Regression Analysis

Simple Linear Regression

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Regression Concepts:
Model Diagnostic Example

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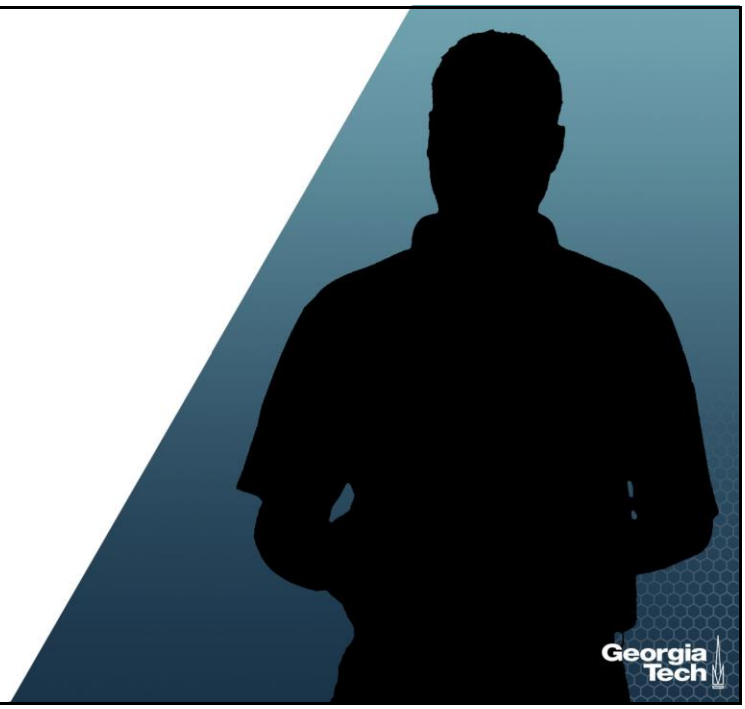
About This Lesson



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Linear Regression: Example in R

A company, which sells medical supplies to hospitals, clinics, and doctors' offices had considered the effectiveness of a new advertising program. Management wants to know if the advertising is related to sales.

This company intends to increase the sales with an effective advertising program.

Do the assumptions of the linear regression model hold?
What is the explanatory power of the model?

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Example in R: Residual Analysis

a. What are the assumptions of linear regression?
b. Do the assumptions hold? Provide the graphical displays needed to support the diagnostics. Interpret.
c. Do you identify any outliers?
d. How much variability in sales is explained by the advertising expenditure?

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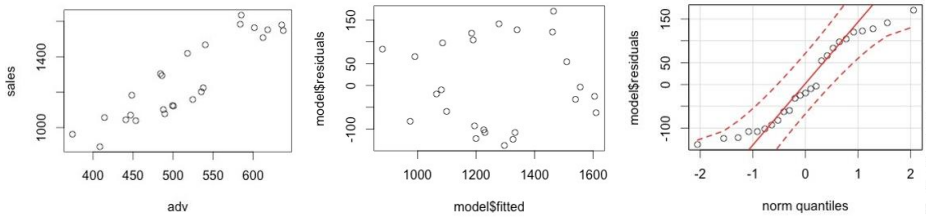
Example in R (cont'd)

a. The assumptions are:
Linearity, Constant Variance, Independence, and Normality.

b. plot(adv, sales)
plot(model$fitted, model$residuals)
library(car); qqPlot(model$residuals)



Based on the above plots, **the assumptions appear to hold**.

Example in R (cont'd)

c. *Do you identify any outliers?*

Based on the plots provided in part b, **there do not appear to be outliers**.

d. *How much variability in sales is explained by the advertisement expenditure?*

```
summary(model)$r.squared
[1] 0.8105919
```

Around **81%** of the variability in sales is explained by the advertising expenditure.

Summary

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