Linear Regression

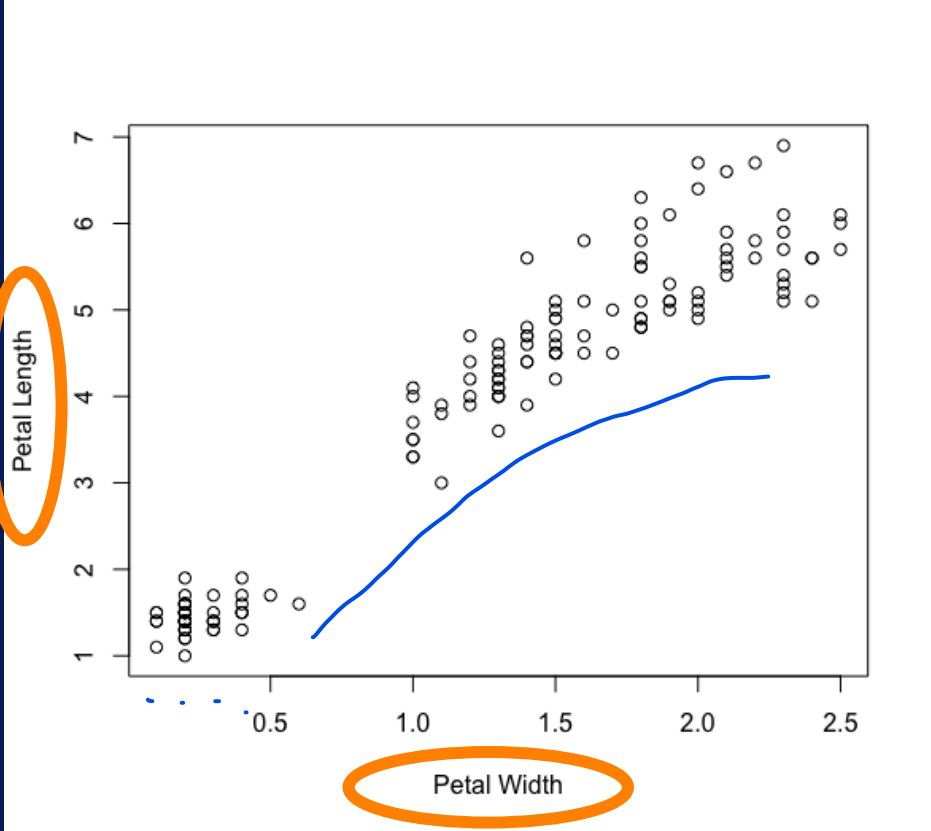
After this video you will be able to..

- Describe how linear regression works
- Discuss how least squares is used in linear regression
- Define simple and multiple linear regression

Linear Regression

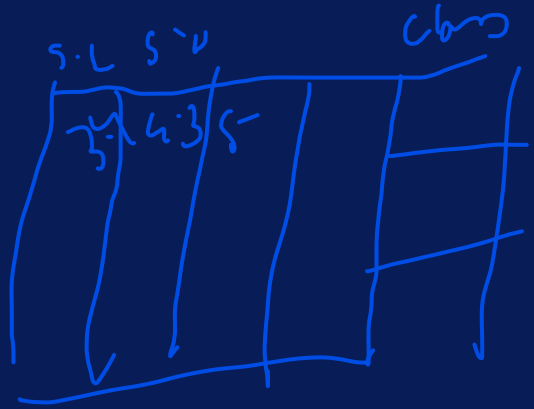
- Captures relationship between numerical output and input variables
- Relationship is modeled as linear

