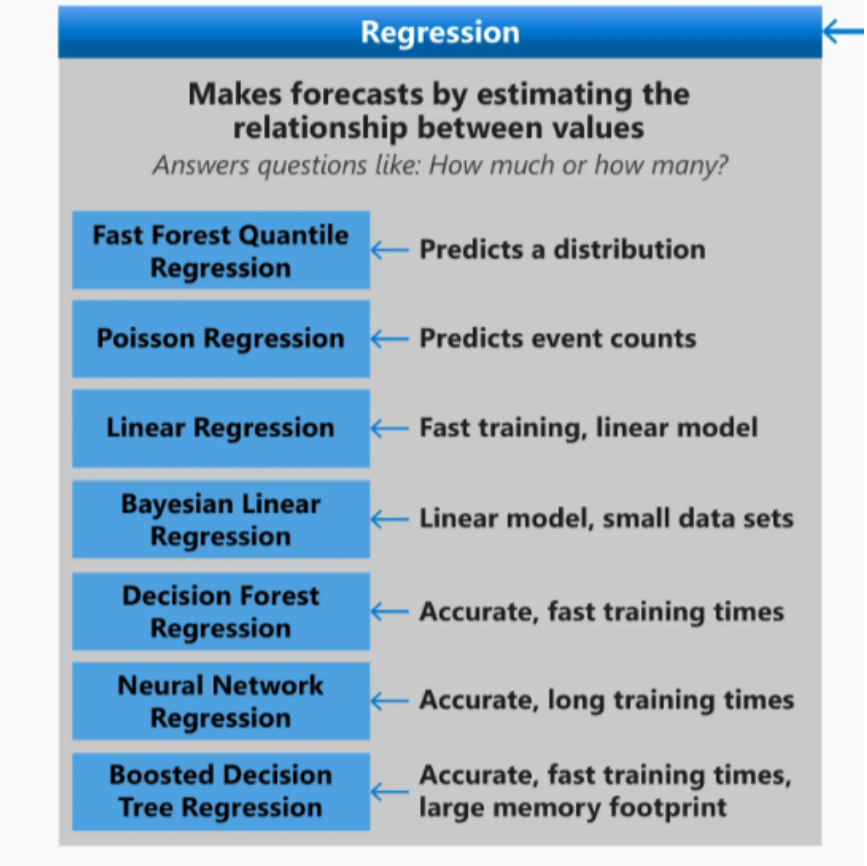
Logistic Regression

Logistic regression is a statistical method used to predict the probability of a certain event happening, like whether something is true or false, yes or no, or 0 or 1. It is commonly used in machine learning to classify things into two categories, such as determining if an email is spam or not, or if a tumor is cancerous or benign.

Logistic regression is more suited for binary classification problems, offers meaningful probability estimates, and is more robust against issues like outliers and improper outputs (outside 0-1 range) compared to linear regression.



Day 2: Logistic Regression

↳ Logistic Regression estimates the probability of an event occurring, such as voted or didn't vote, based on a given data set of independent variables

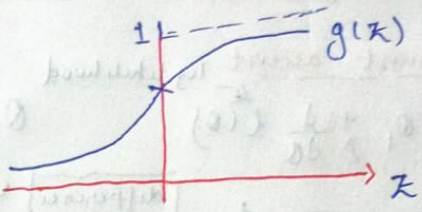
Logestic Regression

hypothesis

$w_0 + h_\theta(x) \in [0, 1]$

$$h_\theta(x) = g(\theta^T x) = \frac{1}{1 + e^{-\theta^T x}}$$

* $g(z) = \frac{1}{1+e^{-z}}$ } "Sigmoid" or Logistic function



ex: Breast Cancer Detection

$p(\underbrace{y=1}_{\text{output}} | \underbrace{x}_{\text{feature \{input\}}}; \theta) = h_\theta(x)$

