Idea Factory Intensive Program #2

딥러닝 홀로서기

#1

이론강의/PyTorch실습/코드리뷰

딥러닝(Deep Learning)에 관심이 있는 학생 발굴을 통한
딥러닝의 이론적 배경 강의 및 오픈소스 딥러닝 라이브러리 PyTorch를 활용한 실습

Acknowledgement

Sung Kim's 모두를 위한 머신러닝/딥러닝 강의
- https://hunkim.github.io/ml/
- https://www.youtube.com/playlist?list=PLlMkM4tgfjnLSOjrEJN31gZATbcj_MpUm

Andrew Ng's and other ML tutorials
- https://class.coursera.org/ml-003/lecture
- http://www.holehouse.org/mlclass/ (note)
- Deep Learning Tutorial
- Andrej Karpathy's Youtube channel

WooYeon Kim & SeongOk Ryu's KAIST CH485 Artificial Intelligence and Chemistry
- https://github.com/SeongokRyu/CH485---Artificial-Intelligence-and-Chemistry

SungJu Hwang's KAIST CS492 Deep Learning Course Material

Many insightful articles, blog posts and Youtube channels

Facebook community
- Tensorflow KR (https://www.facebook.com/groups/TensorFlowKR/)
- Pytorch KR (https://www.facebook.com/groups/PyTorchKR/)

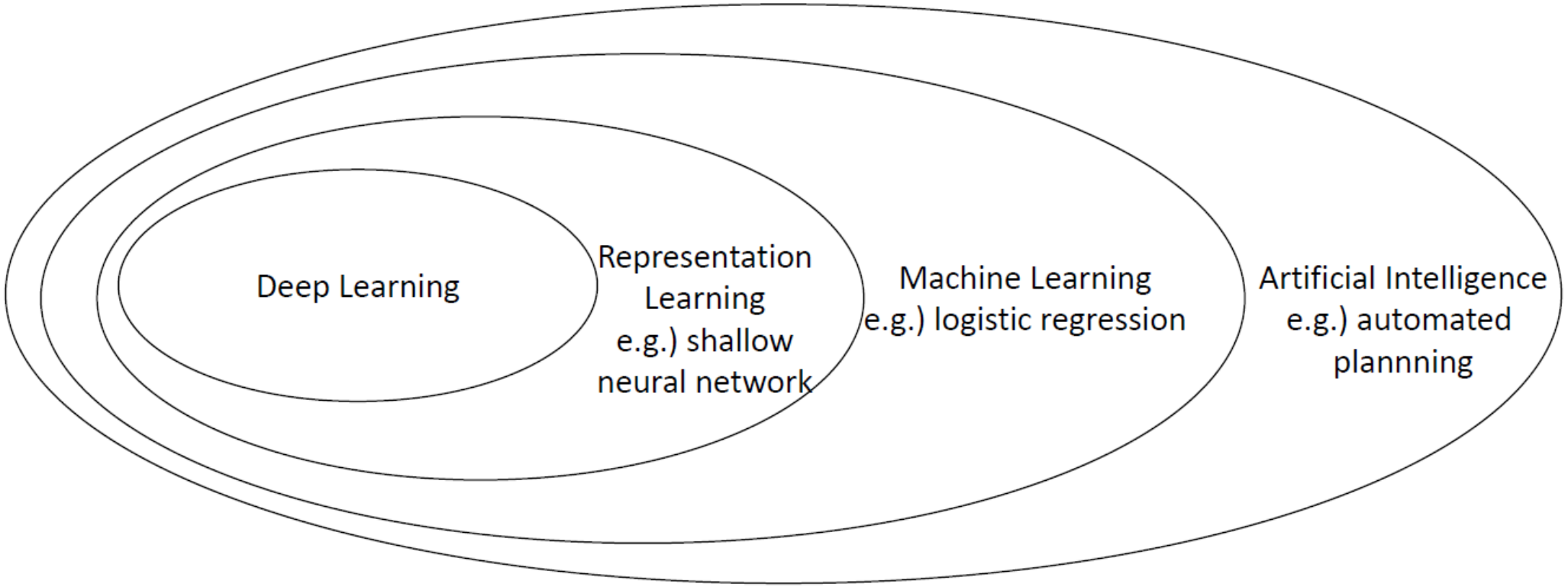
Medium Channel and Writers
- Toward Data Science (https://towardsdatascience.com/)

What is Machine Learning?

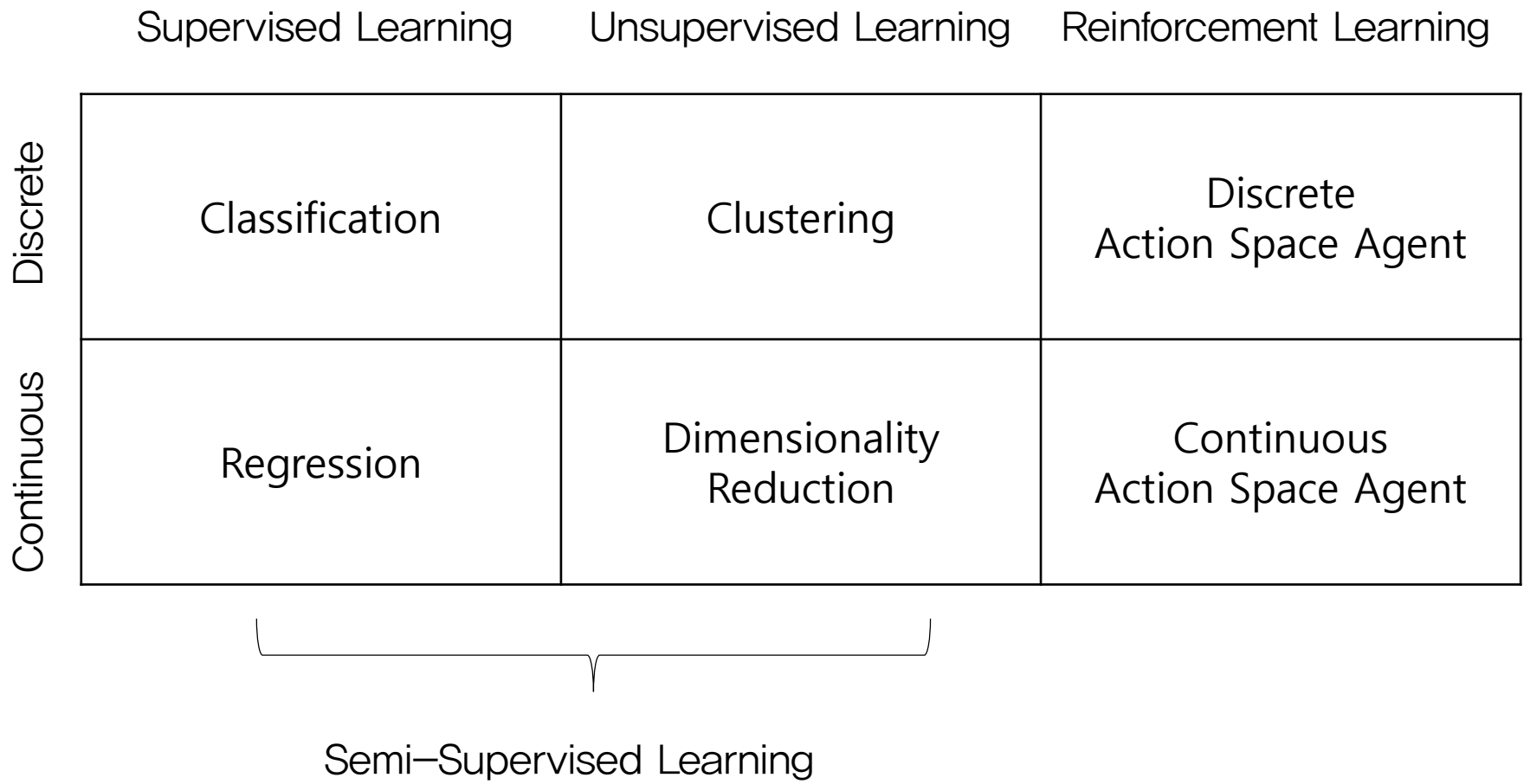
"A Field of study that gives computer the ability to learn without being explicitly programmed"