Linear Regression Model

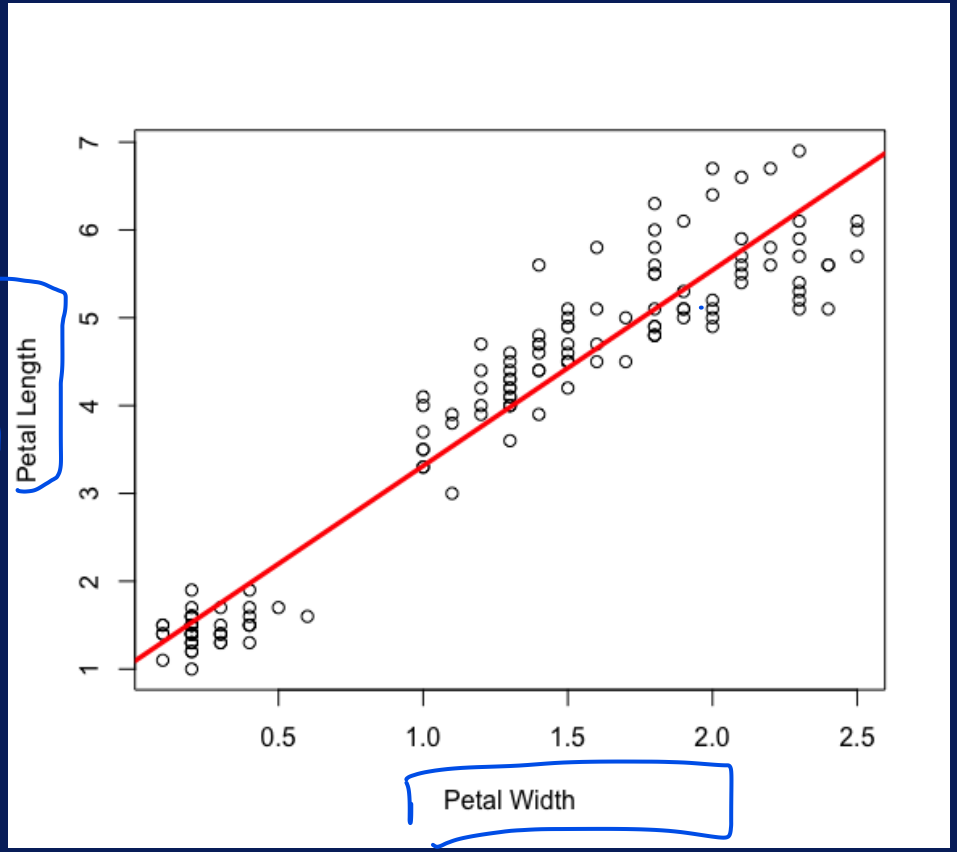


Regression Task:
Given petal width, predict petal length.

