

LECTURE 5-1

# LOGISTIC (REGRESSION) CLASSIFICATION

Sung Kim <hunkim+ml@gmail.com>  
<http://hunkim.github.io/ml>

# Acknowledgement

## 01. Andrew Ng's ML Class

- <https://class.coursera.org/ml-003/lecture>
- [http://www.holehouse.org/mlclass\(note\)](http://www.holehouse.org/mlclass(note))

## 02. Convolutional Neural Networks for Visual Recognition

- <http://cs231n.github.io>
- <http://cs231n.stanford.edu/>

## 03. TensorFlow

- <https://www.tensorflow.org>
- <https://github.com/aymericdamien/TensorFlow-Examples>

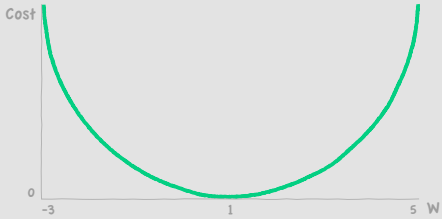
# Regression (HCG)

X1(hours)	X2(attendance)	Y(score)
10	5	90
9	5	80
3	2	50
2	4	60
11	1	40

H	C
G	

# Regression (HCG)

X1(hours)	X2(attendance)	Y(score)
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Hypothesis	Cost
$H(X)=WX$	$cost(W) = \frac{1}{m} \sum (WX - y)^2$
Gradient Decent	
$W := W - \alpha \frac{\partial}{\partial W} cost(W)$	

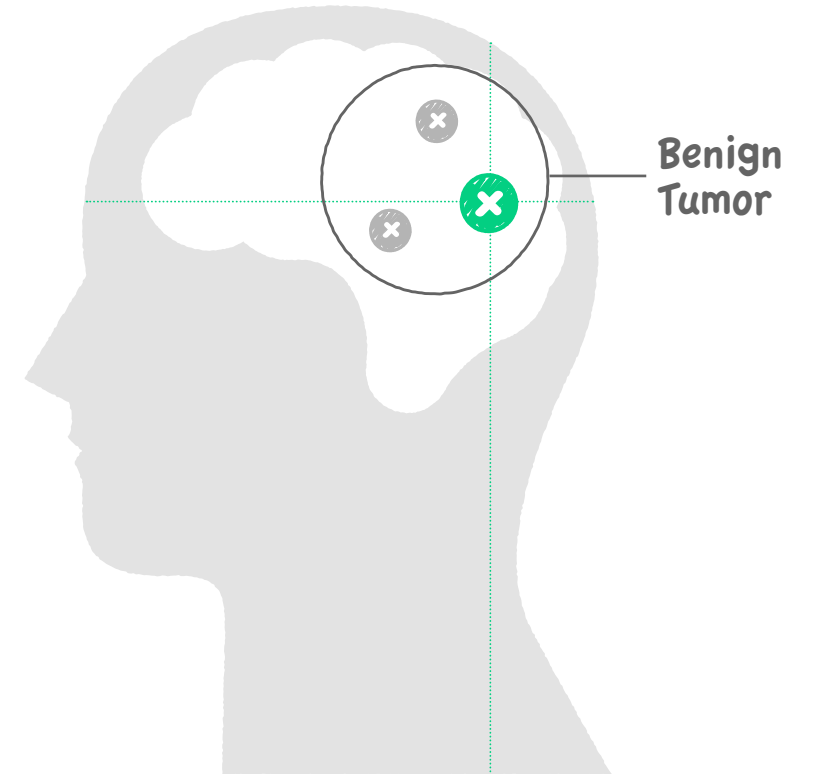
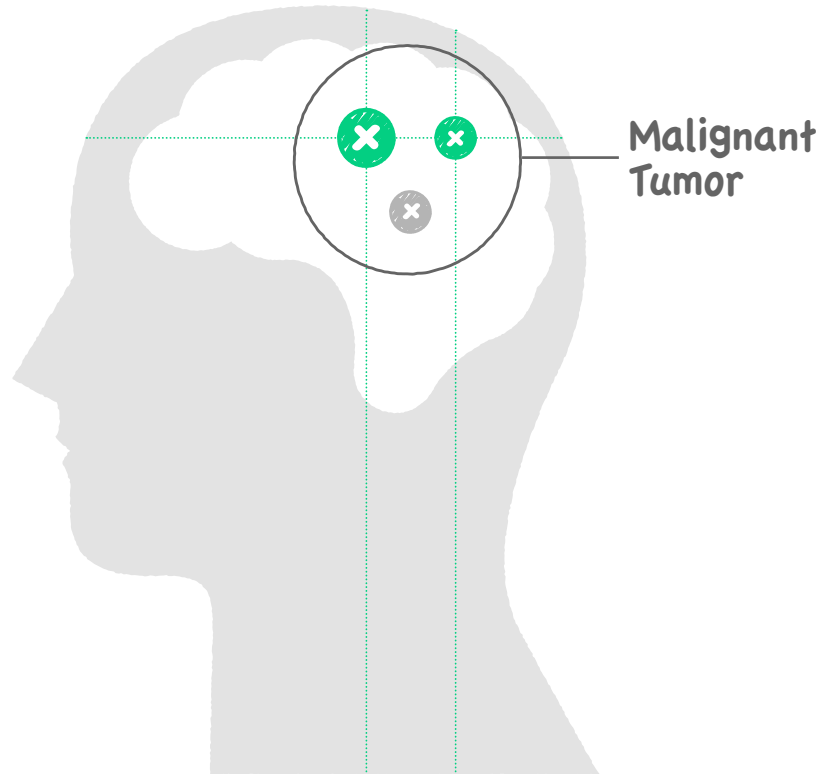
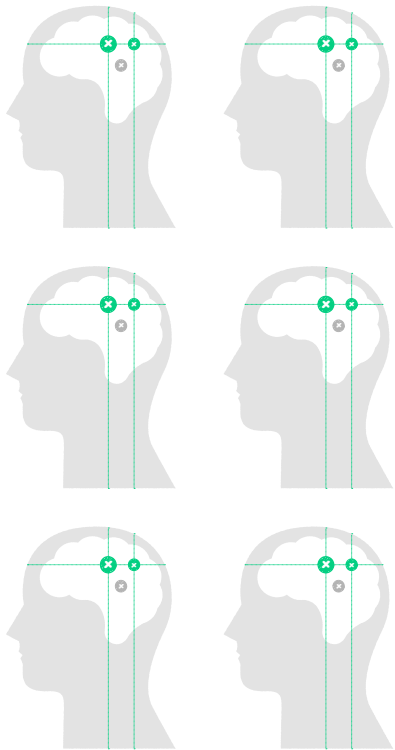
# Classification

