



VECTOR
INSTITUTE

Bias in AI:

Week #1: AI Overview

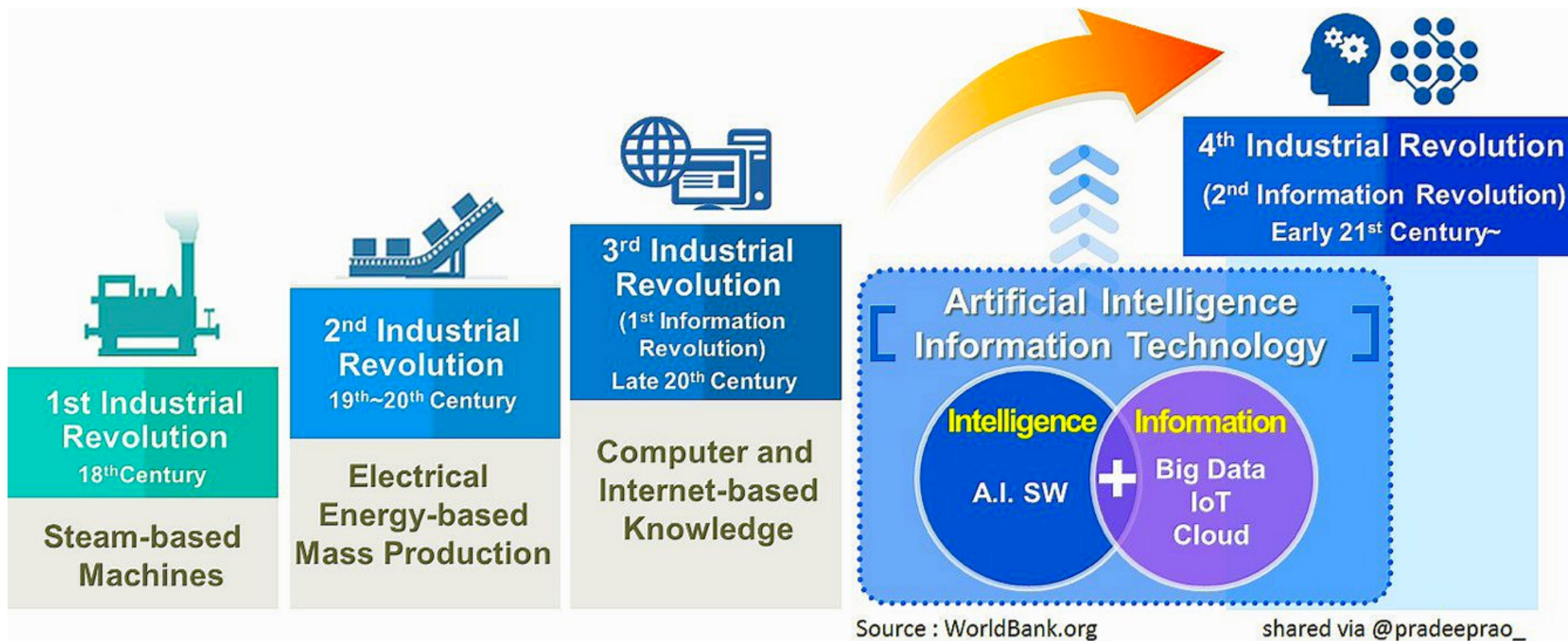
Instructor:
Sayyed Nezhadi

Summer 2022

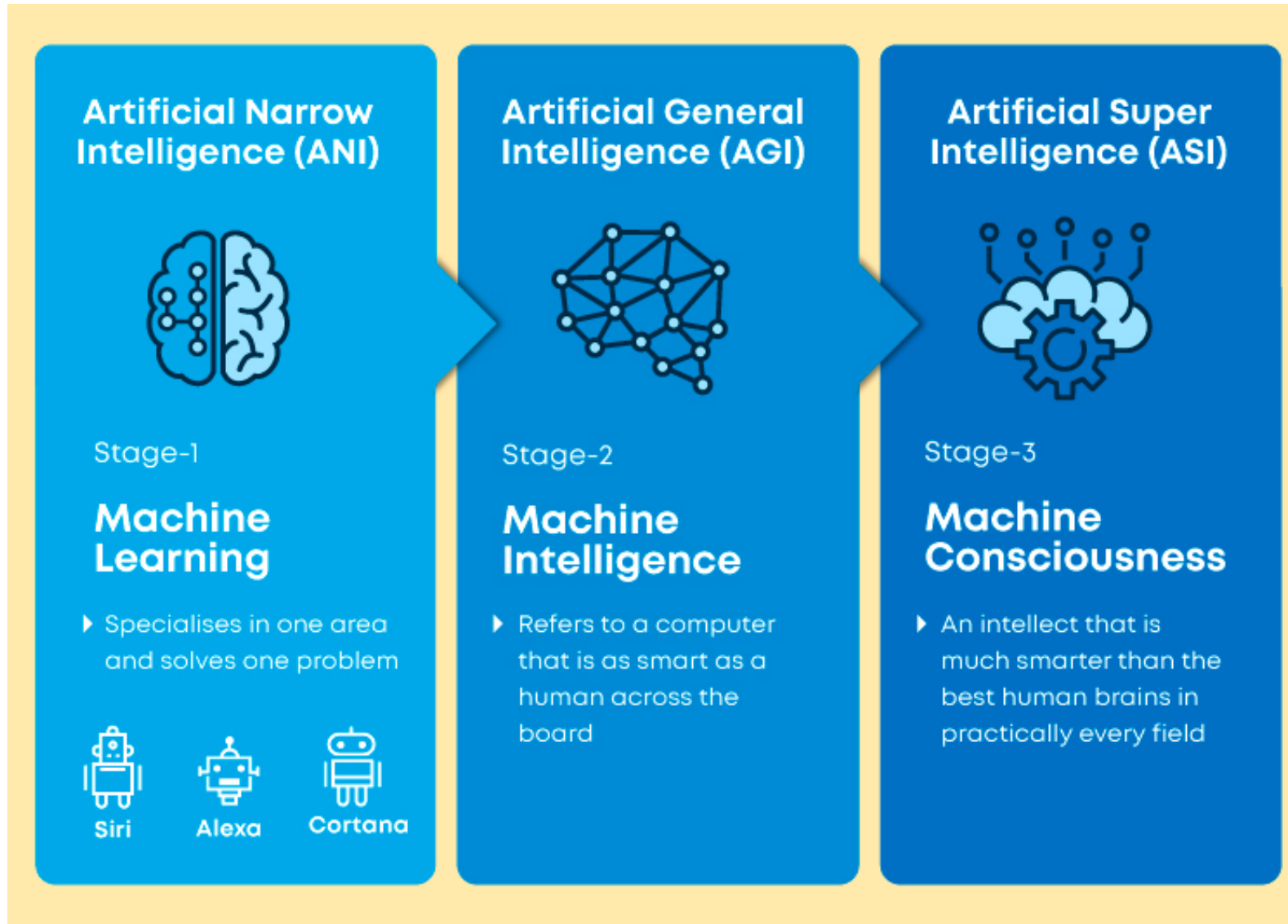
What is AI (Artificial Intelligence)?

