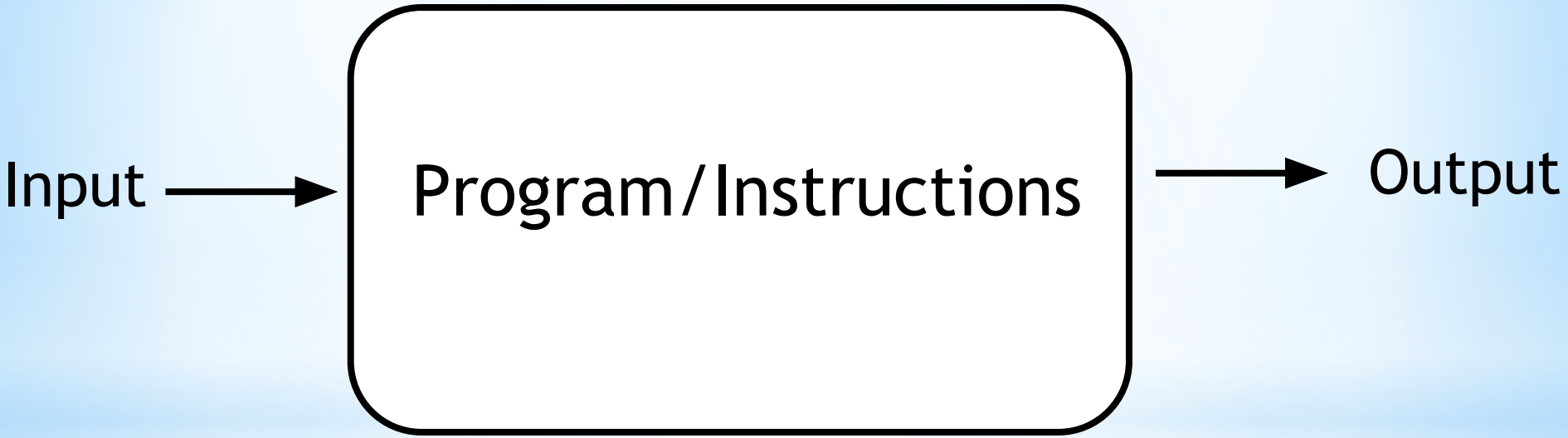
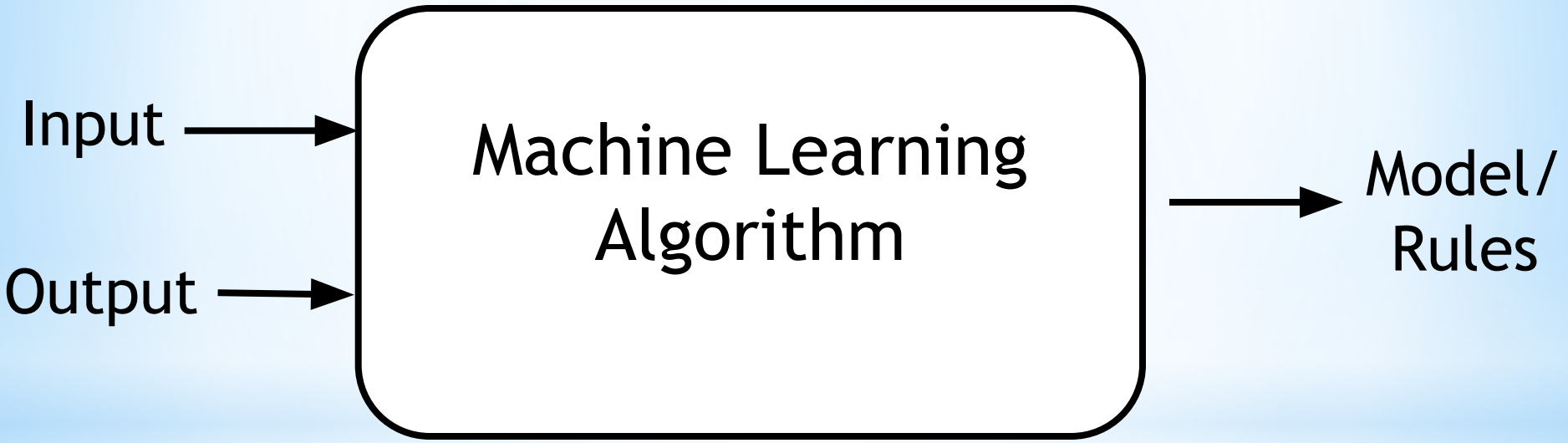
MACHINE LEARNING

The Programming Approach



The Machine Learning Approach



How To Define Machine Learning ?

- Allows machines to think (X)
- Allows machines to take their own decisions (X)
- Allows machines to learn by themselves
- A computer program is said to **learn** from experience *E* with respect to some class of tasks *T* and performance measure *P*, if its performance at tasks in *T*, as measured by *P*, improves with experience *E*.
- Machine learning allows machines to pick up patterns from data

