울산대학교 공과대학 IT융합학부
IT융합전공

Introduction to Deep Learning

Fall 2024

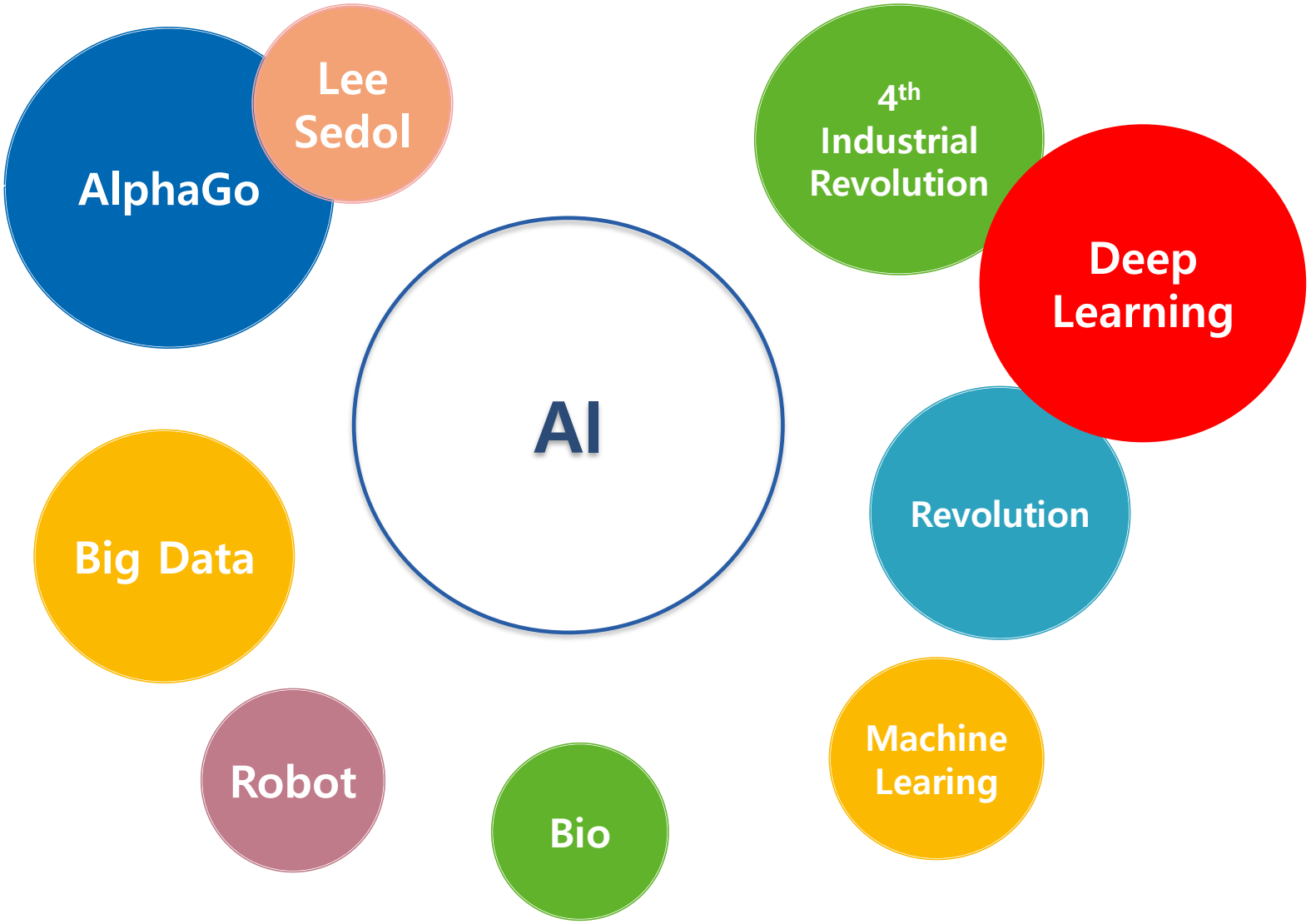
School of IT Convergence

Prof. Daehwan Kim

Topics

- Introduction to AI applications
- Machine Learning Basics
  - Training, Test
  - Supervised Learning: Regression, Classification
  - Unsupervised Learning: Clustering
- **CNN** (Convolutional Neural Network)
- **RNN** (Recurrent Neural Network)
- **GAN** (Generative Adversarial Network)
- **Transformer, Attention, Transfer, Meta, Zero/Few-shot**
- Their Applications

What do you think about AI ? (1)



Artificial Intelligence ? (1)