Iris dataset



Linear Regression Model



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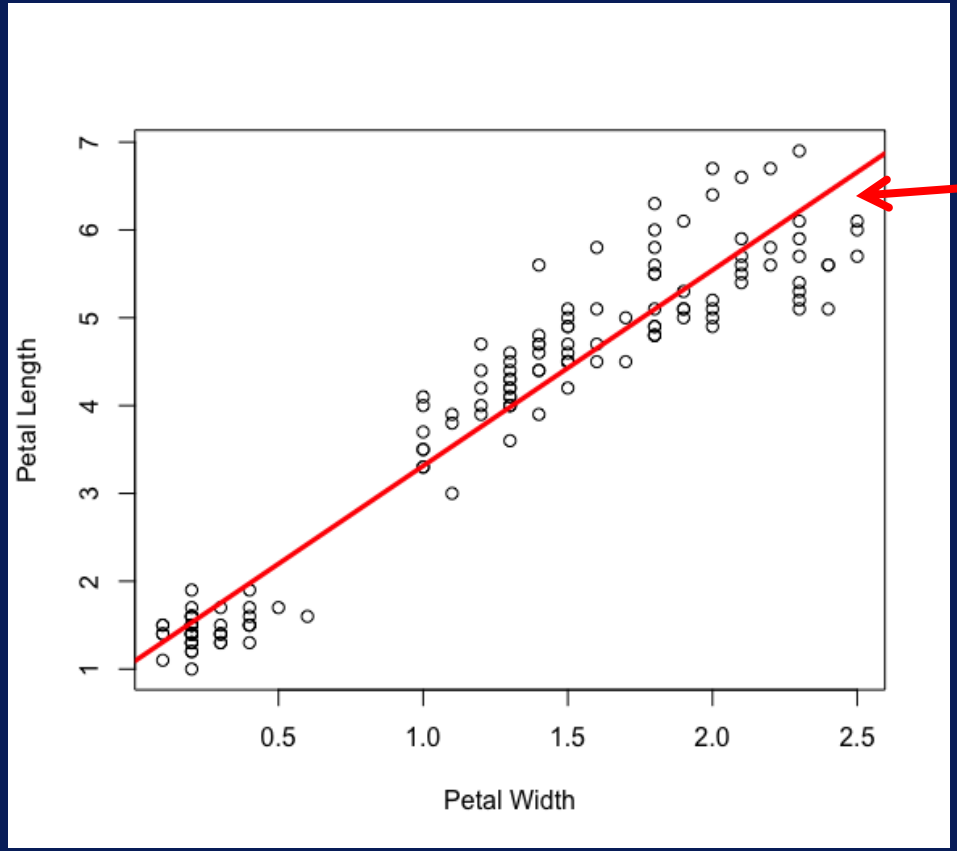
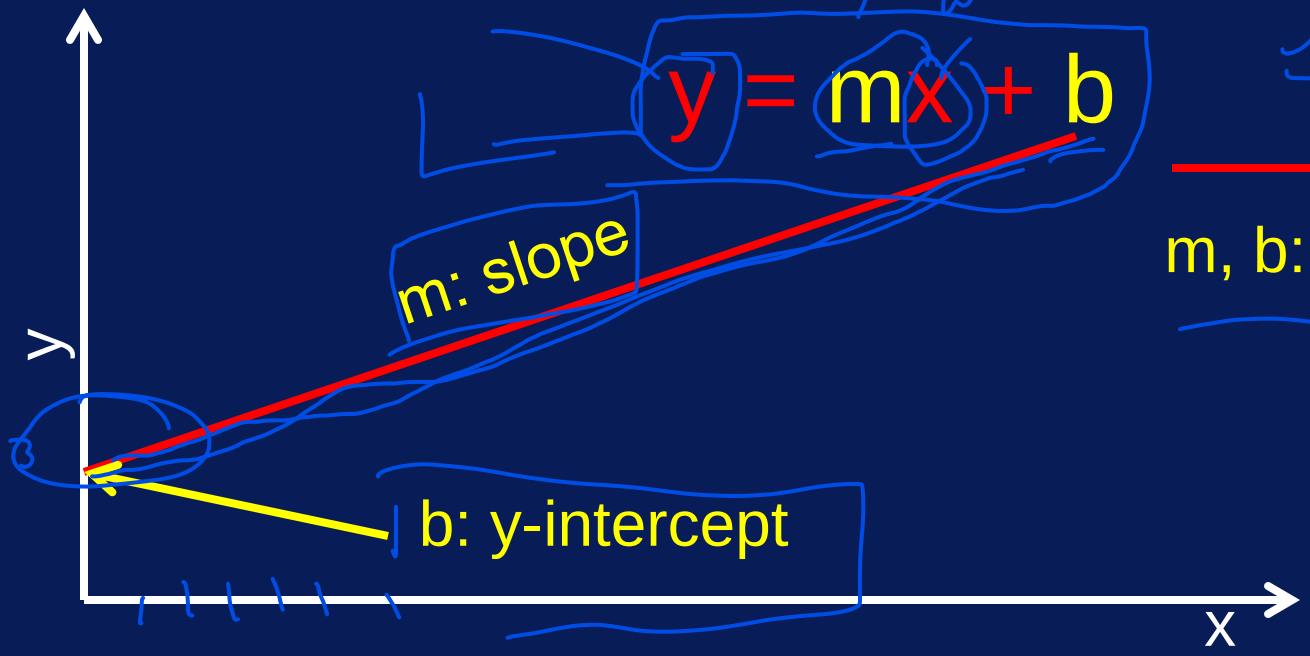
Linear Regression Model