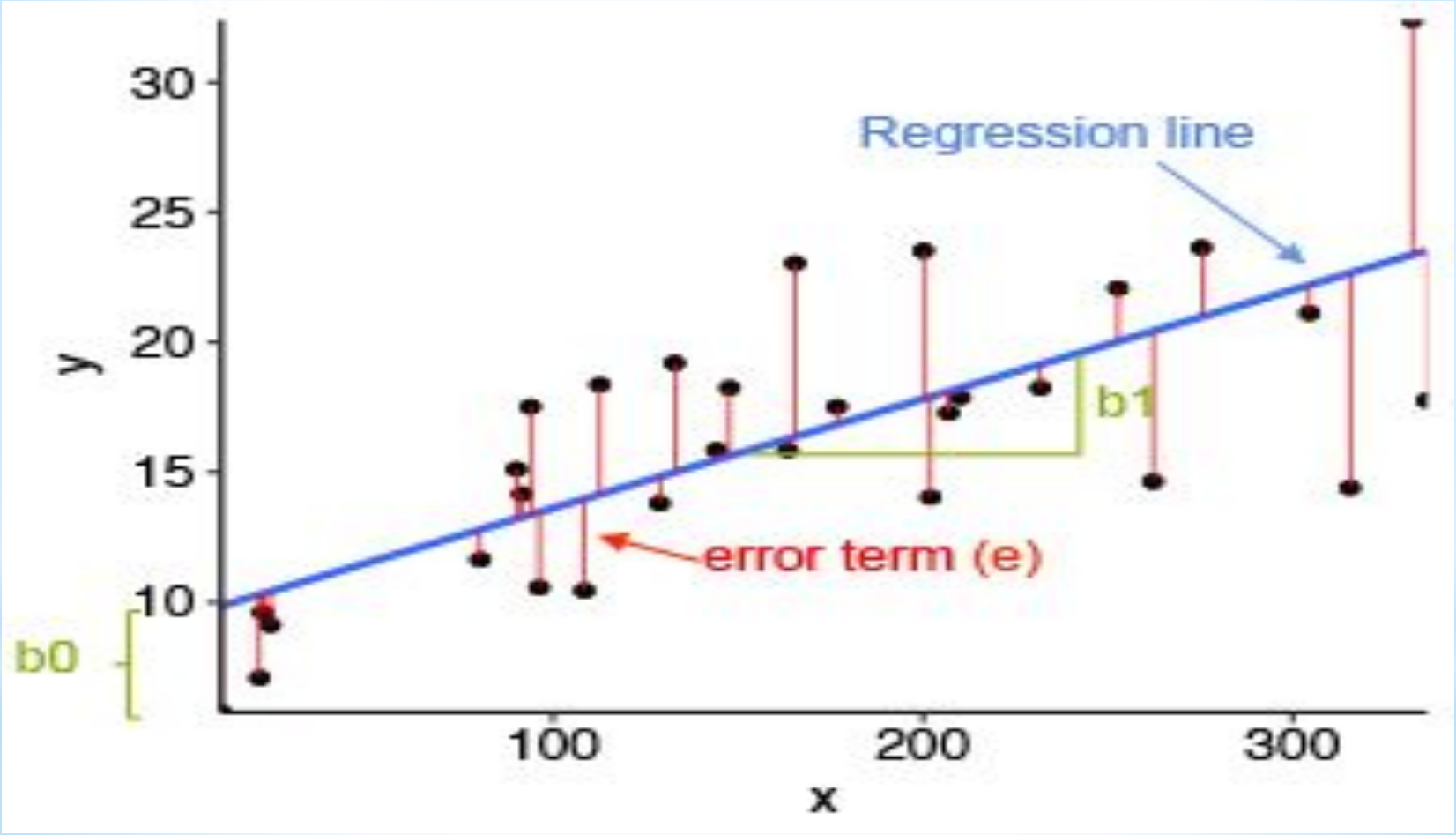
TYPES OF MACHINE LEARNING

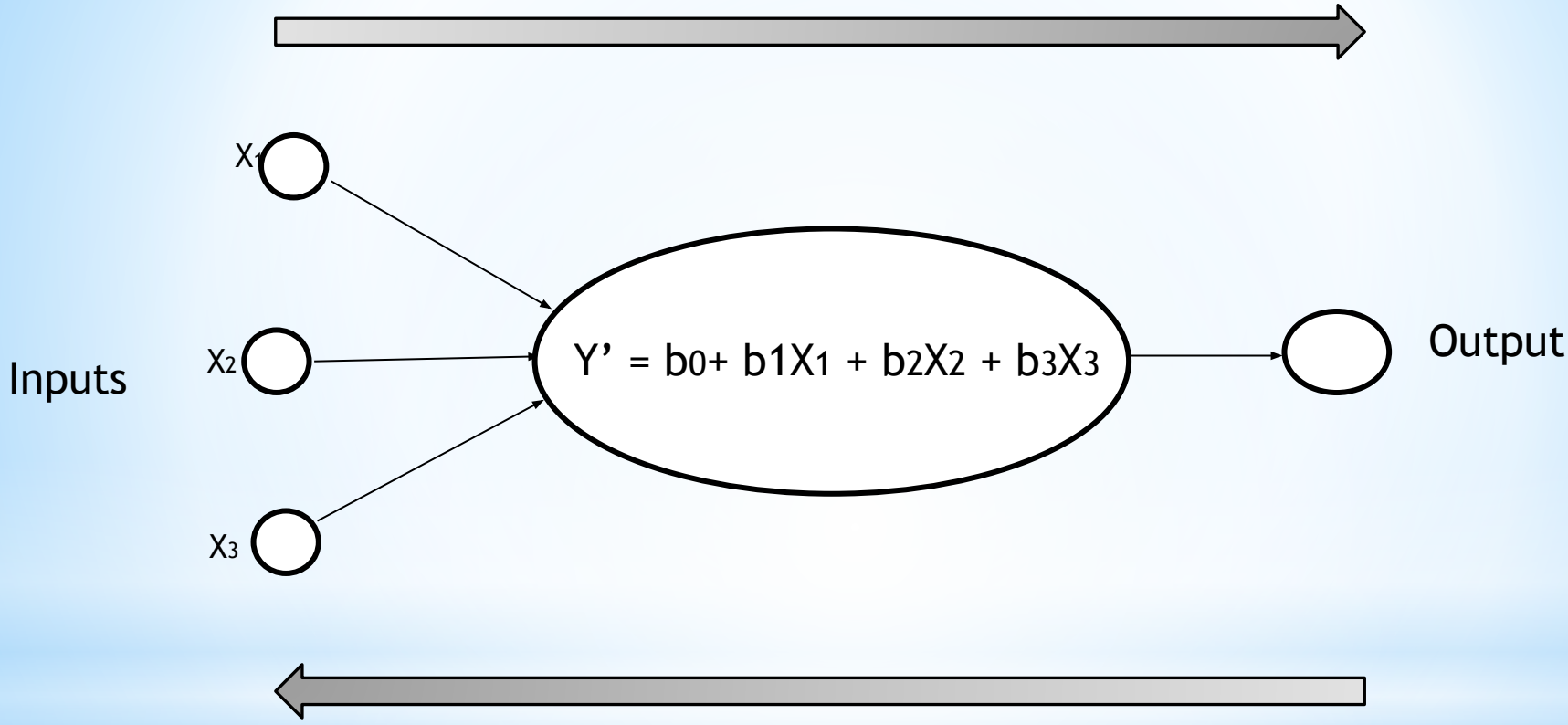
- Supervised Learning
  - Regression
  - Classification
- Unsupervised Learning
  - Clustering
- Reinforcement Learning

