AI for everyone

AI

- Artificial Narrow Intelligence (one-trick)
  - Eg. Smart speaker, self-driving car, AI in farming & factories.
- AGI (Artificial general Intelligence)
  - Do anything any human can do.

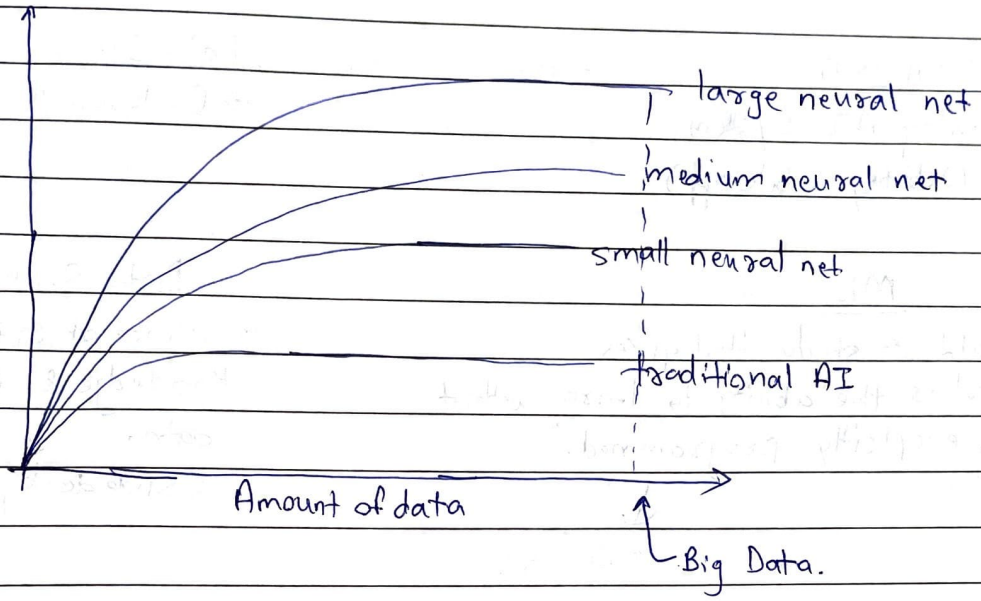
Supervised learning

A → B

Input → output

Input		output	Applications
Email	→	Spam	Spam filtering
Audio	→	text transcipt	Speech Recognition
English	→	Chinese	Machine translation
Ad, user info	→	click? (0/1)	Online Advertising
Image, radar info	→	position of other cars	Self-driven cars
Image of phone	→	defect? (0/1)	Visual Inspection.

* Why now?



Acquiring data

- Manual labeling
- From observing behaviours
  - → Human behaviour
  - → Machine behaviour.
- Download from website/ partnerships.

Use & Mis-Use of data

Data is messy

- Garbage In, Garbage Out
- Data problems
  - Incorrect labels
  - Missing values.
  - Multiple types of data
    images, audio, text
    unstructured data

M.L v/s Data Science

ML : A → B

Running AI system
(eg. website/ mobile app)

Data Science

→ Conclusions / Statistics.

ML

"Field of study that gives computers the ability to learn without being explicitly programmed."

↓

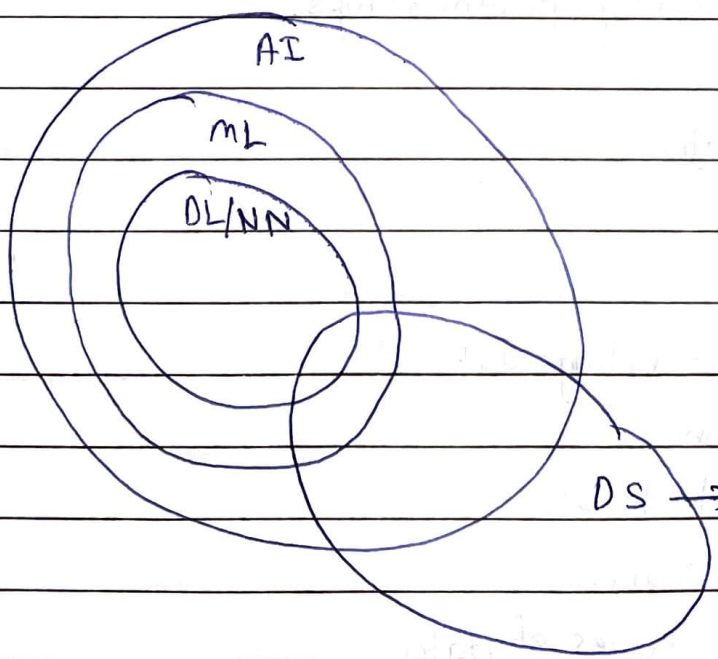
Softwares

Data Science

→ Science of extracting knowledge & insights from the data.
(slide deck, PPT)

Deep Learning (ANN → Artificial Neural Network)

Neural networks are orginially inspired by the brain but the details of how they work are completely unrelated to how the biological brains work.



DS → Data Science will be like cross cutting ~~sub~~ subset of AI.

Lesson from rise of Internet

Internet Era

Shopping mall + website ≠ Internet company

- A/B testing
- Short Iteration time.
- Decision making pushed down to engineers and other specialised roles.

AI era

Any company + Deep learning ≠ AI company

- Strategic Data Acquisition.
- Unified Data Warehouse.
- Pervasive Automation.

AI Transformation

1. Execute pilot projects to gain momentum.
2. Build an in-house AI team.
3. Provide broad AI strategy.
4. Develop an AI strategy.
5. Develop internal and external communications.

What makes ML problem easier

1. Learning a "simple" concept.
2. Lots of data available.

Self driving car

Can do

→ Recognise position of car where it is & how long it is from our car.

Can't do

→ Person who making gesture to stop the car.

→ Person who is riding motorcycle and giving gestures to go left.

X-Ray diagnosis

Can do	Can't do
- Diagonse pneumonia from 10k labelled images.	- Diagnose pneumonia from 10 images of medical textbook chapter explaining pneumonia.

ML tends to work poorly when:

1. Learning complex concepts from small amounts of data.
2. It is asked to perform on new types of data.

★ Starting an AI project

- Workflow of machine learning project.
- Selecting AI projects
- Organizing data and team for the projects

★ Key steps of ML projects

Echo/Alexa

1. Collect data.
2. Train Model.
   - Iterate many times until good enough.
3. Deploy model.
   - Get data back.
   - Maintain/Update Model.

→ Optimizing 'Sales funnel

Visit website → Product page → Shopping cart → Checkout

1. Collect data
2. Analyse data
   → Iterate many time to get good insights.
3. Suggest Hypothesis/ Actions.
   → Deploy changes
   → Re-analyze new data periodically.

Technical diligence

- Can AI meet desired performance.
- How much data is needed.
- Engineering timeline.

Business diligence

- Lower costs
- Increase Revenue
- Launch new product or business.

AI technical tools:

ML frameworks

- Tensorflow
- PyTorch
- Keras
- MXNet
- CNTK
- Caffe
- Paddle Paddle
- Scikit-learn
- R
- Weka

Research publications

- Arxiv

Open source → github

Ex. Roles

- Software Engineer
- Machine learning engineer.
- Machine Learning Research.
- Data Scientist
- Data Engineer
- AI product manager

AI:-

- Computer Vision -
  - Image classification
  - Object detection
  - Image segmentation
  - Tracking
- NLP
- Text classification.
  - Sentiment recognition
- Information retrieval
- Name Entity Recognition.
- P-O-S tagger (part of speech)
- Speech
- Robotics