regression line

Least Squares Algorithm

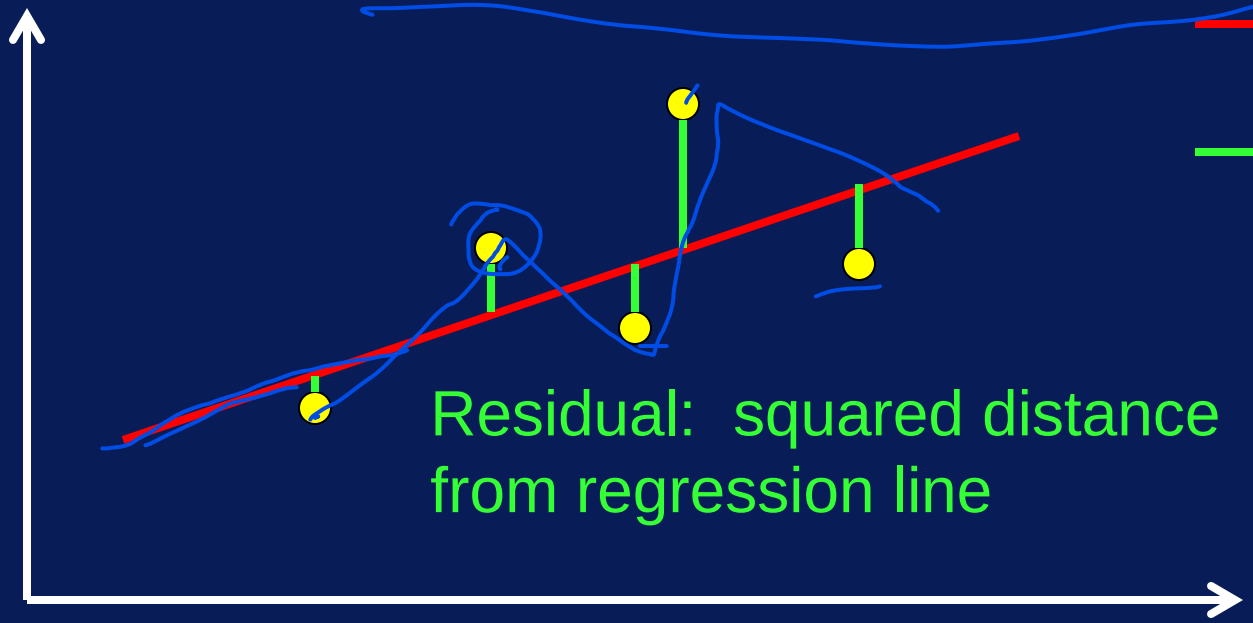


regression line

m, b: model parameters

Training linear regression model adjusts model parameters to fit samples

Least Squares Method



regression line

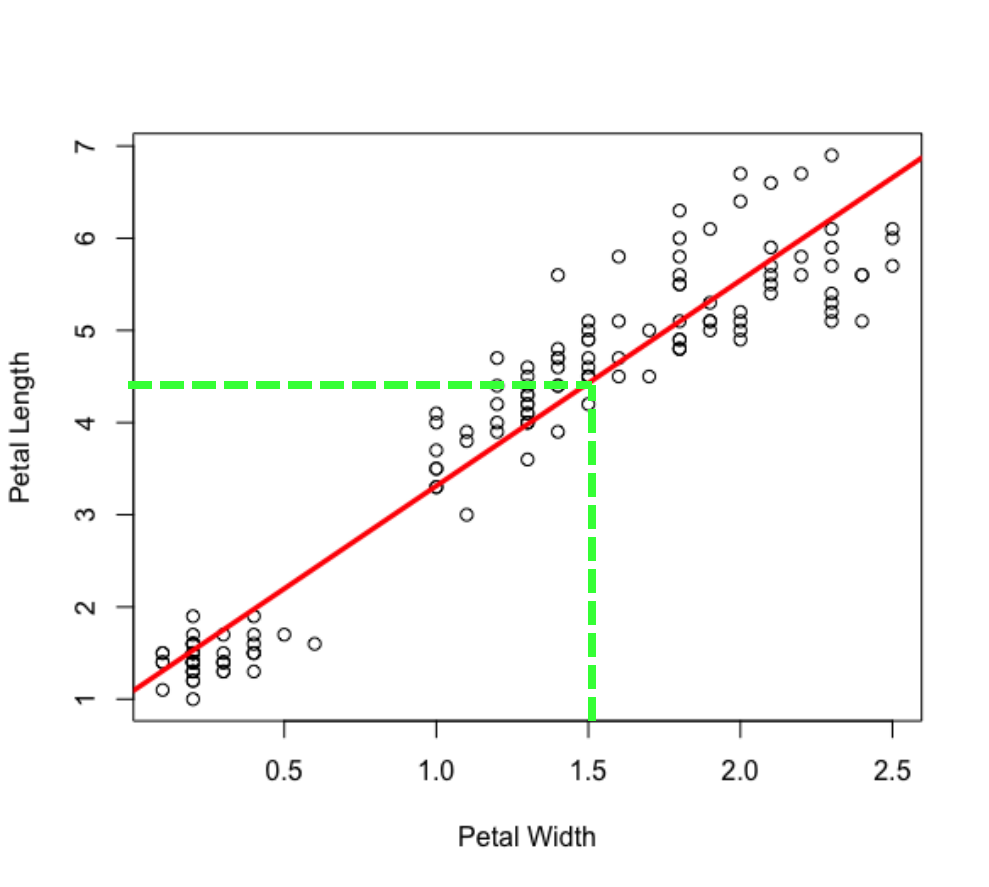
sample

distance from regression line (error)

Residual: squared distance from regression line

Goal: Find regression line that makes sum of residuals as small as possible