Steps In Machine Learning

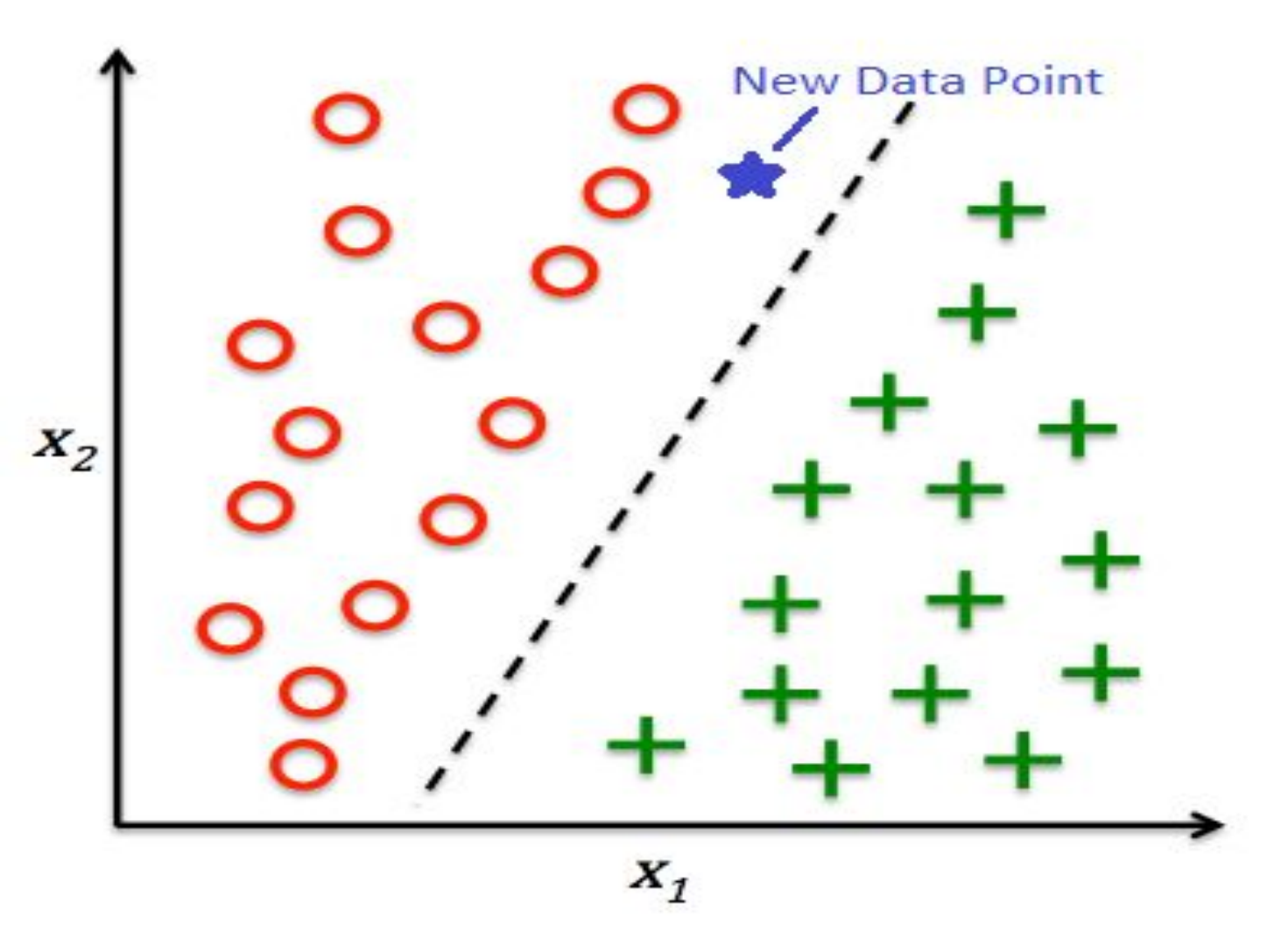
1) Data Collection
2) Data Preparation
3) Exploratory Data Analysis
4) Modelling
5) Evaluation
6) Tuning
7) Deployment

