VECTOR INSTITUTE

Bias in AI:
Week #1: AI Overview

Instructor:
Sayyed Nezhadi

Winter 2022

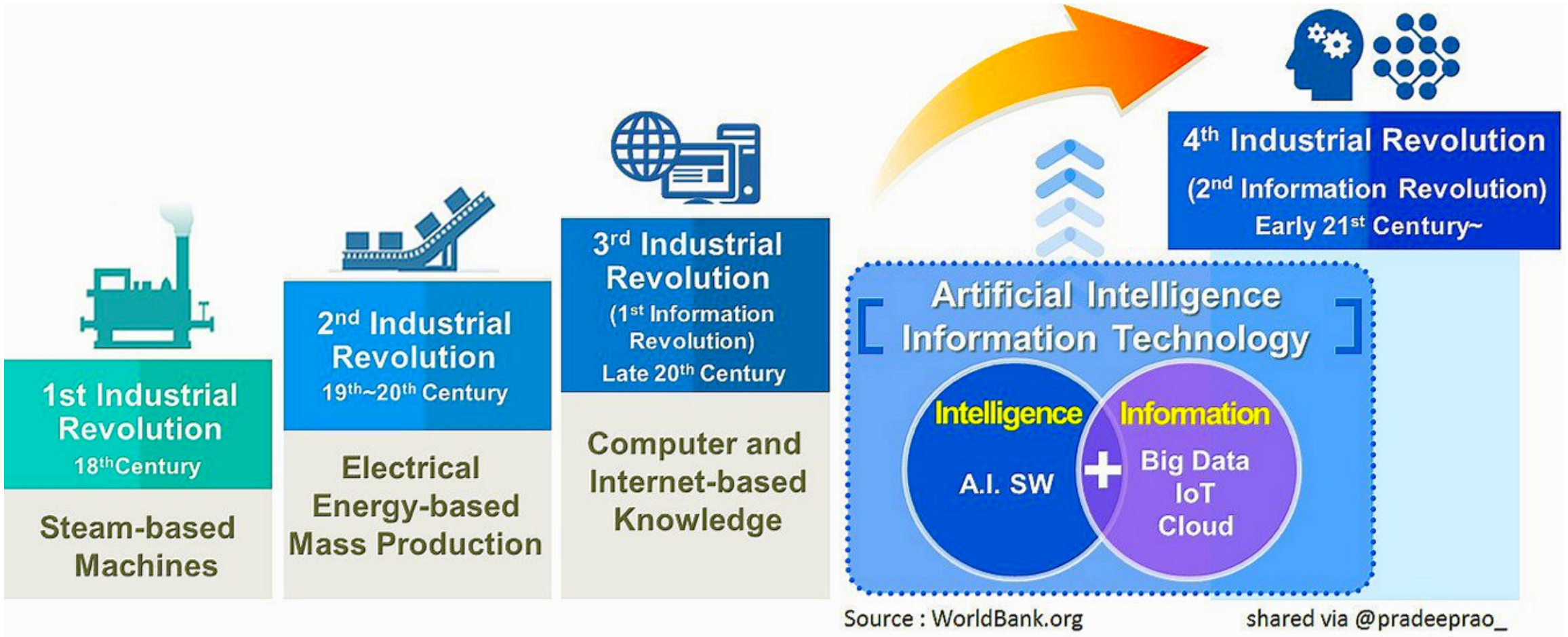
What is AI (Artificial Intelligence)?

- AI is a branch of science which deals with helping machines to find solutions to complex problems in a more human-like fashion.

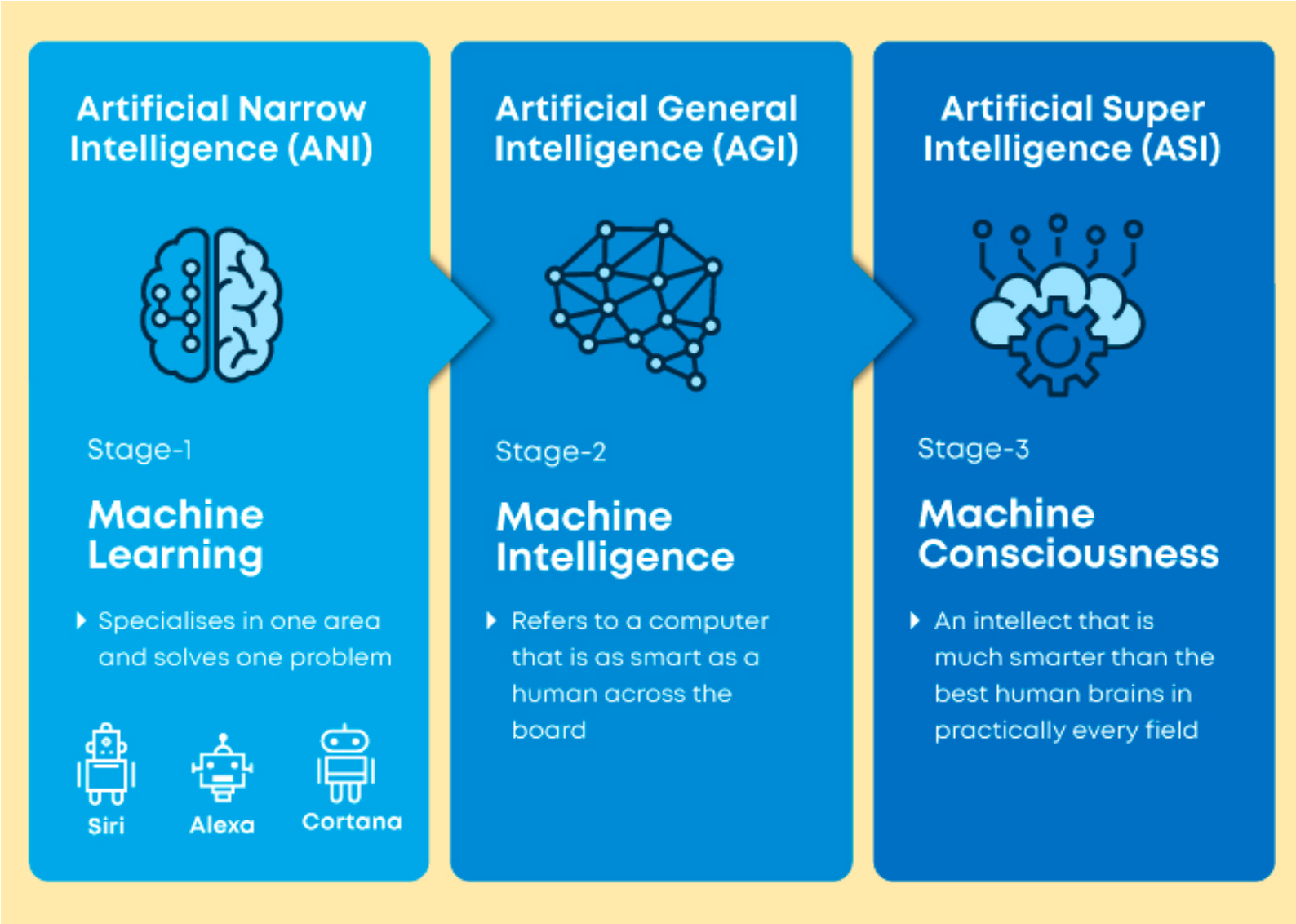
- Empowers the computers to sense, reason, engage, and learn.

