

Discussion 1: Introduction

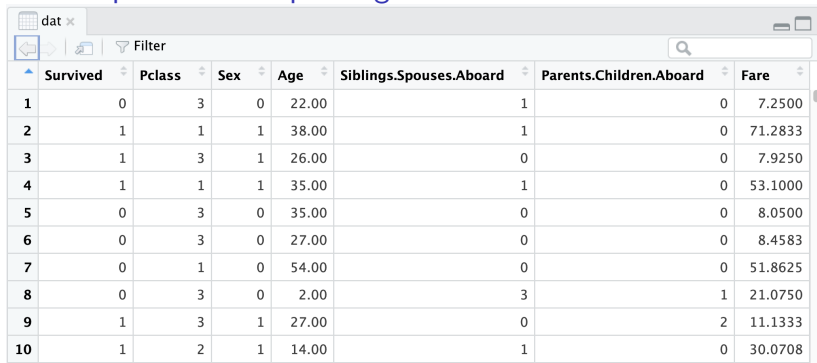
Siyu Wang

Department of Statistics
University of Wisconsin
Madison, WI 53706, USA

September 8, 2023

About Prof. Wei-Yin Loh's Research

How to predict if the passenger would survive?



	Survived	Pclass	Sex	Age	Siblings.Spouses.Aboard	Parents.Children.Aboard	Fare
1	0	3	0	22.00	1	0	7.2500
2	1	1	1	38.00	1	0	71.2833
3	1	3	1	26.00	0	0	7.9250
4	1	1	1	35.00	1	0	53.1000
5	0	3	0	35.00	0	0	8.0500
6	0	3	0	27.00	0	0	8.4583
7	0	1	0	54.00	0	0	51.8625
8	0	3	0	2.00	3	1	21.0750
9	1	3	1	27.00	0	2	11.1333
10	1	2	1	14.00	1	0	30.0708

Figure: Dataset: Passengers on the Titanic

Decision Tree Model

Survival of passengers on the Titanic

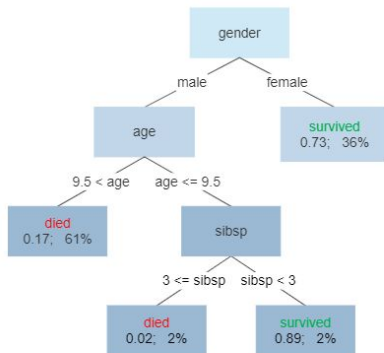





Figure: A tree showing the survival of passengers on the Titanic

If you search CART on Google Scholar...





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Classification and regression trees [PDF] wiley.com

[WY Loh](#) - Wiley interdisciplinary reviews: data mining and ..., 2011 - Wiley Online Library


... A **regression tree** is similar to a **classification tree**, except that the Y variable takes ordered values and a **regression** model ... Historically, the first **regression tree** algorithm is AID,20 which ...

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Fifty years of classification and regression trees [PDF] wiley.com

[WY Loh](#) - International Statistical Review, 2014 - Wiley Online Library


... As we reach the 50th anniversary of the publication of the first **regression tree** algorithm (... Automatic Interaction Detection (AID) (Morgan & Sonquist, 1963) is the first **regression tree** ...

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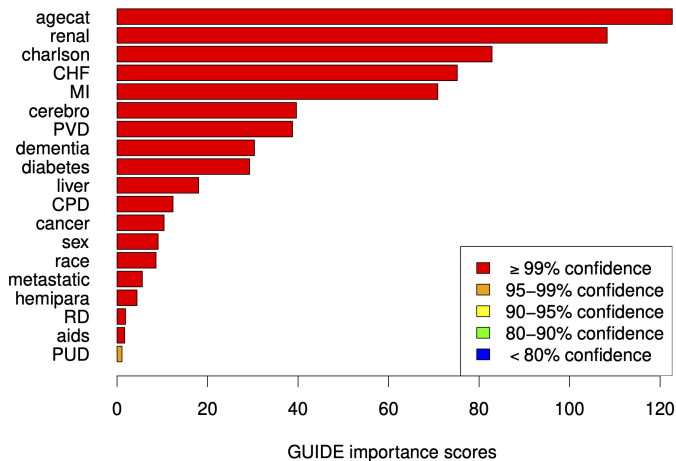
Classification and regression trees: a powerful yet simple technique for ecological data analysis [PDF] wiley.com

[G De'ath](#), [KE Fabricius](#) - Ecology, 2000 - Wiley Online Library

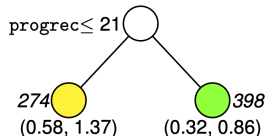
... **Regression tree** analyses showed that dense ... **regression trees** and linear models for the analysis of these data and show how linear models fail to find patterns uncovered by the **trees**...