– Arthur Samuel, 1959

Deep Learning, Machine Learning, Artificial Intelligence



Categories of ML Problems



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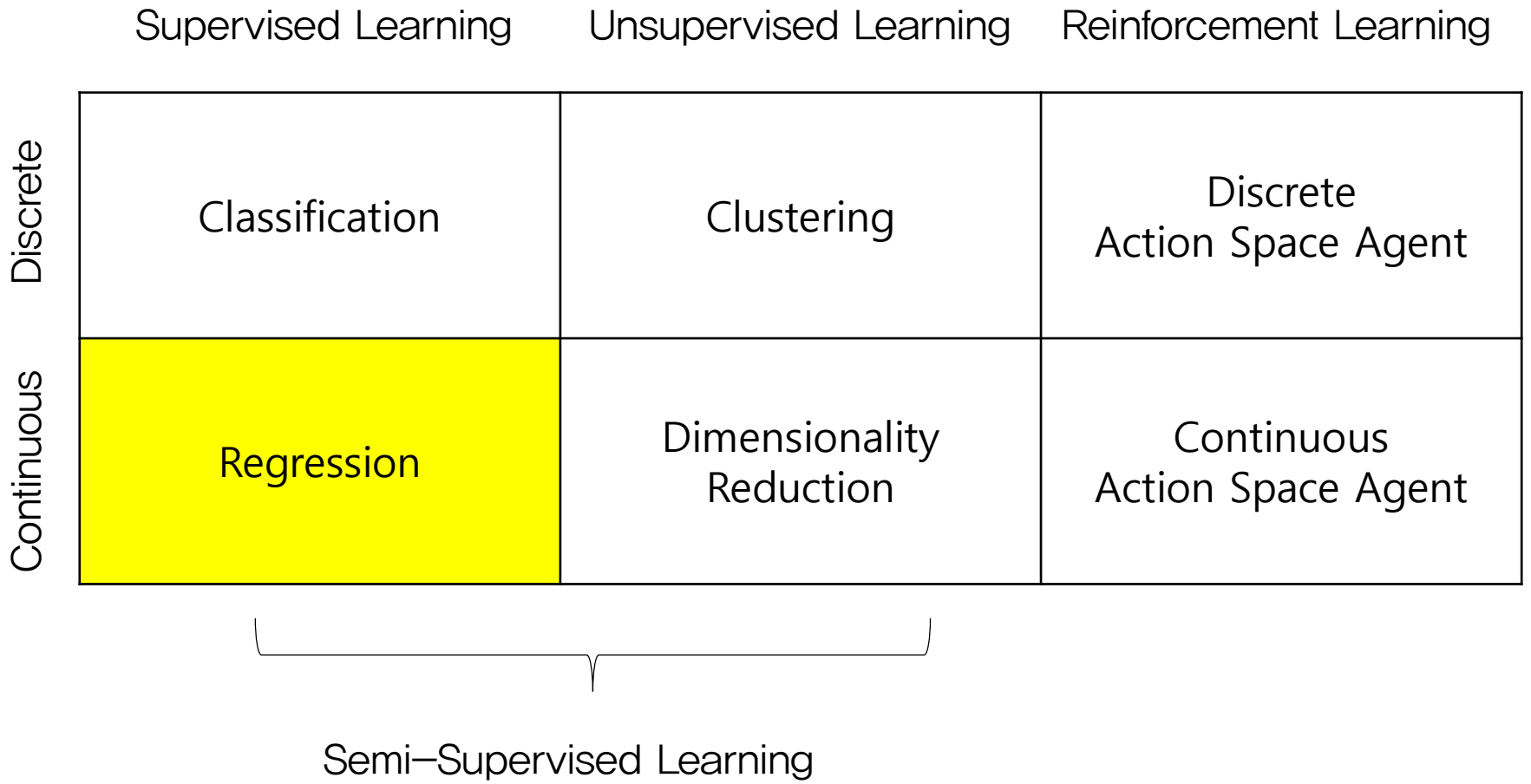


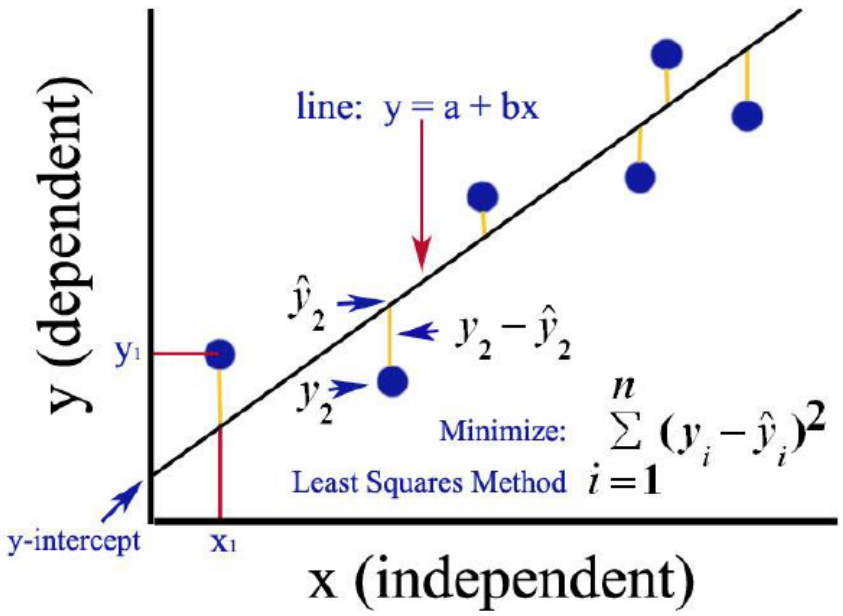
Regression Problem

Price Prediction Based on Gi-Young Style Chart Analysis

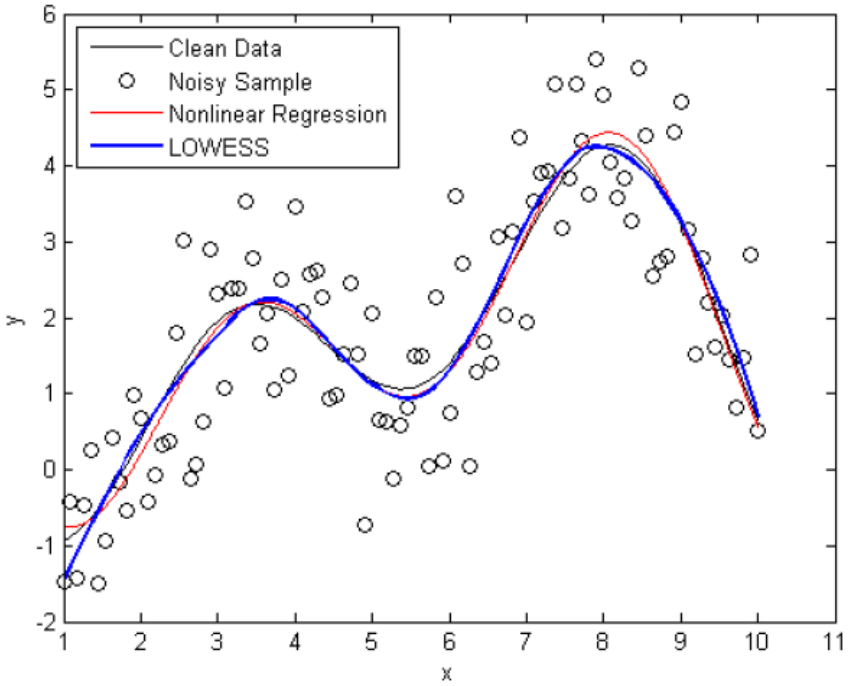
https://coinpan.com/free/22082900

Regression Problem

Fit the prediction function f(x) to the training data,
to predict continuous real value



