

# Regression & Classification Intuition

# Simple Linear Regression

## Intuition – Step 1

# Regressions

## Simple Linear Regression

Constant                      Coefficient

↓                      ↓

$$y = b_0 + b_1 * x_1$$

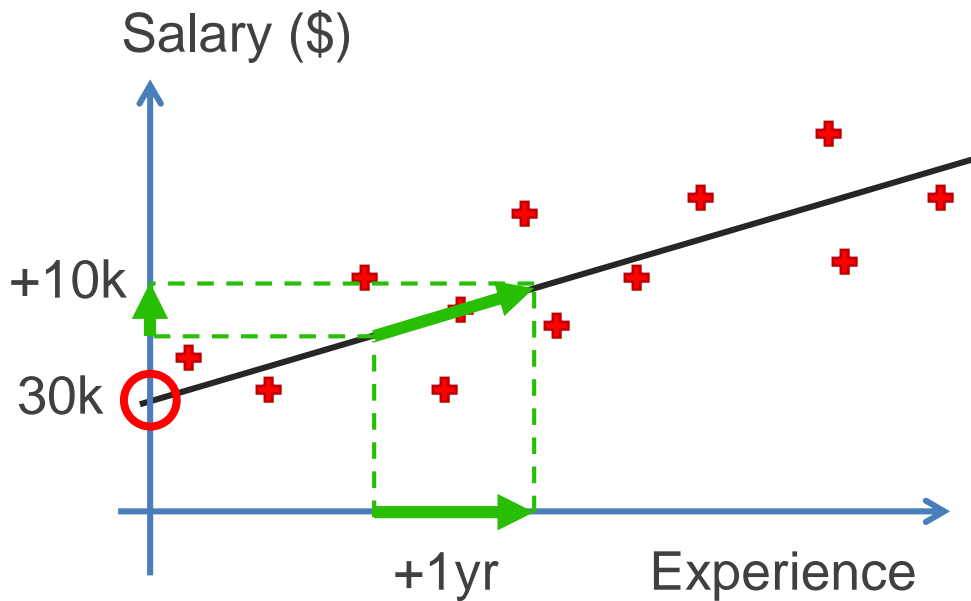
↑                      ↑

Dependent variable (DV)                      Independent variable (IV)

The diagram illustrates the components of the Simple Linear Regression equation  $y = b_0 + b_1 * x_1$ . The equation is centered on the slide. Above the equation, the word 'Constant' is positioned above  $b_0$  and 'Coefficient' is positioned above  $b_1$ . Green arrows point from 'Constant' down to  $b_0$  and from 'Coefficient' down to  $b_1$ . Below the equation, 'Dependent variable (DV)' is positioned below  $y$  and 'Independent variable (IV)' is positioned below  $x_1$ . Green arrows point from 'Dependent variable (DV)' up to  $y$  and from 'Independent variable (IV)' up to  $x_1$ .

