Course Outline & Introduction

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Regression for Applied Data Science (ADSC2020)

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THOMPSON RIVERS UNIVERSITY

Topics

Course Basics

- Course: Regression for Applied Data Science (ADSC2020)
- Lecturer: Ing. Sean Hellingman, Ph.D.
- Meeting times: Mon/Wed/Fri 12:30 - 13:20 in OM 1241

Course Outcomes

- Create and appraise a variety of regression models.
- Identify when regression is appropriate or inappropriate for various situations.
- Apply regression to a variety of data types.
- Select a type of regression based on the nature of the data and purpose of the investigation.
- Assess the quality of models, predictions, and inferences of various regression models.
- Understand and interpret regression notation.

Tentative Topics

- Statistical models
- Model Formulas & Coefficients
- Estimation & Assumptions
- Model Selection
- Predictions
- Generalized linear models (GLMs)
  - Logistic regression
  - Models for count data
  - Continuous (GLMs)
- Regularization methods
- Smoothers
- SARIMA models

Software

- R within the R Studio environment.

Moodle

- All important course information will be located on the course Moodle page.

Lectures

- Content is focused on the applied side of theory.
- Combination of lecturing and working through examples.
- Please ask questions as they arise!
- Practice *exercises* are included at the end of the lecture slides for your convenience.
- **Expectations:**
  - Please be respectful to everyone.
  - **Please don't be disruptive to your colleagues.**
  - **Please leave your mobile devices on silent.**

Lecture Participation

- We are in a computer lab & R is loaded on the computers.
- I will post example code **prior** to lectures.
- It is strongly encouraged to work along through the examples.

Course Evaluation Weights

- Assignments 30%
- Tests 30%
- Project 40%
  - 30% Written report
  - 10% Oral presentation

TRU ADSC Letter Grades

Letter Grade	Numerical Grade	Grade Points	Letter Grade Definitions
A+ **A** **A-**	90–100 85–89 80–84	4.33 4.00 3.67	Excellent. Superior performance showing comprehensive, in-depth understanding of subject matter. Demonstrates initiative and fluency of expression.
B+ **B** **B-**	77–79 73–76 70–72	3.33 3.00 2.67	Very good. Clearly above average performance with knowledge of principles and facts generally complete and with no serious deficiencies.
C+ **C**	65–69 60–64	2.33 2.00	Satisfactory. Basic understanding with knowledge of principles and facts at least adequate to communicate intelligently in the discipline.
C-	55–59	1.67	Pass. Some understanding of principles and facts but with definite deficiencies.
D	50–54	1.00	Minimal pass. A passing grade indicating marginal performance. Student not likely to succeed in subsequent courses in the subject.
F	0–49	0.00	Unsatisfactory. Fail. Knowledge of principles and facts is fragmentary.

Assignments (30%)

- 5 total assignments:
  - Focus on practical applications based on the lectures.
  - Assignments will be uploaded as R markdown files in moodle.
  - Due dates can be found in the tentative calendar & on moodle.
  - The **lowest** grade will be dropped.
  - Collaboration is **encouraged** but please submit separate and *different* documents.
  - **Note:** Due dates aren't always consistent.

- **Expectations:**
  - Assignments are mandatory in this course.
  - Completed assignments will be uploaded as to moodle.
  - Please include your name and TRU ID on your assignment.
  - **Late assignments will not be graded.**
  - *LLMs can help when you are stuck, they are not to be used to complete assignments.*

Tests (30%)

- 2 total tests:
  - Test I is tentatively scheduled for **February 28 during the lecture period**.
  - Test II will take place during the exam period.
  - More details about the tests will be uploaded closer to the test dates.

- **Expectations:**
  - Please leave personal items, including mobile phones, in your bag at the front of the class.
  - Please bring and be ready to present English/French language identification (TRU student card) to the tests.
  - **The TRU Academic Integrity policy is always active.**

Project (40%)

- 1 term project:
  - Designed to apply regression methods to real-life data.
  - Groups of 1-3 students may work on the same project.
  - Tentatively due the last week of classes.
  - Presentations will be tentatively scheduled for the last week of classes.
  - *More detailed expectations will be posed soon.*

Office Hours

- Room: OM2812
- Times: Monday 11:30 - 12:20 & Wednesday 13:30 - 14:20
  - *Or by appointment*

Email

- Email questions to: shellingman@tru.ca
- I will be happy to help when I can!
- **Email Expectations:**
  - Please, include an informative subject.
  - Please, clearly state your exact problem and what you have already tried.
  - Please do not email questions last minute (you may not get help in time).

Suggested Textbooks

- The lectures, exercises, and assignments should be sufficient.
- I will also post links to open source resources throughout the course.
- If you want more information on these topics:
  - Fox, J. (2015). *Applied regression analysis and generalized linear models (Third Edition).* Sage Publications.
  - Kaplan, Daniel T. (2017). *Statistical Modelling: A Fresh Approach. (Second Edition).* Retrieved from https://dtkaplan.github.io/SM2-bookdown/
  - Fox, J., & Weisberg, S. (2018). *An R companion to applied regression. Sage publications.* Sage Publications.

Student Resources at TRU

- Academic Supports: https://www.tru.ca/current/academic-supports.html
- Health and Wellness: https://www.tru.ca/current/wellness.html
- Diversity & Equity: https://www.tru.ca/current/diversity-equity.html
- Career & Experiential Learning: https://www.tru.ca/current/jobs-careers.html
- Security: https://www.tru.ca/risk-management-services/security.html
- Students' Union: https://trusu.ca/

TRU SAFE App

- App: https://www.tru.ca/risk-management-services/security/tru-safe-app.html
- Apple: https://itunes.apple.com/app/id1151547903
- Android: https://play.google.com/store/apps/details?id=com.cutcom.apparmor.tru

Accessibility

- All TRU students who require accommodations are encouraged to register with Accessibility Services upon registering with TRU.
- Help determine how test and exam accommodations can be arranged.

AI

LLM AI (ChatGPT)

The instructor reserves the right to question the student on any solutions that appear to be directly produced by generative AI.

Course Outline

- Please refer to the official Course Outline document for additional information about the course.

Exercise 1

- Using your notes from ADSC1000 create a linear regression model using one of the Test II datasets.