Simple Linear Regression

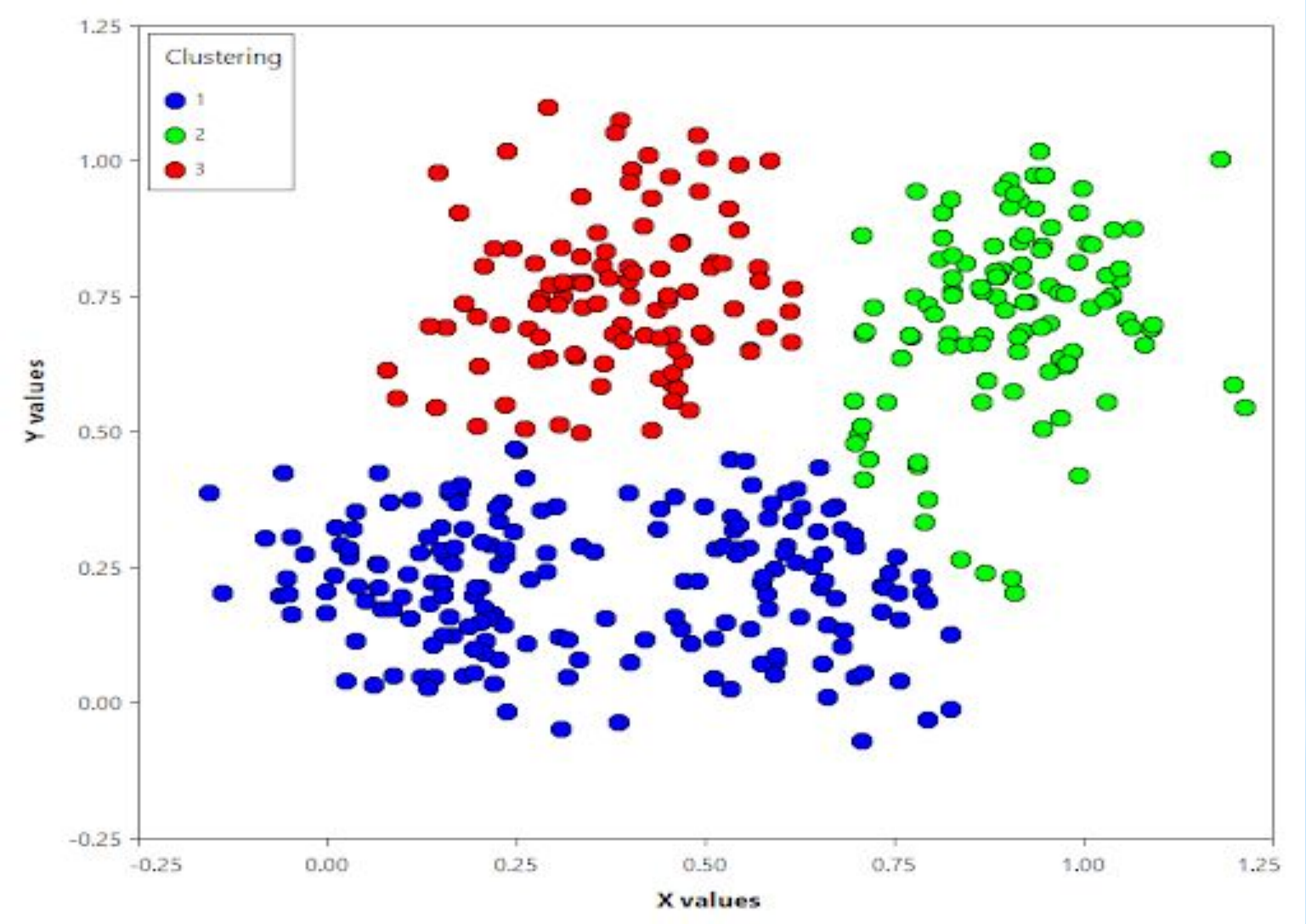



Inputs
X1
X2
X3
Y' = b0+ b1X1 + b2X2 + b3X3
Output

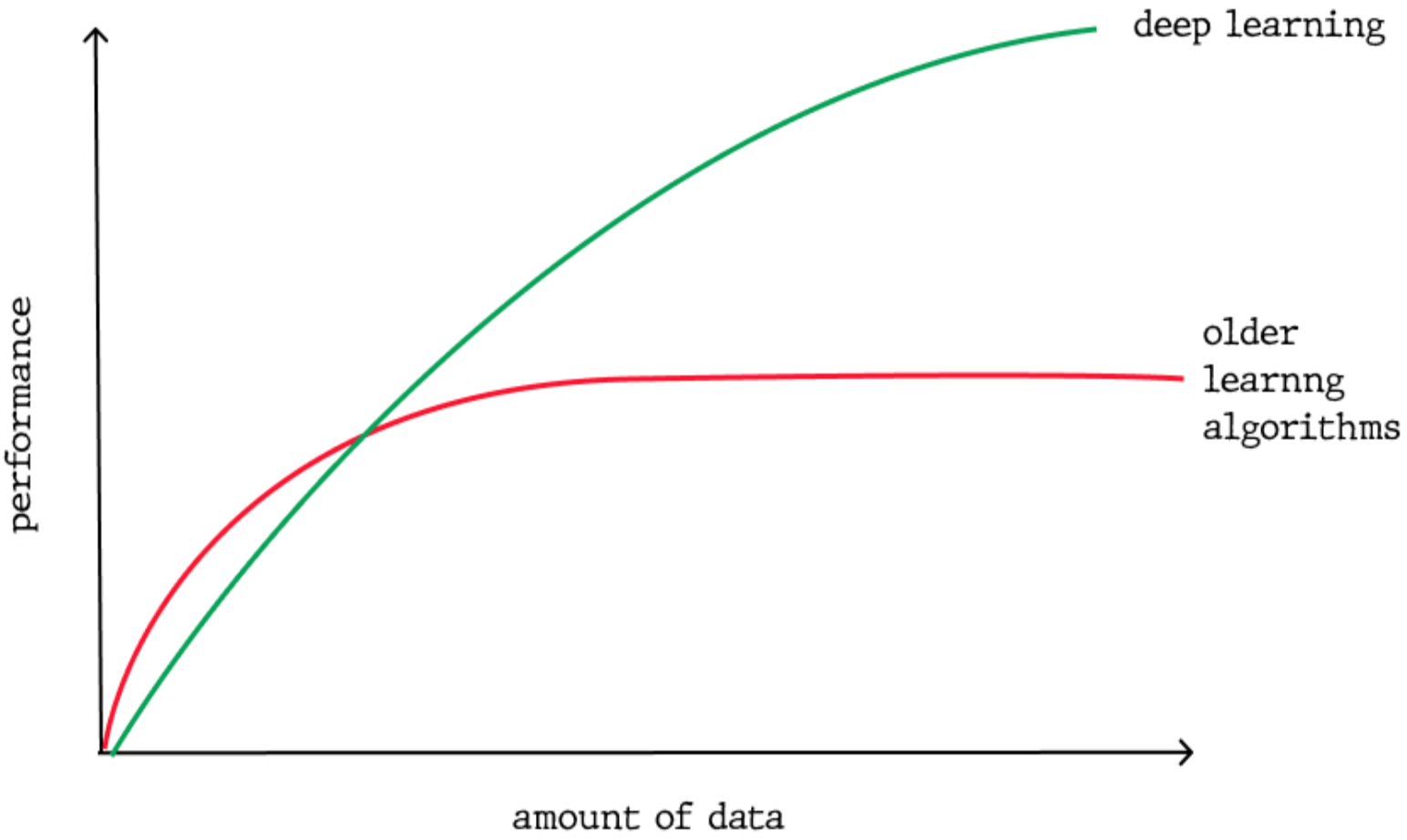
CLASSIFICATION



Clusterin

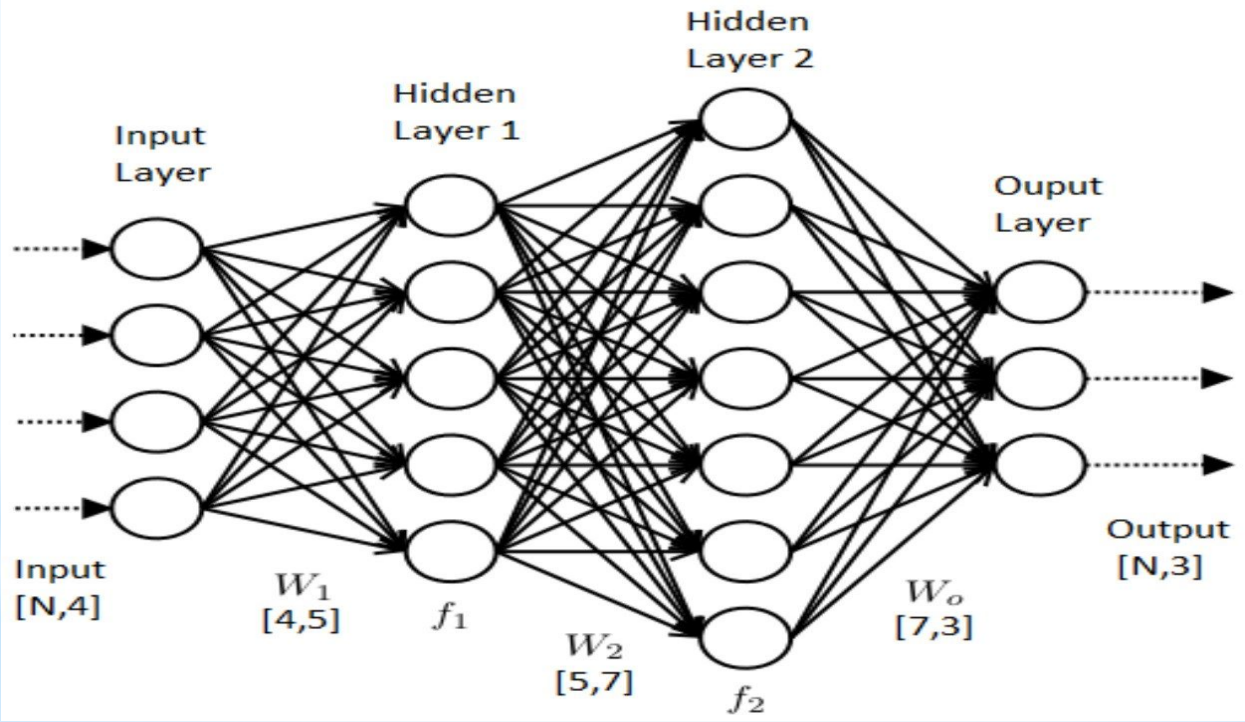

Clustering
1
2
3
1.25
1.00
0.75
0.50
0.25
0.00
-0.25
Y values
-0.25
0.00
0.25
0.50
0.75
1.00
1.25
X values