# Regressions

## Simple Linear Regression:



$$y = b_0 + b_1 * x$$



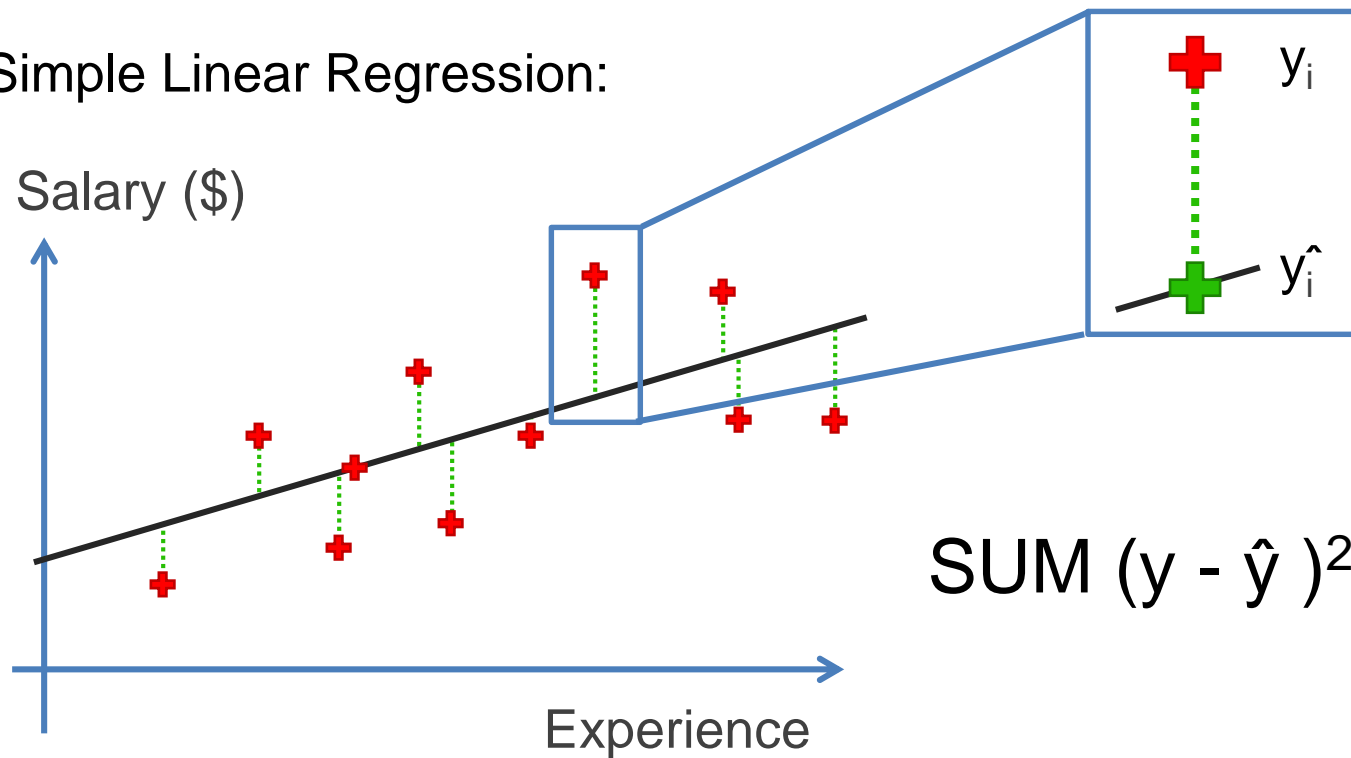
$$\text{Salary} = b_0 + b_1 * \text{Experience}$$

# Simple Linear Regression

## Intuition – Step 2

# Ordinary Least Squares

Simple Linear Regression:

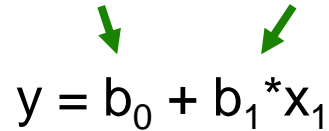


$$\text{SUM } (y - \hat{y})^2 \rightarrow \min$$

# Multiple Linear Regression Intuition

# Regressions

Simple Linear  
Regression

$$y = b_0 + b_1 * x_1$$


Multiple Linear  
Regression

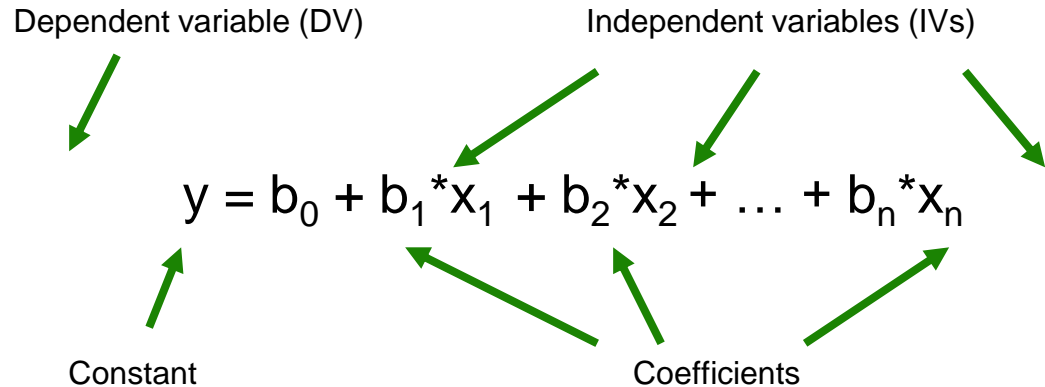
Dependent variable (DV)

Independent variables (IVs)

$$y = b_0 + b_1 * x_1 + b_2 * x_2 + \dots + b_n * x_n$$

Constant

Coefficients





# Logistic Regression Intuition

# Logistic Regression

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## Linear Regression:

