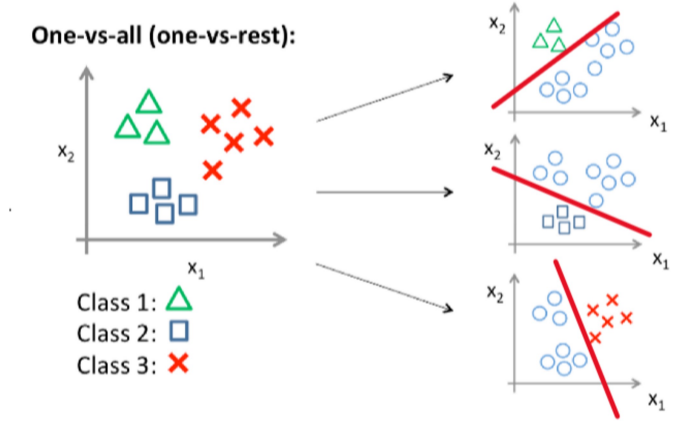
4. Softmax Classifier

2019년 3월 29일 금요일 오후 4:43

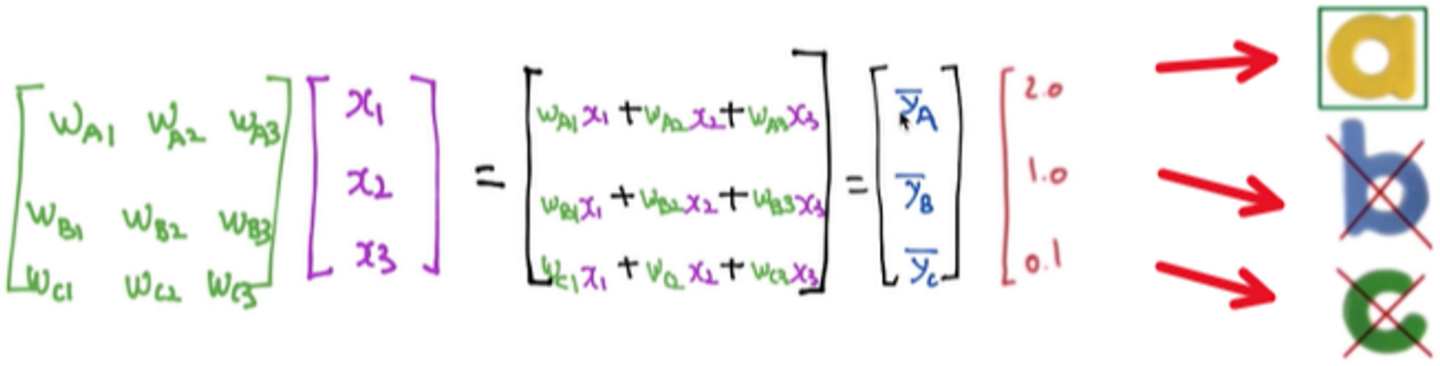
1. ***Definition***

- N개의 결과값을 추측할 때

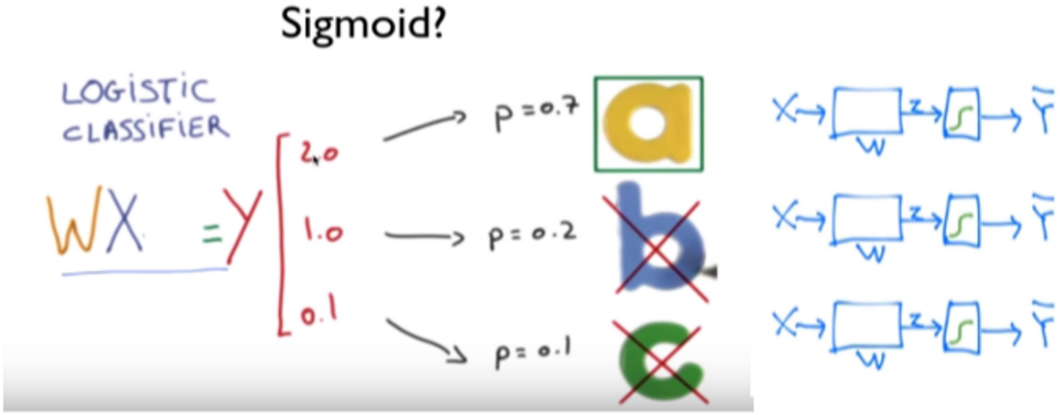
- ***Multinomial classification : 데이터 -> 분류***



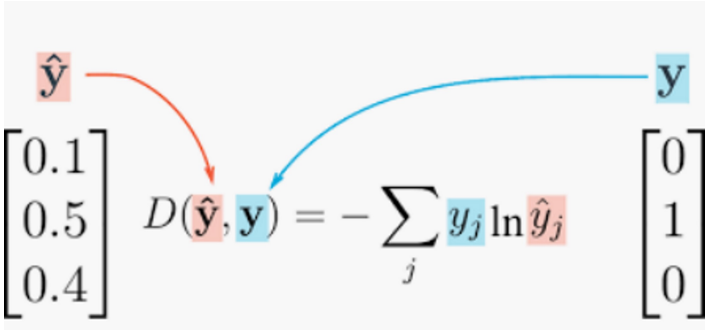
- ***Linear model : 데이터 -> 값***



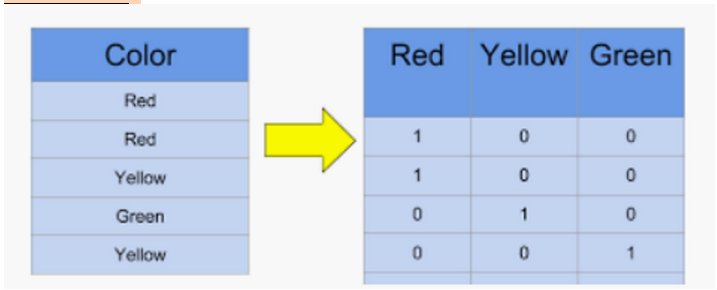
- ***Sigmoia : 값 -> 확률***
  - 0 < p < 1 : 확률
  - P값의 합은 1



