Statistical Models (551305)

Trimester 2

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Outline of presentation

- Motivation

- Module content

- A cool example

- Learning outcomes

- Module organization

Motivation

▶ Builds on first year module **Intro to Probability & Statistics**

▶ Part of well-rounded mathematical education

▶ Teaches you the statistical computer language R
  (widely used in research as well as in industry)

▶ Useful for project work and dissertations

▶ Statistical modelling and simulation widely applied
  (sports, finance, machine learning, etc.)

▶ Good foundation for Data Science oriented careers

Module content

Topics covered:

- Normal distribution family (t, F, χ^2)
- One-sample hypothesis tests
- Two-sample hypothesis tests
- Tests for contingency tables
- Regression Models

Example: Man Utd performance

Manager	Won	Drawn	Lost
Moyes	27	9	15
Van Gaal	54	25	24
Mourinho	84	32	28
Solskjaer	91	37	40
Rangnick	11	10	8
ten Hag	61	12	28

Table: Performance of Man Utd managers since 2014

- Man Utd performance declined in the post-Sir Alex Ferguson era

- Since 2014 Man Utd has had 6 different managers (excluding interims)

Example: Man Utd performance

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Table: Performance of Man Utd managers since 2014

- **Question:** Are managers to blame for Man Utd performance? *(Spoiler: No)*

- Analysis possible using **Tests for Contingency Tables**

Learning outcomes

- Statistical models for statistical inference on given data sets

- Formulate and test hypotheses $+$ interpret the results

- Linear Models to analyse relations between variables

- Discuss assumptions underlying given statistical models
  Do such assumptions hold?

- Bonus: Use statistics to challenge friends' football opinions

Module organization

Teaching: Each week we have

- 2 lectures of 2 hours
- 1 tutorial of 1 hour

Assessment:

- 10 problem sheets (accounts for 30% of final mark)
- Coursework (accounts for 70% of final mark)

Get in touch for more information:

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