17/08/23

Artificial Intelligence -

* We try to mimick human intelligence

Two subfields -

1. Machine learning

Structured data - Numbers values weight colour texture

* These data will be provided to machine learning model.

2. Deep learning -

* Neural networks

* Visual processing > Audio processing > Natural language processing

Difference between Narrow AI and General AI.

* Narrow AI is to automate human tasks practically and subs.
* General AI - strict rules around it

Training Model -

* Lots of data and time to machine.

* We have to give lots of datasets to machine for training. So that it can learn and

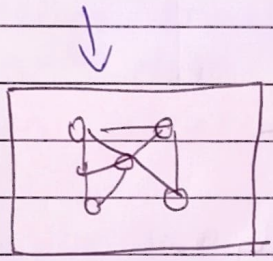
understand.

- Training is very important for any machine learning model to learn.
- Testing - After training we check on the accuracy of model
- Training an AI is like training a child, it take a lot of time and data.

Real life application -

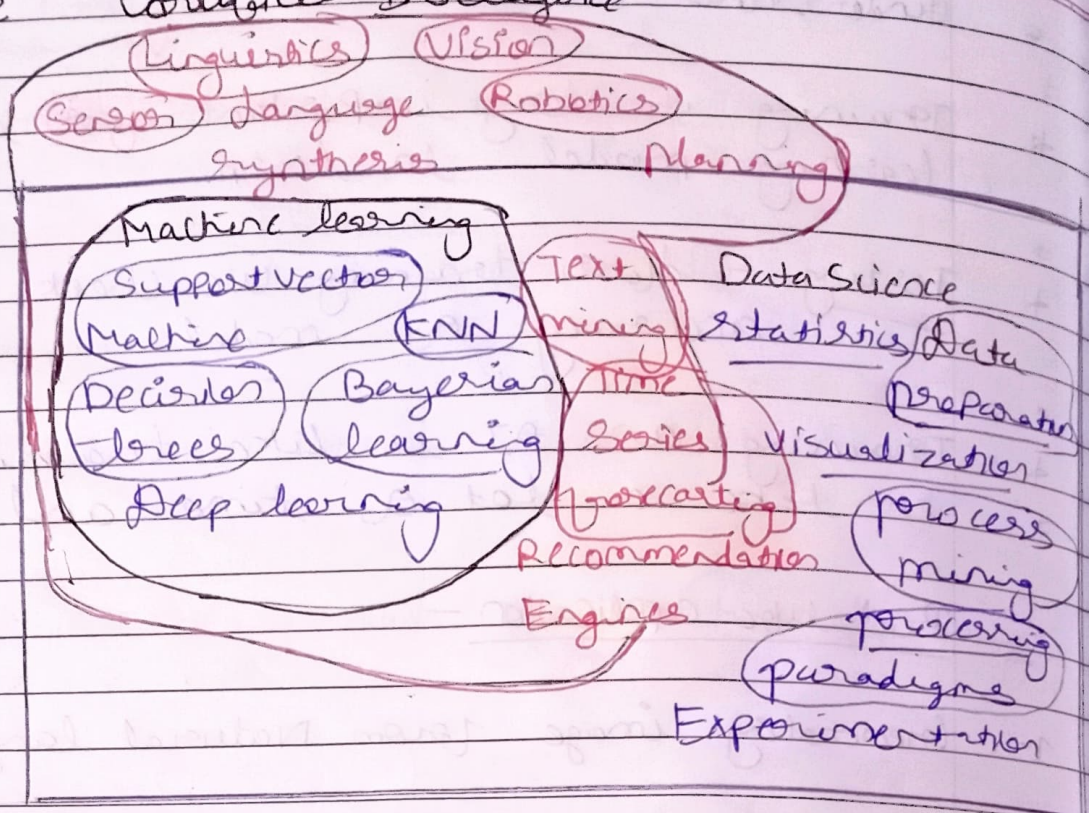
1. Generating image from Natural language

A photo of an astronaut riding a horse



- Because of AI this is possible
- With AI, we can generate image with (text) prompt.
- With the use of AI we can generate very high quality image in seconds.
- Some tools related to this are bing AI and midjourney.

