Lecture 1

Science before statistics

* Statistics is just what we do in order to do science

DAGS – generative models of the data generating process

GOLEMS – statistical models that, hopefully, are justified by the generative causal model

OWLS – the workflow of creating a DAG, investigating the DAG using a Golem, and exploring the findings and implications

What do we need to create a golem?

* A generative causal model
* Clay, water, and the word of God
* Persecution among the ghettos of central and eastern Europe in the 16th century
* None of the above
* All of the above

How does McElreath describe an idealized data analysis workflow?

1. Define generative model
2. Develop a specific estimand
3. Design an estimator
4. Test (3) using (1)
5. Analyze sample, summarize

Lecture 2

How should we use the sample to get at the estimand, to produce the estimator, to get an estimate? Once we get a sample, how do we summarize it? How do we communicate its uncertainty?

Estimates are never points, they are distributions.

Estimand: amount of the Earth covered in water

When we compute something from the posterior, we want to use the whole distribution not a point from the distribution. The distribution is the estimate.

What do we want to take away from lecture 1?

What do we want to take away from lecture 2?

n choose k {n k}

probabilities of sequences

likelihood function

bayes theorem

beta distribution

Enumerating a,b,c,d

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| abcd | bacd | cabd | dabc |
| abdc | badc | cadb | dacb |
| acbd | bcad | cbad | dbac |
| acdb | bcda | cbda | dbca |
| adbc | bdac | cdab | dcab |
| adcb | bdca | cdba | dcba |

6x4=24

4! = 4x3x2x1=24

How many groups of 2 from a,b,c,d?

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| ab | ~~ba~~ | ~~ca~~ | ~~da~~ |
| ac | bc | ~~cb~~ | ~~db~~ |
| ad | bd | cd | ~~dc~~ |

6 unique combinations of 2 selections from a,b,c,d

How many possible groups of 2?

4x3 = 12

How many groups that duplicate?

2x1 = 2

12/6