- Spam Detection : Spam or Ham
- Facebook Feed : Show or Hide
- Credit Card Fraudulent Transaction Detection : Legitimate or Fraud

# 0,1 Encoding

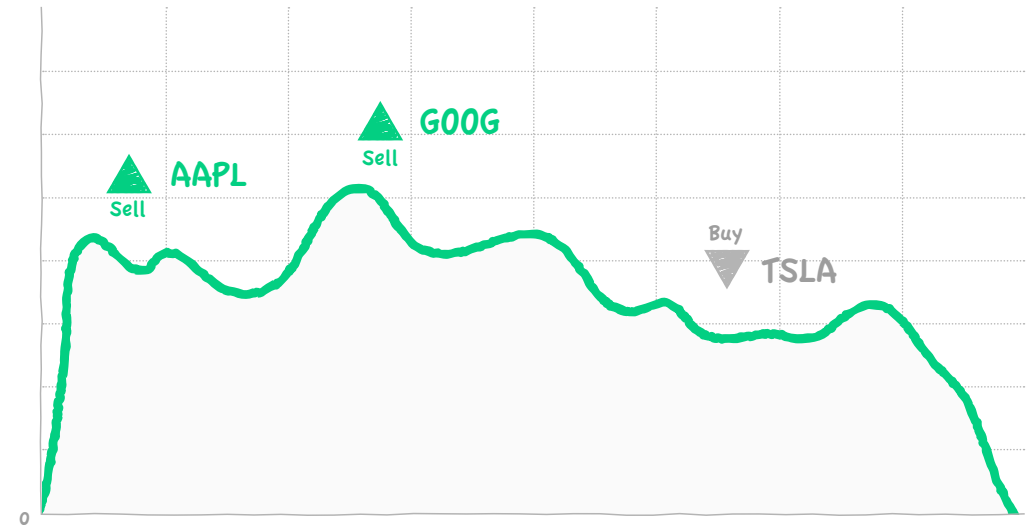
- Spam Detection : Spam(1) or Ham(0)
- Facebook Feed : Show(1) or Hide(0)
- Credit Card Fraudulent Transaction Detection : Legitimate(0) or Fraud(1)