Linear regression



Nonlinear regression

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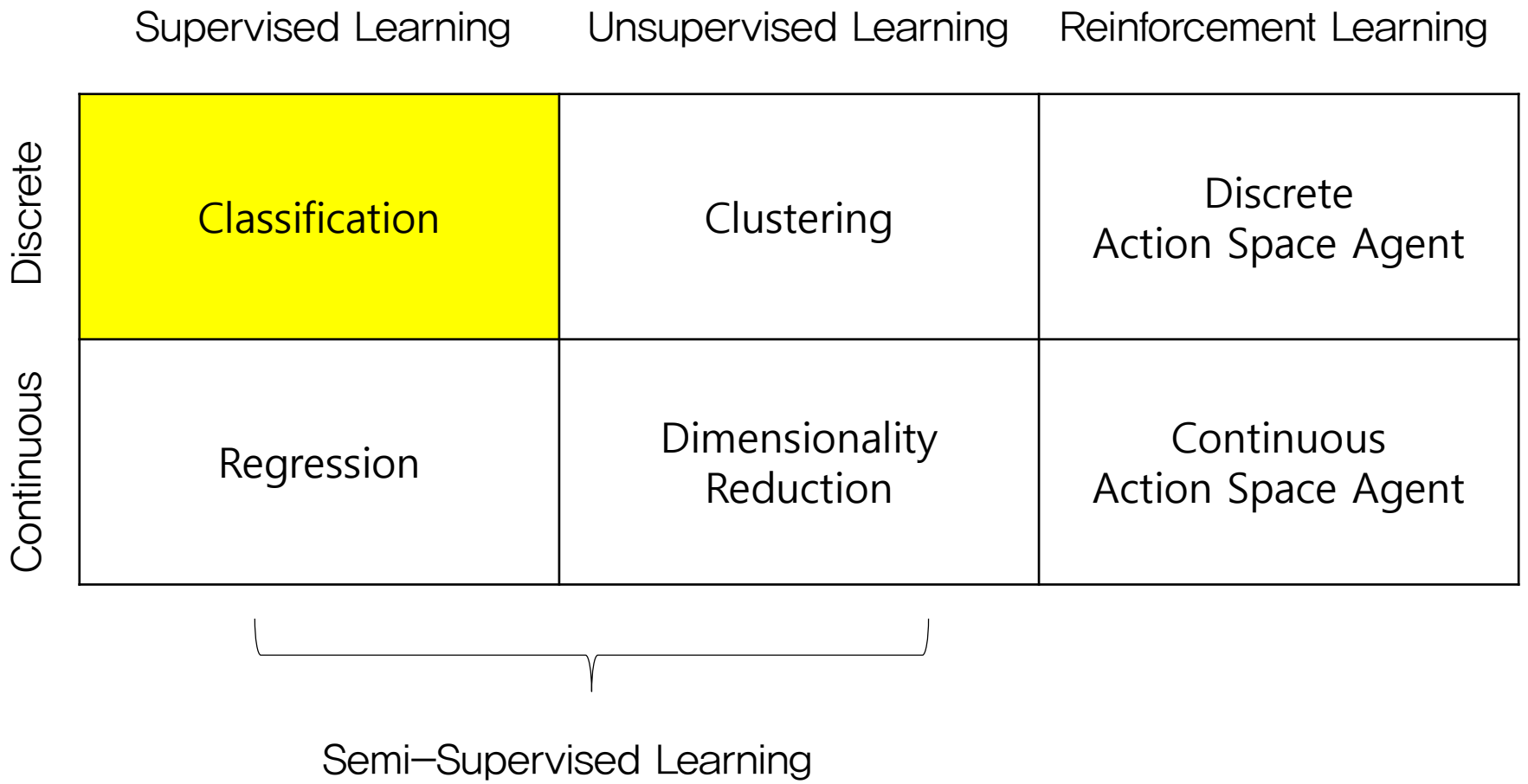


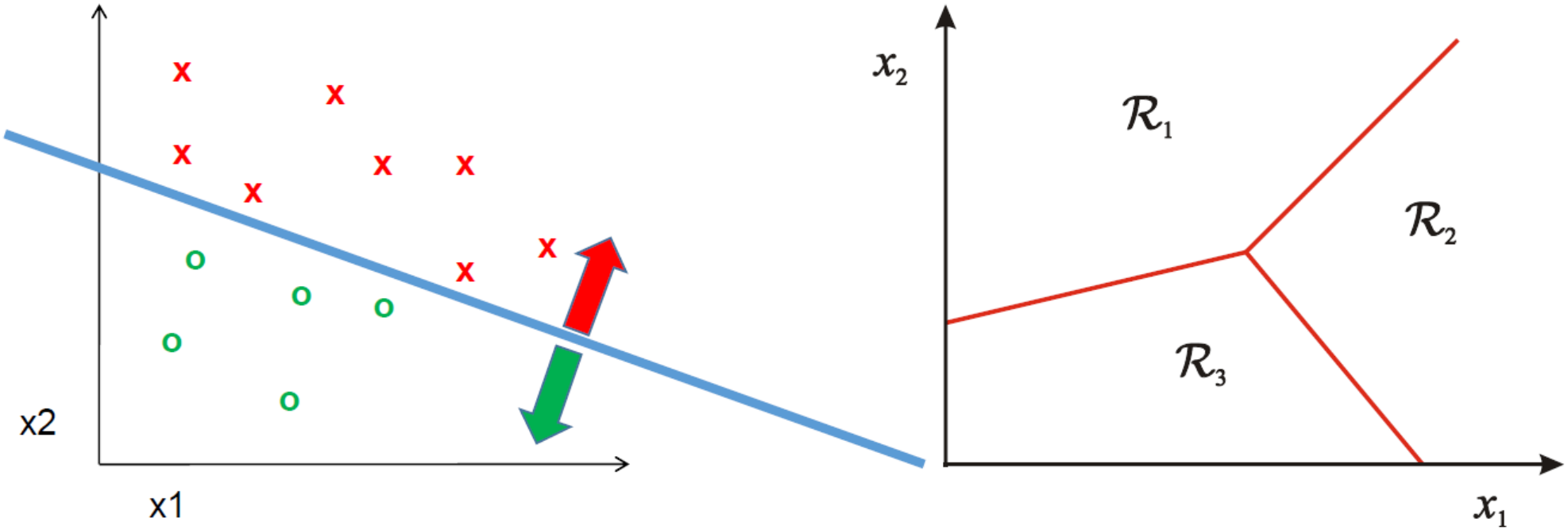
Classification Problem

Chihuahua or Muffin?

https://medium.freecodecamp.org/chihuahua-or-muffin-my-search-for-the-best-computer-vision-api-cbda4d6b425d