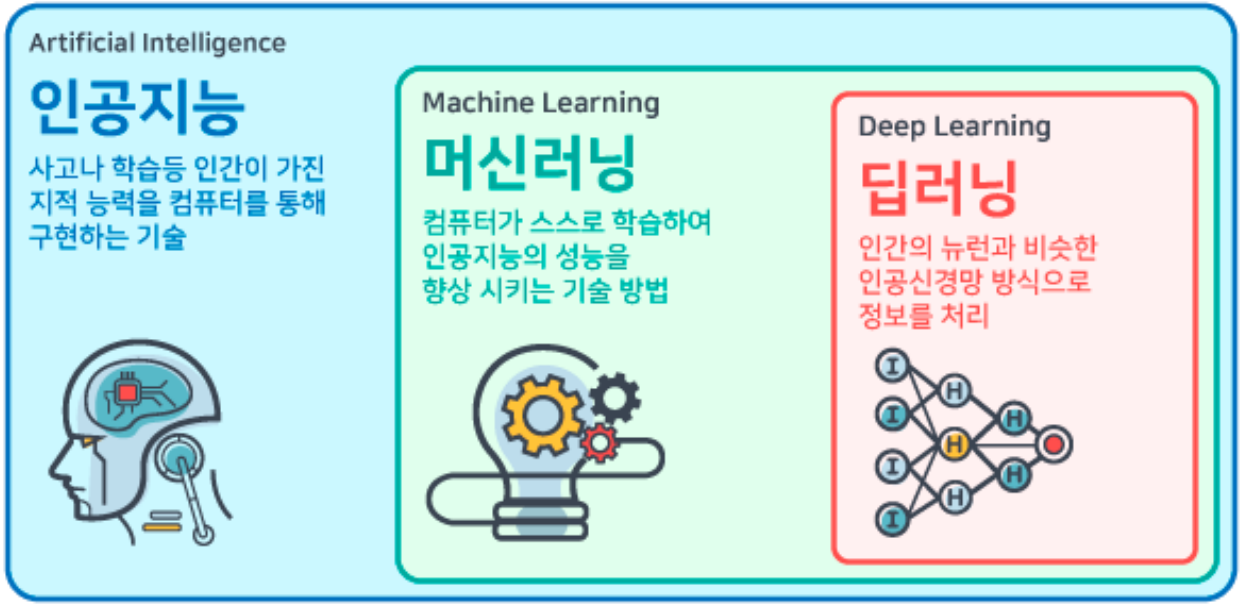
- It allows machines to think, judge and act on their own

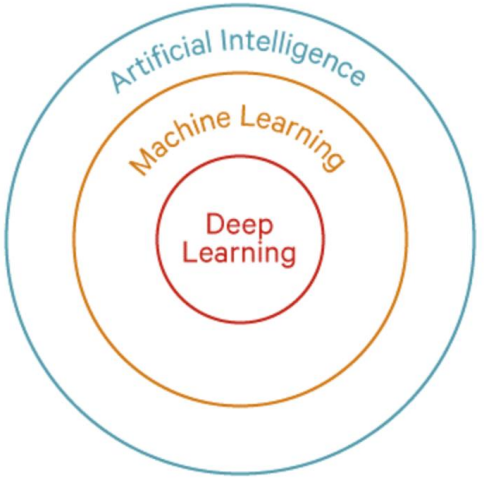
Research that develops algorithms and techniques that enable machines to learn

딥러닝 ?!
[Deep Learning]

One of the learning algorithms in ML

Artificial Intelligence ? (2)





Artificial Intelligence (AI) ⇒ **Deep Learning (DL)**

AI – Top trend in the IT

영상 출처 – youtube

AI – Example (1)

AI Try-On

영상 출처 – youtube

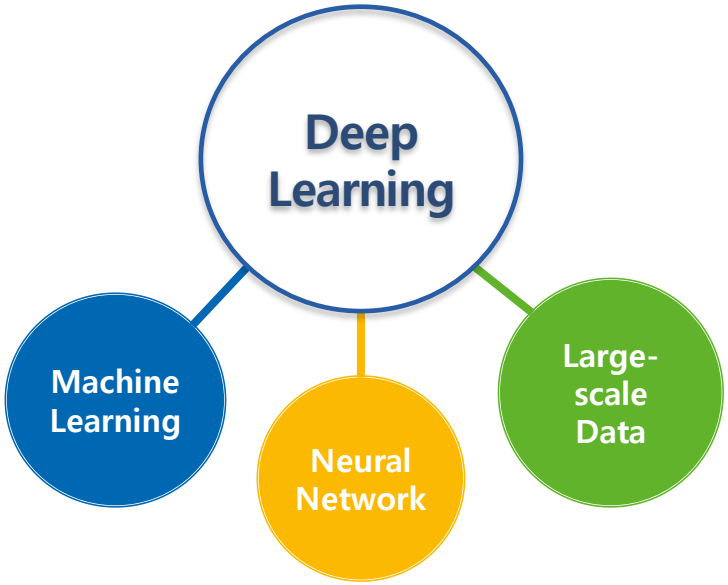
AI – Example (2)

Apple vision pro

영상 출처 – youtube

Deep Learning (1)

- **Views**
  1. Academic – Maverick of Machine Learning
  2. Born – DNA of Neural Network
  3. Statistical – Large-scale Data, Big Data



