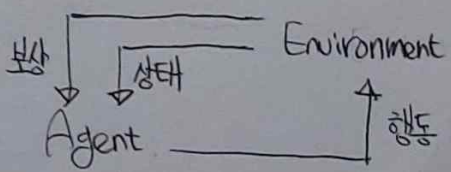
* 기계학습 1주차 A4 1page 정리 2016104109 컴퓨터공학과 김성수

* Type of Machine learning P.17

① 지도 학습 : Supervised
→ 특징 벡터와 목표값이 모두 주어진 상황
→ 회귀 : Regression
→ 분류 : Classification

② 비지도 학습 : Unsupervised
→ 특징 벡터는 주어지지만, 목표값이 주어지지 않음
→ 군집화 : Clustering
→ 밀도추정 : Density Estimation
→ 차원축소 : Demensionality Reduction

③ 강화 학습 : Reinforcement
→ 행동을 수행하고 얻는 보상을 최대화하는 과정



* Data Representation Methodology P.32

① Training Set

x_1	x_2	y
$x_1^{(1)}$	$x_2^{(1)}$	$y^{(1)}$
⋮	⋮	⋮
$x_1^{(n)}$	$x_2^{(n)}$	$y^{(n)}$

② Feature Vector

$$\underline{x} = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

③ Design Matrix

$$X = \begin{bmatrix} x_1^{(1)} & x_2^{(1)} \\ \vdots & \vdots \\ x_1^{(n)} & x_2^{(n)} \end{bmatrix} = \begin{bmatrix} \underline{x}^{(1)T} \\ \underline{x}^{(n)T} \end{bmatrix}$$

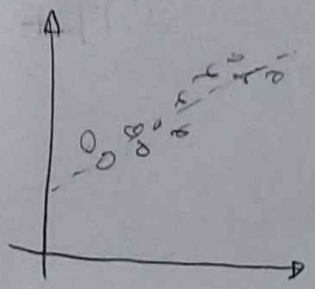
④ Linear Model

$$\hat{y} = \underline{w}^T \underline{x} + b$$

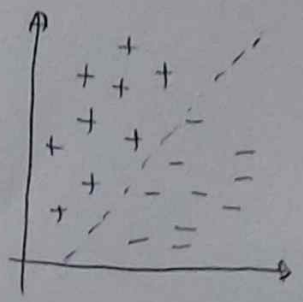
$$[\theta_1, \theta_2] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

* Supervised vs Unsupervised P.17~20

① 지도 학습

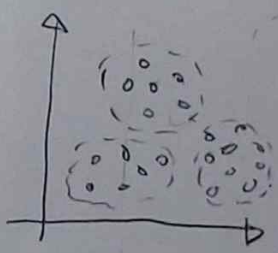


→ Regression, 실수치
Ex) 가격 예측

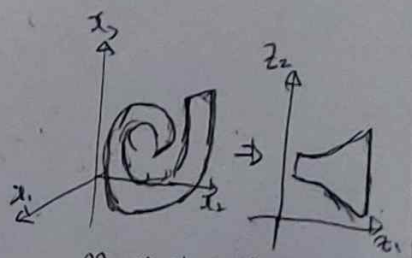


→ Classification, 부류값
Ex) 스팸메일 판별

② 비지도 학습



→ Clustering, 군집화

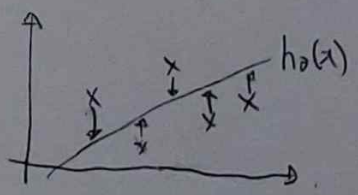


Manifold → 2개로의 분화
→ Demensionality Reduction

* Cost Function P.33

· MSE (Mean Squared Error)

$$J(\theta_0, \theta_1) = \frac{1}{2m} \sum_{i=1}^{n} (h_\theta(x^{(i)}) - y^{(i)})^2$$



* Optimization P.35

① Gradient Descent
② Stochastic Gradient Descent → Iterative
③ Newton's Method
④ Normal Equation → Analytic