

성균관대학교

S I O R

로봇학회

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AI

2 주 차

목차

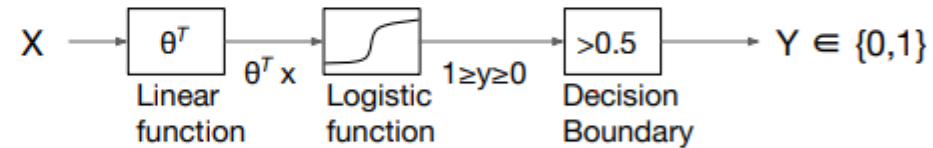
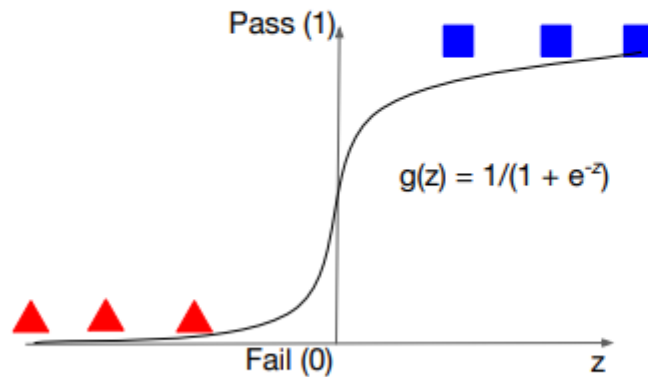
- Logistic Regression
- Logistic Regression cost
- Softmax Regression
- Softmax Regression cost

Logicstic Regression

...

Sigmoid (Logistic) function

$g(z)$ function out value is between 0 and 1



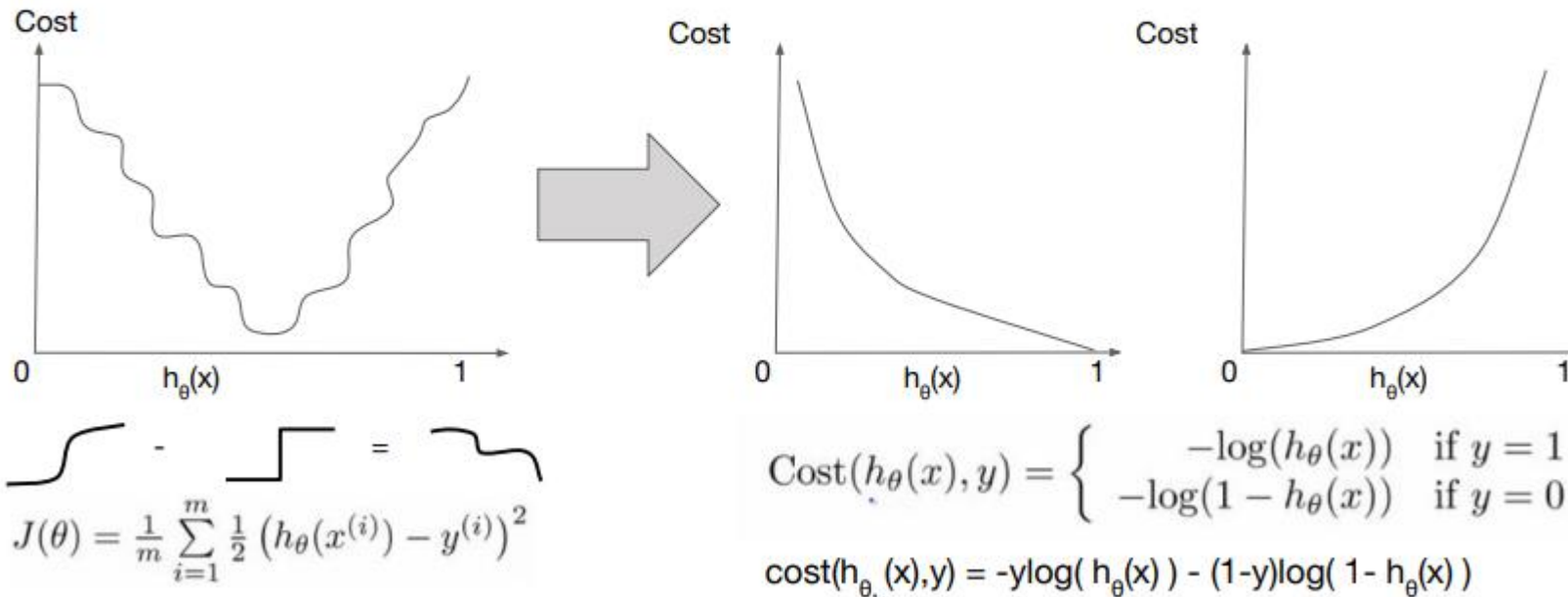
Where we define $g(z) \rightarrow z$ is a real number $\rightarrow g(z) = e^z/(e^z + 1) = 1/(1 + e^{-z})$