- One of the hottest topics in the market with the potential to fundamentally change society; how we work, predict behavior, advertise, and so many more things.

The 4th Industrial Revolution



Types of AI



Source: www.mygreatlearning.com/blog/what-is-artificial-intelligence/

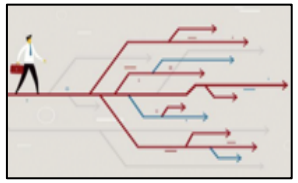
Sample AI Applications

Autonomous Vehicles

Future Predictions

Generating Artworks

Intelligent Agents



Intelligent Marketing

Living Portraits

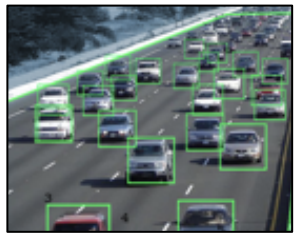
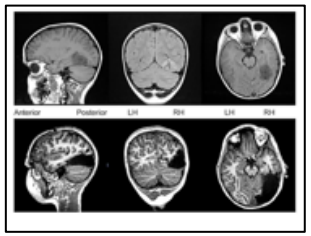
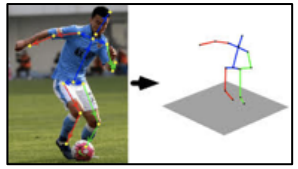


