What Is AI?

Artificial Intelligence is the ability of a computer or a computer controlled robot to perform tasks commonly associated with intelligent beings.

- According to the study of McKinsey, AI is estimated to create an additional $13 trillion.

There are three types of Artificial Intelligence.

- **ANI (Artificial Narrow Intelligence)**

Artificial Narrow Intelligence (ANI) also known as " Weak " AI that is programmed to perform a single task such as self driving cars and smart speakers. ANI is the only level of AI achieved by mankind so far.

- **AGI (Artificial General Intelligence)**

Artificial General Intelligence (AGI) or " Strong " AI can successfully perform any task that a human being can and that is the goal to build AI. But almost there is no progress in AGI.

- **ASI (Artificial Super Intelligence)**

Artificial Super Intelligence (ASI) will surpass human intelligence in all aspects from creativity, to general wisdom, to problem

solving. This is the type of AI that many people are worried about, and the type of AI will lead to extinction of human being.

What is Machine Learning?

Machine learning is a concept which allows the machine to learn from examples and experience and without explicitly programmed.

Methods of Machine Learning:

❖ **Supervised Learning**

Supervised learning is the one, which you can consider the learner is guided by a teacher. We have a dataset which act as a teacher and its role is to train the model or machine. Once the model has trained its can start making a prediction or decision when new data is given to it.

❖ **Un-Supervised Learning**

Un-Supervised learning model is self sufficient to learn. It learns through observation and find structure in data. Once the model is given a dataset, it automatically find patterns and relationships in the dataset by creating clusters in it.

❖ **Reinforcement Learning**

It is the ability of an agent/machine to interact with the environment and find out what is the best outcome.

Note : If we have to make the AI system more accurate than we have to build a large neural network so that the outcome becomes more accurate.

What is Neural Network / Deep Learning?

A neural network is a series of algorithm that attempt to recognize the underlying relationships in a set of data through a process that mimics the way the human brain operates. Therefore the Neural network refers to the system of neurons.

Neural Network depends upon the amount of data provided.

What is Data?

It can be any unprocessed fact, value, text, sound or picture that is not being interpreted and analyzed.

Acquiring Data

- Manual Labeling

- From Observing Human Behavior / Machine Behavior

Difference between Machine learning & Data Science.

Machine Learning	Data Science
Field of study that gives computer the ability to learn explicitly programmed.	Science of extracting knowledge and insights from data

What makes a company AI company?

1. Strategic Data Acquisition
2. Unified Data Warehouse
3. Prevasive Automation
4. New Roles such as MLE

AI Tranformation

1. Execute Pilot project to gain momentum
2. Build an in-house AI team
3. Provide broad AI training

4. Develop an AI strategy
5. Develop internal and external communication

How to decide about a New project

1. Technical diligence
    - Is it feasible project?
    - Can AI do it?
2. Anything you can do with a second of thought can be automated using supervised learning.

Due Diligence

Technical Diligence	Business Diligence	Ethical Diligence
• Can AI system meet desired performance? • How much data is needed? • Engineering Timeline	• Lower Cost • Increase Revenue • Launch New product or business	• Is this going to make the society better?

Build vs Buy

- ML projects can be inhouse or outsourced.
- DS projects are most commonly in-house.

- Some things will be industry standard, avoid building those.

Strength and weakness of Machine Learning

- **Works when**
    1. Learning a simple concept
    2. Lots of Data Available
- **Doesn't work when**
    1. Learning a complex concept from small amount of data.
    2. Asked to work on new type of data such as X-ray images in different conditions and angles.

Machine Learning Changing Jobs

- **Sales**
    1. Identifying Sales Opportunity
    2. Prioritizing
- **Manufacturing Line Manager**
    1. Optimize Manufacturing
    2. Machine learning can spot defects
- **Recruiting**
    1. Indentify how people prefer recruitments
    2. Spot good candidates

Brainstorming Framework

- Automate Task Rather than job.
    1. Automating Call Centre : Picking phone, emails, issue refund, call routing
    2. Automating Radiologist : X-ray, mentoring other doctors, consulting
- What are the main drivers of business value?
- What are the main pain points in your business?

How to work with AI team

- Specify your Acceptance criteria
    I. 95% accuracy
    II. Training, validation and Test dataset
- Don't Expect 100% accuracy
    I. Limitations of Machine Learning
    II. Insufficient Data
    III. Mislabeled Data
    IV. Ambiguous Labels (Human preception)

Key steps of Machine Learning Project

- Collect Data
- Train Model
    i. Iterate many times until good enough
- Deploy Model
    i. Get Data Back
    ii. Maintain & Update Model

Key Steps of Data Science Project

- Collect Data
- Analyze Data
    i. Iterate many times to get better insights
- Suggest Actions
    i. Deploy changes
    ii. Reanalyze new data periodically

Machine Learning Frameworks

- TensorFlow
- PyTorch
- Keras
- MXNet

- CNTK
- Caffe
- Paddle-Paddle
- Scikit-Learn
- R
- Weka

Research Publications

- Arxiv

Open Source Repositories

- GitHub