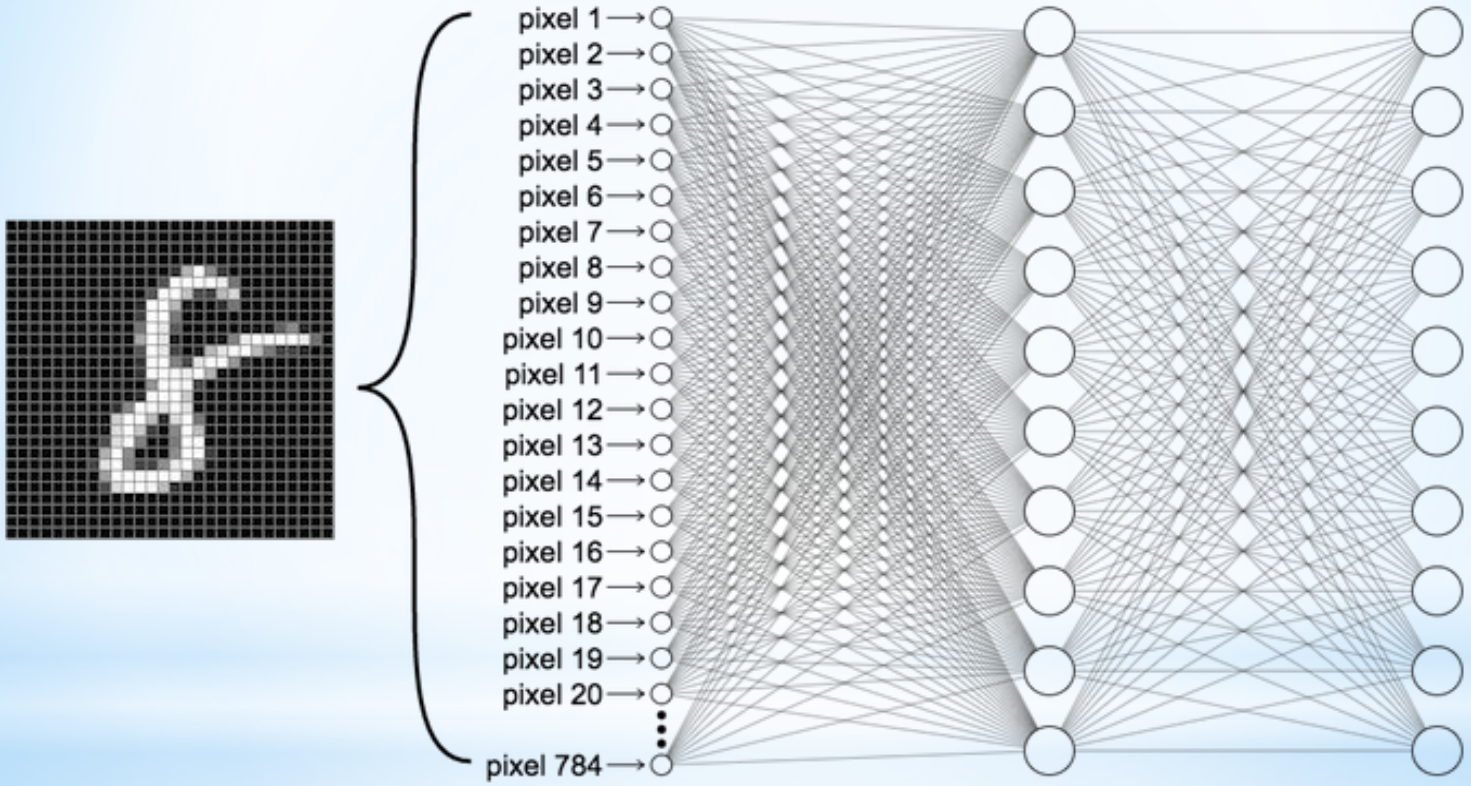
Deep Learning



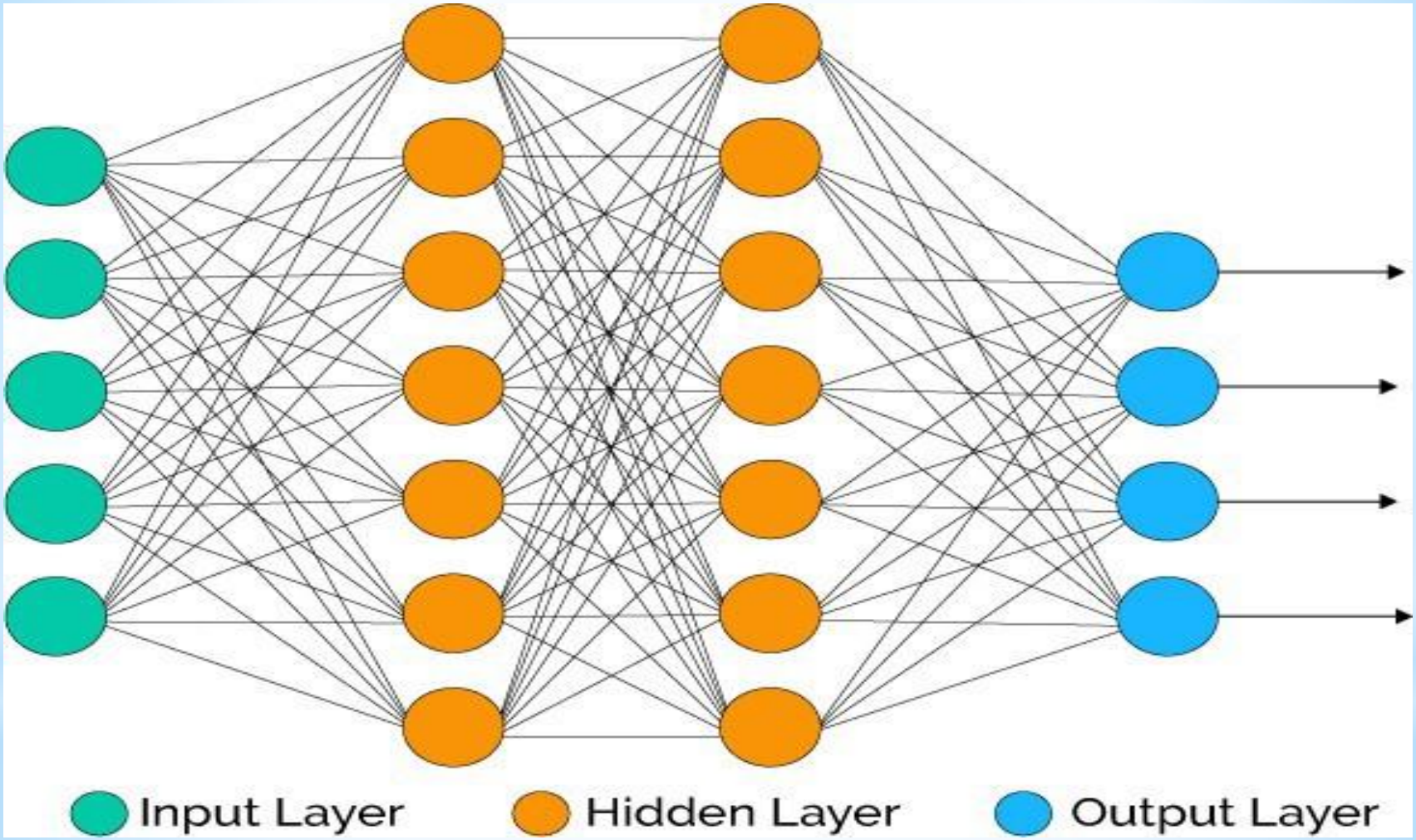
Artificial Neural Networks

- ANNs are densely interconnected network of a large number of processing nodes.
- These nodes are organized into layers which process data in a feed forward manner.