Image Understanding



Brain Tumor Detection

Contact Tracing



Sports Analytics

Sentiment Analysis

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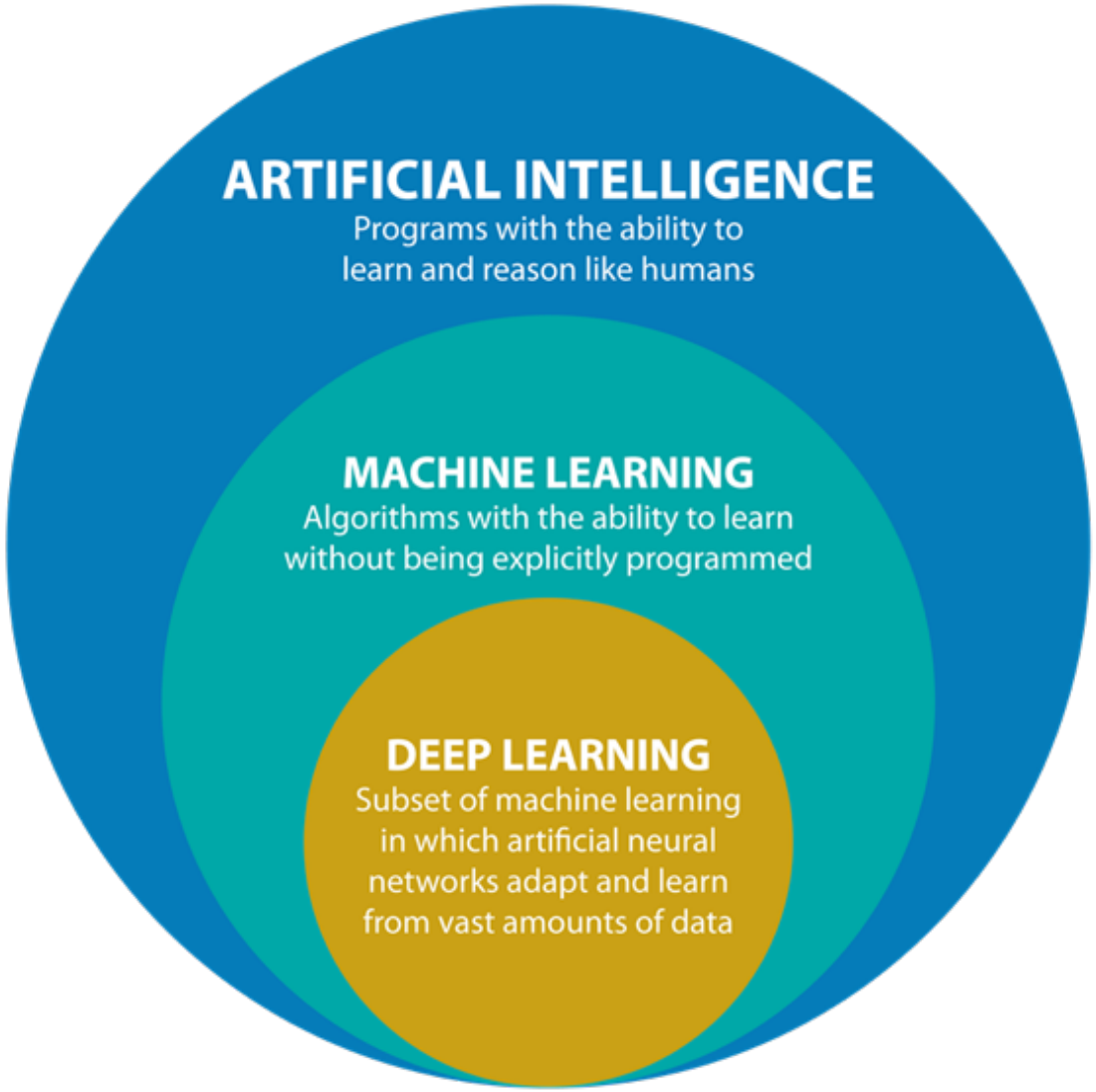
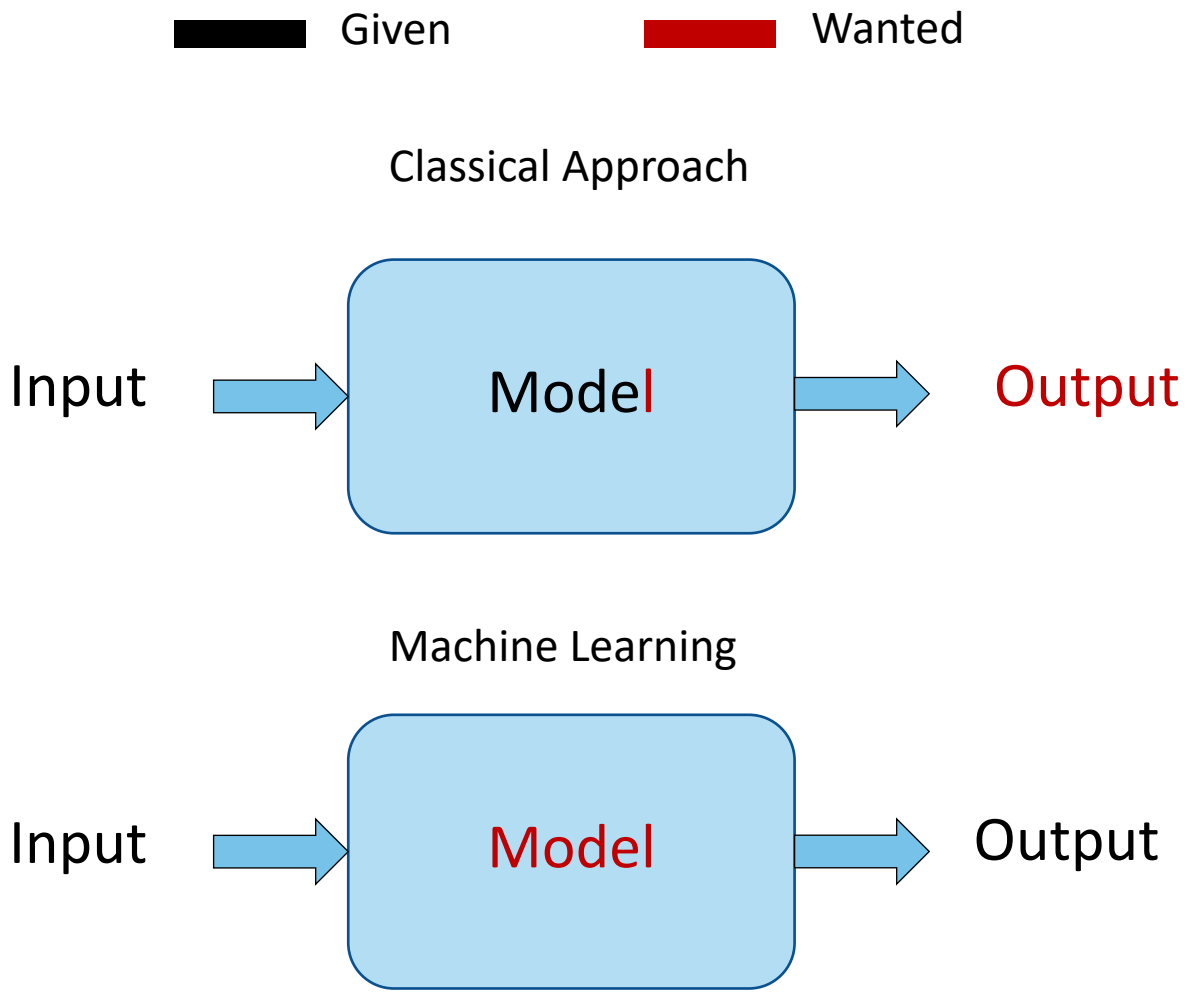
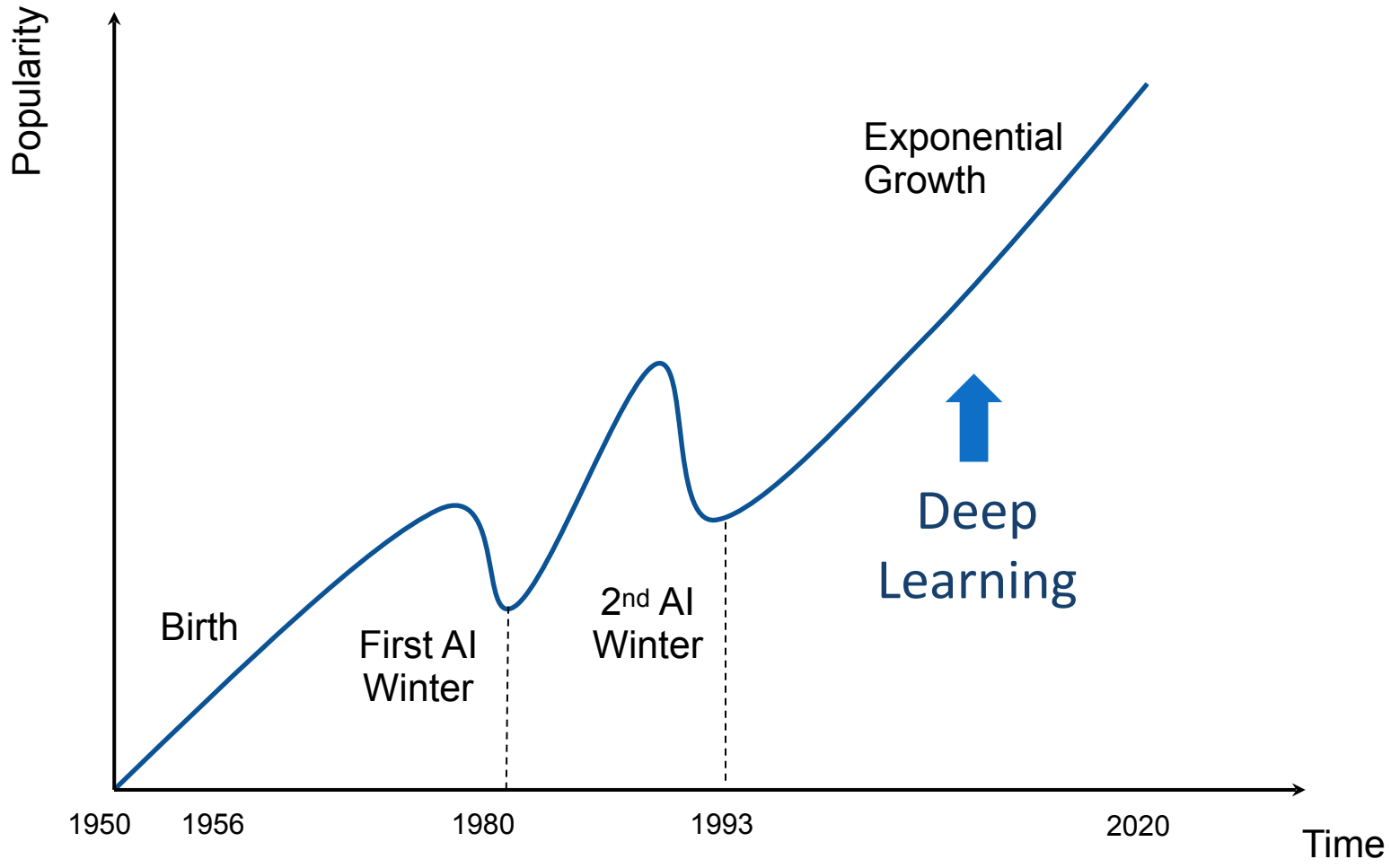
AI vs. ML/DL