Classification Problem

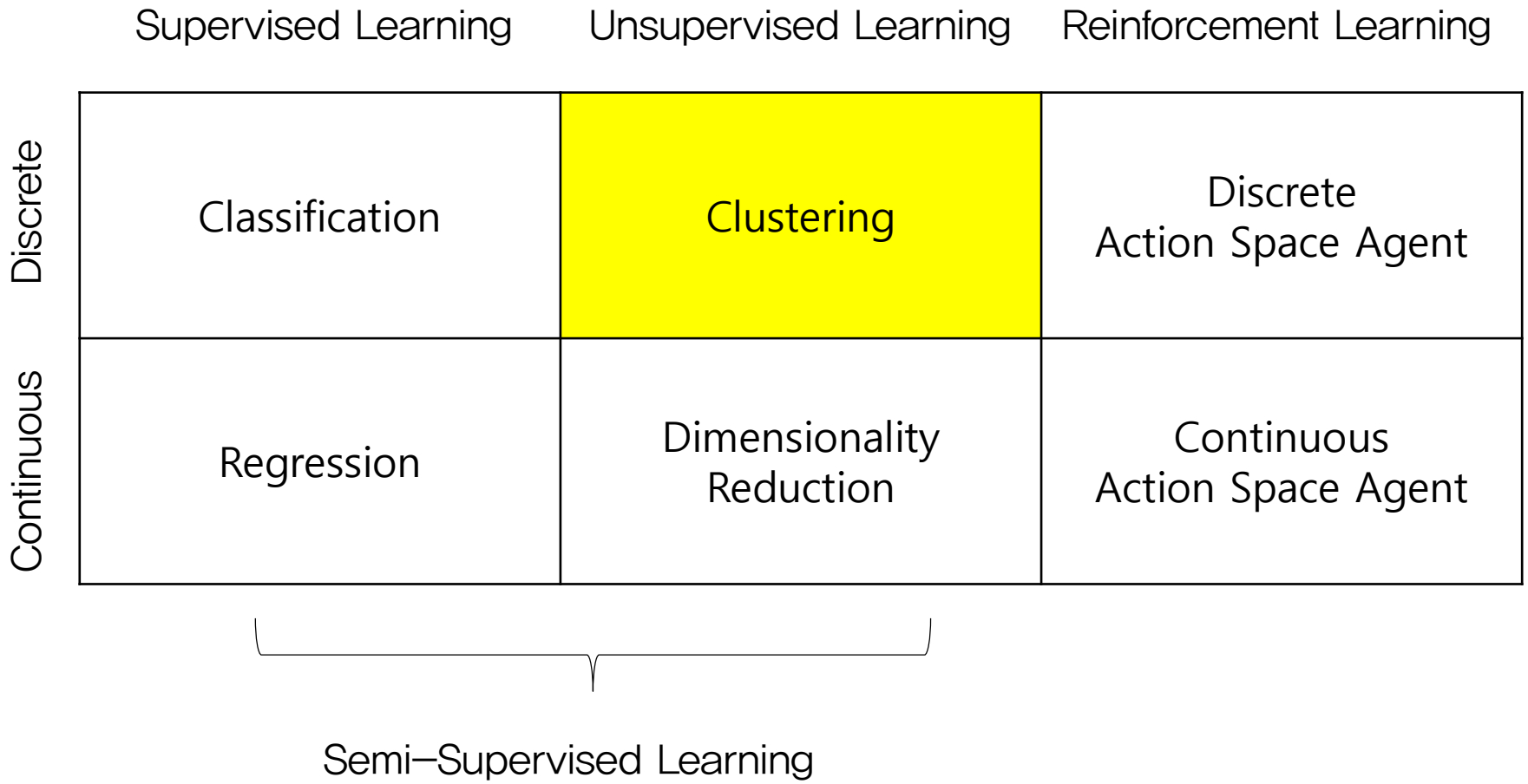
Identifying which of a set of categories a new instance belongs