- **Simple:**

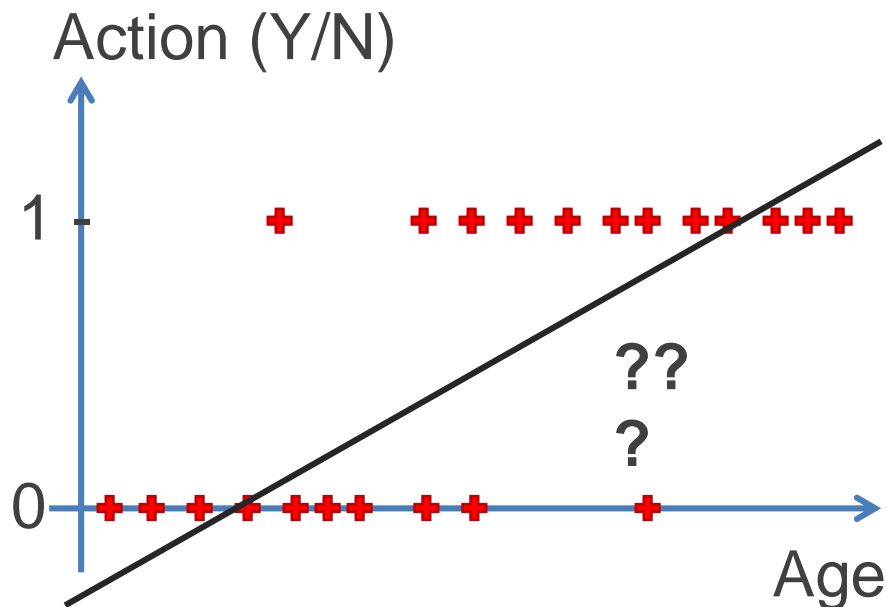
$$y = b_0 + b_1 * x$$

- **Multiple:**

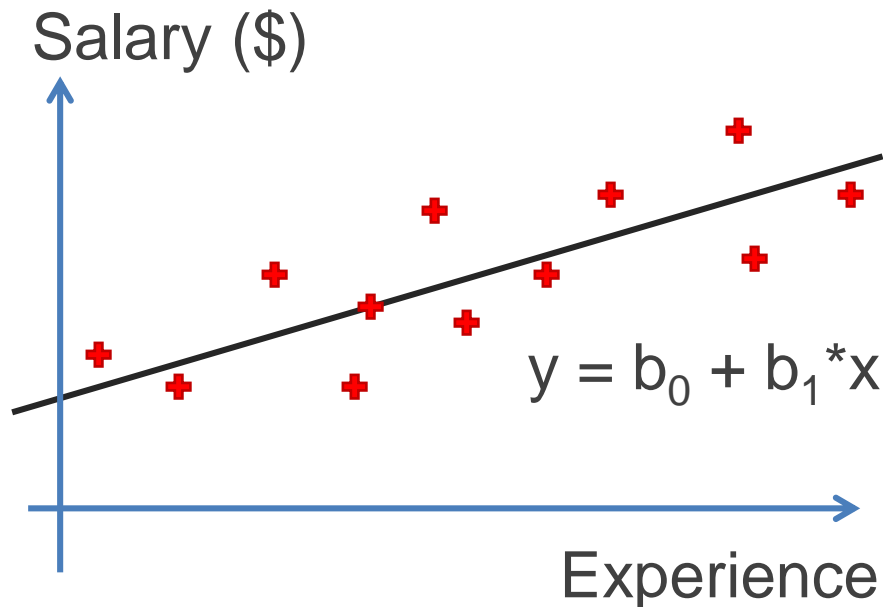
$$y = b_0 + b_1 * x_1 + \dots + b_n * x_n$$