- ***Cross-entropy : 확률, 값 -> cost***



- ***One hot***



Color
Red
Red
Yellow
Green
Yellow

Red	Yellow	Green
1	0	0
1	0	0
0	1	0
0	0	1

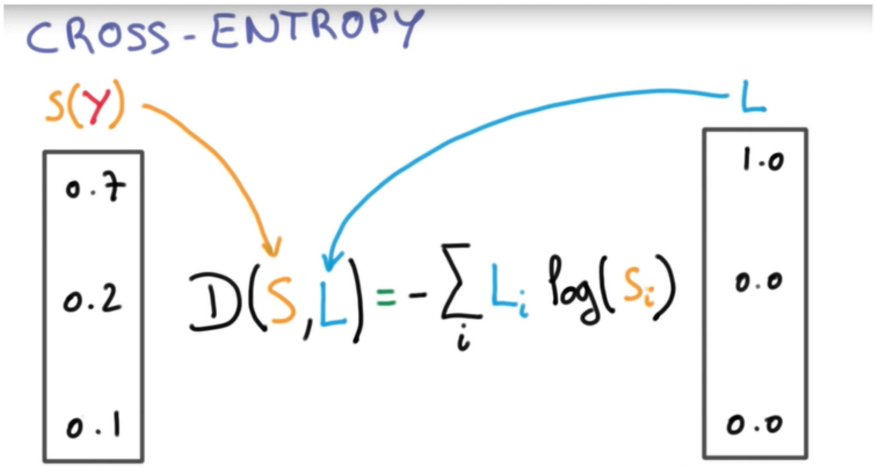
2. ***Hypothesis***

```
logits = tf.matmul(X, W) + b
hypothesis = tf.nn.softmax(logits)
```

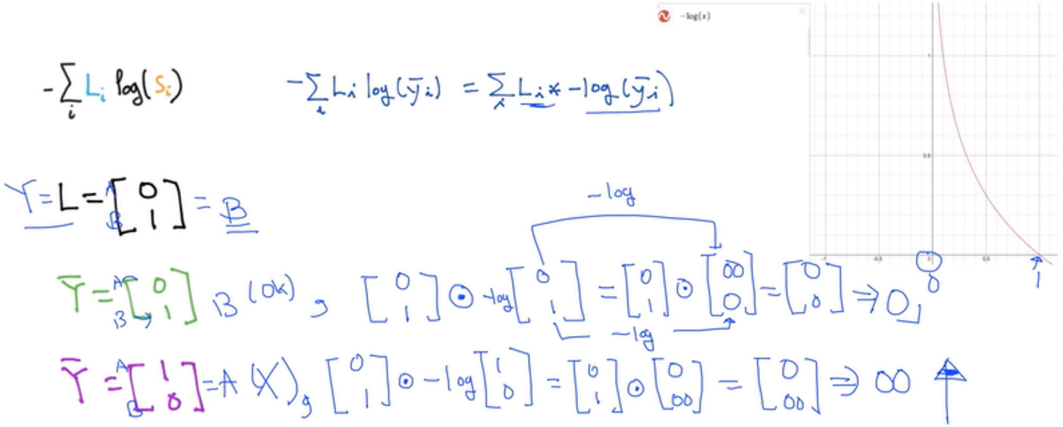
```
hypothesis = tf.nn.softmax(tf.matmul(X,W))
```

3. ***Cost function***

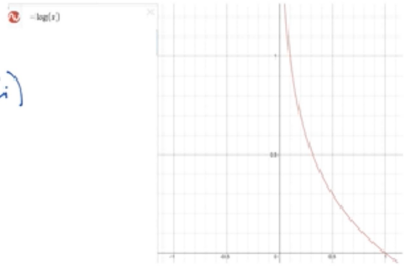
Cost function



Cross-entropy cost function



Cross-entropy cost function



$$-\sum_i L_i \log(S_i) \qquad -\sum_i L_i \log(\hat{y}_i) = \sum_i L_i * -\log(\hat{y}_i)$$

$$L = \begin{bmatrix} 1 \\ 0 \end{bmatrix} = A$$

$$\hat{Y} = \begin{bmatrix} 1 \\ 0 \end{bmatrix} = A \quad (O), \quad \begin{bmatrix} 1 \\ 0 \end{bmatrix} \odot \begin{bmatrix} 0 \\ 00 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \Rightarrow O$$

$$\hat{Y} = \begin{bmatrix} 0 \\ 1 \end{bmatrix} = B \quad (X), \quad \begin{bmatrix} 1 \\ 0 \end{bmatrix} \odot \begin{bmatrix} \infty \\ 0 \end{bmatrix} = \begin{bmatrix} \infty \\ 0 \end{bmatrix} \Rightarrow \infty$$

Logistic cost VS cross entropy

$$C(H(x), y) = y\log(H(x)) - (1-y)\log(1-H(x))$$

$$D(S, L) = -\sum_i L_i \log(S_i)$$

$$// \; ?$$

4. ***Gradient descent algorithm***