COL774
Machine Learning
Aug 17, 2021

Last class:-

① Supervised learning

$D = \{x^{(i)}, y^{(i)}\}_{i=1}^{m}$ → #examples

→ Labels are available during training

$\forall i :- x^{(i)} \in \mathbb{R}^n$, $y^{(i)} \in \{-, \} \in \mathbb{R}$

- → Linear Regression
- → Logistic Regression
- → GDA (Gaussian Discriminant Analysis)
- → Naive Bayes (Generative models)
- → SVM (Support Vector Machines)
- → Decision Trees / Random Forests
- → NN (Neural Networks)
  - → Deep NN

② Unsupervised learning

$\{x^{(i)}, z^{(i)}\}_{i=1}^{m}$

- → Clustering
- → Density estimation
- → EM (Expectation Maximization)
- → (PCA) Principal Component Analysis

③ Semi-supervised

Learning Theory

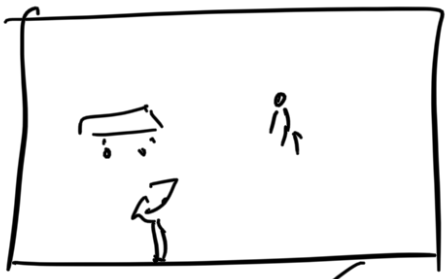
Semi-Supervised

$\{x^{(i)}, y^{(i)}\}_{i=1}^{m'}$

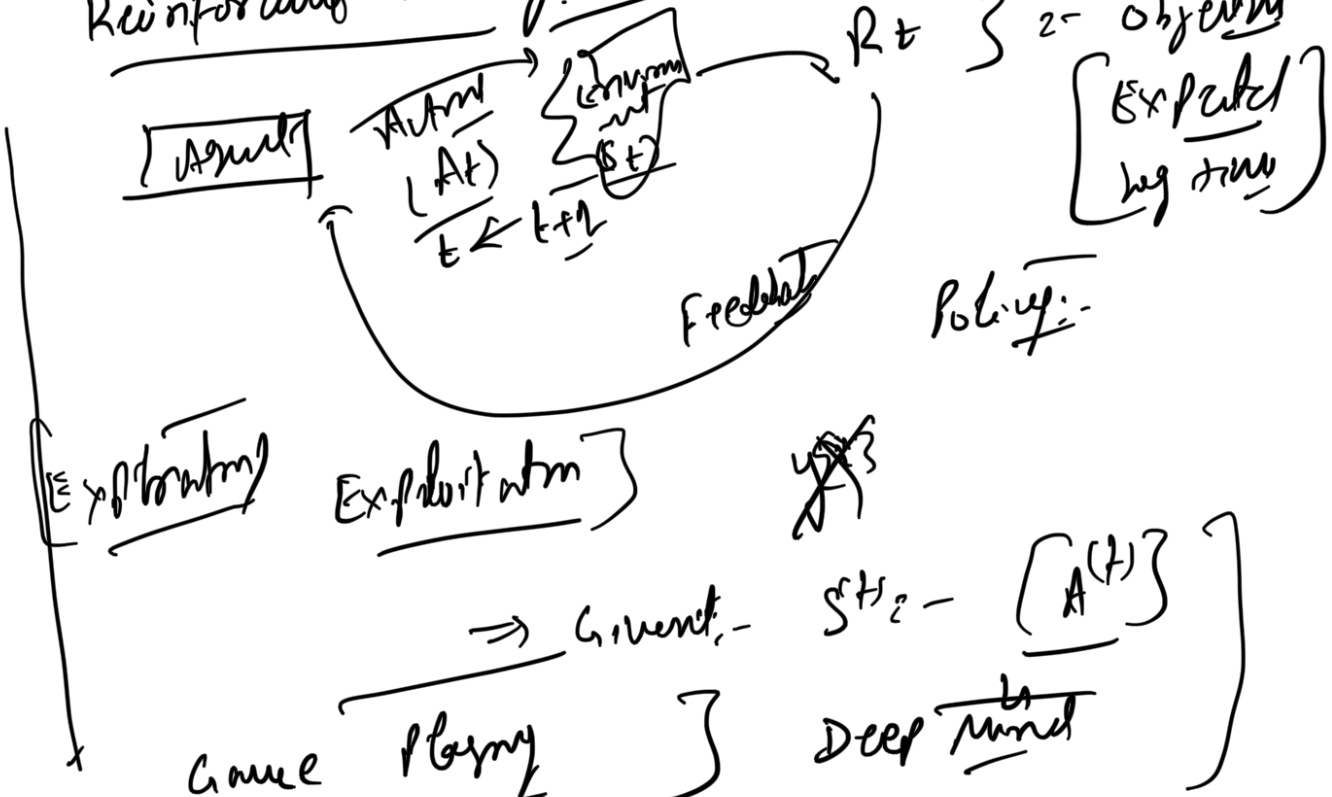
$\forall i :- i \in \{l_1, l_2, \ldots, l_k\}$

$y^{(i)}$ is available
& not otherwise

Object Detection:



Reinforcement Learning:



→ Given:- $S^{(t)}$ - $[A^{(t)}]$

Game Playing } Deep Learning

Exploitation Exploration

First Learning Algorithm:-

$\{x^{(i)}, y^{(i)}\}_{i=1}^{m}$

Linear Regression:-

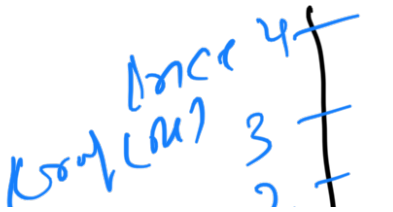
↳ $h_\theta(x)$:- $[y]$

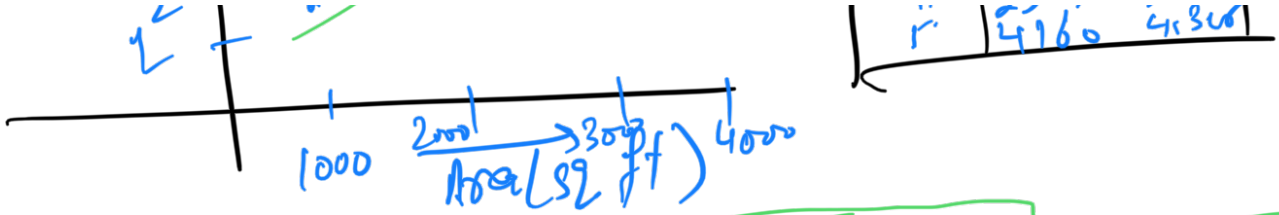
Linear Function

$x \in \mathbb{R}$

$y \in \mathbb{R}$

S.No.	$x^{(i)}$ (Sq ft)	$y^{(i)}$
1.	1093	1.2 Cr
2.	2086	2.2 Cr
3.	3456	3.6 Cr
4.	2517	2.6 Cr





$y = \theta_1 x + \theta_0 + \varepsilon$ ⇒ noise

$h_\theta(x) = \theta_1 x + \theta_0$ ↑ ≈ 0

$\theta_0(x) = \sum_{j=0}^{n} \theta_j x_j$

- What is the notation?
- How do you find θ_0 & θ_1