# Logistic Regression

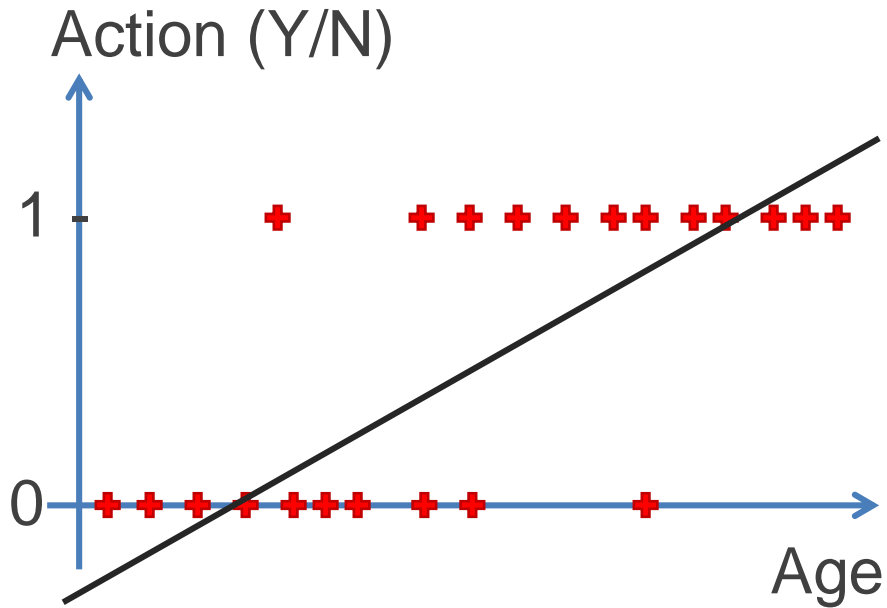
This is new:



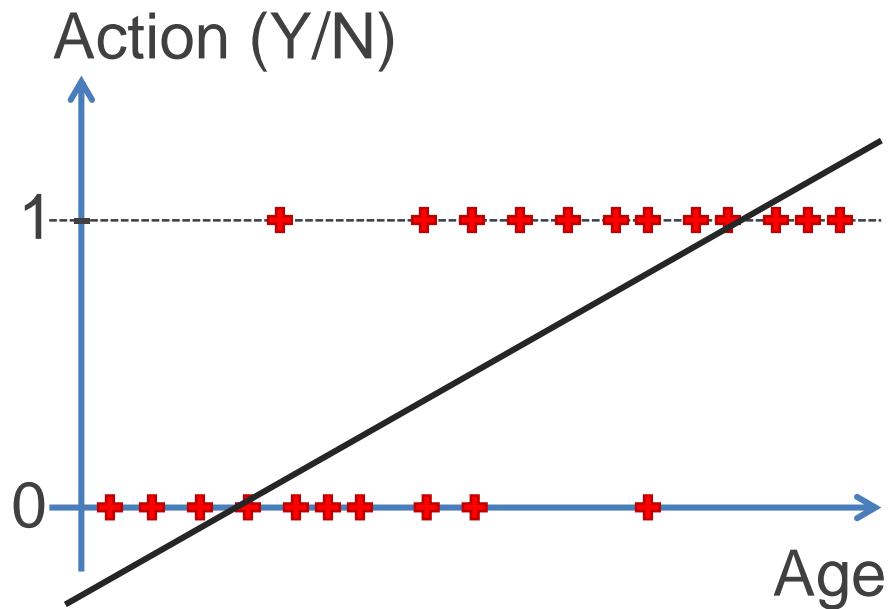
We know this:



