MACHINE LEARNING

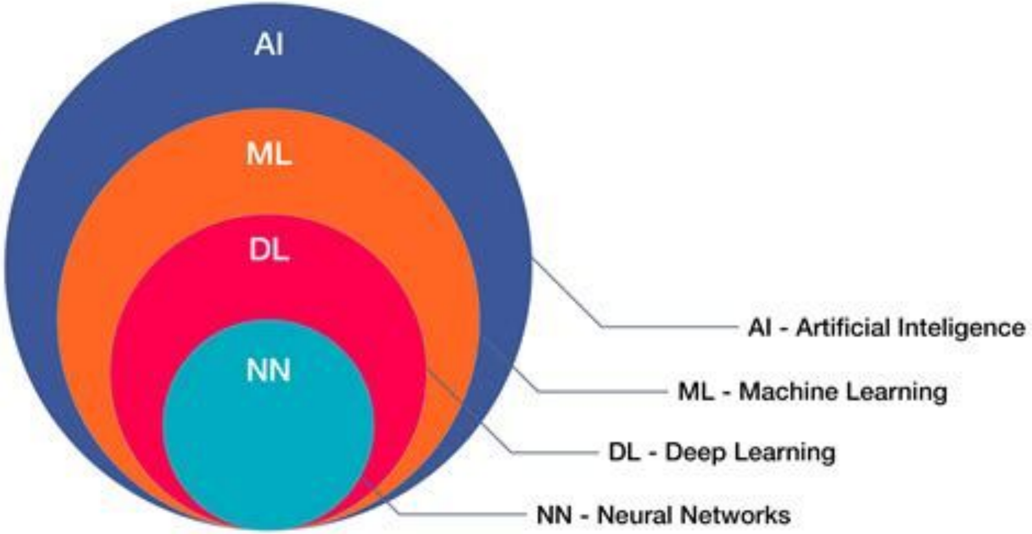
DAY 2

Lets go buy some chocolates!

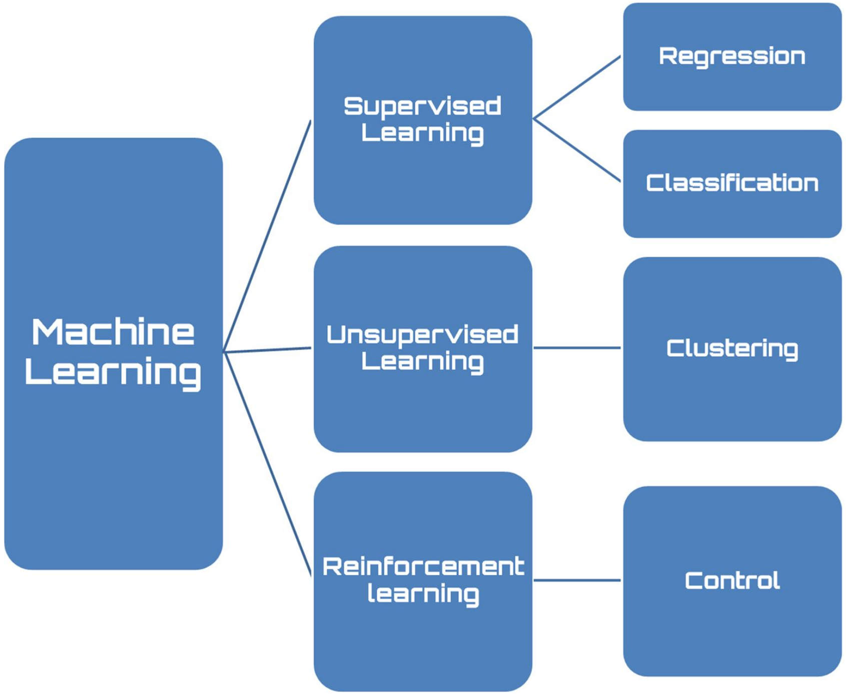
NO.	PRICE
1	10
2	20
4	40

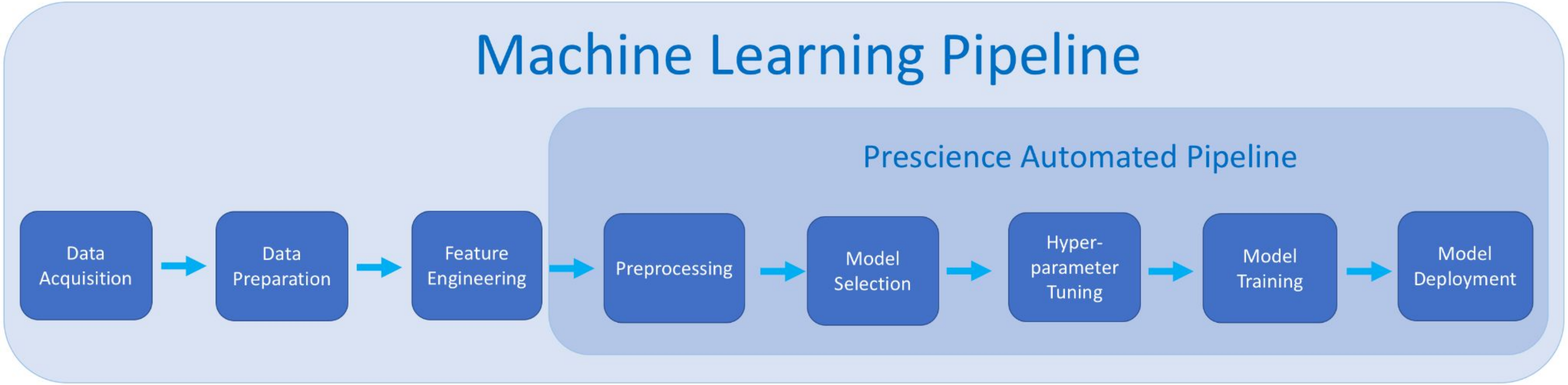
3	?

