Models of Choice and Forecasting

Fall 2022

Instructor

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Office: Mudd Building room 401
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Class information

Classroom: Annex 100 [Salem] and TBA [Portland]
Class Hours: 18:00 - 22:00 M

Course description

TLDR: The course is what I think of as the natural successor for Data Analysis, Modeling, and Decision Making that extends basic regression to a broader universe of data types and the particular troubles in forecasting data observed over time.

It relies on two texts that exist in both paper and digital [with free access] forms. The first half of the course is built around The Handbook of Regression Modeling in People Analytics: With Examples in R, Python, and Julia by Keith McNulty [Global Director of Talent Sciences at McKinsey and Company] that covers models for discrete data types [binary, ordered, nominal choices, counts of events, and survival/duration analysis].

The second half of the course relies on the excellent Forecasting, Principles and Practice, 3rd Edition, by Rob J. Hyndman and George Athanasopoulos of Monash University in Australia that is entirely supported by R libraries for time series problems.

The lectures will focus on intuition and the mathematical logic but the goal is to put the tools into practice. To this end, the expectations are weekly homework exercises to insure that we can actually do what we are presented but there are two key summary deliverables: a project employing a detailed application of choice models near the middle and a project in time series forecasting due at the end of the term. Both are to be presented at the end of the term on date to be arranged to make up for the cancellation the first week.

Important Dates

October 21st - Last day to drop
December 5th - Last day to withdraw
See the Academic Calendar for more information.

Course goals

1. Extend your knowledge of models for statistical inference to include models for `limited dependent variables` – binary, ordered, nominal, and survival data and data generated by hierarchies.

2. Extend your knowledge of appropriate techniques for examining data over time.

3. Develop a framework for building hypotheses about data and infrastructure for evaluating them with statistical tools.

4. Communicate the results of models to a variety of audiences in a presentation format.

Class textbooks

There are two main texts for the course; one for each half.

People Analytics

McNulty, Keith. 2021. **Handbook of Regression Modeling in People Analytics**, Boca Raton, FL: CRC Press, ISBN: 978-1032041742

Forecasting

Hyndman, Rob J. and George Athanasopoulos. 2021. **Forecasting: Principles and Practice, 3rd Edition**, Melbourne, Australia: OTexts, ISBN: 978-0987507136

Lectures and papers

The lecture slides are posted to the course website. There will be a bit of supplementary reading on counts to be posted shortly.

Table 1: Course Schedule.

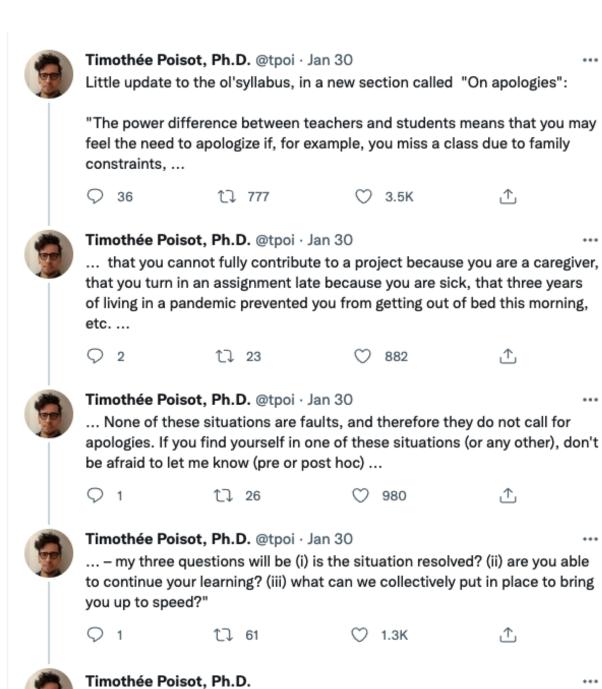| Date	Class	Week	Lecture
2022-08-29	1	1	Review
2022-09-12	2	3	Summary and Regression
2022-09-19	3	4	Binomial Logit
2022-09-26	4	5	Ordered and Multinomial Logit
2022-10-03	5	6	Hierarchies
2022-10-10	6	7	Survival and Duration Data
2022-10-17	7	8	Power Analysis and Summary
2022-10-24	8	9	Time: The Basics
2022-10-31	9	10	Decompositon and Summary
2022-11-07	10	11	Judgemental Forecasts
2022-11-14	11	12	Exponential Smoothing and ARIMA
2022-11-28	12	14	Dynamic Regression
2022-12-05	13	15	Hierarchies and Advanced Forecasting

Student conduct

We are a community of learners. Our professional commitment is to create an environment that advances the science and practice of managing organizations. As individuals, we conduct ourselves with honor and integrity, treat everyone with respect, take responsibility for our actions, and fulfill our promises. Examples of conduct consistent with this expectation include:

- Taking initiative
- Crafting solutions
- Completing assignments according to an agreed schedule
- Offering constructive criticism and accepting it appreciatively
- Taking responsibility for our own learning and that of others

We expect someone who observes or learns about behavior inconsistent with our expectations of conduct to initiate corrective action by clarifying the situation and encouraging the responsible party to act appropriately. In the case of a violation of School or University policies or the laws of relevant jurisdictions, notify the appropriate enforcement authorities.

Attendance policy

You should attend. You are also adults. My philosophy is best summarised by the person that so eloquently stated it.