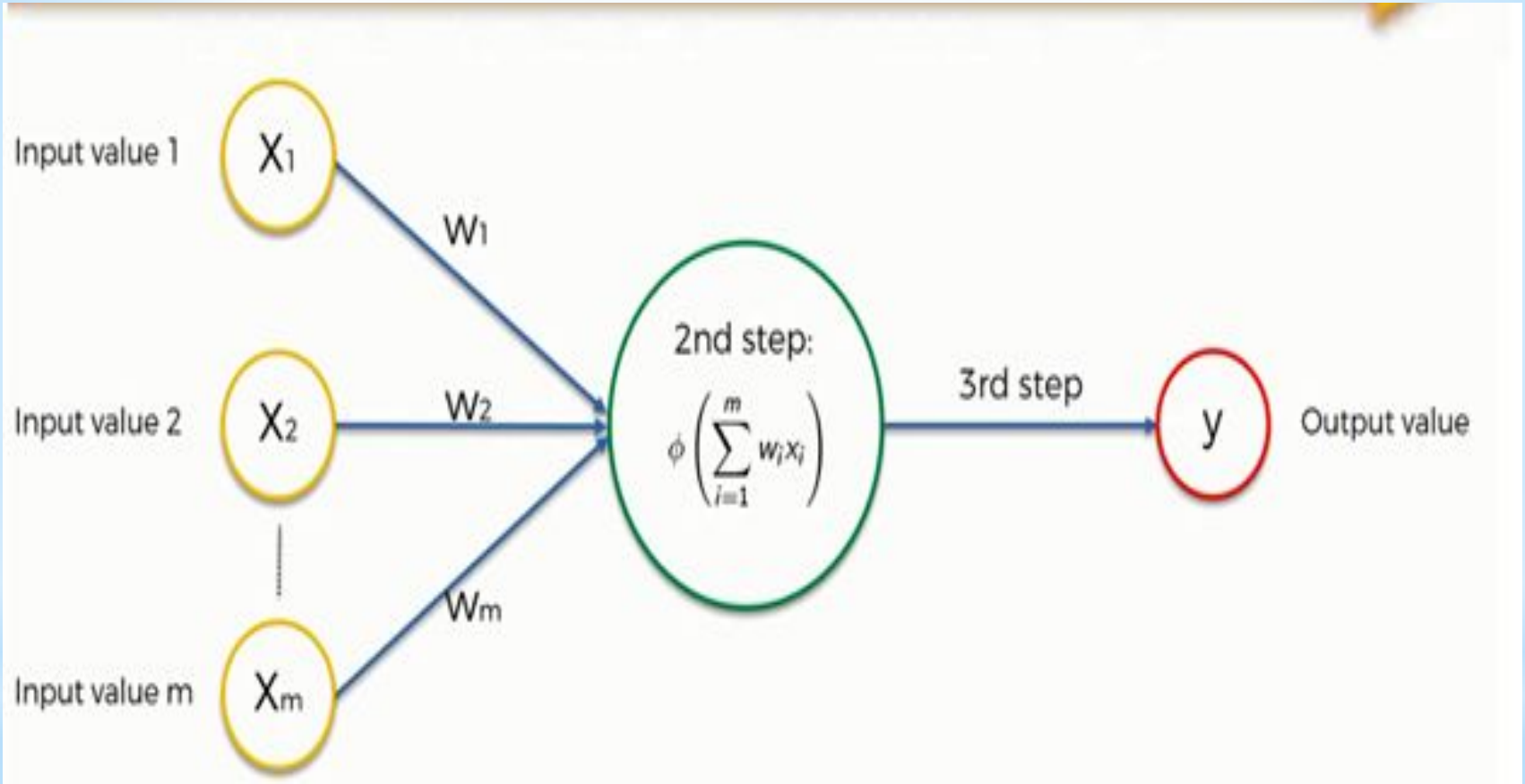



pixel 1
pixel 2
pixel 3
pixel 4
pixel 5
pixel 6
pixel 7
pixel 8
pixel 9
pixel 10
pixel 11
pixel 12
pixel 13
pixel 14
pixel 15
pixel 16
pixel 17
pixel 18
pixel 19
pixel 20
pixel 784