ARTIFICIAL INTELLIGENCE
Programs with the ability to learn and reason like humans
MACHINE LEARNING
Algorithms with the ability to learn without being explicitly programmed
DEEP LEARNING
Subset of machine learning in which artificial neural networks adapt and learn from vast amounts of data

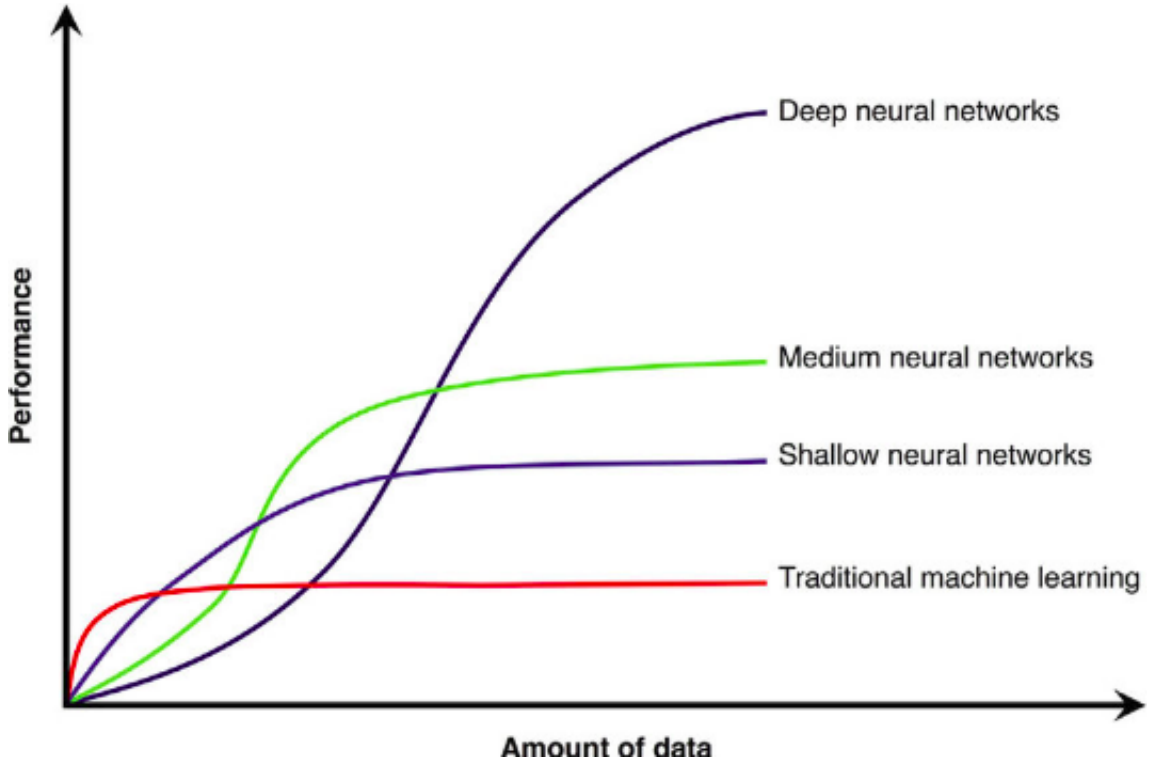

Given
Wanted
Classical Approach
Input
Model
Output
Machine Learning
Input
Model
Output