Timothée Poisot, Ph.D. @tpoi · Jan 30

Little update to the ol'syllabus, in a new section called "On apologies":

"The power difference between teachers and students means that you may feel the need to apologize if, for example, you miss a class due to family constraints, ...

◯ 36　　　⟲ 777　　　♡ 3.5K　　　↥

Timothée Poisot, Ph.D. @tpoi · Jan 30

... that you cannot fully contribute to a project because you are a caregiver, that you turn in an assignment late because you are sick, that three years of living in a pandemic prevented you from getting out of bed this morning, etc. ...

◯ 2　　　⟲ 23　　　♡ 882　　　↥

Timothée Poisot, Ph.D. @tpoi · Jan 30

... None of these situations are faults, and therefore they do not call for apologies. If you find yourself in one of these situations (or any other), don't be afraid to let me know (pre or post hoc) ...

◯ 1　　　⟲ 26　　　♡ 980　　　↥

Timothée Poisot, Ph.D. @tpoi · Jan 30

... – my three questions will be (i) is the situation resolved? (ii) are you able to continue your learning? (iii) what can we collectively put in place to bring you up to speed?"

◯ 1　　　⟲ 61　　　♡ 1.3K　　　↥

Timothée Poisot, Ph.D.
@tpoi

But what if students abuse this? I don't really care. I'd rather have a helpful system that is vulnerable to cheaters than a restrictive system that puts more stress on those who don't need it.

7:30 AM · Jan 30, 2022 · Twitter Web App

Grading

Late policy

I really can't accept late assignments because they are to be both prepared and presented, for feedback and explanation. That said, we will have ample time to prepare them and I do understand that things happen; a video substitute could arise if circumstances so dictate.

Grade	Range
A	95-100
A-	92-94
B+	89-91
B	86-88
B-	82-85
C	78-81
F	< 78

Assignment weighting will follow:

Item	Weight
Choice Project	40 %
Forecasting Project	40 %
Homework/Participation	20 %

Project presentation

The goal of most regression analysis in enterprise is the communication of data understanding. To this end, the presentation is crucial because it combines the ability to analyse and to explain. It may also provide you with a worthwhile `portfolio` piece that you can display to the world. I am happy to assist you in doing this; RMarkdown and quarto tools make this quite easy, or easier than ever before.

Willamette Code of Conduct

The Code of Conduct for all Willamette students can be found here.

Solicitation of Input

Student input for the purpose of course improvement is taken very seriously and will potentially be done periodically. Please take the time to evaluate this course and the instructor, especially at the end of the semester. Evaluations will in no way affect your grade. I simply cannot know the student experience in the classroom without your perspective.

COVID policy

I have grown weary of including this part of a syllabus, but these times demand special attention. Keeping each one of us and the community safe is our first priority. Spreading a deadly or long-term debilitating condition to fellow members of a close-knit community is surely something that we would all regret tremendously. I will assure that I weigh this heavily; I also teach in the daytime program with some students deeply interwoven in campus affairs and I remain deeply concerned that I might act as a vector of transmission among populations if we all are not first and foremost concerned with the health and safety of the community. We may cohabitate with people with particular vulnerabilities and, in my view, we owe it to each other to respect and support the community's maintenance of safety.

As a responsibility to the public health of the community, I will support students that cannot attend in-person for basically any reason. Should you elect to participate remotely, I am happy to support you in obtaining the experience you desire. Please notify me of challenges you are facing so that we can navigate them in a timely fashion. The class discord is great for this but be proactive. Zoom sessions are available for every meeting and I will do everything I can to support us in first and foremost maintaining community safety.

Students are required to follow the operative published Willamette University COVID-19 policies.

We cannot control the progression and transmission of the virus that causes COVID-19 in the broader community. I remain fully committed to delivering the highest quality in-person learning experience through these unprecedented times. However, you can rest assured that I am fully prepared to continue instruction entirely online should circumstances dictate this transition for the safety of the Willamette community.

Campus resources

Disabilities

In accordance with the Americans with Disabilities Act, students with bona fide disabilities will be afforded reasonable accommodations. Students in need of additional access to any educational services, including the appropriate processes for request and demonstration under statutory recognition, should contact the office of Accessible Education Services: via their website or 503-370-6737.

Educational Philosophy

As candidates for the Masters of Business Administration, I expect you to be occupied first and foremost with managing your own learning. I am very much available to assist you in accomplishing our learning objectives, as are your tutors, but you must take an active role and that includes being proactive about knowledge gaps, struggles, and shortcomings before we can develop strategies for solving them. Indeed, the ability to recognize the limits of one's own knowledge and expertise and seeking out expert counsel is widely regarded as a key trait among successful managers. As a matter of logic, managing your own success in the course cannot fall to anyone but you. I promise to do all that I can to assist you when you actively manage your mastery of course objectives.

Final thoughts

This document is a roadmap for our semester. We learn about data together and our individual experiences shape how we interpret and value data. Like all your classes, you will get out what you put into this course. Asking for help from one another and your instructors is important, don't be afraid to ask a question about something you don't know or if you want to check your knowledge about something you think you know. I will not generically require that you turn in assignments but they are to give rise to checks on your progress. Asking questions about anything on them is crucial to your learning should mastery prove elusive.

If this document is updated, a copy will be supplied to you via WISE and changes will be announced in class.