- 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



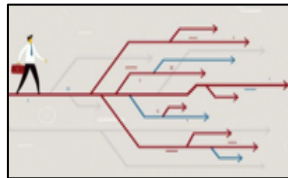
Future Predictions



Generating Artworks



Intelligent Agents



Intelligent Marketing



Living Portraits

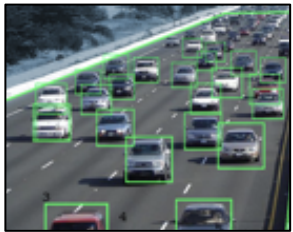
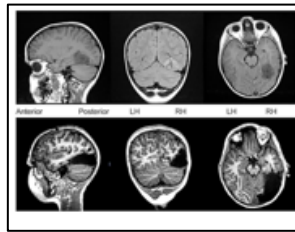
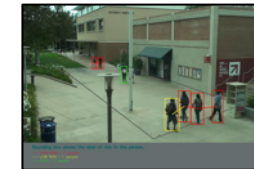


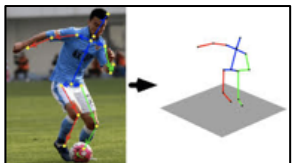
Image Understanding



Brain Tumor Detection



Contact Tracing



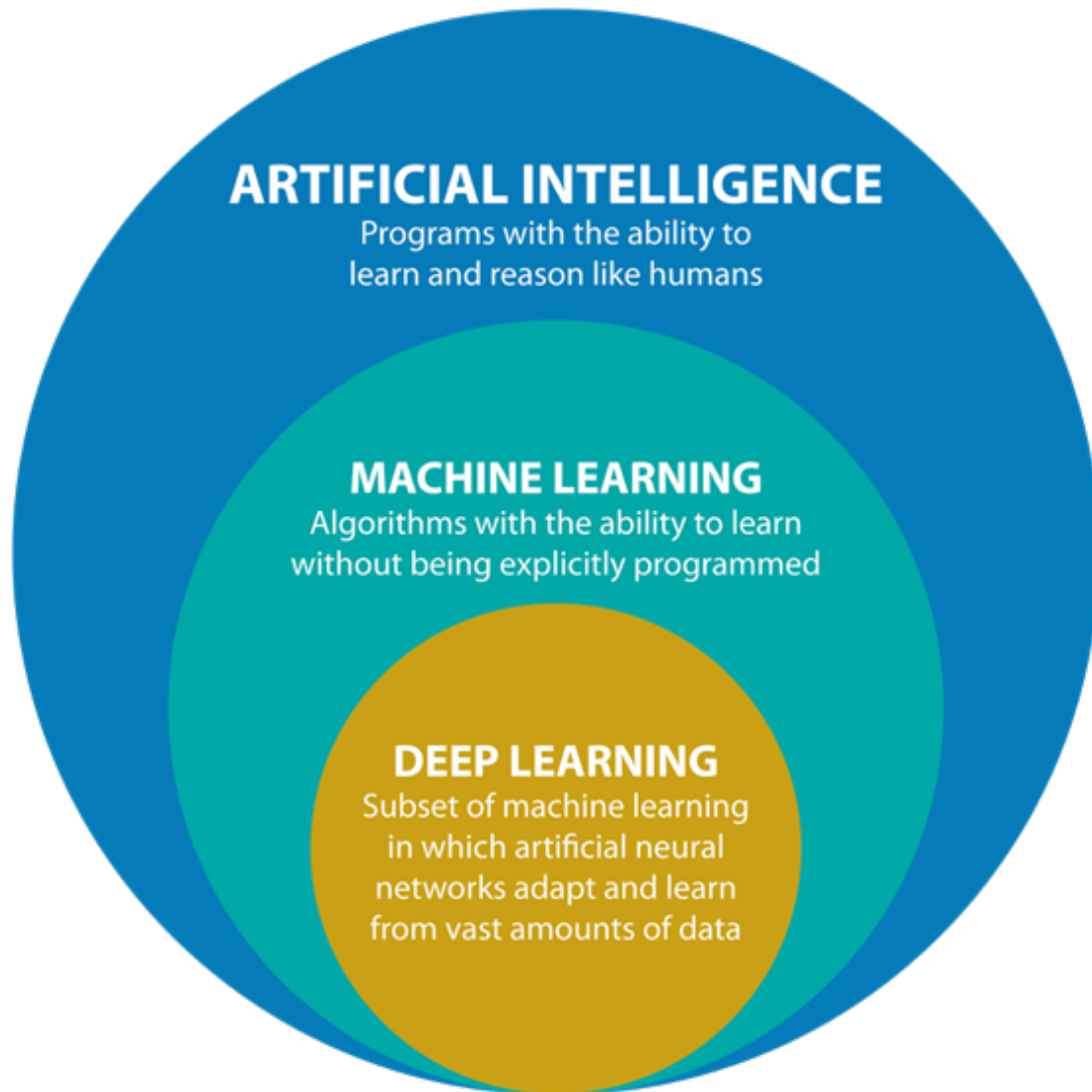
Sports Analytics



