

Regression



Mass Street
University
PER EDUCATIONEM PROGRESSUS

Regression Methods

- Linear
- Logistic
- Polynomial
- LASSO
- Ridge Reduction
- Elastic Nets



Linear Regression

- Calculates a Slope Function.
- Works best with linear, continuous data.
- Uses Least Square method to find best fit.

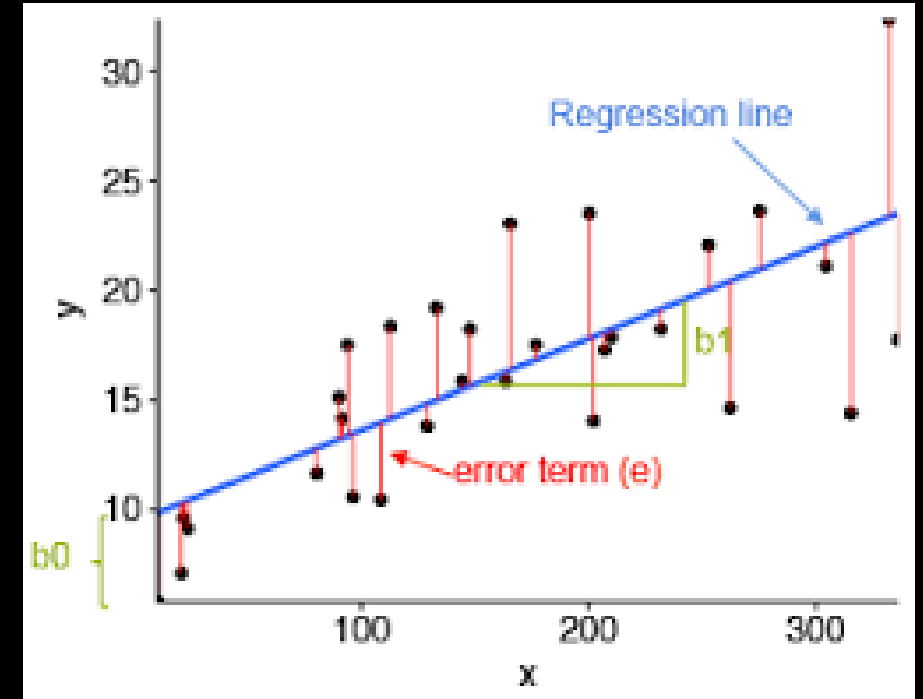
$$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$$

Diagram illustrating the components of the Linear Regression equation:

- Y_i : Dependent Variable
- β_0 : Population Y intercept
- β_1 : Population Slope Coefficient
- X_i : Independent Variable
- ε_i : Random Error term