Data Science



AI key concepts –

- Applied statistics –

* Dataset is very big.
* We need to understand the data, its distribution among other things.

- Big data analysis –

* We do not need to write code from scratch.
* We needs to predict is big data.
* Extract the right information

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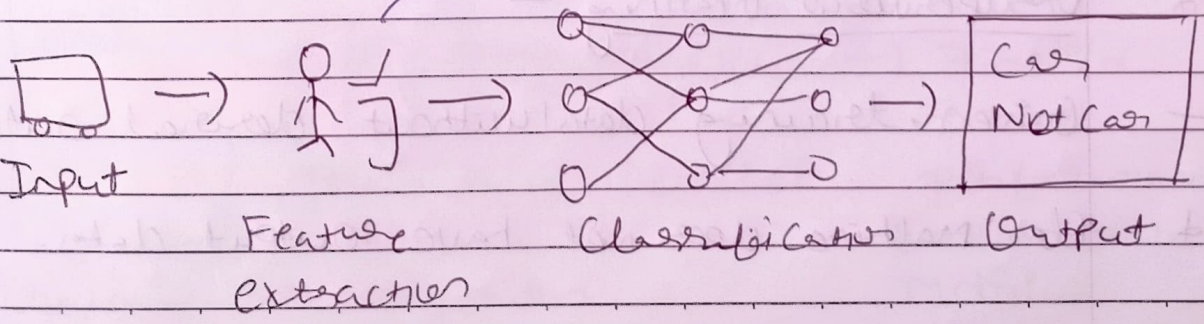
Machine learning -

- We need to understand the algorithms that will be used.
- We need learn foundations of the algorithms

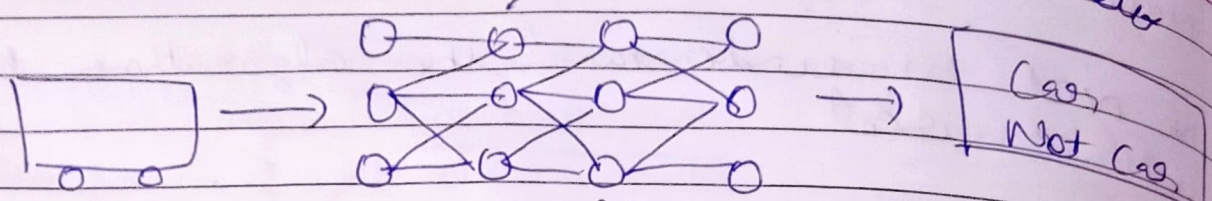
Deep learning -

- Sub domain of ML.
- Complex networks, complex models for prediction.
- In ML, we tells machine what to learn and what to predict but in DL, we won't be telling machine specific things just give the data and output and model learns itself.
- Example - ChatGPT - deep learning Model
- Gives human like response.
- Python is very easy to learn and use.

Machine learning, we tell the machine



Deep learning — Machine figure out itself



Input Feature + Classification Output
extraction

* We give detail to algorithm in ML, like size of input etc and then it decides
* But in deep learning, algo figures out that itself.
* It starts learning the features by itself.

Types of learning —

1. Supervised learning —

— Given: training data + desired outputs (labels)
↓
what to learn

Example - We give various images of cars with labelling as car and not car.

2. Unsupervised learning —

— Given: training data without desired outputs

* Here machine does not have output data.

