

Section Two

Class COGS 9

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50 Years of Data Science

- General thoughts?
- Points of confusion?

Some main topics

- 6 Divisions of data science
- 2 Cultures in modeling: Prediction vs inference
- Common task framework: The secret sauce of the predictive culture
- Statistics vs Computer science vs Data Science

Six divisions of data science

- Data exploration
- Data representation and transformation
- Computing
- Modeling
- Data viz
- The science of data science

Two cultures: prediction vs. inference

- **Prediction**

- Prioritizes predictive success on unseen input data
- Generally silent about the mechanism generating the prediction (e.g. Deep neural networks // black box)
- Machine learning, often in CS departments, not statistics departments

- **Inference**

- Modeling the relationship between input and output variables.
- Develop interpretable models that fit the data well
- Implicitly believe that there is a 'true' model generating the data and that there is a 'best' way to analyze data
- Makes up most of traditional statistics

Common Task Framework

- The secret sauce of the predictive modeling culture.
 - Minimizes prediction errors on tasks over time.
 - What algorithms works the best for prediction on different types of datasets?
 - We effectively can brute force this, not caring about the true generating mechanism of the data.
- What makes up a common task framework?
- What are examples?

Questions

- How would you define data science? Is it an umbrella category consisting of Stats, CS? What are the differences?
- How does UCSD data science fit into this definition?
- What are examples of predictive tasks? What are examples of inferential tasks?

Questions

- What are examples of predictive tasks? What are examples of inferential tasks?
- What makes something a science? Is data science a science?
- How important is learning tools as a data scientist? Where does it rank among the other things to learn as a data scientist?

Attendance

- Enter your number and today's word into the attendance form
- **Today's word:** Vader
- **Form:** <https://forms.gle/tx9GcpANHEMwj8Jv7>
- <https://tinyurl.com/cog9-spring-23>