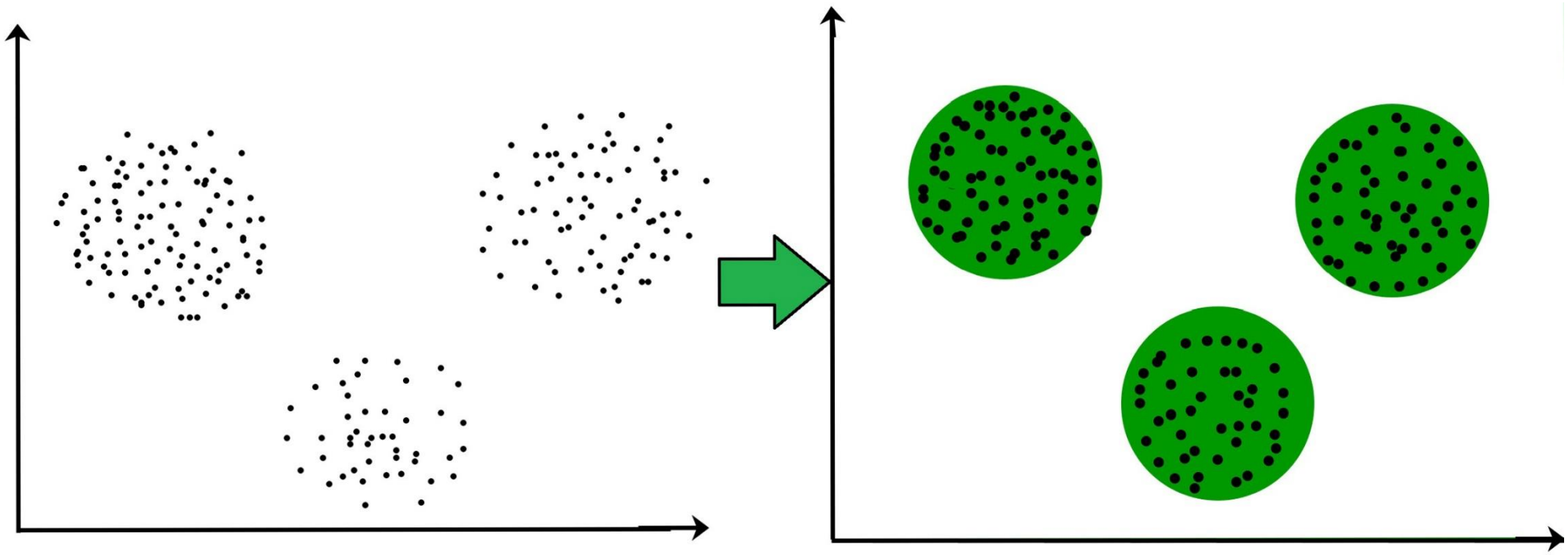
Binary Classification

Multi-class Classification

Categories of ML Problems



Clustering Problem

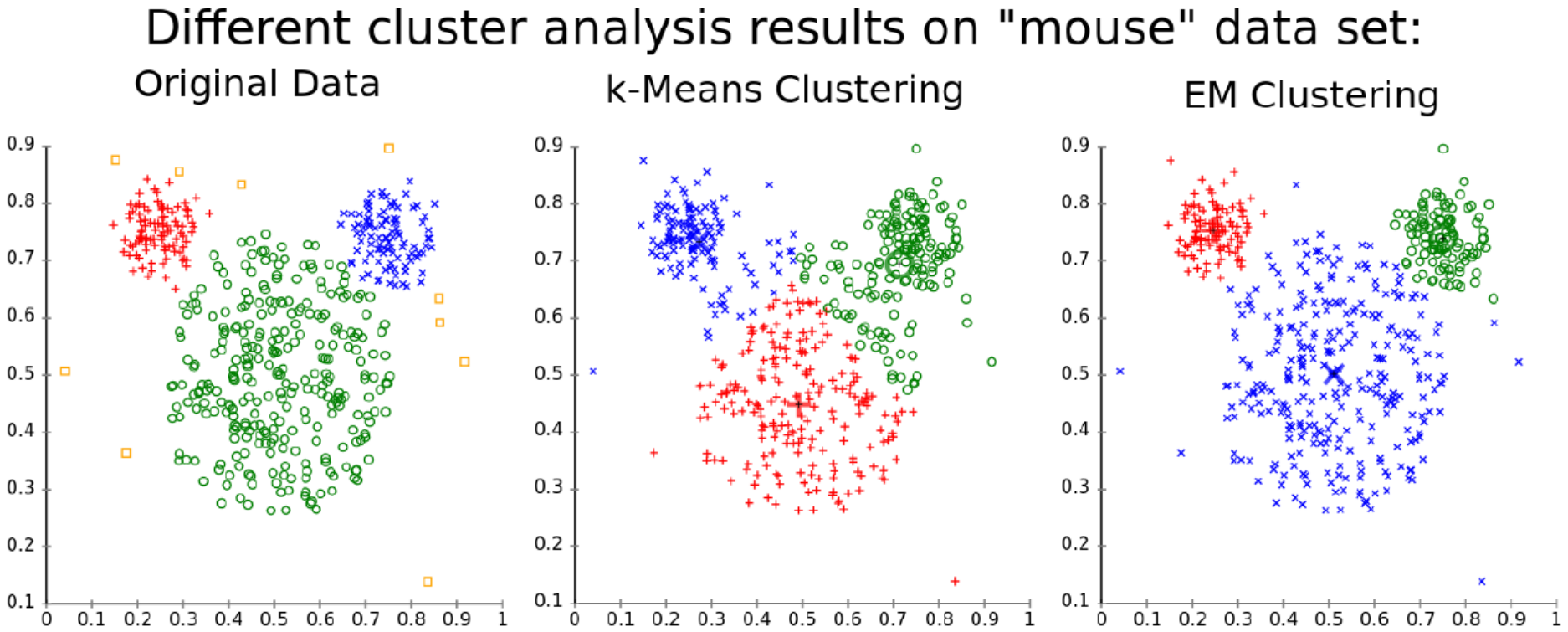


Grouping smilar samples into K groups

https://www.geeksforgeeks.org/clustering-in-machine-learning/

Clustering Problem

Automatic grouping of instances, such that the instances that belong to the same clusters are more similar to each other than to those in the other groups



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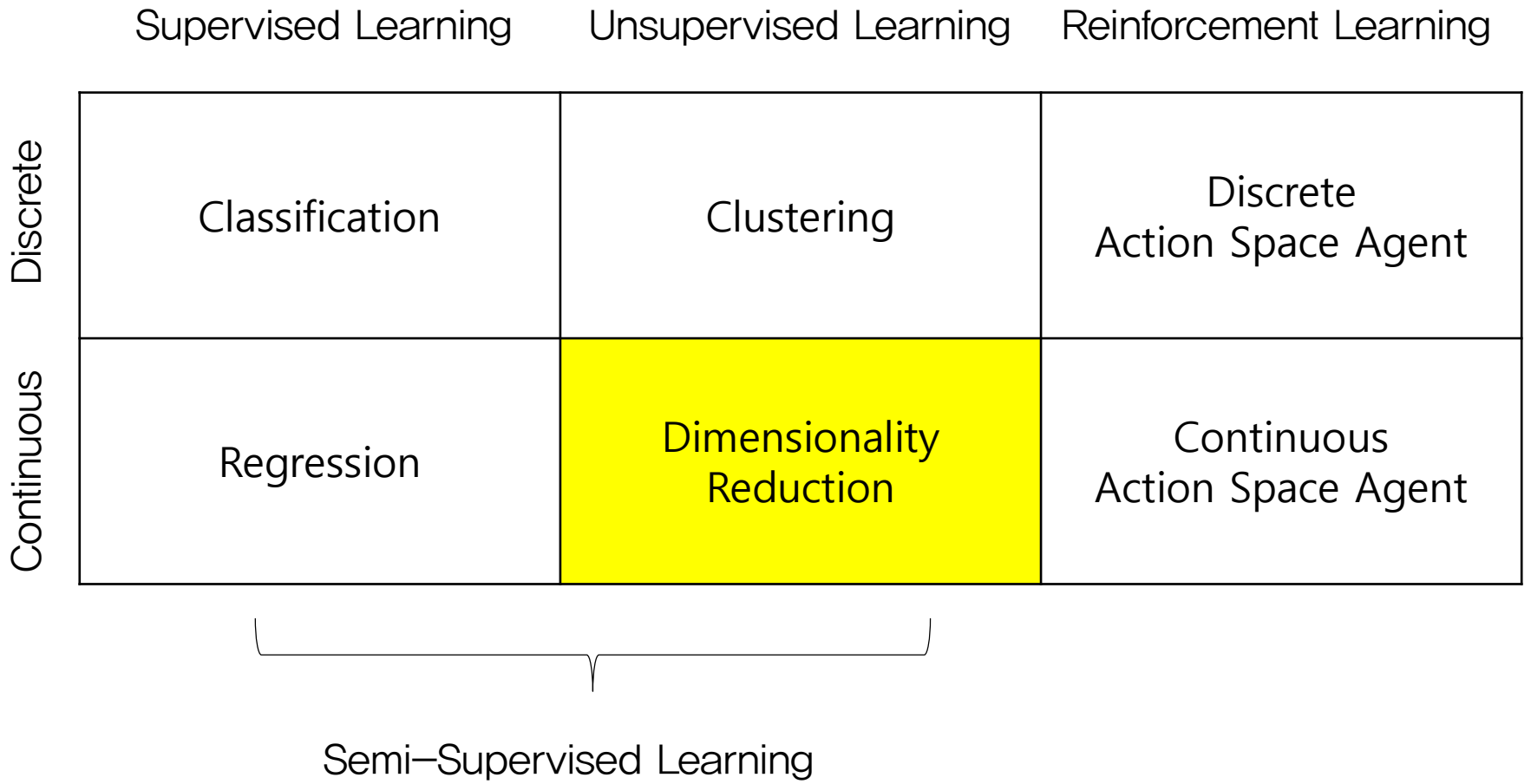
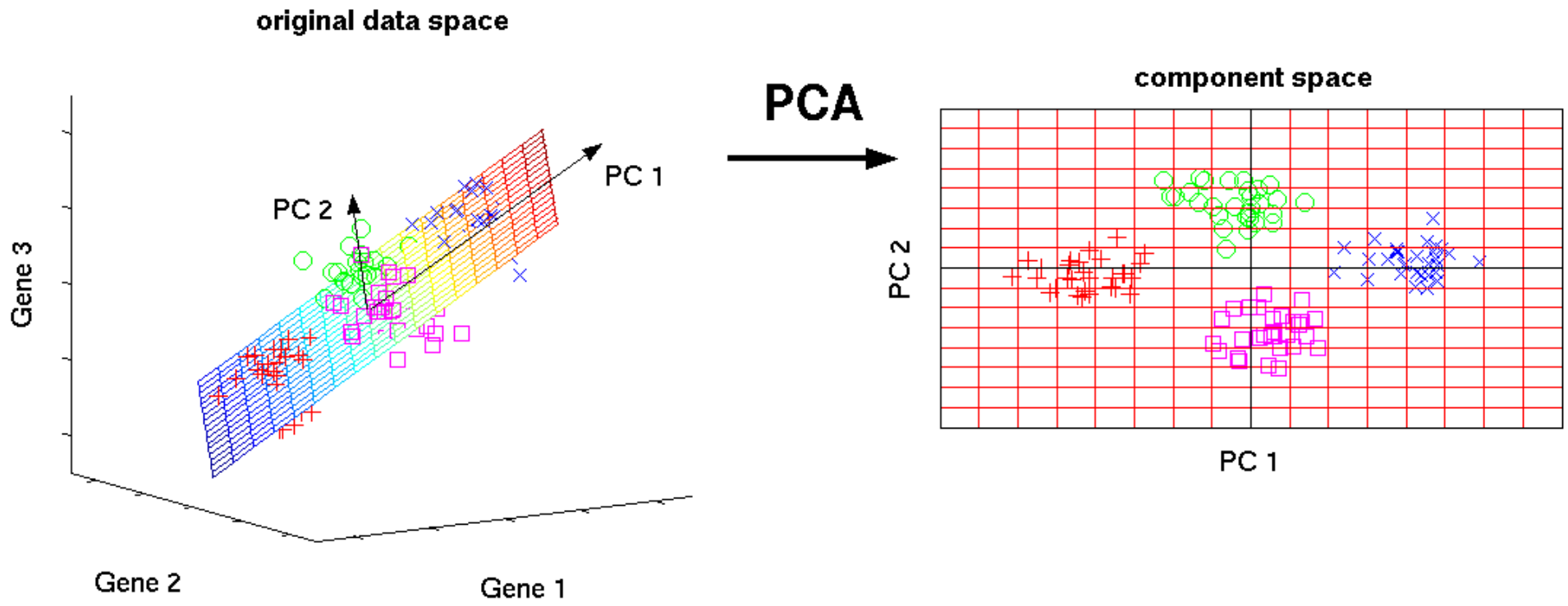