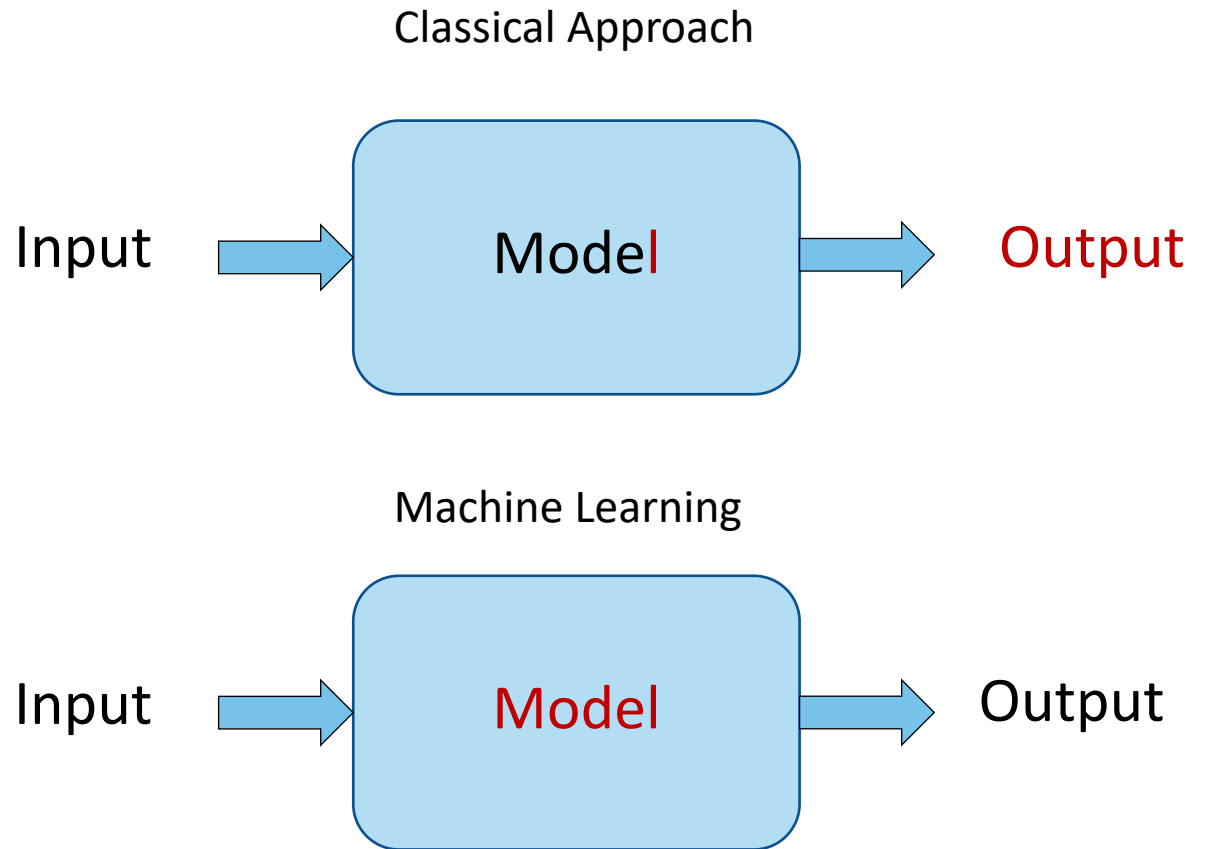
Sentiment Analysis

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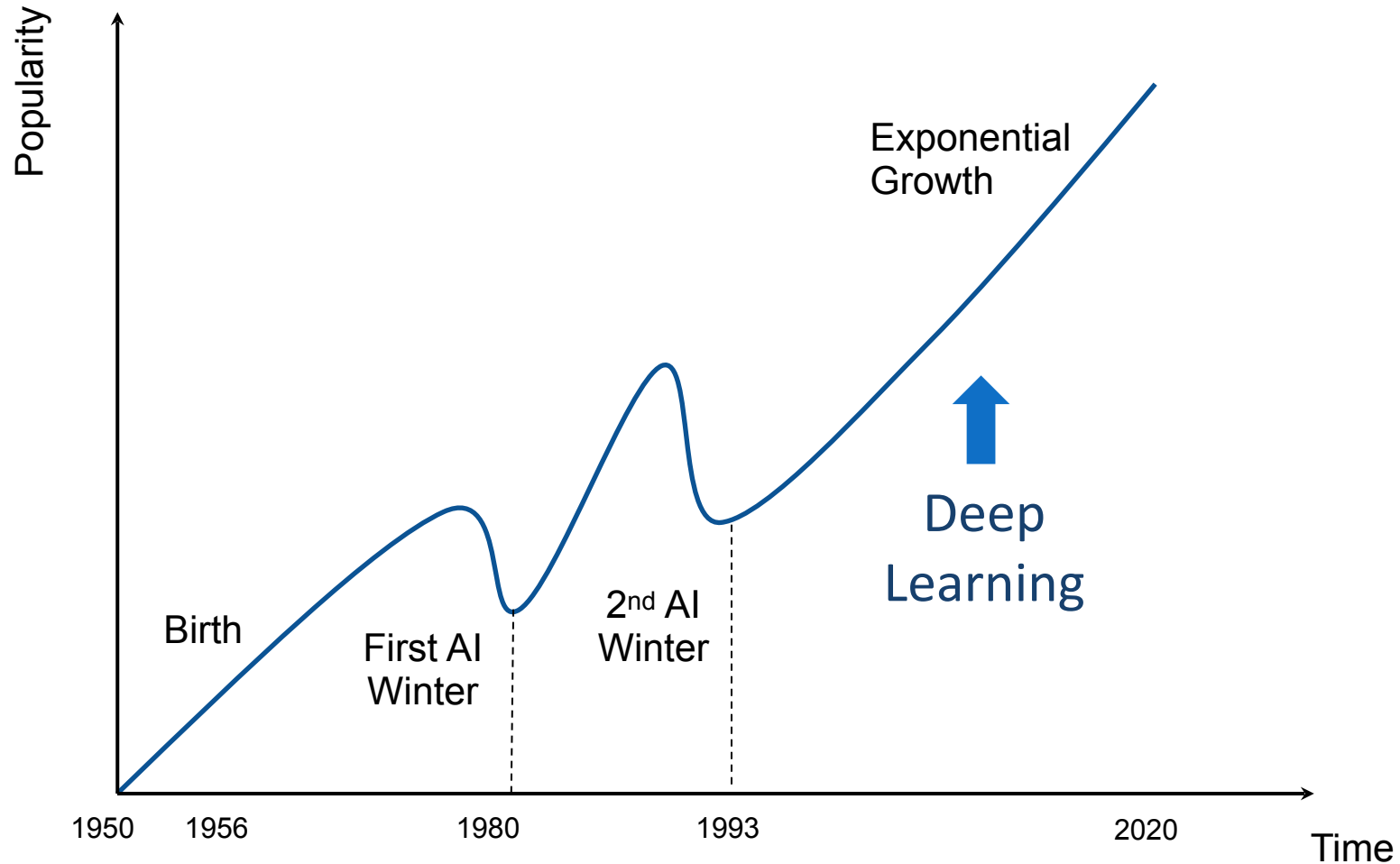
AI vs. ML/DL



■ Given ■ Wanted

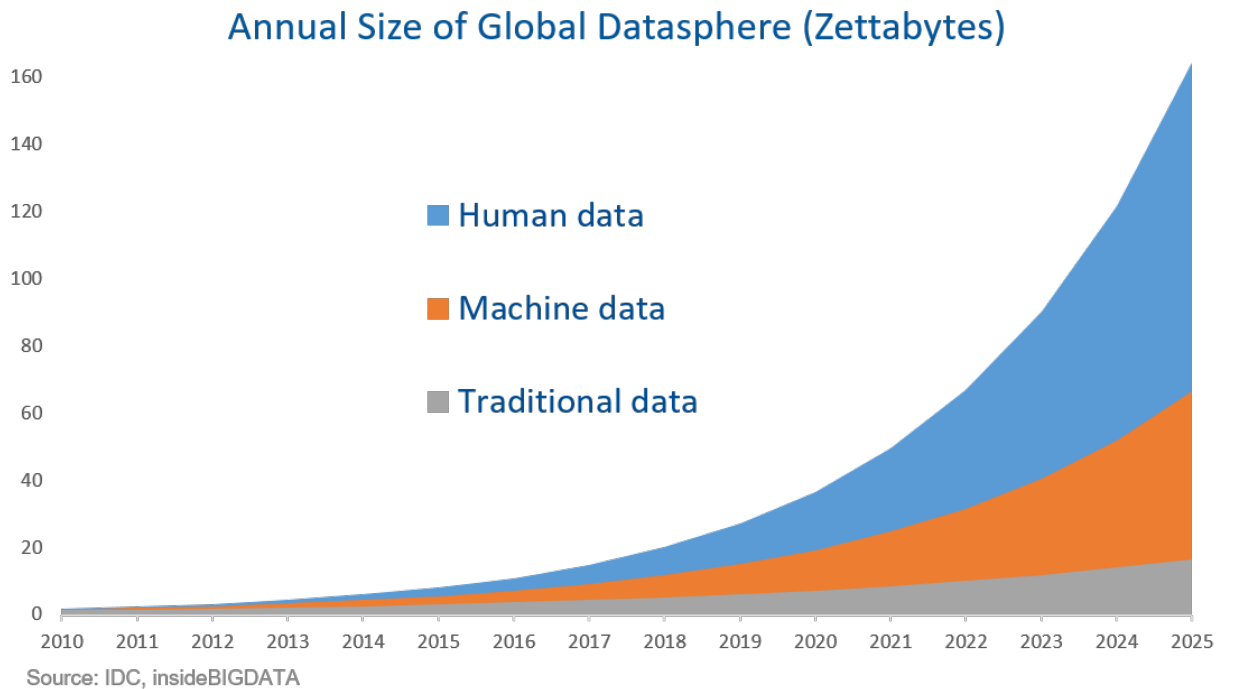
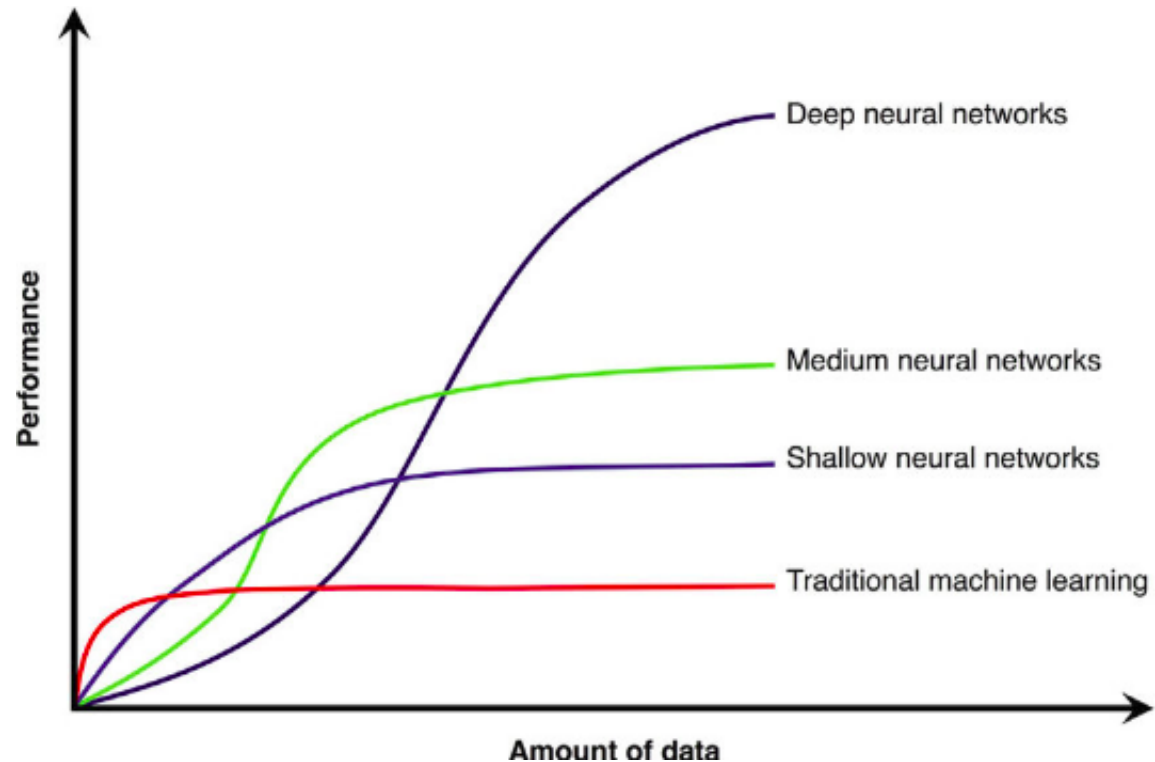