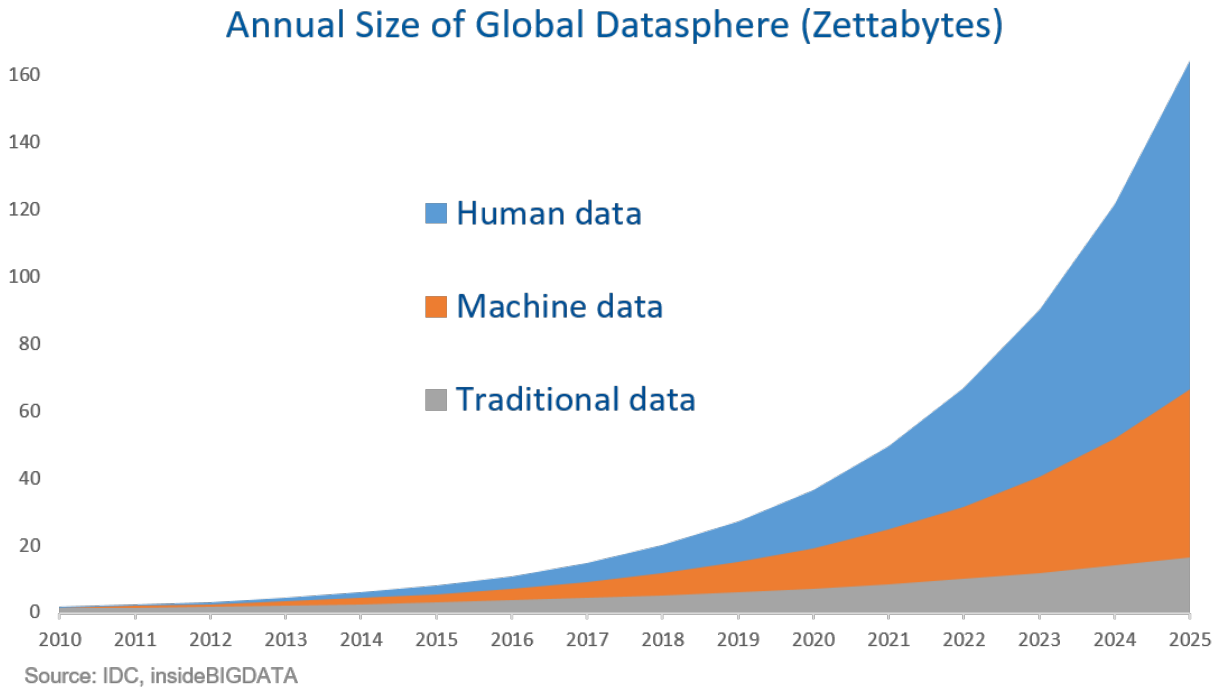
Why Now?