Dimensionality Reduction Problem

Reduce the dimension of input data, to avoid the effect of the curse of dimensionality



Reduce unnecessary representation axis

https://hackernoon.com/a-laymans-introduction-to-principal-components-2fca55c19fa0

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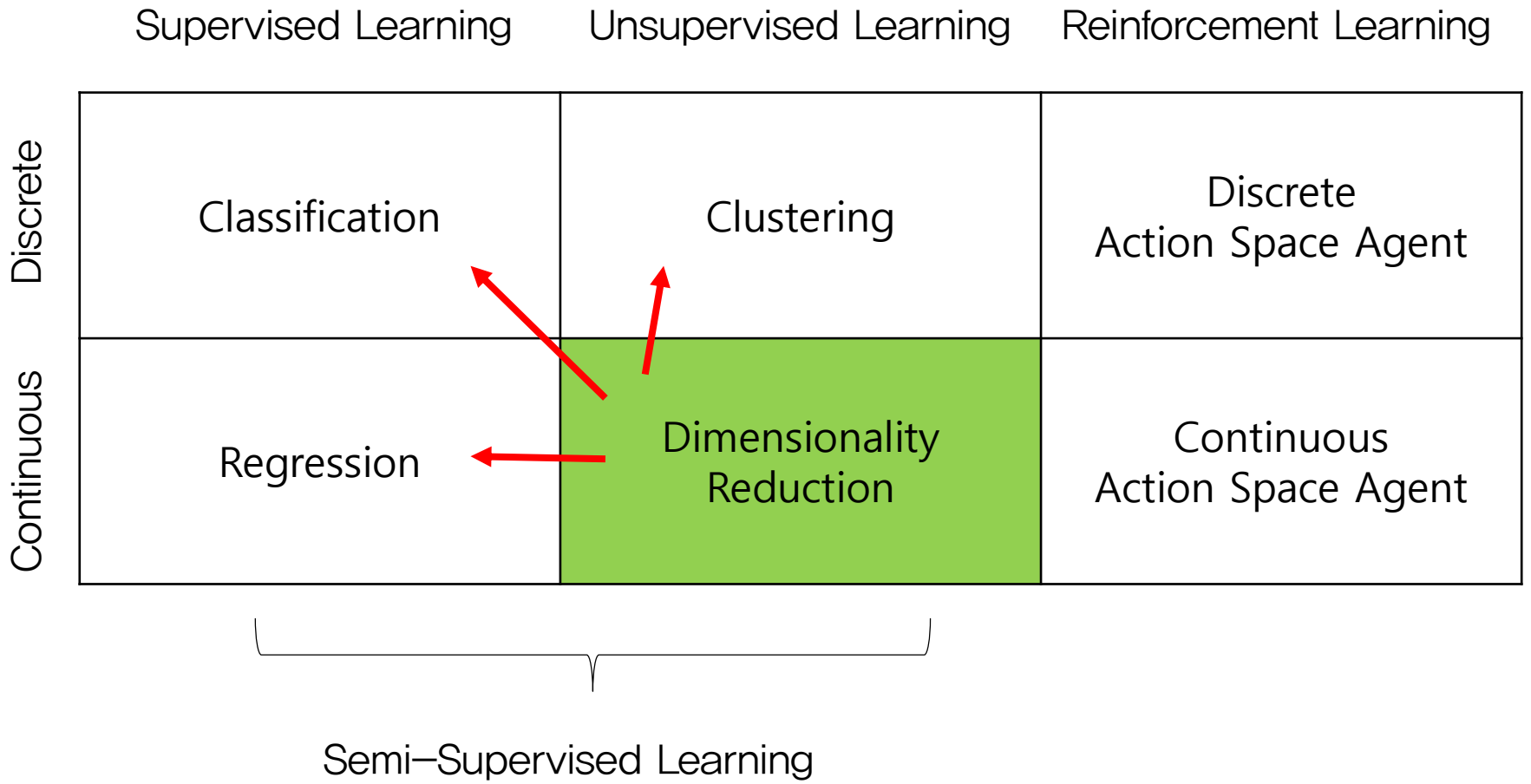