3. Semi-Supervised learning -

- Given training data + a few desired outputs
- We have only some labelled outputs

4. Reinforcement learning -

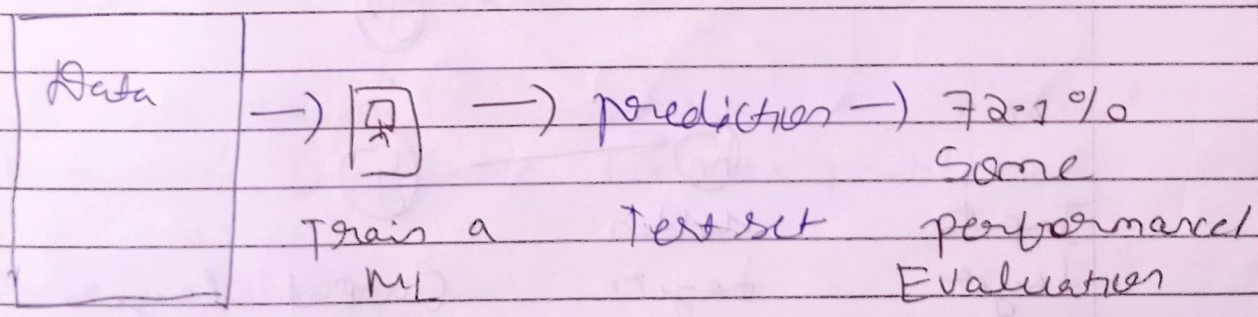
- Rewards from sequence of actions.

learning Paradigms -

airplane, automobile, hand, images

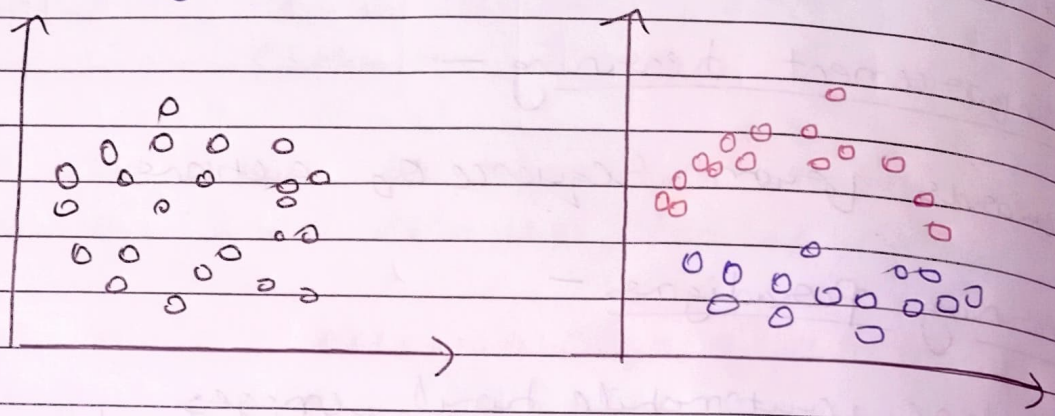
- Supervised learning - Classification
- Making Classify new items based on previous dataset.
- Supervised learning - Regression
- predicting Calories, predicting age
- General formula

Traditional Supervised learning -



Learning paradigms –

- Unsupervised learning –
- Clustering –

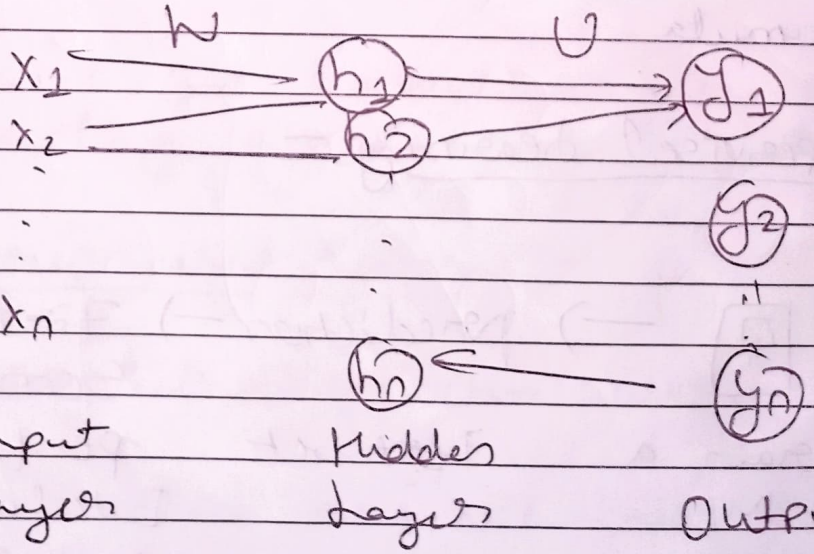


* Similarity of data is used to categorize the data.