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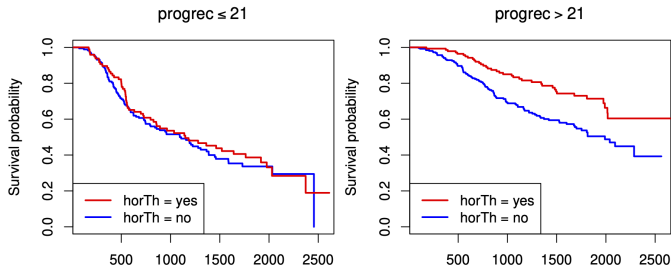
Features of GUIDE: Importance Score



Features of GUIDE: Subgroup Analysis



Sample sizes in *italics* beside nodes; 95% bootstrap confidence intervals of relative risks for hormone therapy versus none below nodes



Course to Take: STAT443 or STAT761

STAT 479
Introduction to
Classification and Regression Trees
October 2, 2017

Wei-Yin Loh
Department of Statistics
University of Wisconsin-Madison
<http://www.stat.wisc.edu/~loh/guide.html>

WY Loh STAT 479: Introduction to Classification and Regression Trees 1

(a) 2017Fall

STAT 761
Decision Trees for Multivariate Analysis
September 9, 2018

Wei-Yin Loh
Department of Statistics
University of Wisconsin-Madison
<http://pages.stat.wisc.edu/~loh/guide.html>

Lectures: 8:20–9:40am MW, 133 SMI
Office hrs: 1–2pm M, 1217C MSC, and 10–11am W, 1210 MSC
Class email list: stat761-1-118@lists.wisc.edu

WY Loh STAT 761: Decision Trees for Multivariate Analysis 1

(b) 2018Fall

STAT 443
Classification and Regression Trees
9:30–10:45AM TR

Instructor: Wei-Yin Loh
TA: Siyu Wang

Class email list: stat443-1-s21@g-groups.wisc.edu
TA Zoom office hours: 7–9PM Mon
<https://uwmadison.zoom.us/j/3486510847>

April 26, 2021 STAT 443: Classification and Regression Trees (Loh) 1

(c) 2021Spring

STAT 761
Classification and Regression Trees

Instructor: Wei-Yin Loh

Class email list: stat761-1-121@g-groups.wisc.edu

December 6, 2021 STAT 761: Classification and Regression Trees (Loh) 1

(d) 2021Fall

STAT 443
Classification and Regression Trees
11:00–12:15PM TR, Psych 103
(simulcast on zoom)

Instructor: Wei-Yin Loh
Instructor zoom office hours: 5–6PM M, 4–5PM F

TA: Siyu Wang
TA office hours: 1–2PM W (zoom), 1–2PM R (6173C MSC)

Class email list: stat443-1-122@g-groups.wisc.edu

December 7, 2022 STAT 443: Classification and Regression Trees (Loh) 1

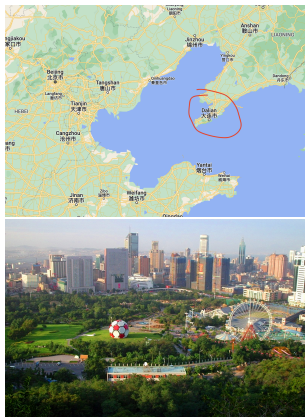
(e) 2022Fall

Papers to Read

- ▶ Loh, W.-Y. (2014), Fifty years of classification and regression trees (with discussion), *International Statistical Review*, vol. 34, 329-370
- ▶ Loh, W.-Y. (2009), Improving the precision of classification trees, *Annals of Applied Statistics*, vol. 3, 1710-1737

Information About Me

- ▶ Siyu Wang, 5th year Ph.D. student.
Previous VISP student (why Ph.D.?).
- ▶ swang739 AT wisc DOT edu
- ▶ Office hour:
 - ▶ In-Person: Tuesday 14:30 - 15:30 pm
@6173C MSC.
 - ▶ Zoom: Thursday 11:00 am - 12:00 pm
<https://uwmadison.zoom.us/j/3486510847>
- ▶ Discussions (interactions encouraged):
 - ▶ Fri 8:00 - 09:15 am @114 Social Work
 - ▶ Fri 9:30 - 10:45 am @382 Van Hise
 - ▶ Slides can be found on Canvas after the discussion.