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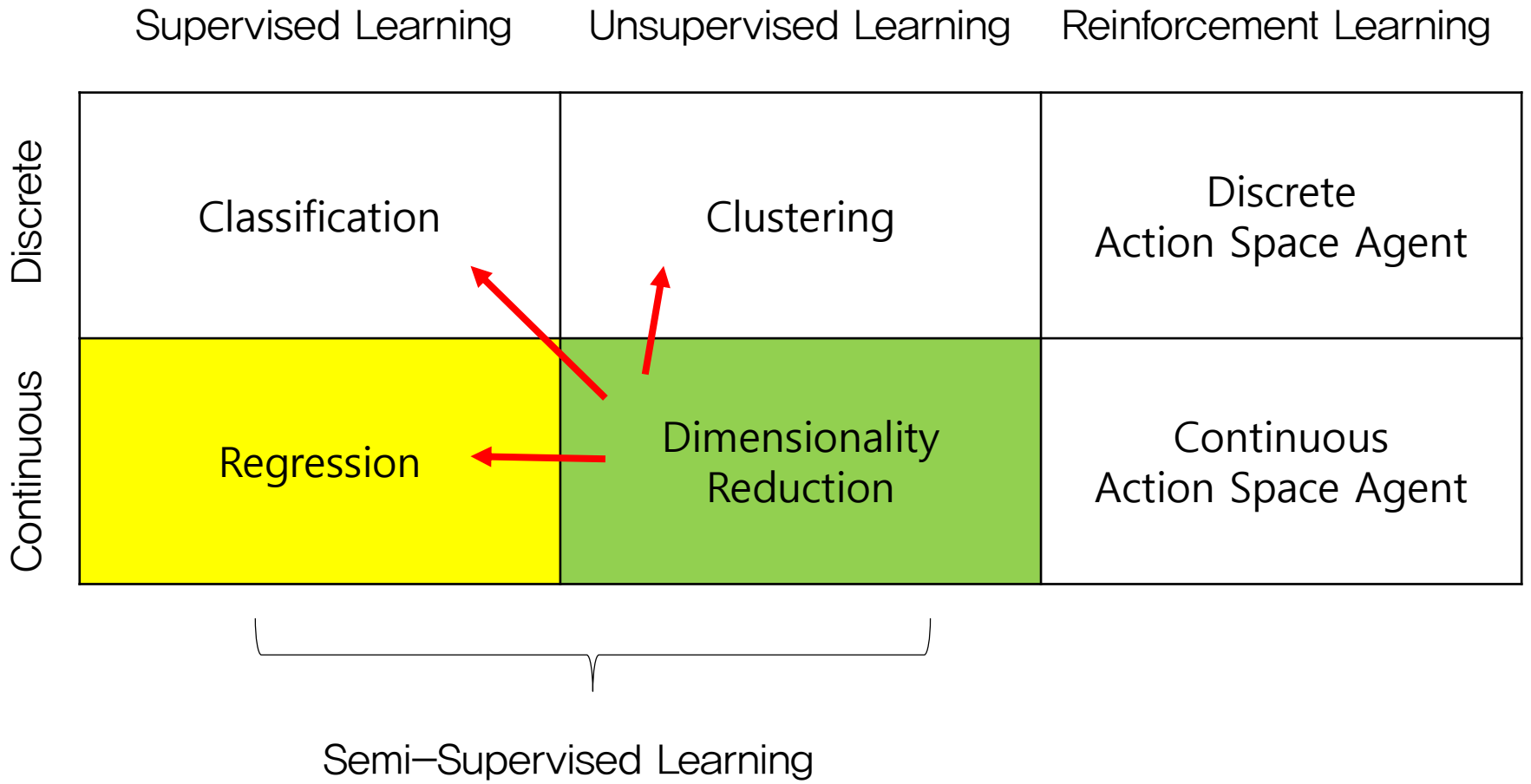

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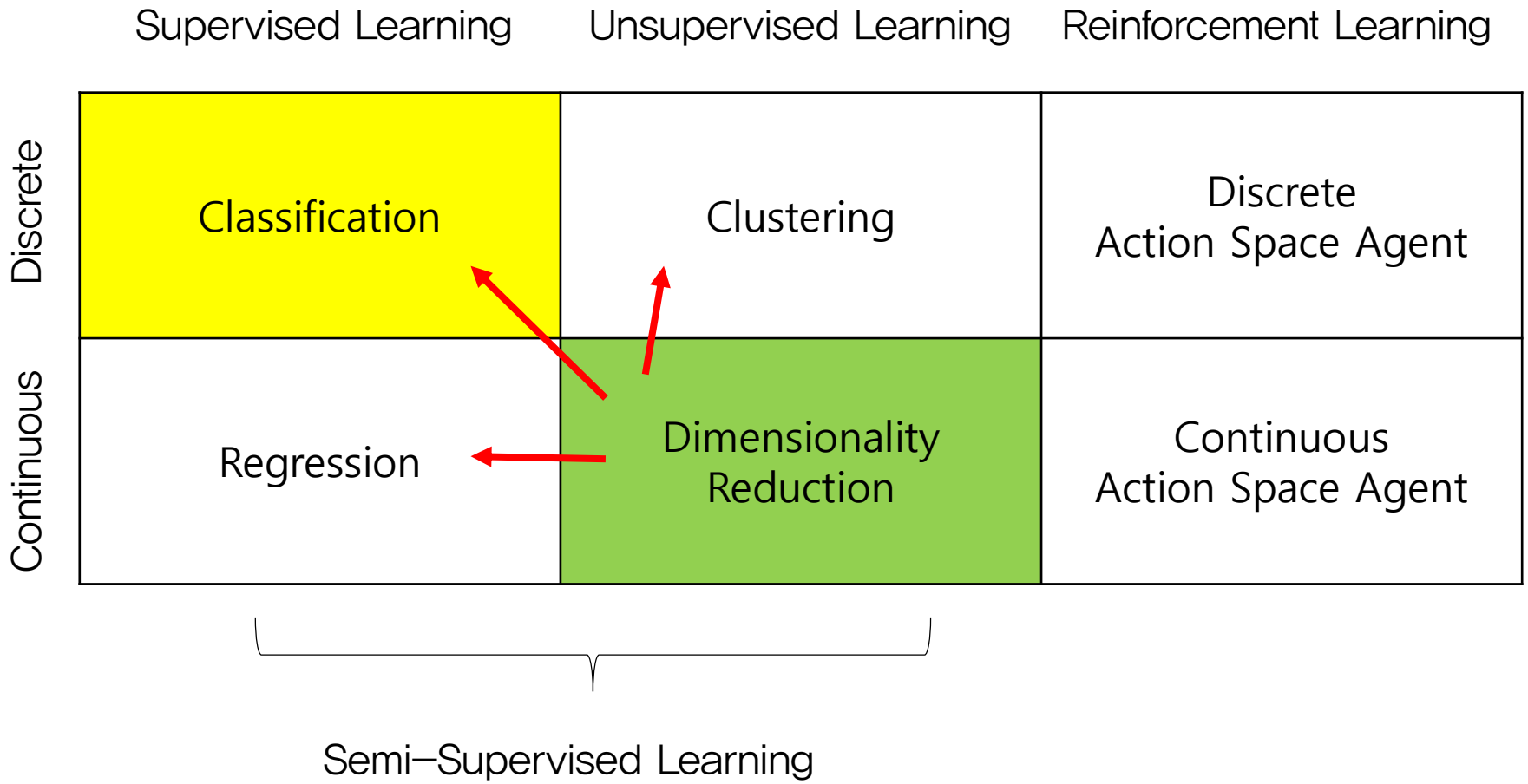