Why Now?

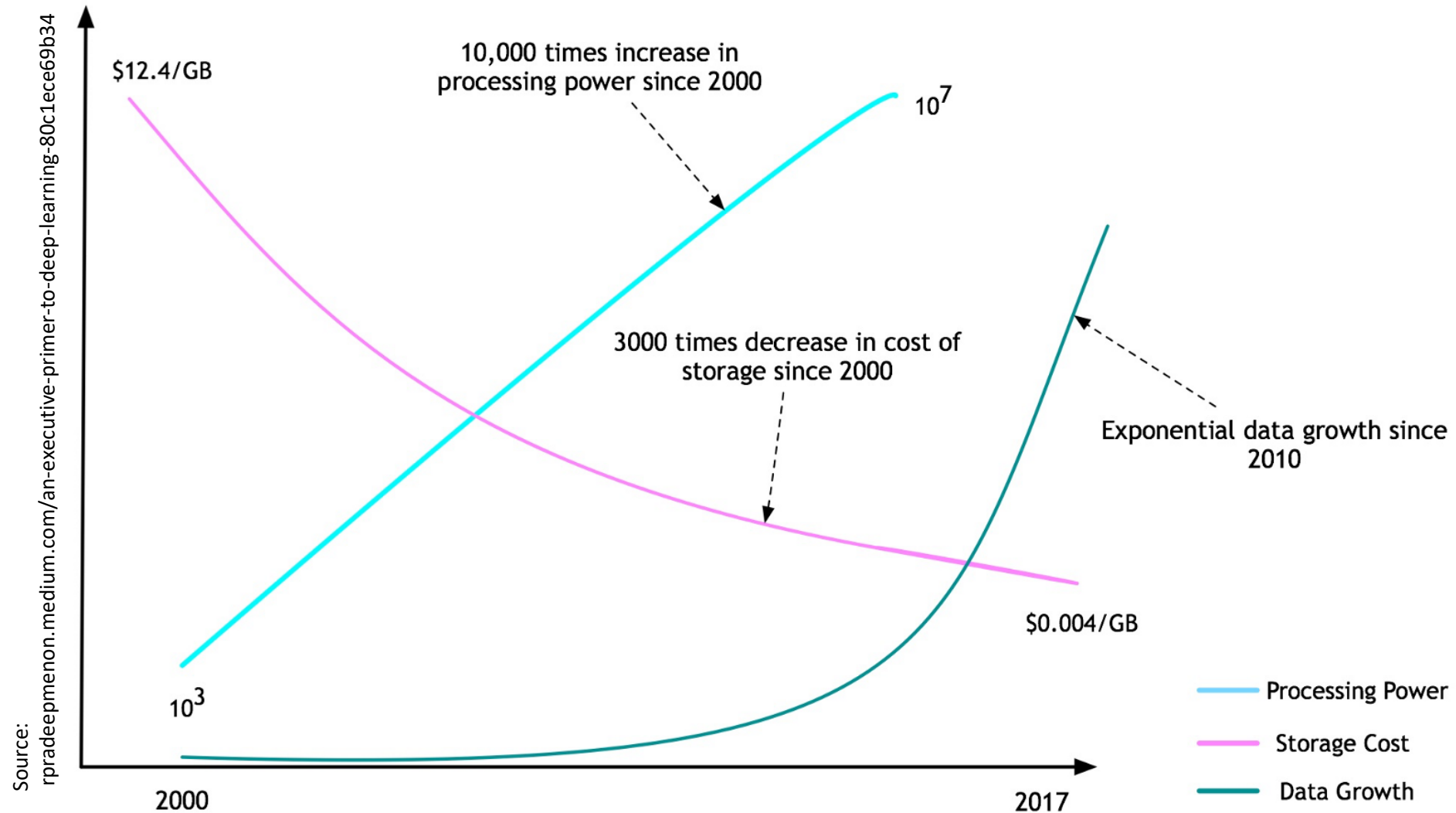


Big Data
+
Processing
Power

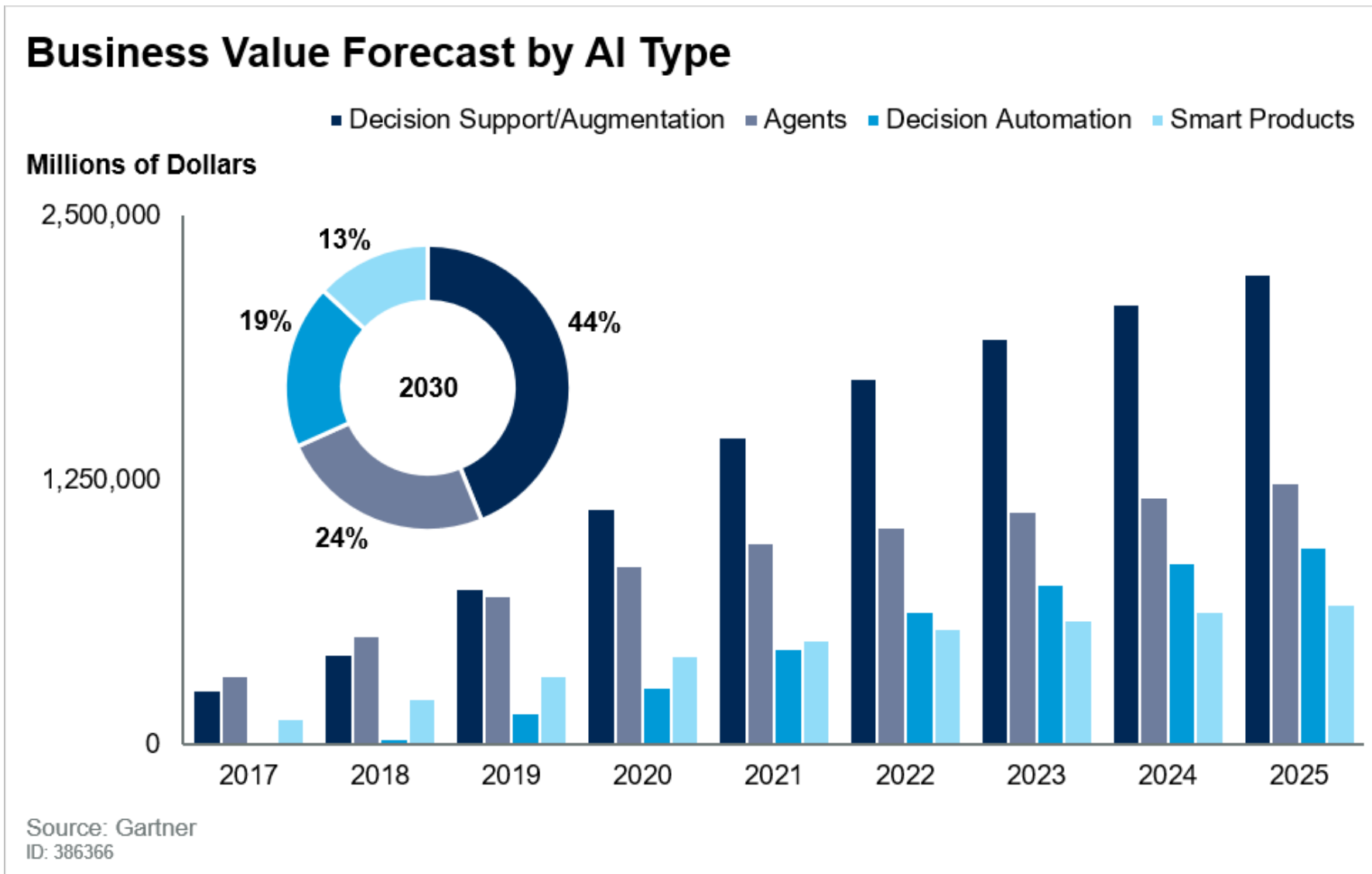
Data Explosion and Impact




Processing Power & Storage



Business Value of AI



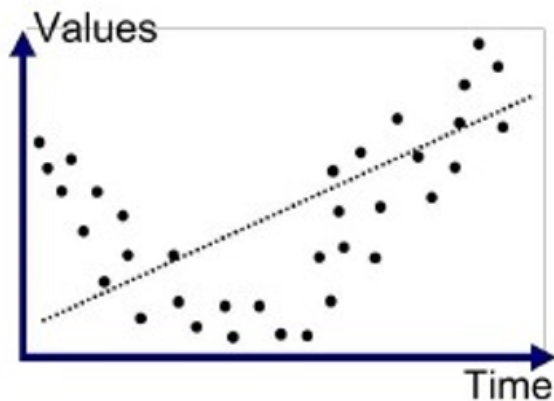
Major Challenges of AI in Industry

- 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

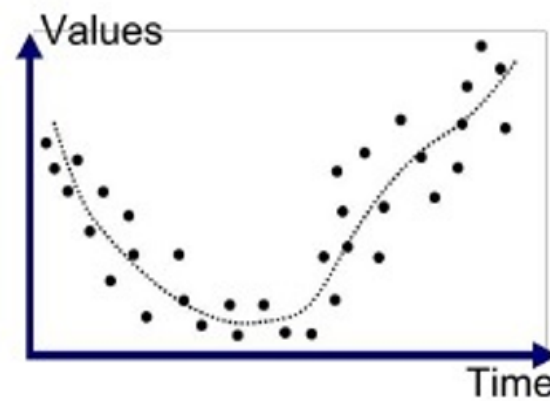
Deep Learning Refresher

The case for Neural Networks

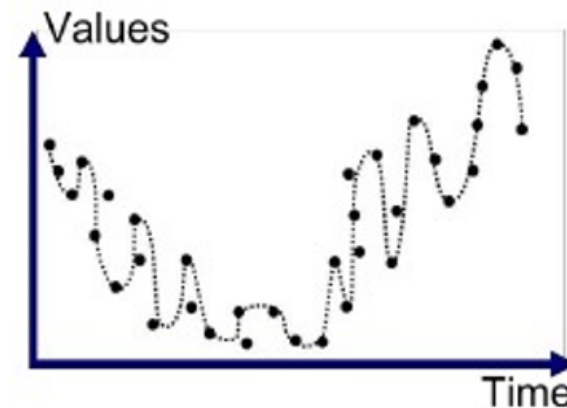
- The main goal of ML is to find a model that not only fits well on training data but also generalizes well on new unseen data.
- Generally, the best approach is to use a complex non-linear model (to avoid underfitting) but prevent overfitting using regularization methods.