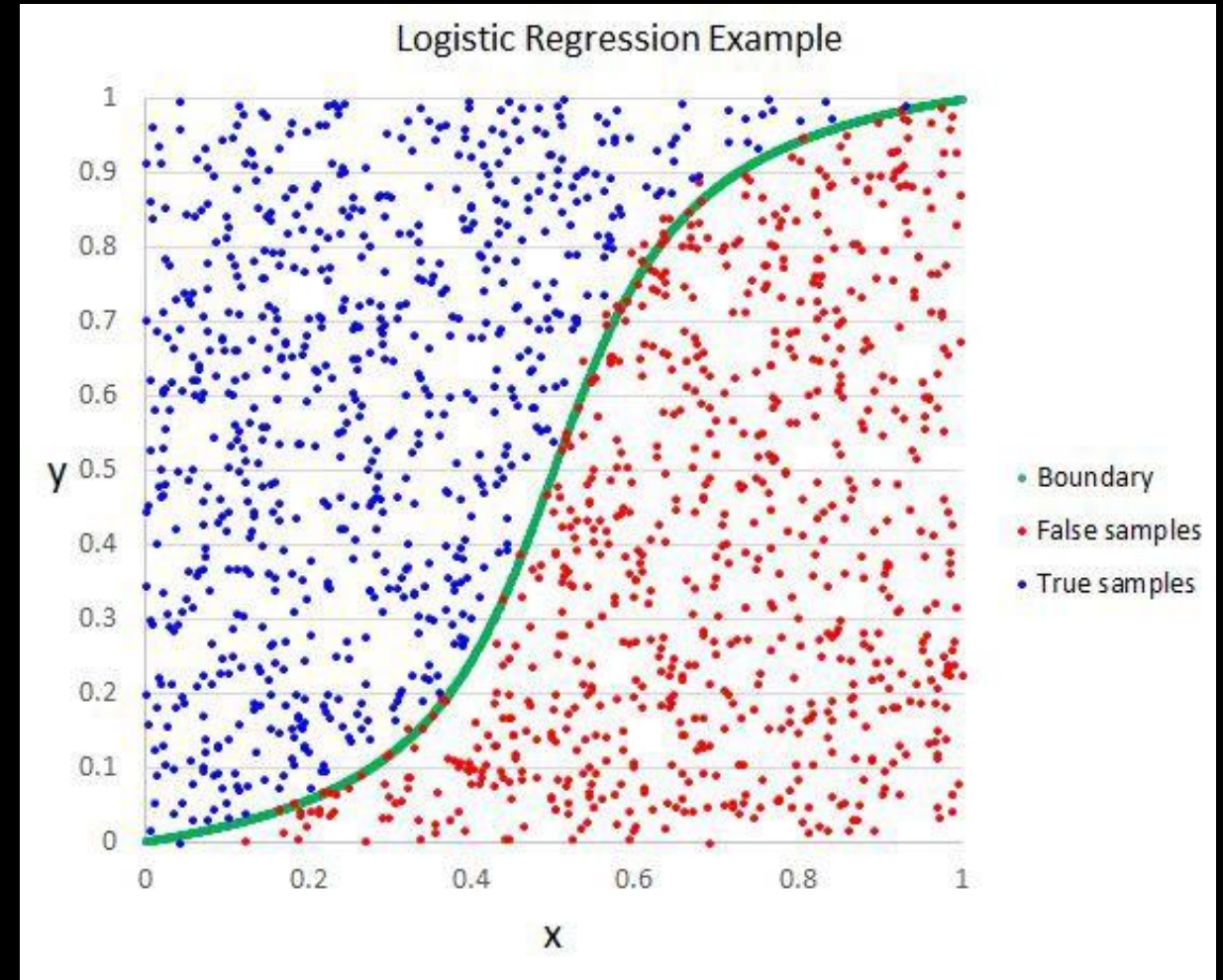
The equation is also labeled with components:

- β_0 : Linear component
- $\beta_1 X_i$: Linear component
- ε_i : Random Error component