Madison's First Family of Math

- ▶ Po-Shen Loh: Math professor at Carnegie Mellon University and the national coach of the USA International Mathematical Olympiad team.
- ▶ Po-Ru Loh: Associate Professor at Harvard Medical School
- ▶ Po-Ling Loh: Professor in the Statistical Laboratory in the Department of Pure Mathematics and Mathematical Statistics at the University of Cambridge.



The Key to Success: Motivations

What was it like growing up in such a math-oriented house?

*Po-Shen: When I was around fifth grade or so, my father found a book of interesting math puzzles. **These were not like "Do 100 arithmetic problems as fast as possible." They were problems that made you think outside the box,** like, you have six toothpicks, can you line up the six toothpicks so that there are four triangles made? The solution is that you make a tetrahedron. Which is not what you expect, right? That introduced me to the practice of thinking about something for a while and then finding out, "Oh, my gosh, you do it that way."*

Related Readings (and Watchings)

- ▶ Article: [The Coach Who Led the U.S. Math Team Back to the Top](#)
- ▶ Article: [Yi wei hua yi fu huo le mei guo ao shu guo jia dui: zhang duo 6 nian 4 ci duo guan, da po zhong guo dui long duan](#)
- ▶ Video: [Building Human Intelligence at Scale, to Save the Next Generation from ChatGPT](#)
- ▶ Video: [Mei guo ao shu zong jiao lian luo bo shen \(shang\): Ru guo bu shi di yi, mei guo ren jiu bu hui guan xin](#)

Comment Section on RateMyProfessor

QUALITY

5.0



STAT850

🤖 AWESOME

Sep 10th, 2021

For Credit: **Yes** Attendance: **Mandatory** Would Take Again: **Yes** Grade: **A** Textbook: **No**

Online Class: **Yes**

DIFFICULTY

3.0

Professor Loh is a fantastic lecturer. Full of energy, a bit off the wall, knowledgeable and application focused. You can't really go wrong with his classes. However, his lectures can be a bit daunting and paying attention in lecture is needed.

HILARIOUS

LECTURE HEAVY

CARING



Comment Section on RateMyProfessor

QUALITY

3.0

DIFFICULTY

5.0

STAT610

😊 AVERAGE

Nov 1st, 2019

For Credit: **Yes** Attendance: **Not Mandatory** Would Take Again: **Yes** Grade: **A-**Textbook: **Yes**

An amiable professor always wears smiles. He loves sharing stories in class. He will teach from the principle and solve problems from a unique view. But the homework and exams are too tricky. Also, the textbook is useless, even in the open book exams. If you miss his class several times, just prepare to quit before the mid-term.



QUALITY

3.0

DIFFICULTY

4.0

STAT602

😊 AVERAGE

Jun 12th, 2019

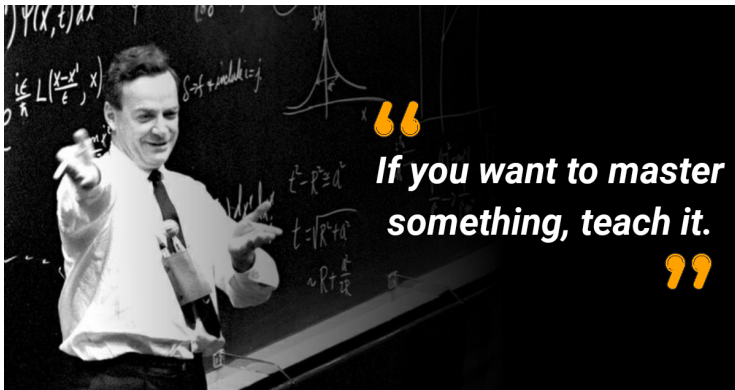
For Credit: **Yes** Attendance: **Not Mandatory** Would Take Again: **Yes** Grade: **A**Textbook: **Yes**

Nice professor, but there's no connection between HW and exam, very tricky exam, get prepared for it

INSPIRATIONAL

TOUGH GRADER

A better way to learn...?



Quiz 0

[Quiz 0 Summary](#)