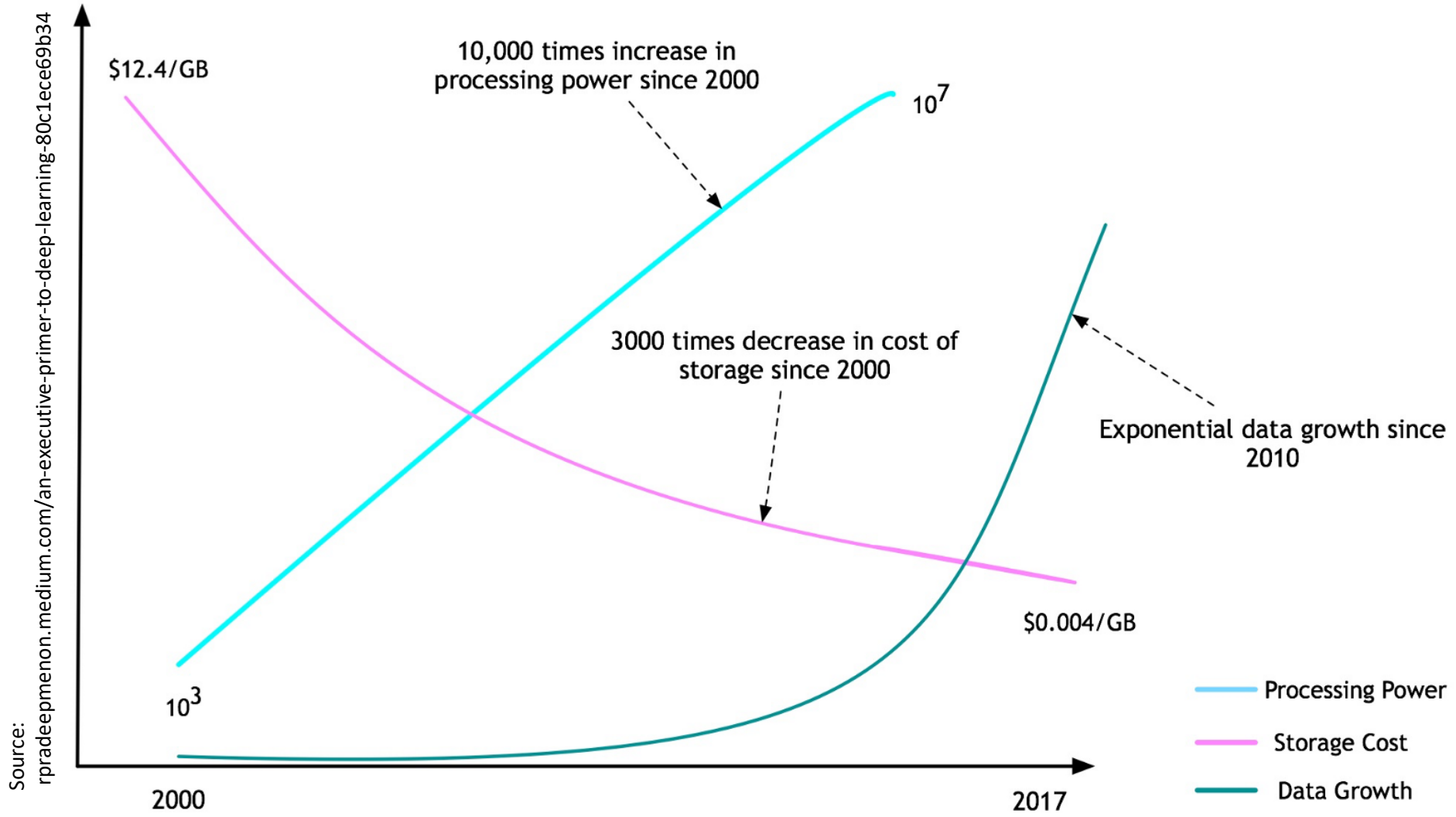
Big Data
+
Processing Power

Data Explosion and Impact

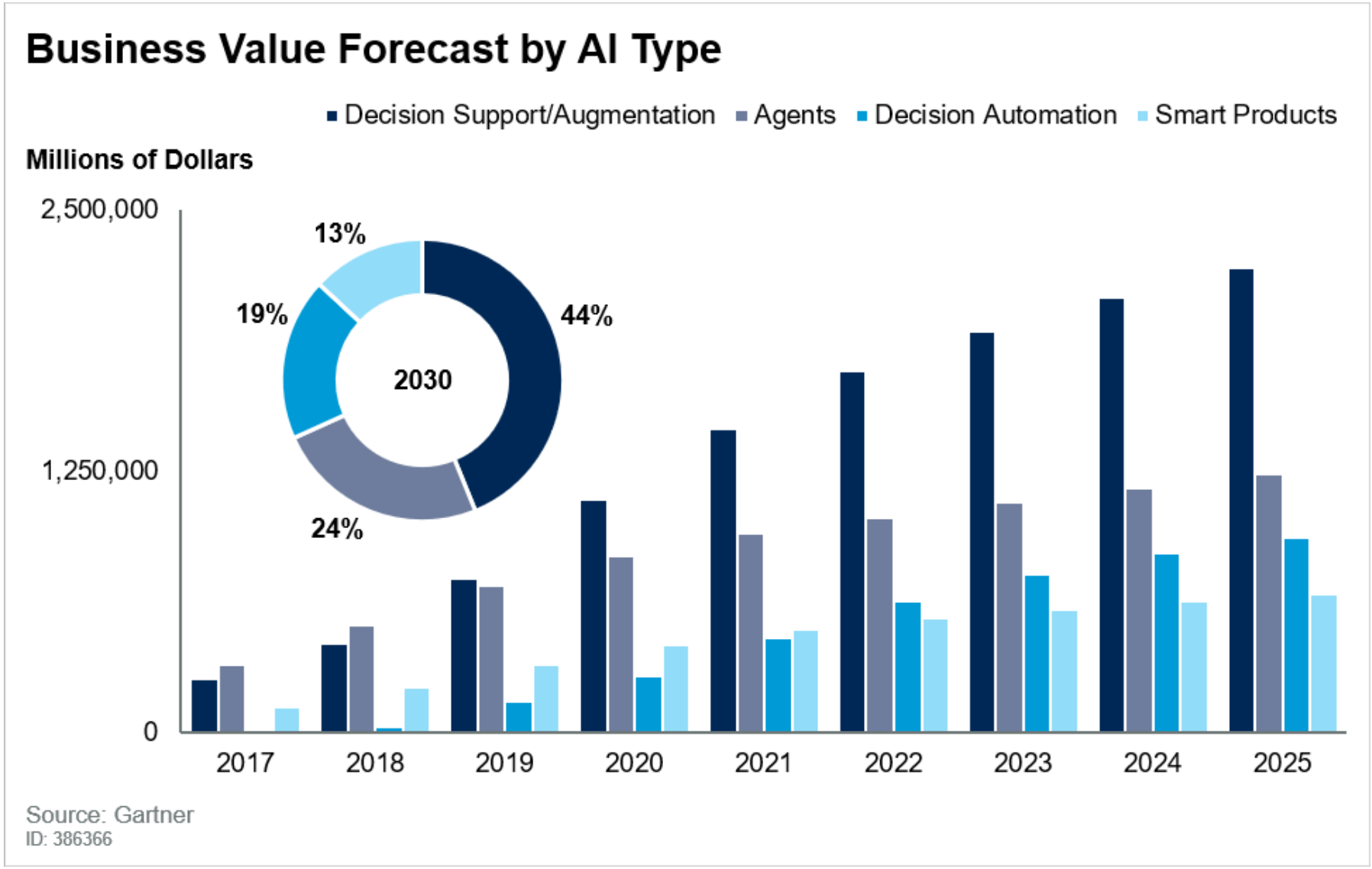




Processing Power & Storage



Business Value of AI



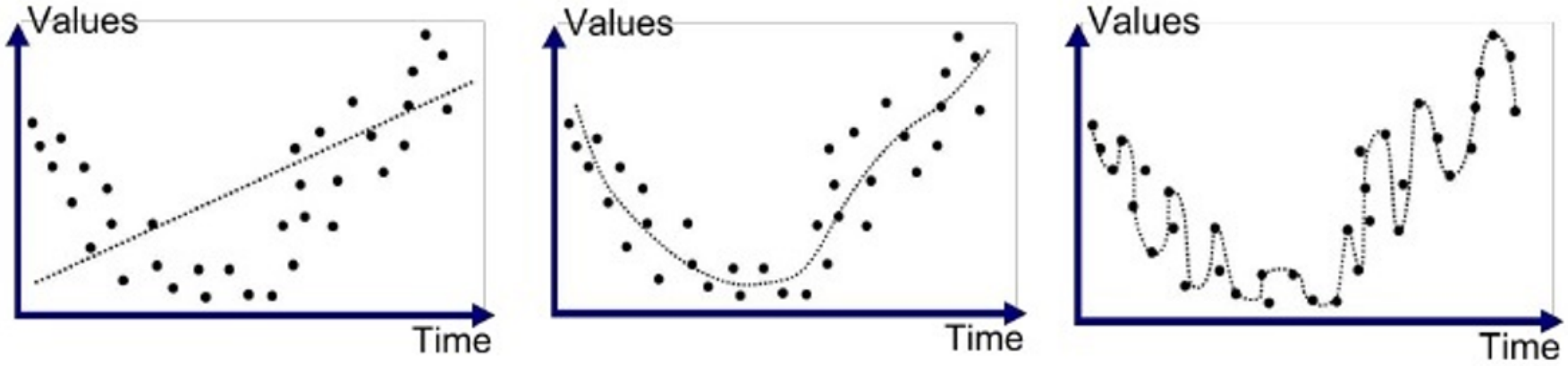
Major Challenges of AI in Industry

- Lack of clear AI strategy
- Lack of talent with appropriate skill sets
- Data availability and quality
- There is no AI without IA (Information Architecture)
- Resources (the AI gap)
- Bias in AI (Identifying and eliminating bias)  This Course
- Security and Privacy
- Regulations (the need for Explainability)
- Ethics considerations

Deep Learning Refresher

