DATA SCIENCE WITH R

REGRESSION

★ Regression Analysis ★

REGRESSION ANALYSIS

➔ **Overview**

Simple Linear Regression

Multiple Linear Regression

Regression Assumptions

Implementation in SAS

Regression

A regression is used to understand and quantify cause-effect relationships

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For example, what happens to sales of a brand of shampoo if there is a discount of 15% offered in a particular week?

We expect sales to go up

Here:

the cause: → a reduction in price

the effect: → an increase in sales

Regression

We know that the effect of a decrease in price is an increase in sales -

What if we also want to know, by how much? What is the increase in sales because of a 15% discount in price?

That is the quantification of the impact

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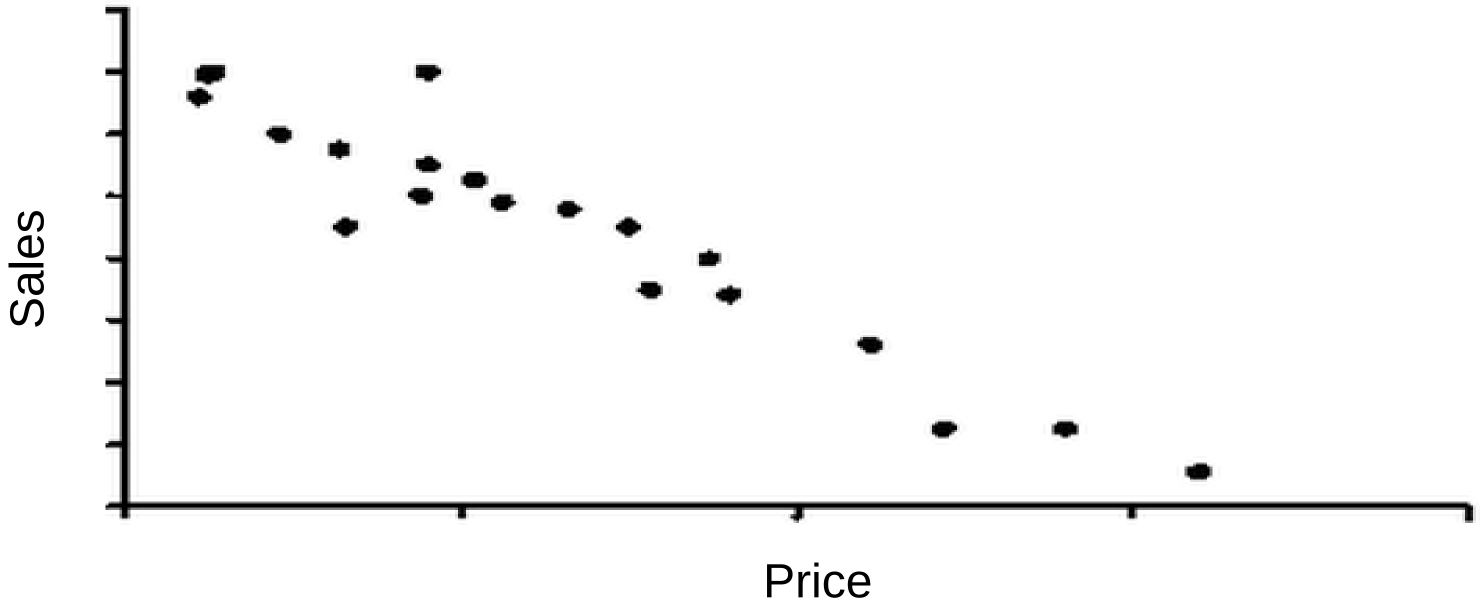

Regression

Statistical

Magnitude

Direction

Causal

Observed Pattern

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Observed Pattern – Dependent variable, Distribution

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Business Application

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Example:

You work for a hospital and are looking to understand factors that may influence the birth weight of a baby

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Sample:

1115 observations from a hospital in the US

Birthweight (grams)	Weeks of gestation	Mother's education in years	Race	Smoked during pregnancy
2898	40	0	0	1
994	26	0	1	1
3977	38	2	0	0
3040	37	2	0	1
3523	38	2	0	0
3100	40	5	0	1
3670	40	6	1	0
3097	41	7	1	0
3040	39	7	1	1
3239	39	7	1	1
2955	38	8	0	0
2200	38	8	0	0
3182	40	8	1	0
3510	40	8	0	0
3381	39	8	1	1
3530	40	8	1	0
2985	38	8	1	1
3374	39	8	1	0
3765	42	8	0	0
2715	39	8	1	0
3640	39	8	1	0
3040	42	8	1	0

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Are these the only factors that impact birth weight of a baby?

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- **Graphical visualization**
- **Correlations**
- **Run regression model**

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We will review the simplest type of regression, linear regression

To Be Continued

Regression Analysis

Simple Linear Regression

THANK YOU