$p(y=0 | x; \theta) = 1 - h_\theta(x)$

y = 1 predict if cancer

y = 0 if not cancer

$y \in \{0, 1\}$

compressed form

$$p(y|x;\theta) = h(x)^y (1 - h(x))^{1-y}$$

If $y = 0$

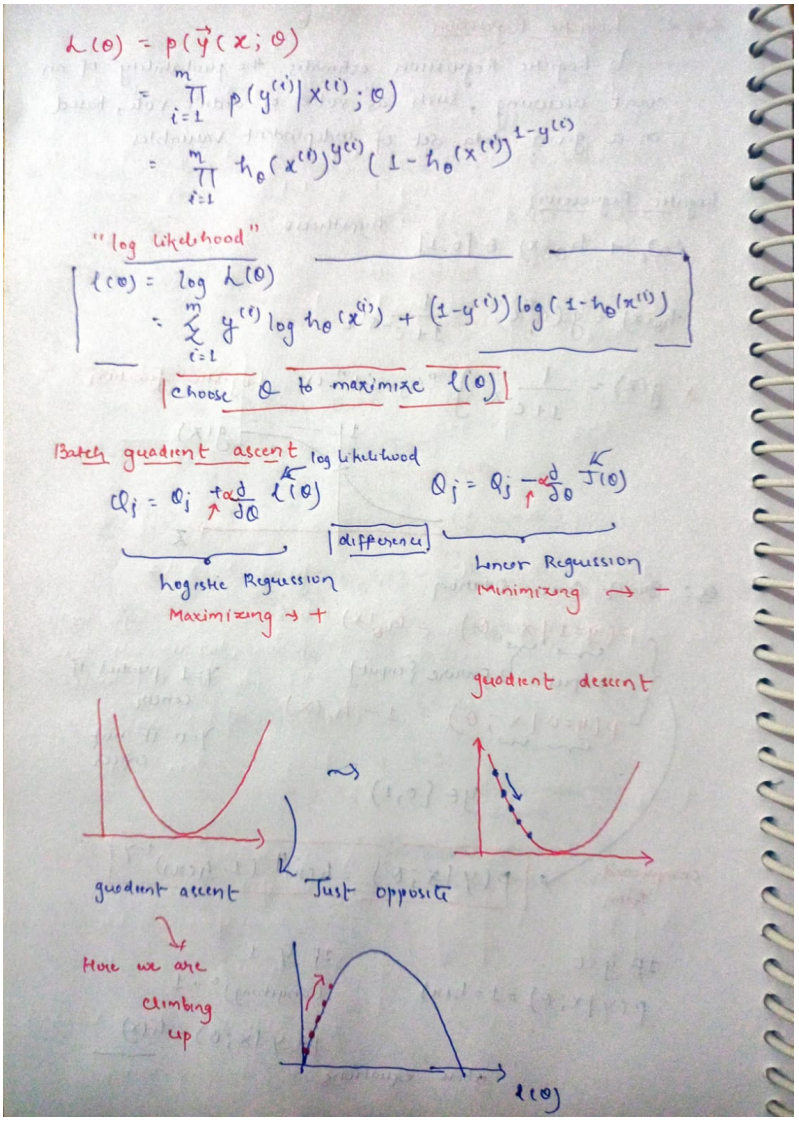
$p(y|x;\theta) = 1 - h(x)$

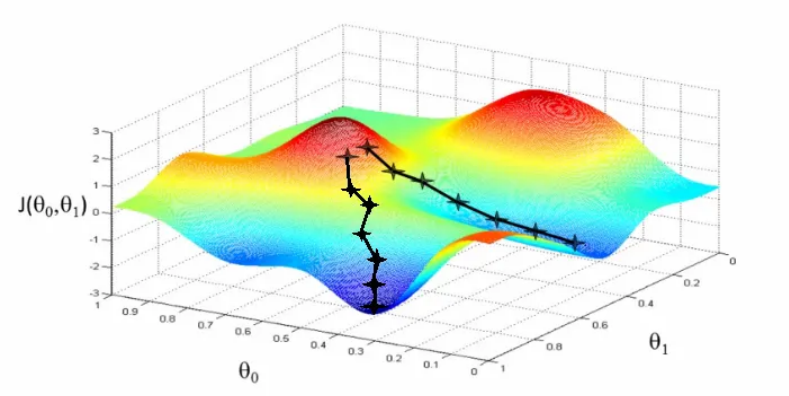
If $y = 1$

$(anything)^0 = 1$

$p(y|x;\theta) = h(x)$

above equations.





In this we're using Gradient ascent . In which we take baby steps to reach top from bottom