The case for Neural Networks

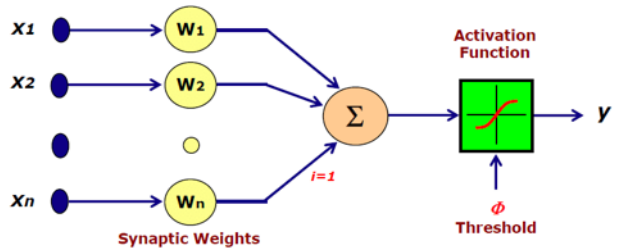
- The main goal of ML is to find a model that not only fits well on training data but also generalizes well on new unseen data.
- Generally, the best approach is to use a complex non-linear model (to avoid underfitting) but prevent overfitting using regularization methods.



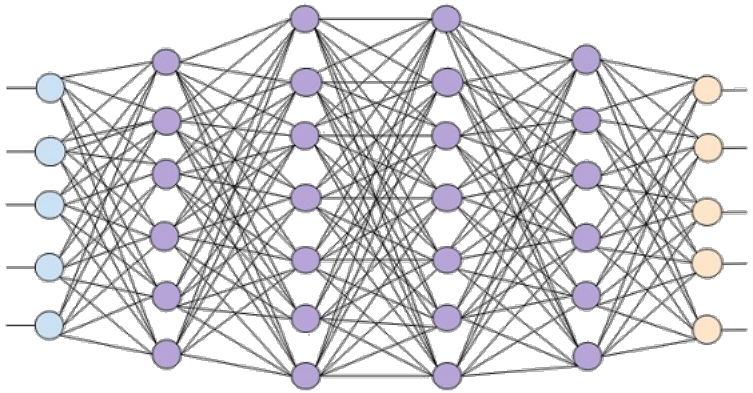
Source: medium.com/@anupbhande

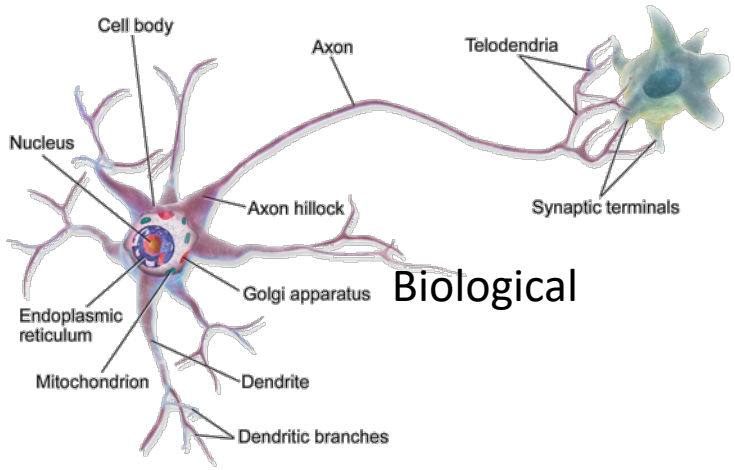
Neural Networks

- A neural network can approximate any continuous function, provided it has at least one hidden layer and uses non-linear activations there (Universal Approximation Theorem).