BIG PICTURE

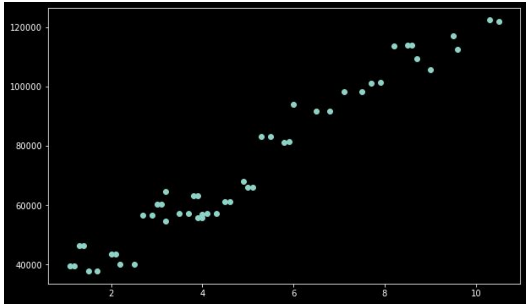

AI
ML
DL
NN
AI - Artificial Inteligence
ML - Machine Learning
DL - Deep Learning
NN - Neural Networks

CATEGORIES

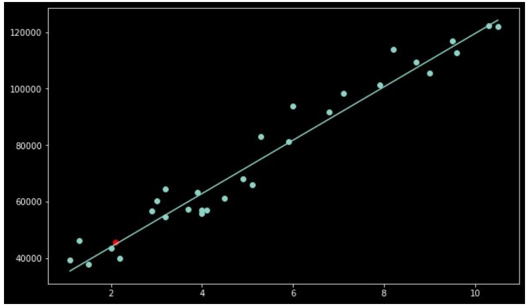

Machine Learning
Supervised Learning
Unsupervised Learning
Reinforcement learning
Regression
Classification
Clustering
Control

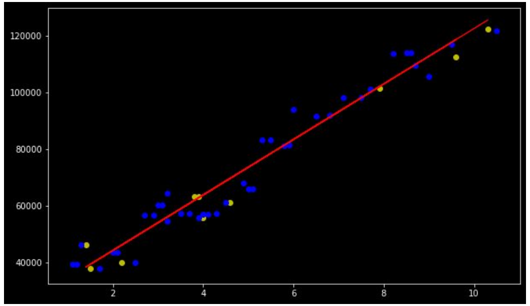

Machine Learning Pipeline
Prescience Automated Pipeline
Data Acquisition
Data Preparation
Feature Engineering
Preprocessing
Model Selection
Hyper-parameter Tuning
Model Training
Model Deployment

REGRESSION



$$Y = m \times X + c$$
$$= c + m \times X$$
$$h_\theta(X) = \theta_0 + \theta_1 \times X$$





Hypothesis: $h_\theta(x) = \theta_0 + \theta_1 x$

Parameters: θ_0, θ_1

Cost Function: $J(\theta_0, \theta_1) = \frac{1}{2m} \sum_{i=1}^{m} \left(h_\theta(x^{(i)}) - y^{(i)}\right)^2$

Goal: $\underset{\theta_0, \theta_1}{\text{minimize}}\; J(\theta_0, \theta_1)$

Gradient Descent

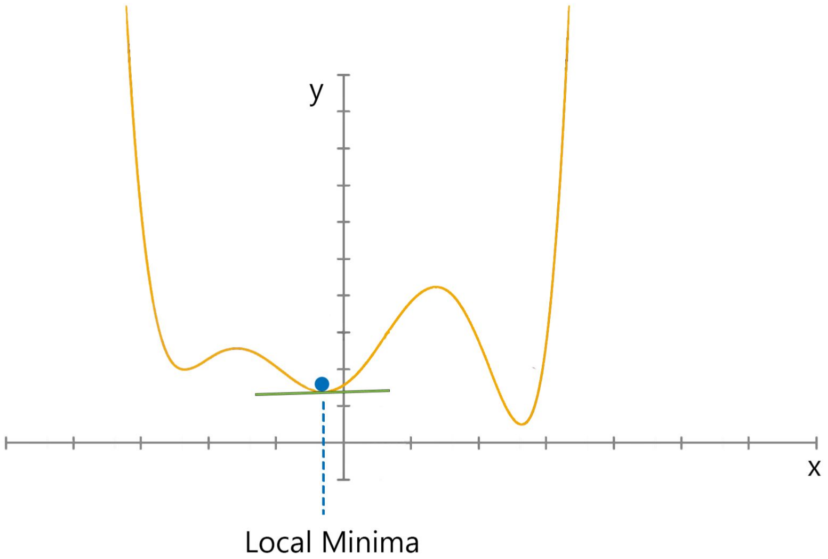
Remember that the general form of gradient descent is:

$$
\begin{aligned}
&Repeat \; \{ \\
&\quad \theta_j := \theta_j - \alpha \frac{\partial}{\partial \theta_j} J(\theta) \\
&\}
\end{aligned}
$$

We can work out the derivative part using calculus to get:

$$
\begin{aligned}
&Repeat \; \{ \\
&\quad \theta_j := \theta_j - \frac{\alpha}{m} \sum_{i=1}^{m} (h_\theta(x^{(i)}) - y^{(i)}) x_j^{(i)} \\
&\}
\end{aligned}
$$

Step in Linear Regression



repeat until convergence {

$$\theta_0 := \theta_0 - \alpha \frac{1}{m} \sum_{i=1}^{m} \left(h_\theta(x^{(i)}) - y^{(i)} \right)$$

$$\theta_1 := \theta_1 - \alpha \frac{1}{m} \sum_{i=1}^{m} \left(h_\theta(x^{(i)}) - y^{(i)} \right) \cdot x^{(i)}$$

}