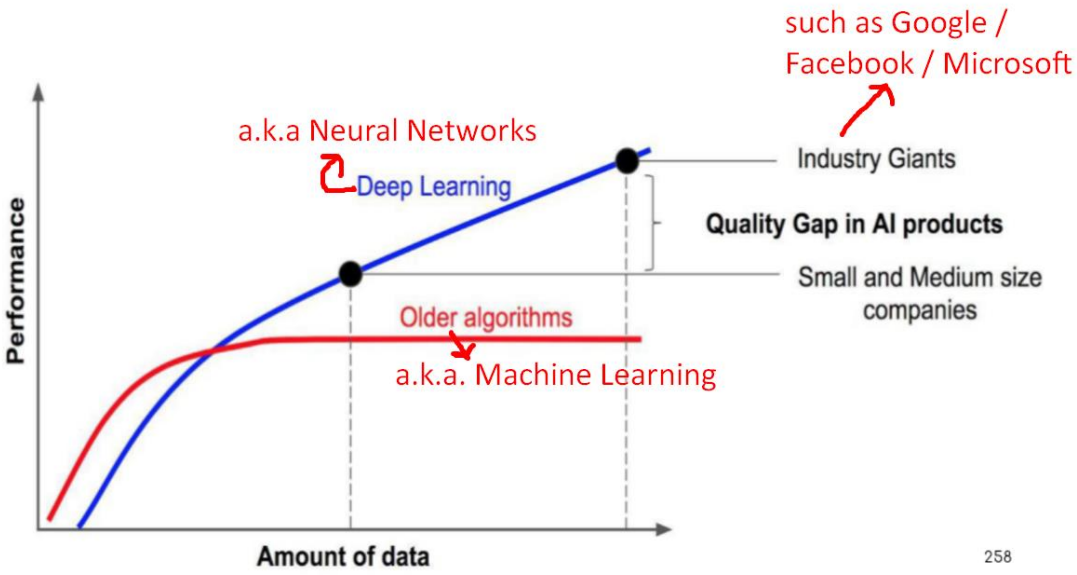


Key Difference between ML vs DL

- ML = Humans are needed for Feature Extraction (using Business Acumen / Domain Knowledge)
- DL = Humans are NOT needed. DL models the human brain, thus able to pick up Domain Knowledge Artificially.







- If you are using "Older Algorithms" (Machine Learning algorithms), they are good only for small amounts of data.
- They might even outperform Deep Learning (Neural Network) model.
- However, as your data grows significantly larger, Deep Learning outperforms other Machine Learning algorithms.
- That is why Google is willing to give you the software Tensorflow for free.
- And Facebook is willing to give you Pytorch for free.
- Because you don't have the amount of data they have – and the processing power capacity.
- The Quality Gap in AI products start to widen as your data grows larger.

REFERENCES

https://towardsdatascience.com/what-is-machine-learning-a-short-note-on-supervised-unsupervised-semi-supervised-and-aed1573ae9bb

https://intellipaat.com/blog/supervised-learning-vs-unsupervised-learning-vs-reinforcement-learning/

ABOUT DR. ALVIN ANG

Dr. Alvin Ang earned his Ph.D., Masters and Bachelor degrees from NTU, Singapore. He is a scientist, entrepreneur, as well as a personal/business advisor. More about him at www.AlvinAng.sg.