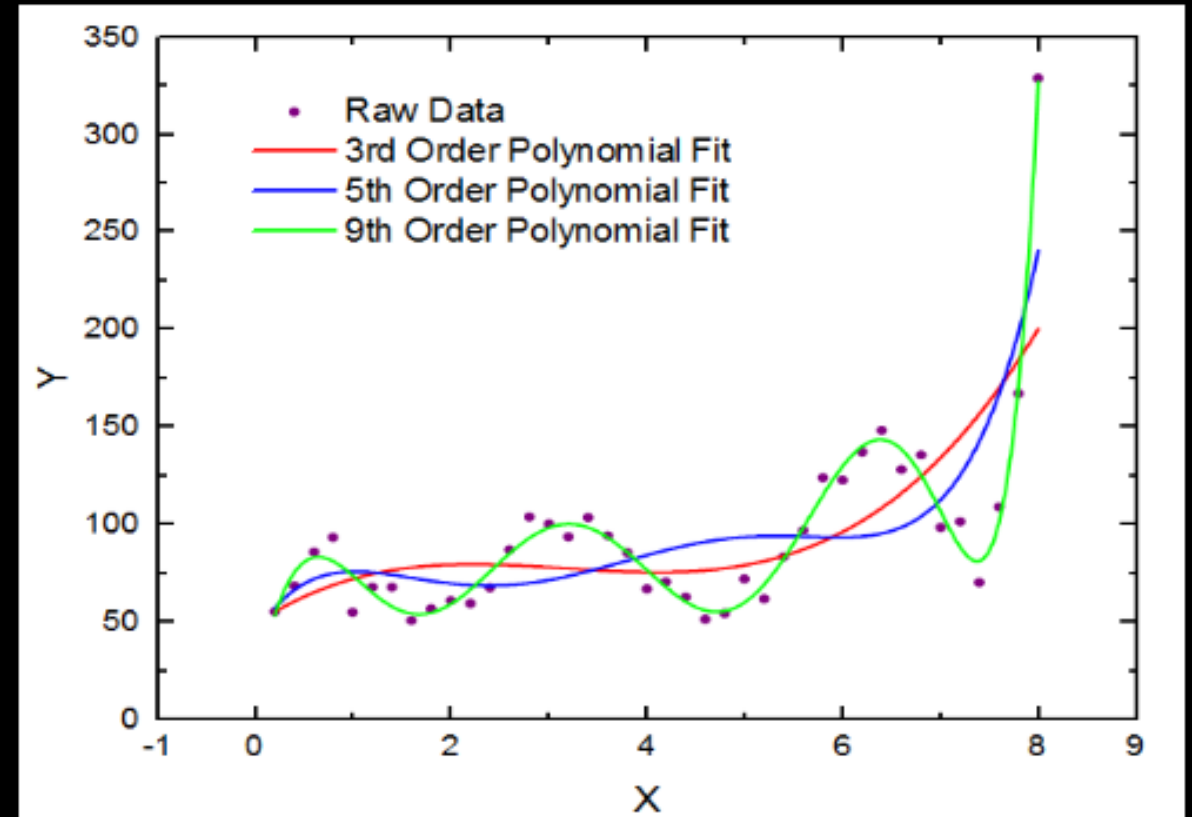
Logistic Regression

- Probabilistic model of relationship between inputs and outputs.
- Only takes binary data.
- Needs big data because of law of large numbers.
- It can work on Non-linear data.
- Prone to overfitting.



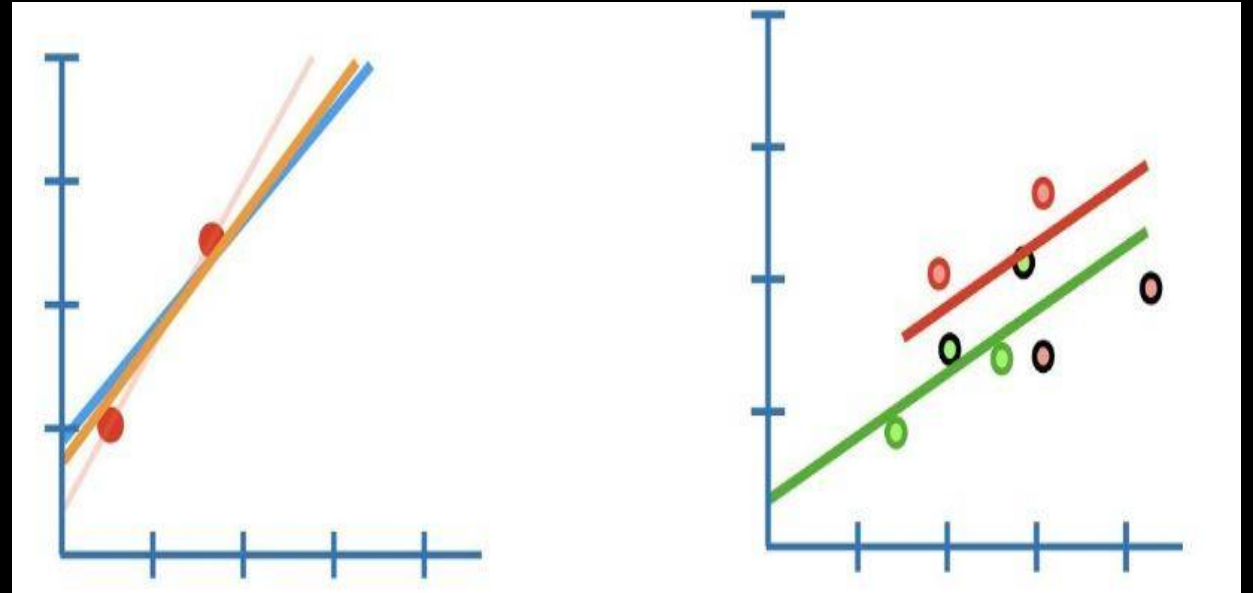
Polynomial Regression

- It fits a polynomial function instead of a linear function.
- Higher orders are more likely to overfit the data.
- Lower orders are more likely to underfit the data.



LASSO

- Works well with highly correlated data.
- Penalizes cost function for correlations.
- Uses L1 regularization.
- Can 'turn off' features of our data.



Elastic Nets

- Hybrid of LASSO and Ridge Reduction.
- Uses L1 and L2 regularization.
- Can train on very highly correlated variables.

