

Linear and Logistic Regression Modelling in R

Preparation

Please make sure you are familiar with the material presented in the slide set “Refresher in Basic Statistics”. These slides contain essential material covered in the course “Basic Statistics and Projects in R”. For your reference, the slides of that course can be found **here** (click on the HTML files in the timetable)

Daily schedule

Time	Activity
09:00-10:40	Lectures (with short break)
10:40-11:00	Coffee break (20 min)
11:00-12:30	Exercises
12:30-13:30	Lunch break
13:30-15:00	Lectures (with short break)
15:00-15:20	Coffee break (20 min)
15:20-17:00	Exercises

Program overview

Day	Time	Topic
Mon	AM	Simple linear regression
	PM	Multiple linear regression
Tue	AM	Introduction to logistic regression
	PM	Model building considerations and strategies
Wed	AM	Models for stratified designs and categorical outcomes
	PM	Exercises, QA, wrap-up

Detailed content

Day	Time	Content
Mon	AM	Simple linear regression Least squares estimation Assessing model fit (R^2) Model assumptions Standard errors and tests (t -test, F -test)
	PM	Multiple linear regression Including multiple independent variables Model selection (F -test, adjusted R^2) Residual analysis (Residual plots, leverage, QQ-plot) Multicollinearity (variance inflation factor)
Tue	AM	Introduction to logistic regression Generalizing the linear model (link functions, maximum likelihood estimation) The logistic model (logistic link, binomial distribution) Interpreting of coefficients (logits, odds ratios) Interactions
	PM	Model building considerations and strategies Testing (Wald and likelihood ratio tests) Assessing linearity of association

Day	Time	Content
Wed	AM	Purposeful variable selection Special issues in prediction modelling (calibration, discrimination, overfitting) Models for stratified designs and categorical outcomes Conditional logistic regression Ordered logistic regression Multinomial logistic regression