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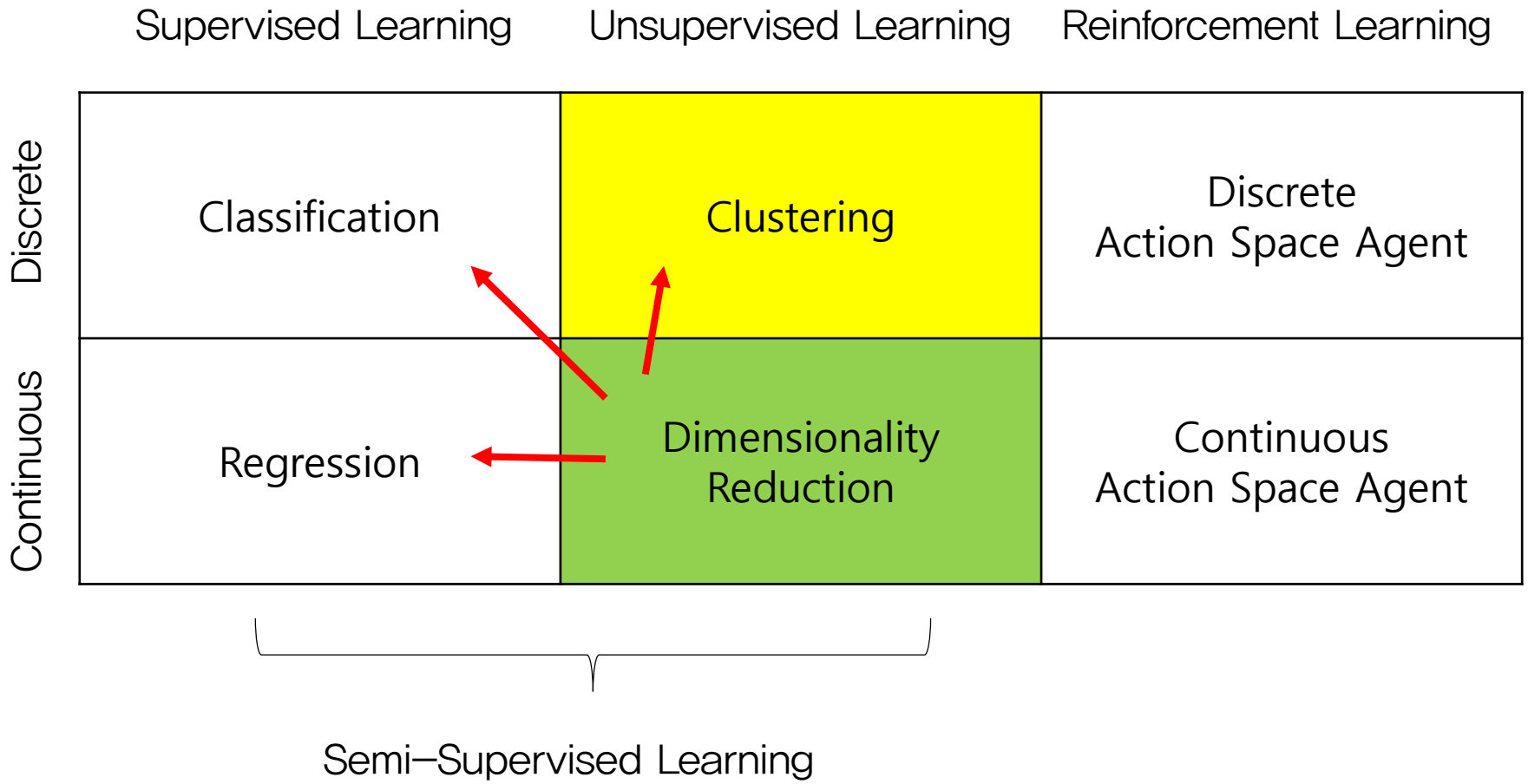
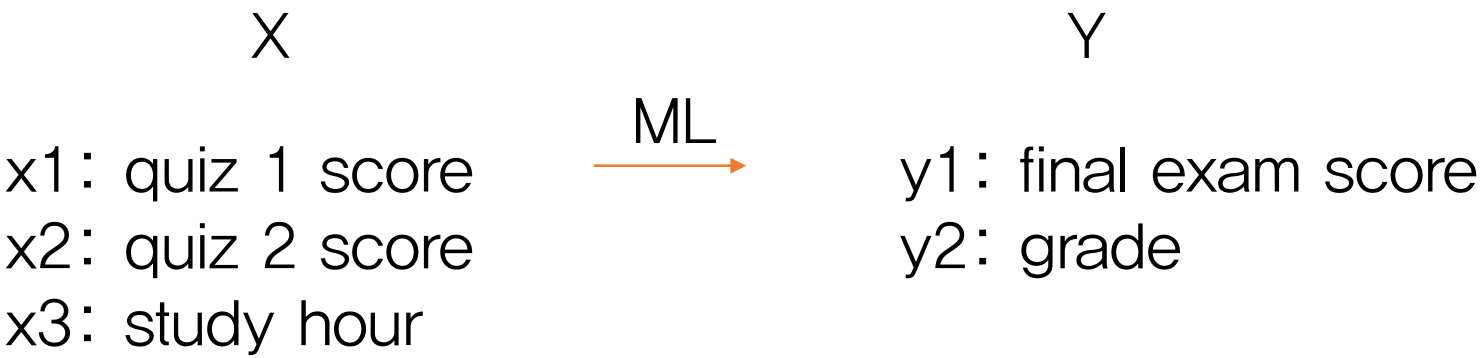
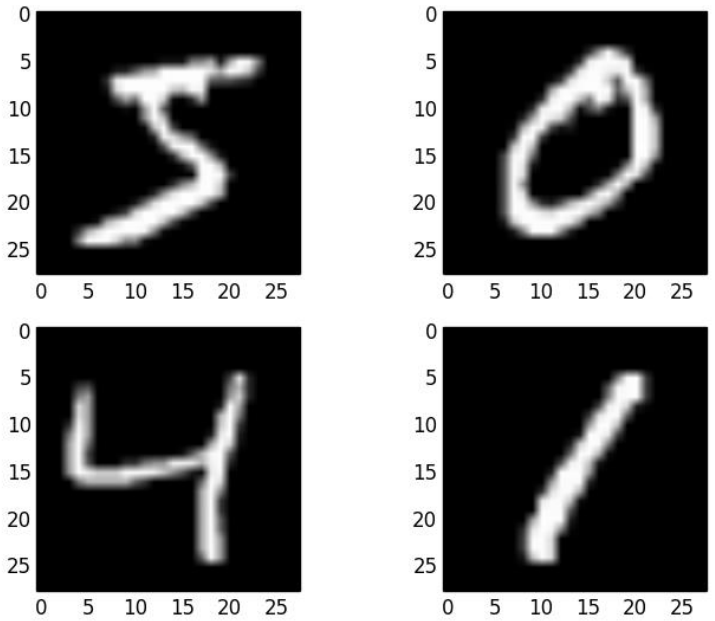


Feature & Data Representation

Case 1



Feature & Data Representation

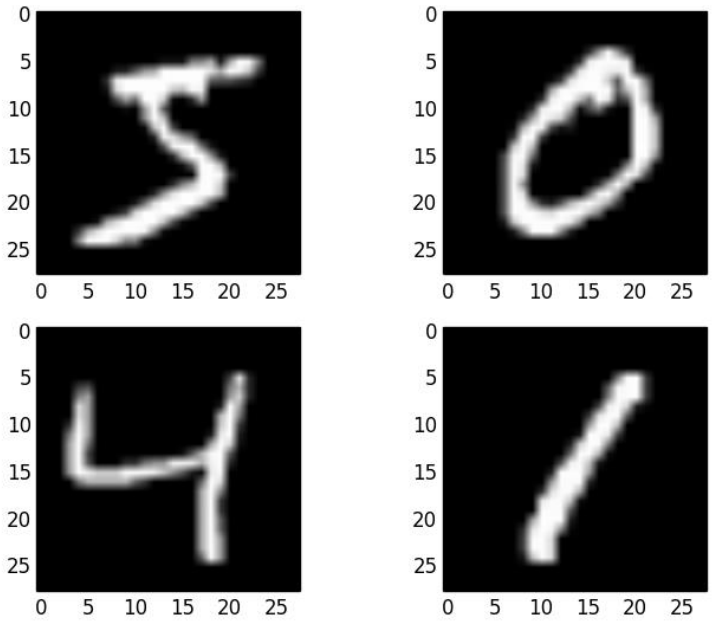


Case 2

X		Y
x1: first pixel value x2: second pixel value x3: third pixel value ... x784: 784th pixel value	→	y1: digit

https://machinelearningmastery.com/handwritten-digit-recognition-using-convolutional-neural-networks-python-keras/

Feature & Data Representation



Case 2

X		h		Y
	DL		ML	
x1: first pixel value	→	h1: feature1	→	y1: digit
x2: second pixel value		h2: feature2		
x3: third pixel value		h3: feature3		
...				
x784: 784th pixel value				

https://machinelearningmastery.com/handwritten-digit-recognition-using-convolutional-neural-networks-python-keras/