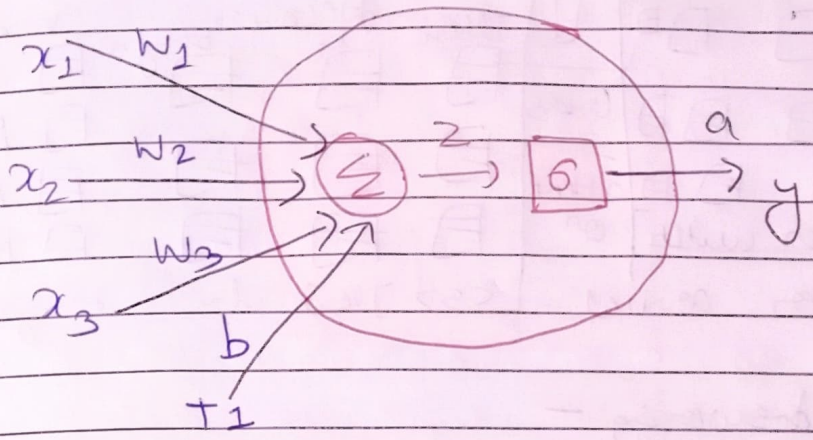
* Whenever machine gets a new data point it will decide between categories the point lies in.

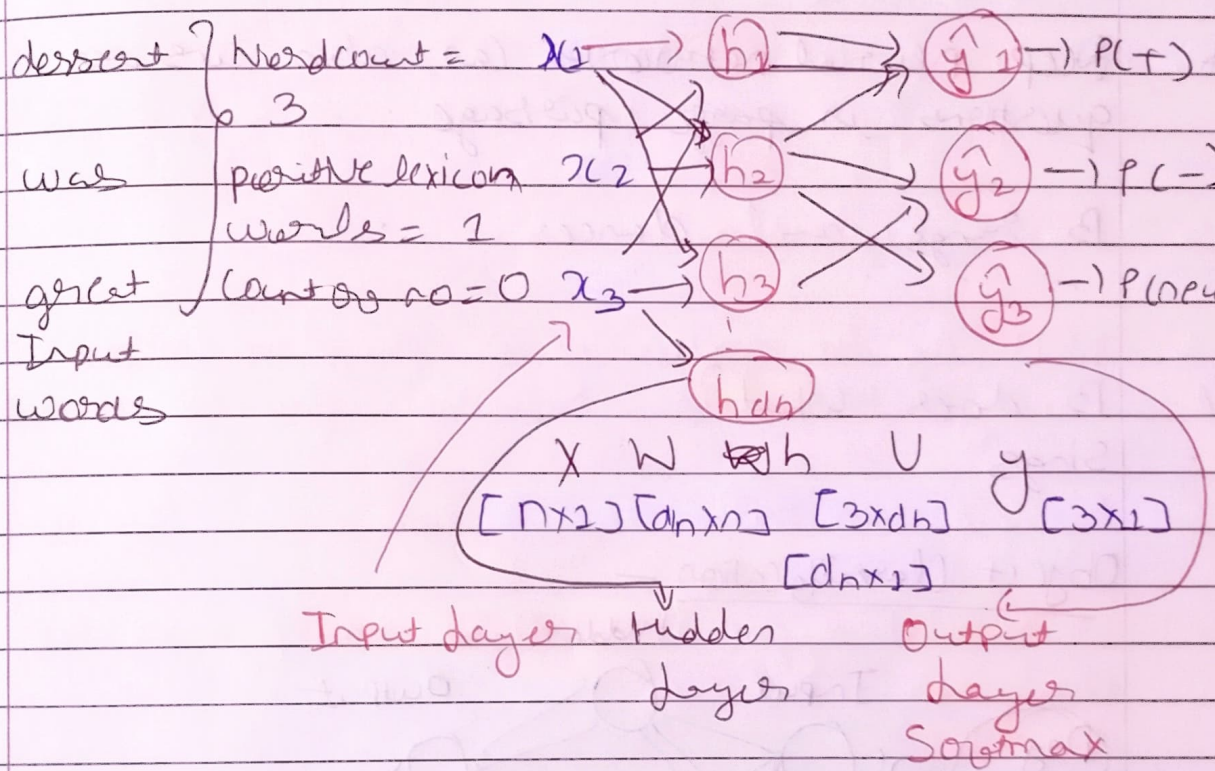
Deep learning –

* Network or model for a task.