Underfitted



Good Fit/Robust

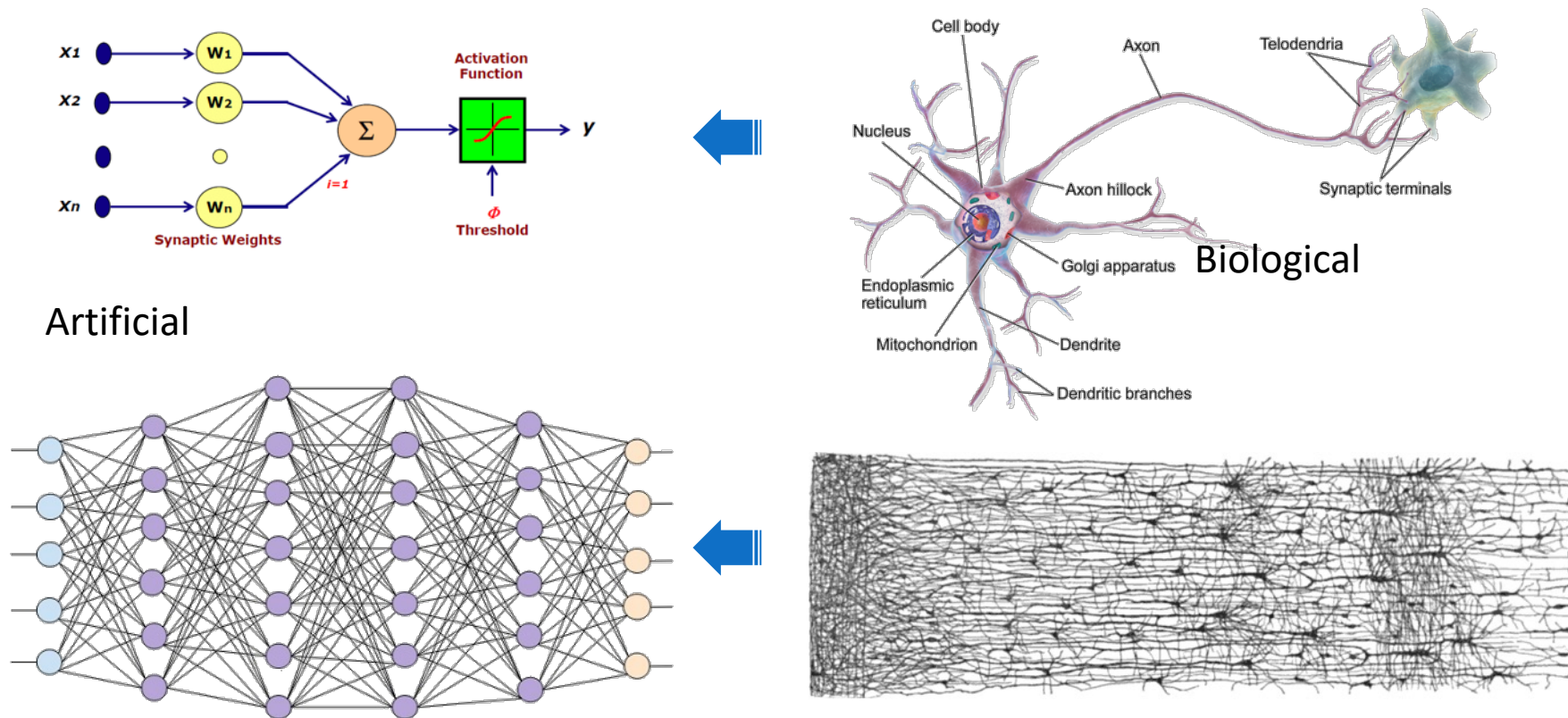


Overfitted

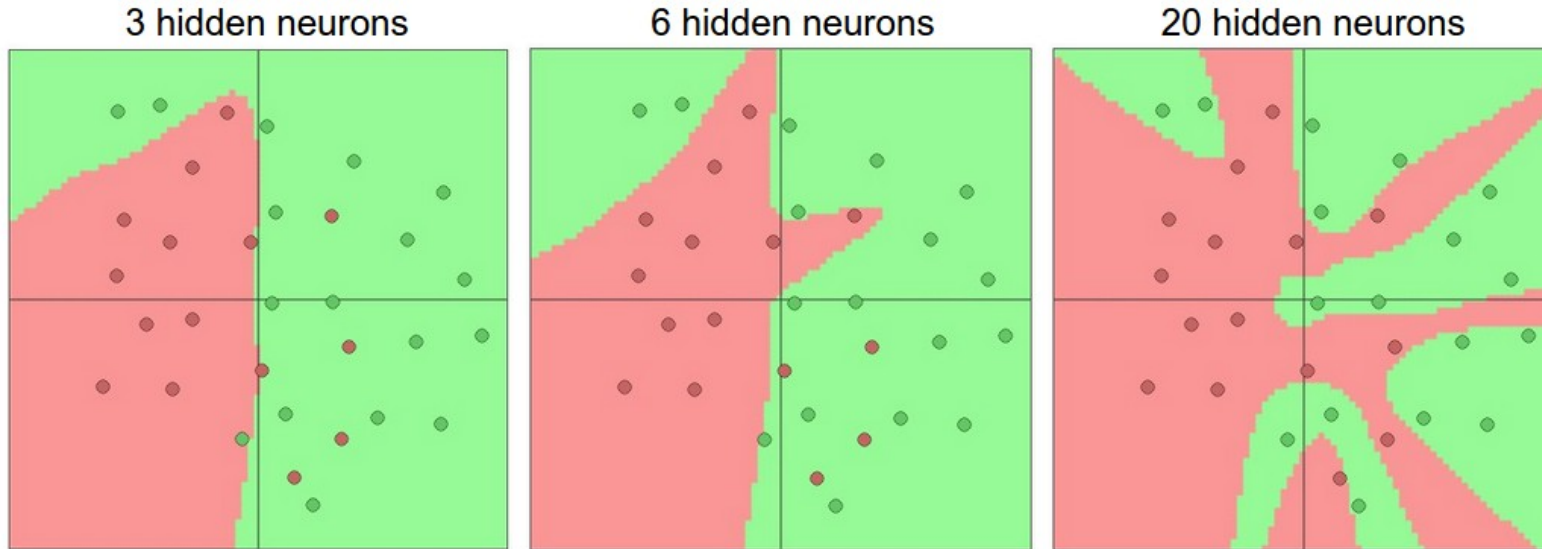
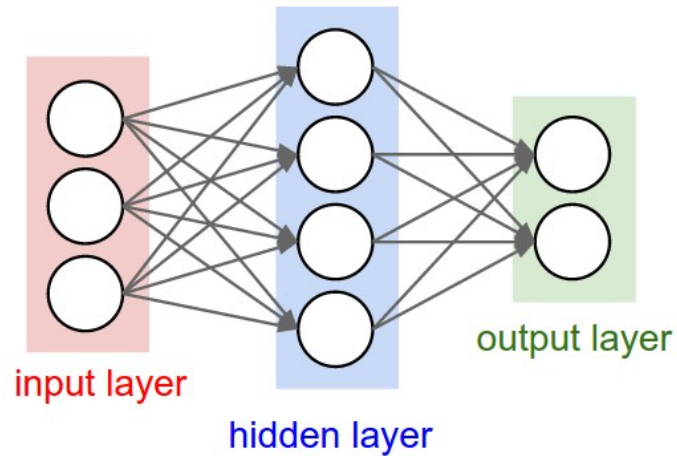
Source: medium.com/@anupbhande

Neural Networks

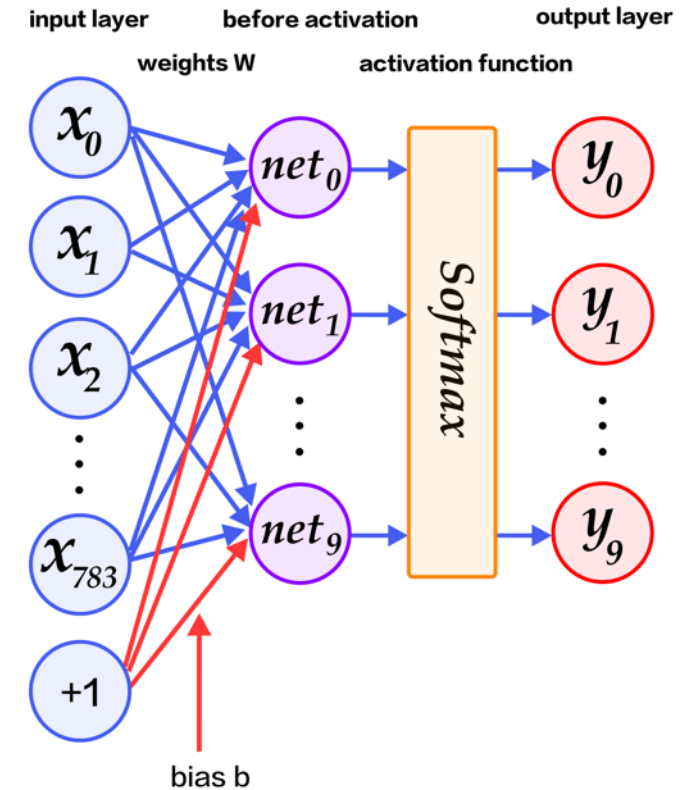
- A neural network can approximate any continuous function, provided it has at least one hidden layer and uses non-linear activations there (Universal Approximation Theorem).



Neural Networks Classifiers



Source: CS231n Course Stanford



Popular Deep Learning Frameworks



TensorFlow



PyTorch



Keras



Sonnet