Logistic Regression Cost

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Cost Function

A convex logistic regression cost function



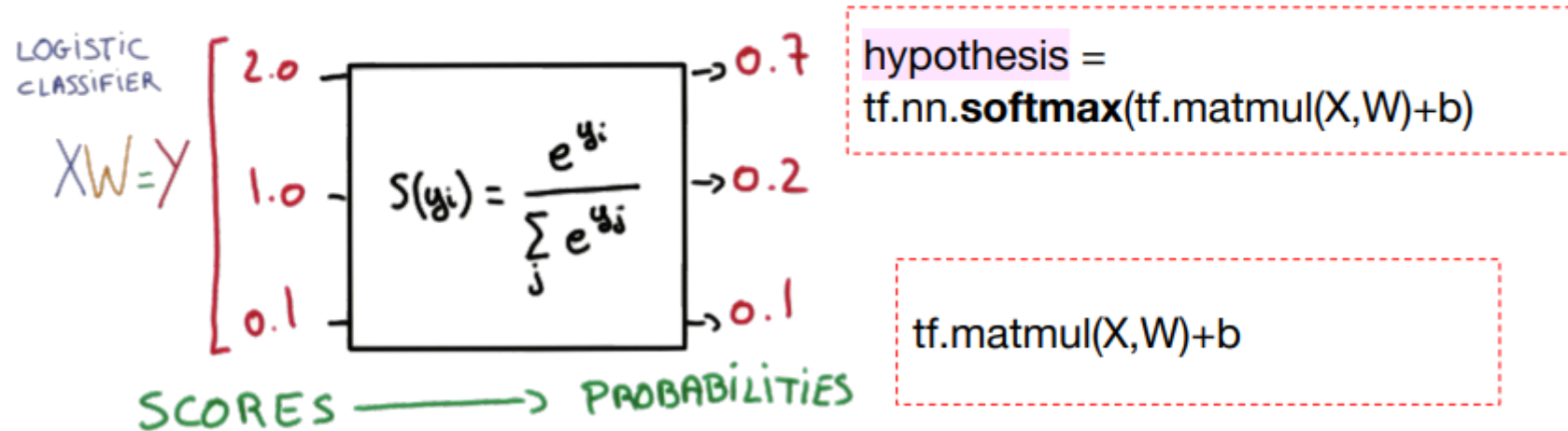
[Tensorflow Code]

```
cost = -tf.reduce_mean(labels * tf.log(hypothesis) + (1 - labels) * tf.log(1 - hypothesis))
```

Softmax Regression

...

Softmax function



Softmax Regression Cost

...

Cost function: cross entropy

The diagram shows the cross entropy cost function and its derivative. On the left, the cost function is written as $\mathcal{L} = \frac{1}{N} \sum_i \mathcal{D}(s(w x_i + b), L_i)$. A purple arrow labeled "LOSS" points to the \mathcal{L} term. Another purple arrow labeled "TRAINING SET" points to the i index in the summation. On the right, the derivative is written as $-\alpha \frac{\Delta \mathcal{L}(w_1, w_2)}{\text{DERIVATIVE}}$. The word "STEP" is written above the derivative expression.

Cross entropy cost/loss

```
cost = tf.reduce_mean(-tf.reduce_sum(Y * tf.log(hypothesis), axis=1))
```

```
optimizer = tf.train.GradientDescentOptimizer(learning_rate=0.1).minimize(cost)
```

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Thank You

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