Linear Regression Model



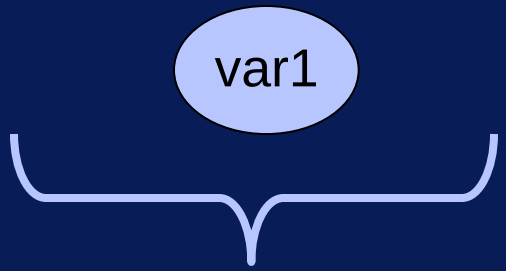
Applying model:

Given petal width =1.5, prediction is

petal length = 4.5

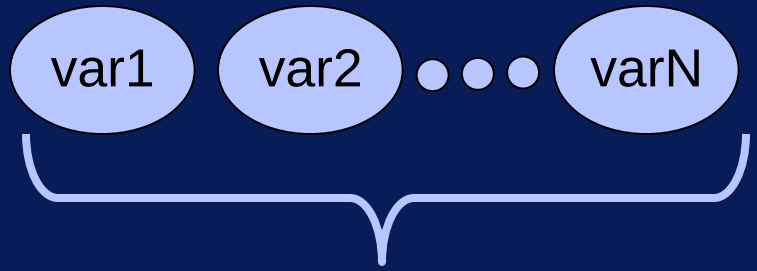
Types of Linear Regression

Simple Linear Regression



Input has one variable

Multiple Linear Regression



Input has >1 variables

Linear Regression Summary

- Captures linear relationship between numerical output and input variables
- Model can be fitted using least squares