# Radiology



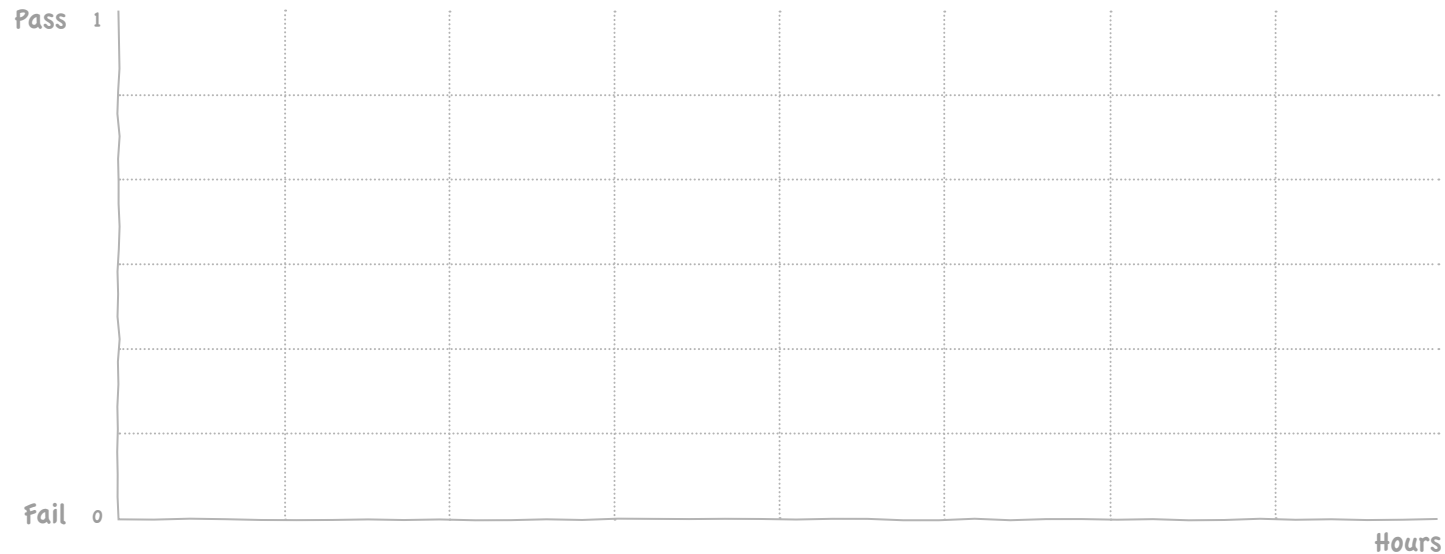
# Finance

DWJI	17,499.10	▼
SPS00	2,025.51	▼
NASDAQ	4,976.9	▲
AAPL	107.71	▲
GOOG	750.06	▲
TSLA	234.24	▼

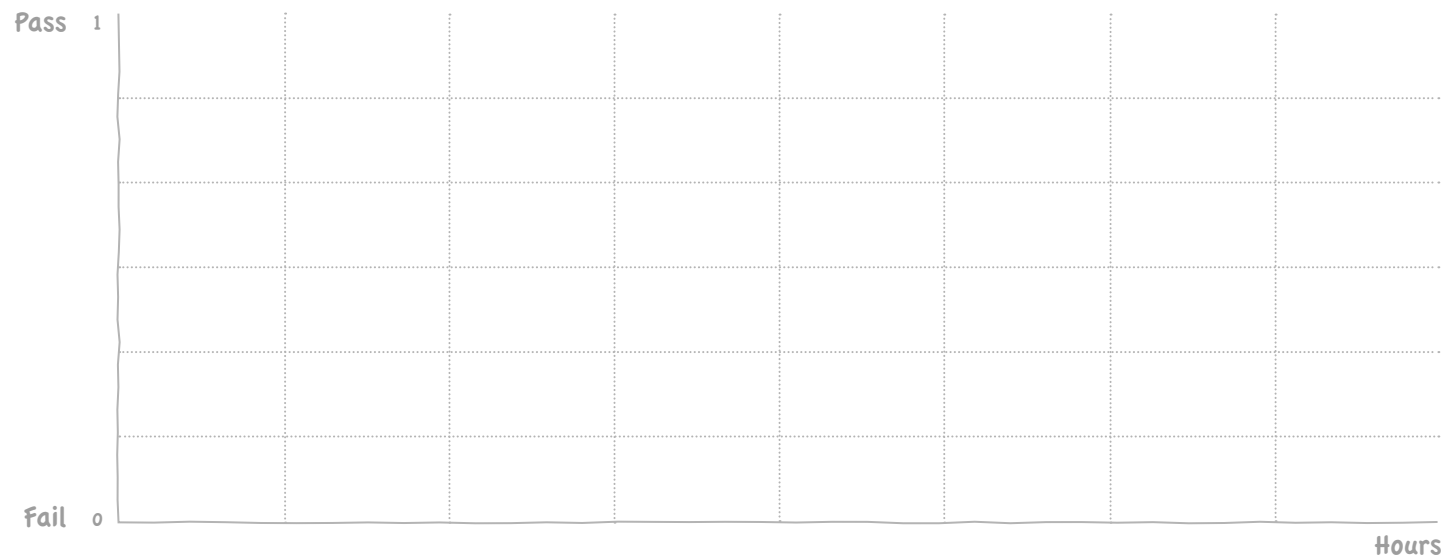




# Pass(1) / Fail(0) Based on Study Hours



# Linear Regression?



# Linear Regression

01. We know  $Y$  is 0 or 1

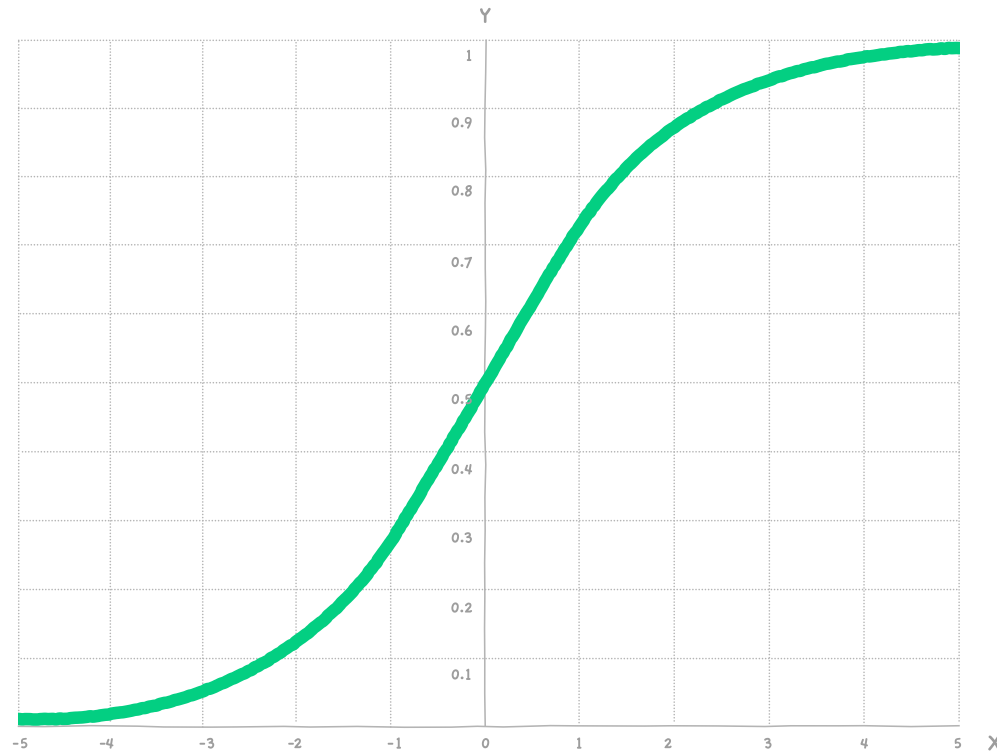
- $h(x) = Wx + b$

02. Hypothesis can give values larger than 1 or less than 0

# Logistic Hypothesis

$$H(x) = Wx + b$$

# Logistic Function, Sigmoid Function



## Sigmoid

Curved in Two Directions,  
like the Letter "S",  
or the Greek  $\varsigma$  (sigma)

# Logistic Hypothesis

$$H(X) = \frac{1}{1 + e^{-w^T x}}$$



**NEXT LECTURE**

# **LOGISTIC (REGRESSION) CLASSIFICATION : COST FUNCTION & GRADIENT DESCENT**