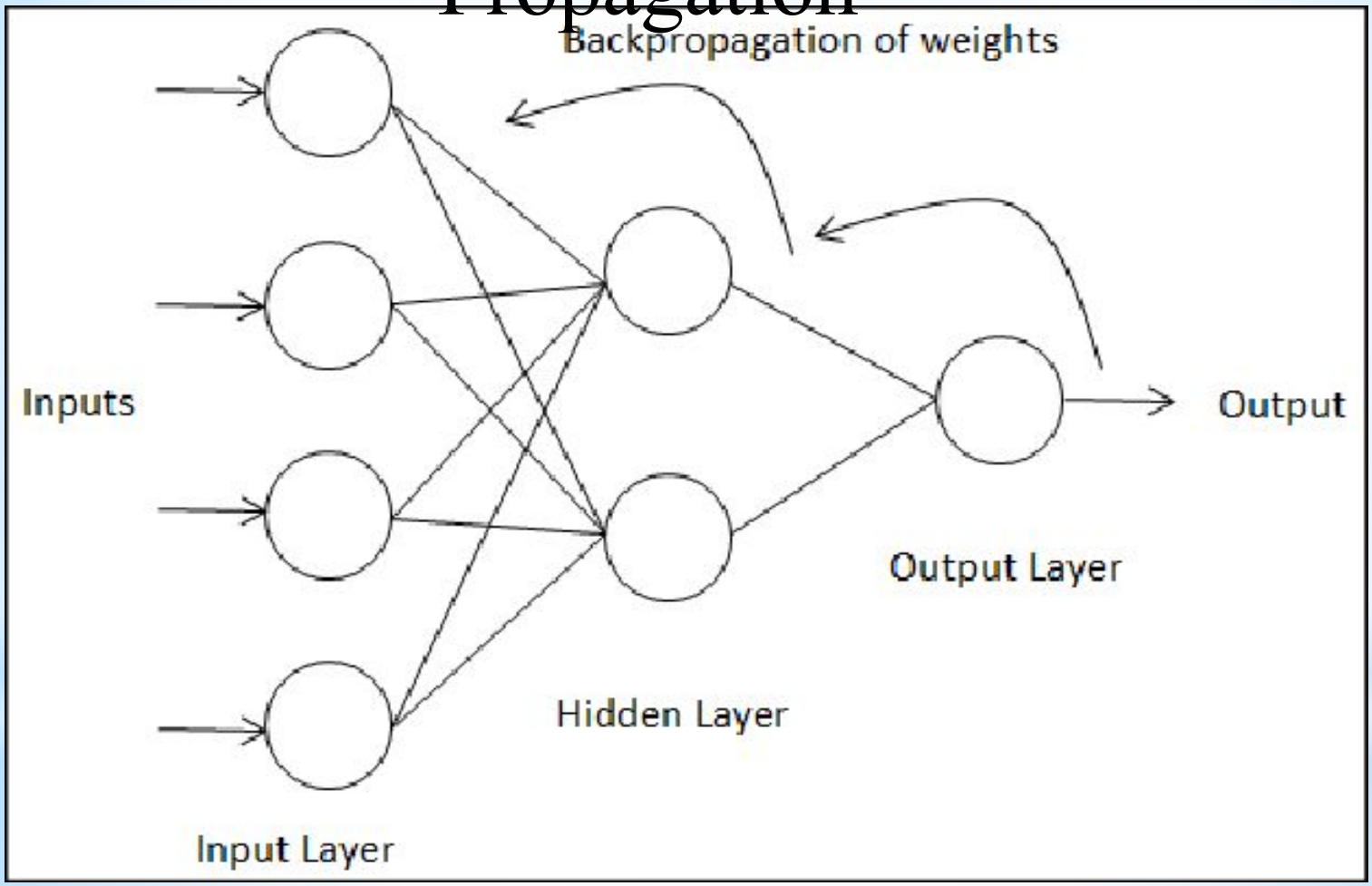
Neural Networks



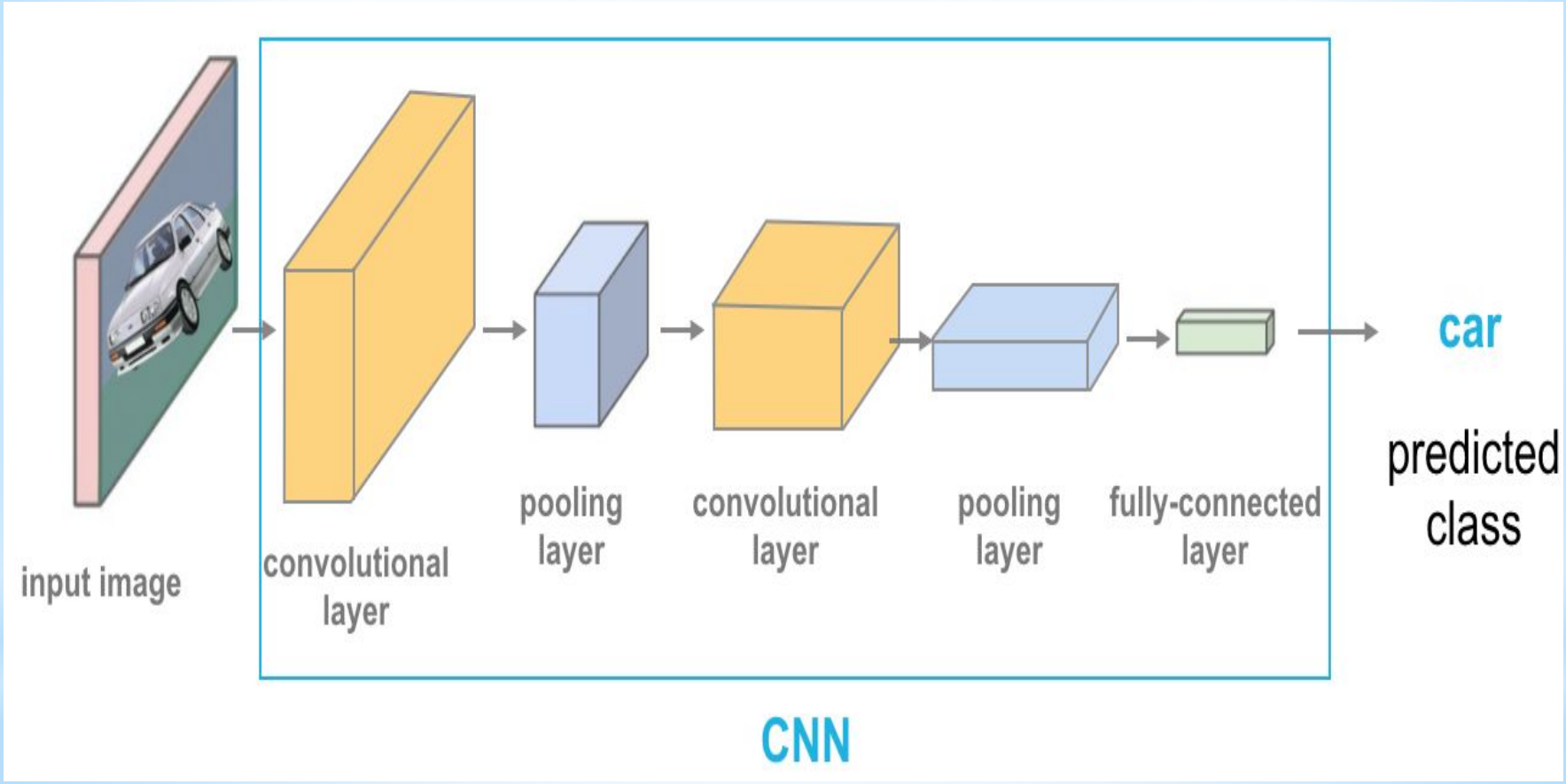
Forward Propagation



Backward Propagation

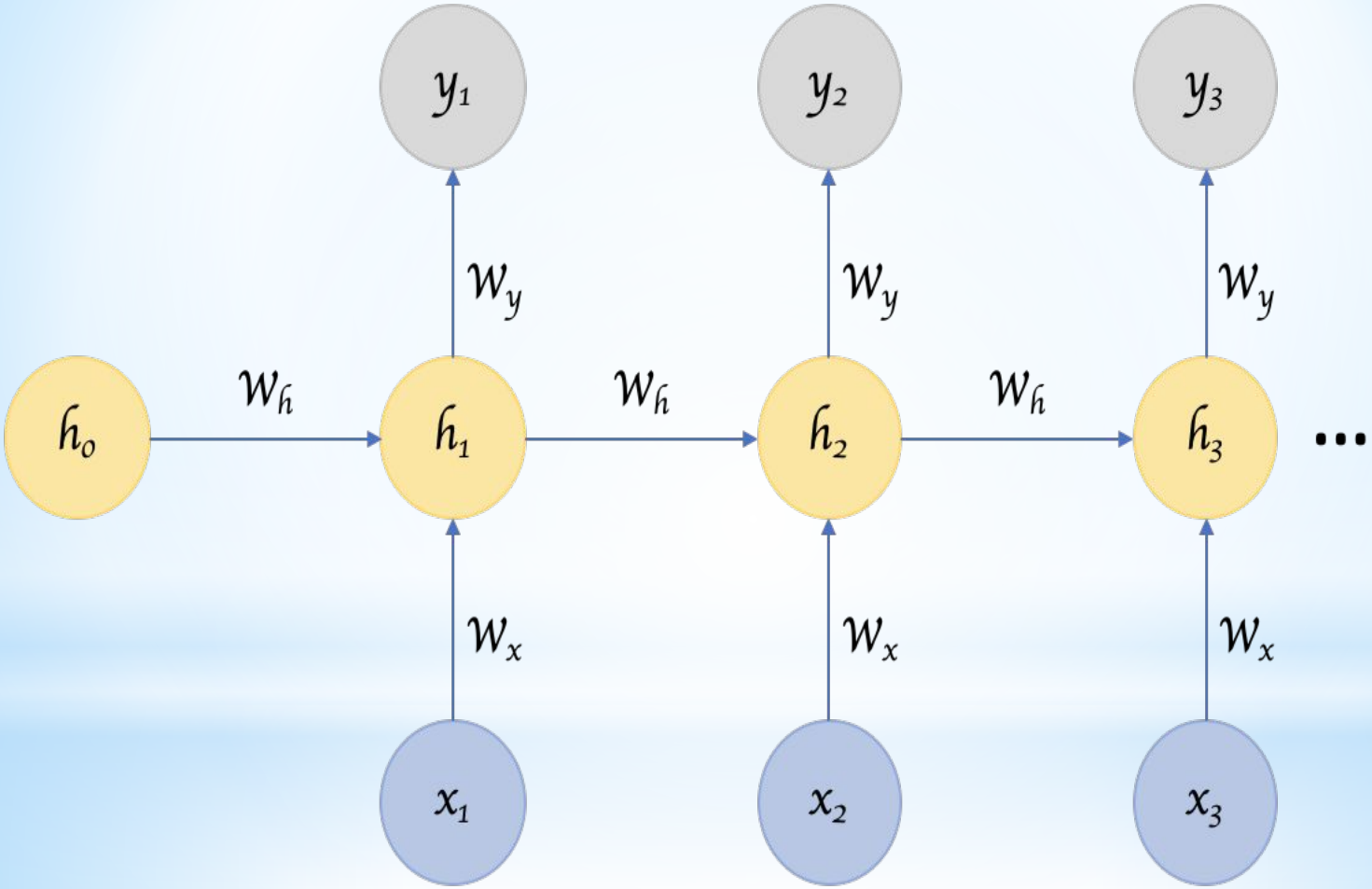


Convolutional Neural Networks




Source: The Telegraph

Recurrent Neural Networks



Libraries / Frameworks

- NumPy
- Pandas
- Matplotlib
- Seaborn
- Scikit-learn
- Tensorflow