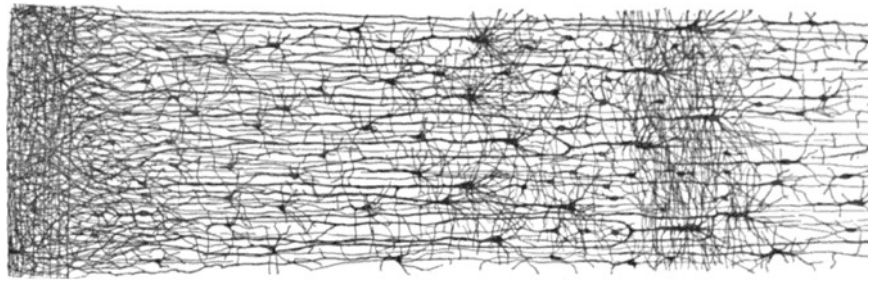


Artificial

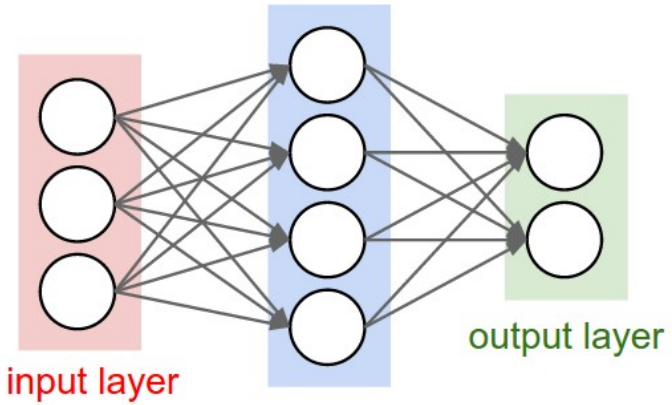


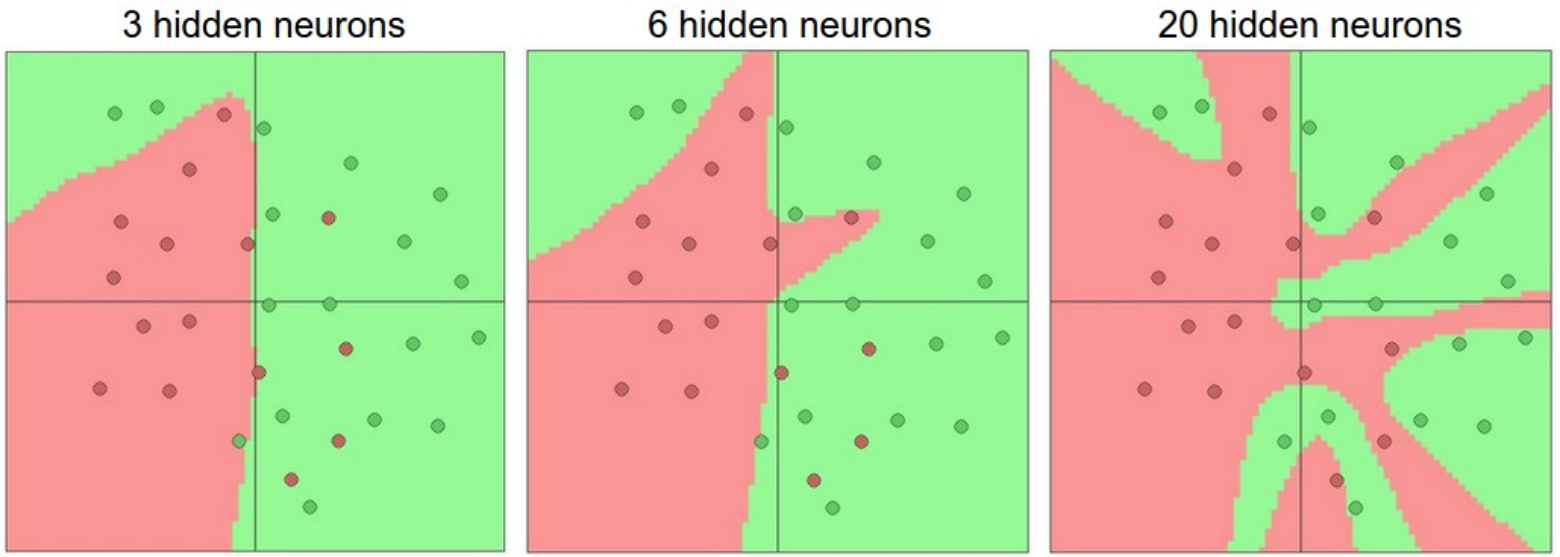


Biological

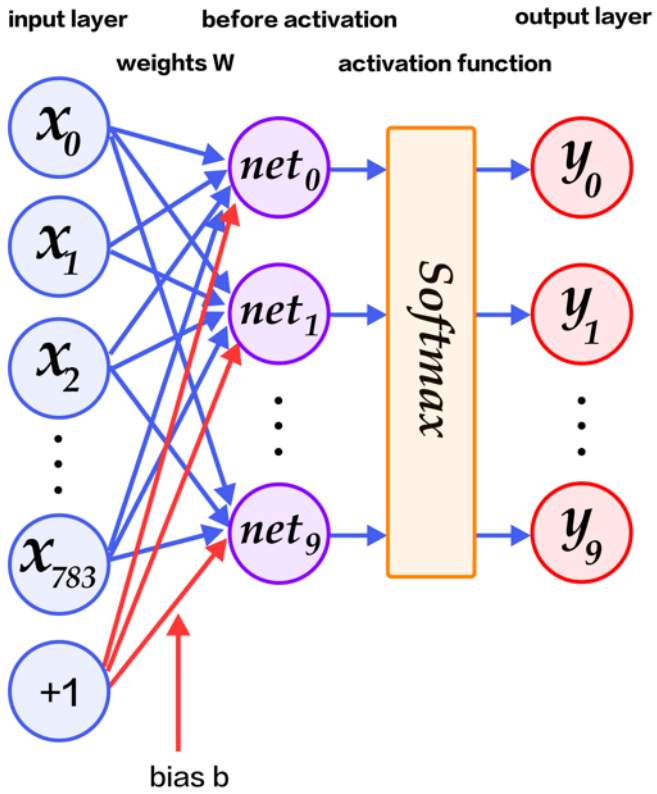


Neural Networks Classifiers





Source:CS231n Course Stanford



Popular Deep Learning Frameworks

TensorFlow

PyTorch

Keras

Sonnet