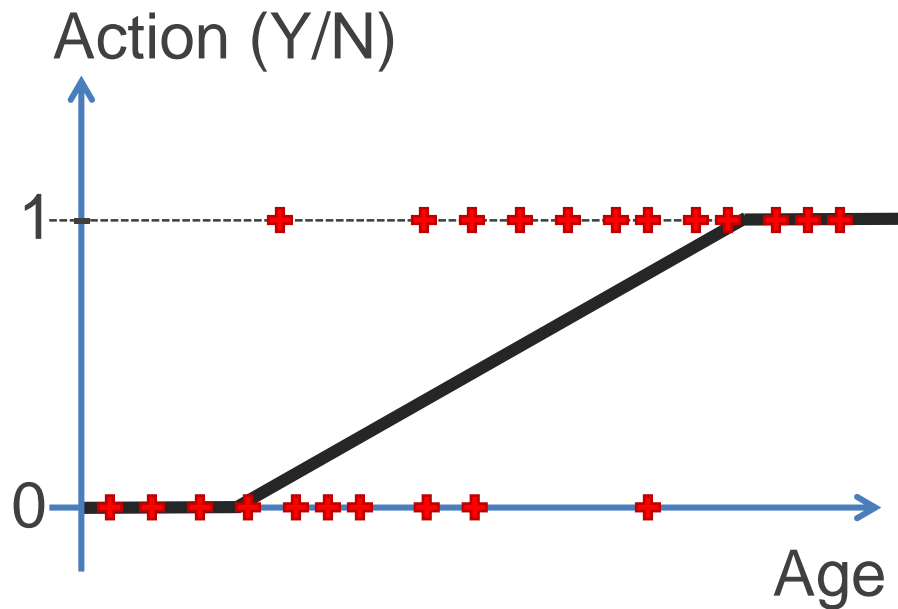
# Logistic Regression



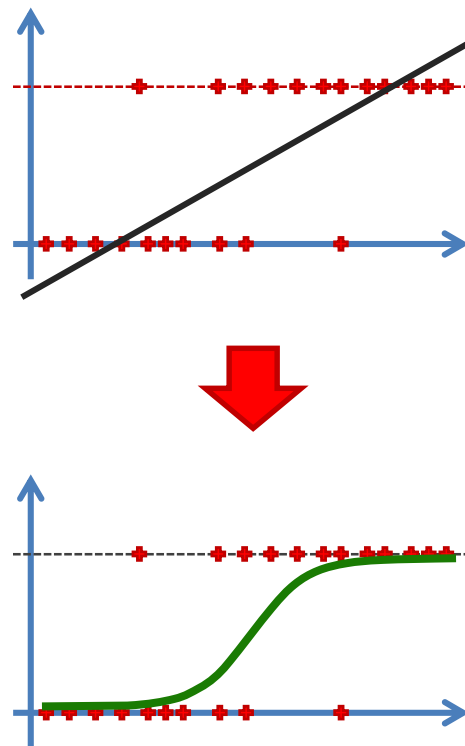
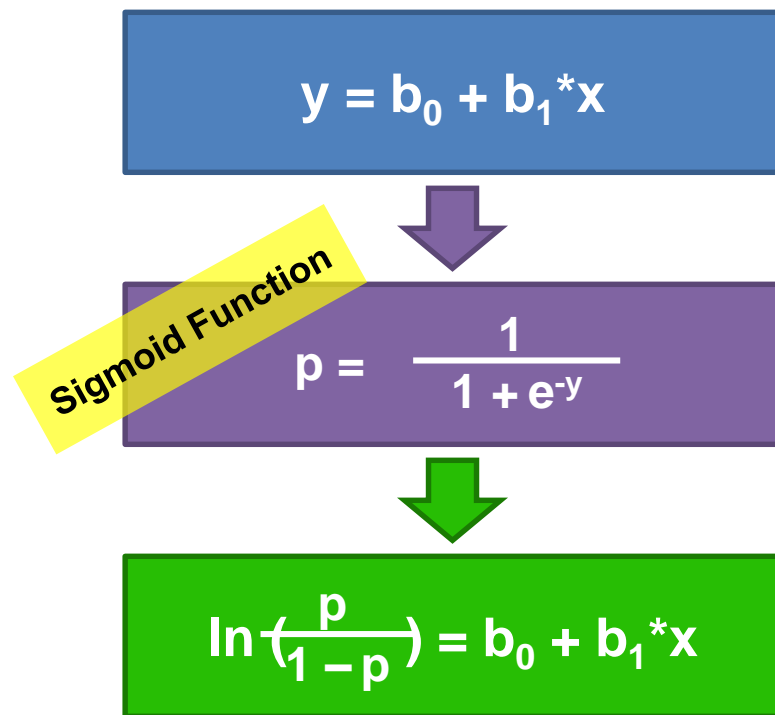
# Logistic Regression