An Algorithm in machine learning

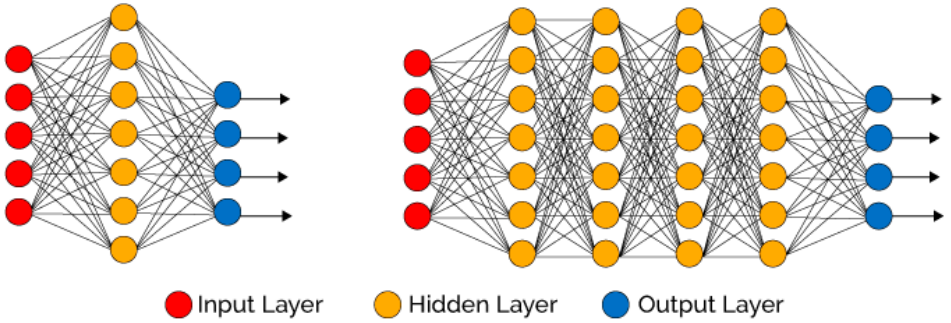
With the ability to think and learn

From large amounts of data !!

Deep Learning ? (2)

- **Definitions**
  1. A set of algorithms using several nonlinear transformation techniques as a branch of machine learning
  2. An algorithm used to cluster or classify objects or data
  3. An upgraded version of an artificial neural network

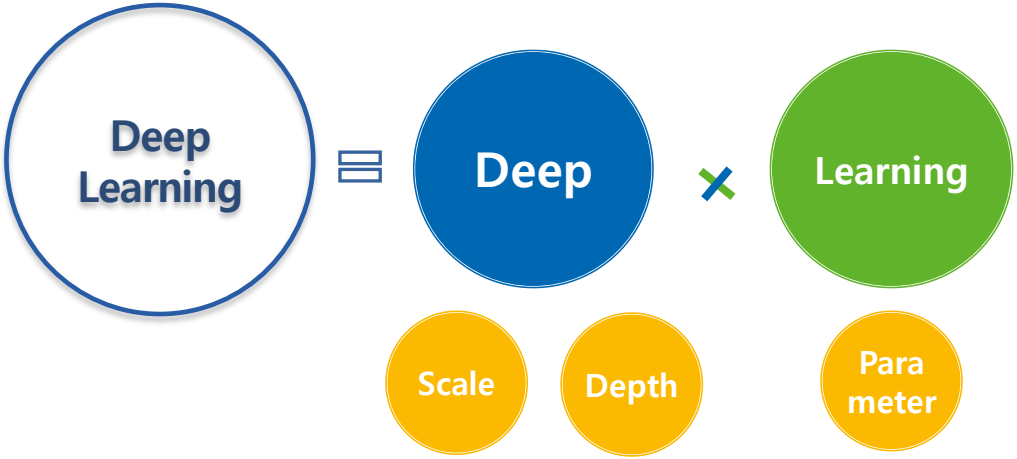
Geoffrey Hinton (University of Toronto)

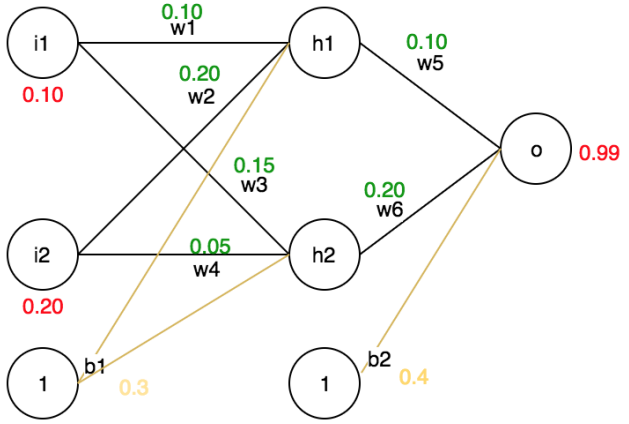


Neural Network Structure

Deep Learning ? (3)

- **Word perspective**
  1. Large scale data ➔ Database
  2. Deep depth NN structure ➔ VGG, ResNet
  3. Parameter Learning ➔ Weight parameter determination





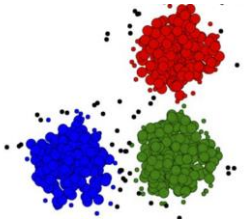
3 Types of Learning

Supervised Learning

- Data(O), Label(O)
- Prediction (Classification, Regression)
  (Ex) Convolutional NN

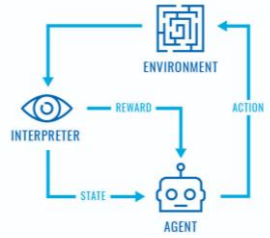
Unsupervised Learning

- Data(O), Label(X)
- Finding hidden data structures (Clustering)
  (Ex) K-mean clustering



Reinforcement Learning

- An agent learns while taking ac action and getting a reward for a given environment (State).
  (Ex) Deep-Q-Network



Q&A