

Introduction to Linear Regression

- **Linear regression** is a method used to model the relationship between a dependent variable and one or more independent variables.
- It assumes that there is a linear relationship between the variables and tries to find the line of best fit that minimizes the sum of squared errors.



Linear regression summary

Simple Linear Regression

- Simple linear regression involves modeling the relationship between a dependent variable y and a single independent variable x .
- The line of best fit can be represented by the equation $y = b_0 + b_1 * x$, where b_0 is the y-intercept and b_1 is the slope of the line.

between a dependent variable y and multiple independent variables x_1, x_2, \dots, x_n .

- The line of best fit can be represented by the equation $y = + b_1*x_1 + b_2*x_2 + \dots + b_n*x_n$.

$$(4x^2y - 3x^2 - 2y) + (8xy - 3x^2 + 2x^2y + 4)$$

$$4x^2y - 3x^2 - 2y + 8xy - 3x^2 + 2x^2y + 4$$

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in Python

- We can use the `LinearRegression` class from the `scikit-learn` library to perform linear regression in Python.
- Here is an example of how to fit a simple linear regression model:

```
from sklearn.linear_model import LinearRegression

# define the data
X = [[0], [1], [2]]
y = [0, 1, 2]

# create and fit the model
model = LinearRegression()
model.fit(X, y)
```

- We can use visualization libraries such as matplotlib or seaborn to create scatter plots and visualize the line of best fit.
- Here is an example of how to create a scatter plot with a fitted line:

```
import matplotlib.pyplot as plt

# define the data
X = [0, 1, 2]
y = [0, 1, 2]

# plot the data
plt.scatter(X, y)

# plot the fitted line
plt.plot(X, y)
```