# Logistic Regression



# Logistic Regression



# Logistic Regression

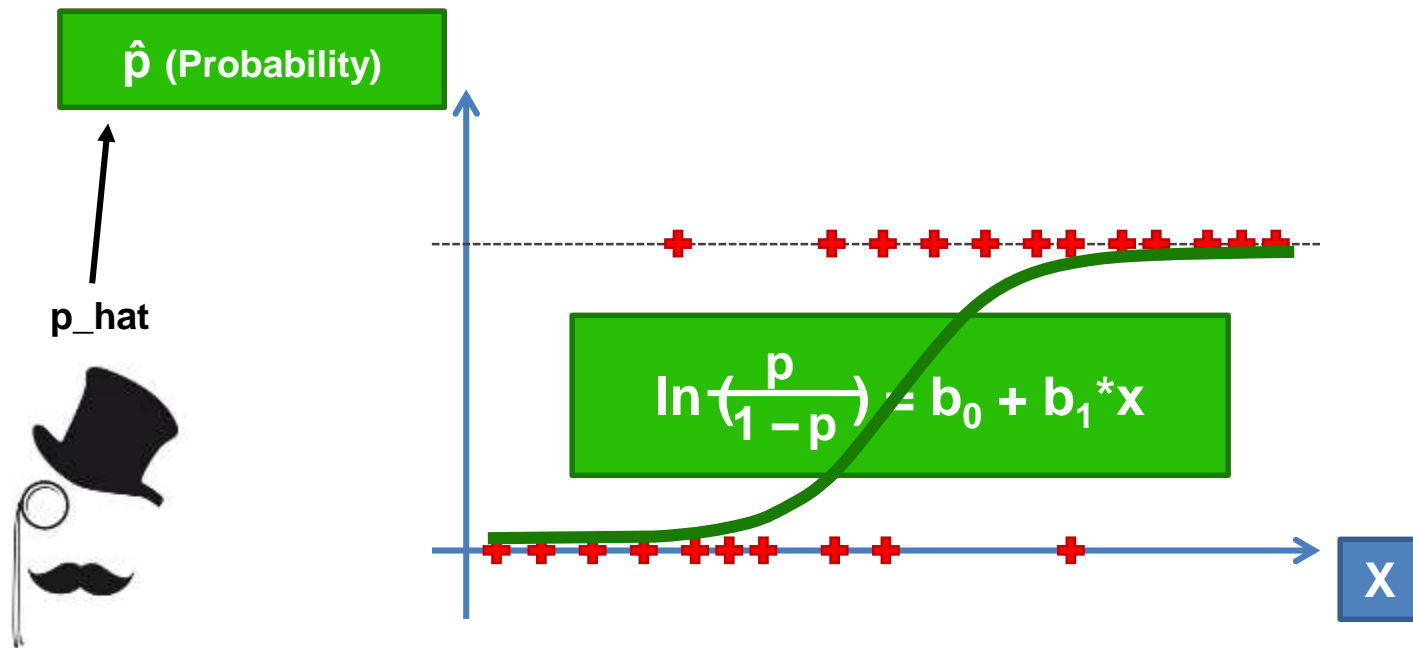
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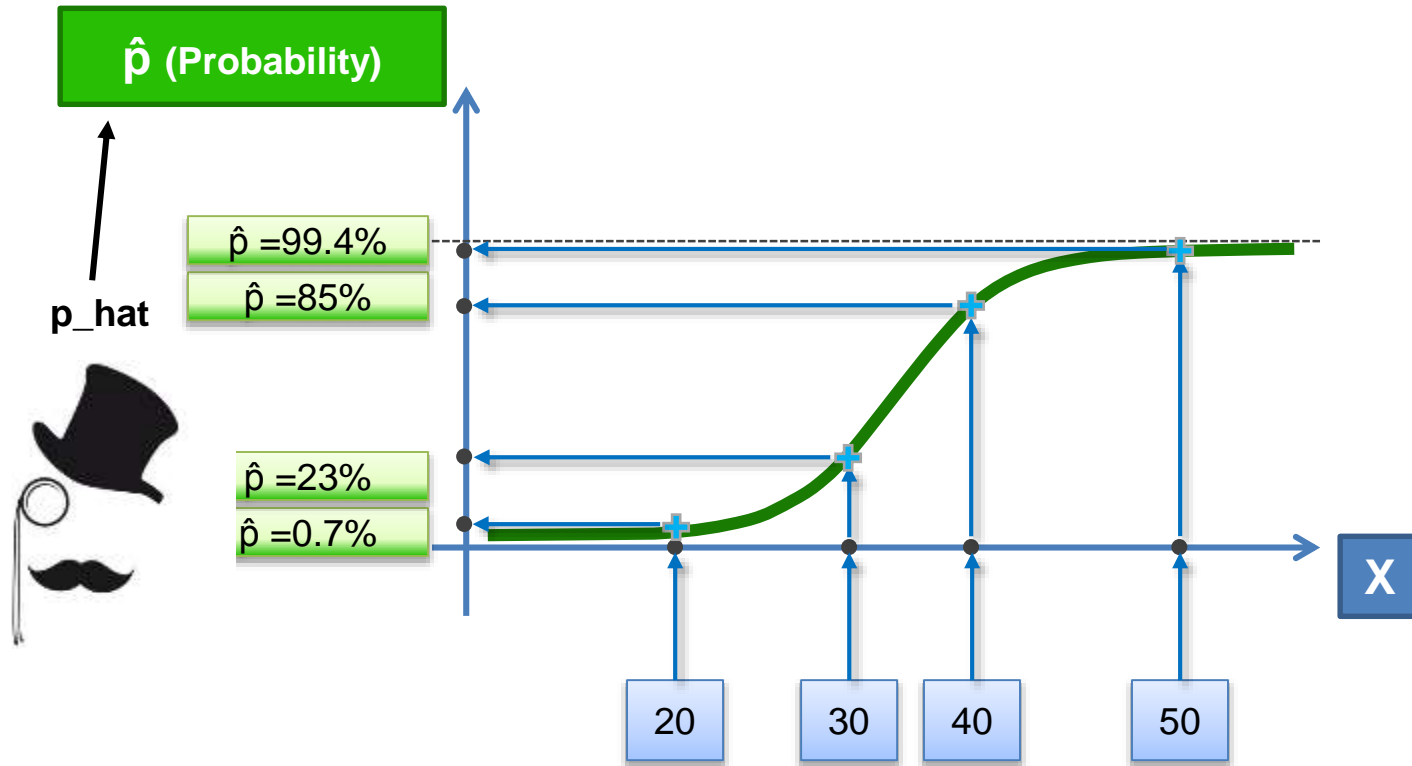
**WHAT JUST  
HAPPENED  
???**