one node take input and pass to next node



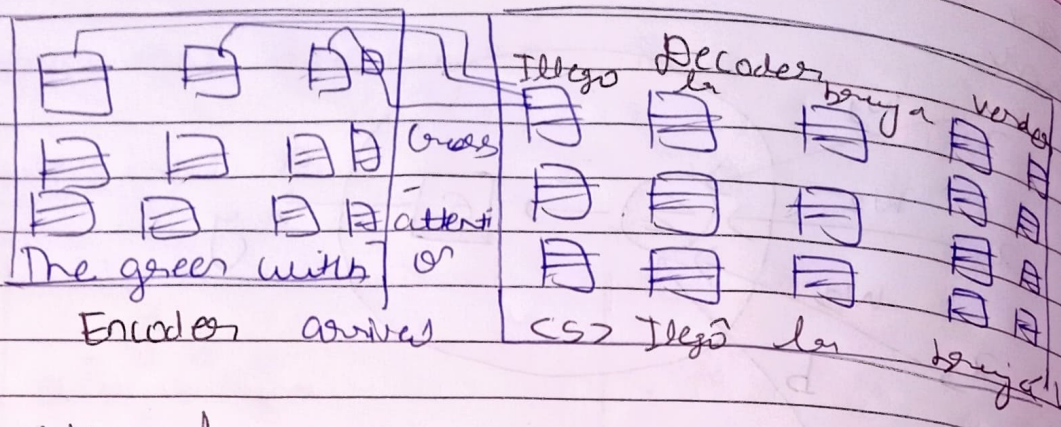


Algorithm to decide if review is positive or negative

A well designed architecture of Neural Networks can solve complex problems.

This is widely used.

Machine translation



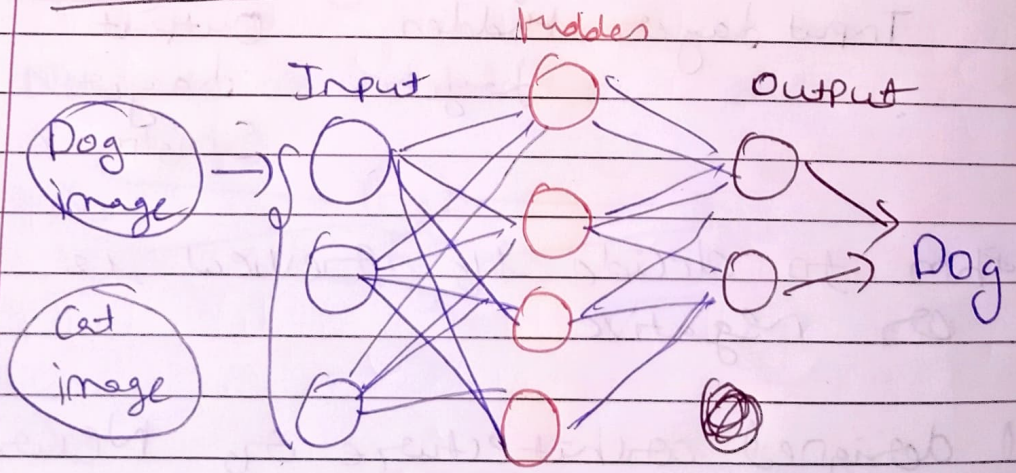
Question Answering –

- Deep neural networks can also answer questions ~~is~~ page passage.

B sings and dances.

Q. B does what?
A. Sings

Object Classification –



- Can learn and classify object
- Once this ~~detection~~ classification