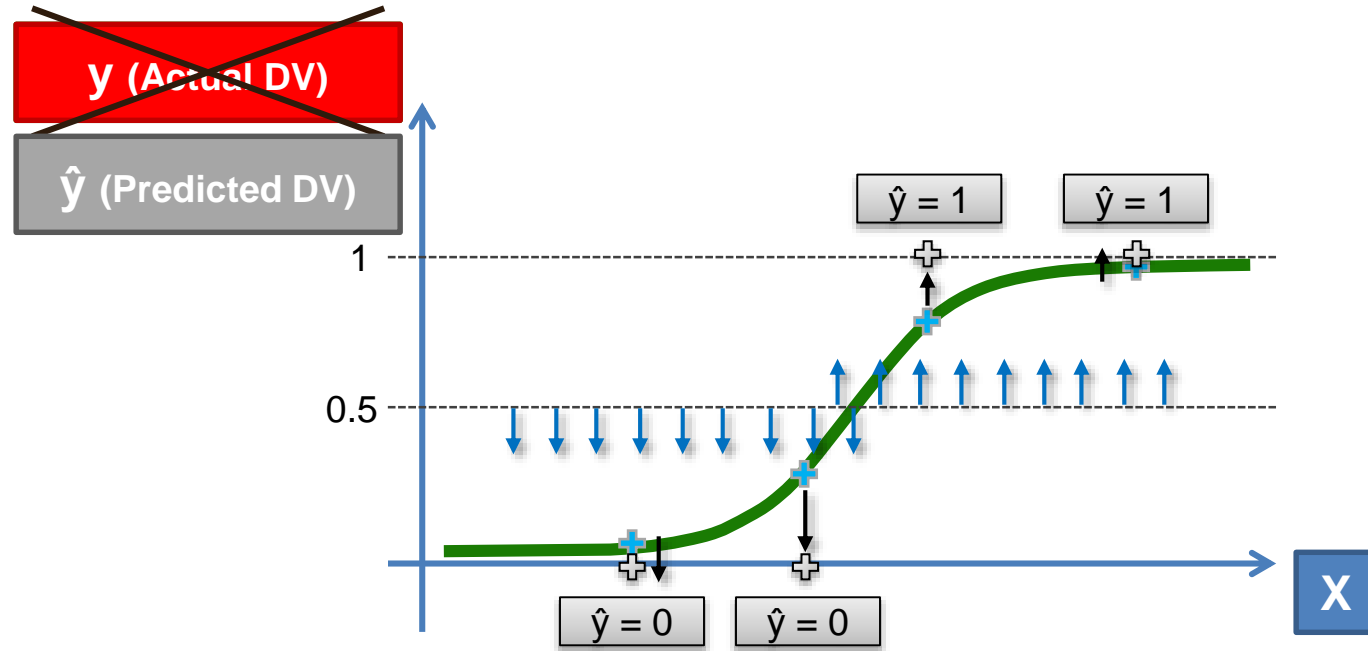
# Logistic Regression



# Logistic Regression



# Logistic Regression



Fin.