# Data Science

Ethics

April 27, 2022

Get you thinking about the ethics of doing Data Science

1. This is not about *morals*, lots of definitions of these things, for us:

- 1. This is not about *morals*, lots of definitions of these things, for us:
  - 1.1 Morals: how you, individually, determine what's right or wrong

- 1. This is not about *morals*, lots of definitions of these things, for us:
  - 1.1 Morals: how you, individually, determine what's right or wrong
  - 1.2 Ethics: moral principals that govern a person's behavior when conducting an activity in a professional capacity

- 1. This is not about *morals*, lots of definitions of these things, for us:
  - 1.1 Morals: how you, individually, determine what's right or wrong
  - 1.2 Ethics: moral principals that govern a person's behavior when conducting an activity in a professional capacity
- 2. I can't tell you what's right or wrong, that's up to your moral worldview

- 1. This is not about *morals*, lots of definitions of these things, for us:
  - 1.1 Morals: how you, individually, determine what's right or wrong
  - 1.2 Ethics: moral principals that govern a person's behavior when conducting an activity in a professional capacity
- 2. I can't tell you what's right or wrong, that's up to your moral worldview
- 3. I can tell you what the Data Science community is discussing as part of their ethical framework

We've concerned ourselves with building models

1. Models are used to go from world of 'data' back to something we can change about the world

- 1. Models are used to go from world of 'data' back to something we can change about the world
- 2. If we don't intend on our models being actionable, why have them?

- 1. Models are used to go from world of 'data' back to something we can change about the world
- 2. If we don't intend on our models being actionable, why have them?
- 3. Things we may conclude from a model:

- 1. Models are used to go from world of 'data' back to something we can change about the world
- 2. If we don't intend on our models being actionable, why have them?
- 3. Things we may conclude from a model:
  - 3.1 An estimate

- 1. Models are used to go from world of 'data' back to something we can change about the world
- 2. If we don't intend on our models being actionable, why have them?
- 3. Things we may conclude from a model:
  - 3.1 An estimate
  - 3.2 rejection of a hypothesis

- 1. Models are used to go from world of 'data' back to something we can change about the world
- 2. If we don't intend on our models being actionable, why have them?
- 3. Things we may conclude from a model:
  - 3.1 An estimate
  - 3.2 rejection of a hypothesis
  - 3.3 Clustering/classification of data points into groups

We often can't know all the data out there, so we have to sample

1. Usually, we want a random sample

- 1. Usually, we want a random sample
- 2. When might we not want a random sample?

- 1. Usually, we want a random sample
- 2. When might we not want a random sample?
- 3. When gather data, (e.g. sampling the population), we have to be careful

- 1. Usually, we want a random sample
- 2. When might we not want a random sample?
- 3. When gather data, (e.g. sampling the population), we have to be careful
  - 3.1 How were questions worded?

- 1. Usually, we want a random sample
- 2. When might we not want a random sample?
- 3. When gather data, (e.g. sampling the population), we have to be careful
  - 3.1 How were questions worded?
  - 3.2 How did you poll people?

- 1. Usually, we want a random sample
- 2. When might we not want a random sample?
- 3. When gather data, (e.g. sampling the population), we have to be careful
  - 3.1 How were questions worded?
  - 3.2 How did you poll people?
  - 3.3 How is missing data handled?

1. Sample Bias

- 1. Sample Bias
  - 1.1 Selection Bias: some subjects more likely to be selected

#### 1. Sample Bias

- 1.1 Selection Bias: some subjects more likely to be selected
- 1.2 Volunteer Bias: people who volunteer are not representative

#### 1. Sample Bias

- 1.1 Selection Bias: some subjects more likely to be selected
- 1.2 Volunteer Bias: people who volunteer are not representative
- 1.3 Nonresponse Bias: people who decline to be interviewed

- 1. Sample Bias
  - 1.1 Selection Bias: some subjects more likely to be selected
  - 1.2 Volunteer Bias: people who volunteer are not representative
  - 1.3 Nonresponse Bias: people who decline to be interviewed
- 2. Survey/Response Bias

- 1. Sample Bias
  - 1.1 Selection Bias: some subjects more likely to be selected
  - 1.2 Volunteer Bias: people who volunteer are not representative
  - 1.3 Nonresponse Bias: people who decline to be interviewed
- 2. Survey/Response Bias
  - 2.1 Interviewer Bias

#### 1. Sample Bias

- 1.1 Selection Bias: some subjects more likely to be selected
- 1.2 Volunteer Bias: people who volunteer are not representative
- 1.3 Nonresponse Bias: people who decline to be interviewed
- 2. Survey/Response Bias
  - 2.1 Interviewer Bias
  - 2.2 Acquiesence Bias: tendency to agree with all questions

#### 1. Sample Bias

- 1.1 Selection Bias: some subjects more likely to be selected
- 1.2 Volunteer Bias: people who volunteer are not representative
- 1.3 Nonresponse Bias: people who decline to be interviewed

#### 2. Survey/Response Bias

- 2.1 Interviewer Bias
- 2.2 Acquiesence Bias: tendency to agree with all questions
- 2.3 Social Desirability Bias: Reluctance to admit to embarassing things

#### 1. Sample Bias

- 1.1 Selection Bias: some subjects more likely to be selected
- 1.2 Volunteer Bias: people who volunteer are not representative
- 1.3 Nonresponse Bias: people who decline to be interviewed

#### 2. Survey/Response Bias

- 2.1 Interviewer Bias
- 2.2 Acquiesence Bias: tendency to agree with all questions
- 2.3 Social Desirability Bias: Reluctance to admit to embarassing things
- 3. Confirmation Bias

#### 1. Sample Bias

- 1.1 Selection Bias: some subjects more likely to be selected
- 1.2 Volunteer Bias: people who volunteer are not representative
- 1.3 Nonresponse Bias: people who decline to be interviewed

#### 2. Survey/Response Bias

- 2.1 Interviewer Bias
- 2.2 Acquiesence Bias: tendency to agree with all questions
- 2.3 Social Desirability Bias: Reluctance to admit to embarassing things
- 3. Confirmation Bias
- 4. Anchor Bias: you might say yes to something because a worse alternative was shown first.

How do clinical trials work (often see as the gold standard)

1. Some receive treatment, others in control group

- 1. Some receive treatment, others in control group
- 2. Each group is picked completely at random

- 1. Some receive treatment, others in control group
- 2. Each group is picked completely at random
- 3. Considerations

- 1. Some receive treatment, others in control group
- 2. Each group is picked completely at random
- 3. Considerations
  - **3.1** Only ethical of alternatives have a good basis (i.e. we don't ask folks to *start* smoking for a trial)

- 1. Some receive treatment, others in control group
- 2. Each group is picked completely at random
- 3. Considerations
  - **3.1** Only ethical of alternatives have a good basis (i.e. we don't ask folks to *start* smoking for a trial)
  - 3.2 Very expensive

- 1. Some receive treatment, others in control group
- 2. Each group is picked completely at random
- 3. Considerations
  - 3.1 Only ethical of alternatives have a good basis (i.e. we don't ask folks to *start* smoking for a trial)
  - 3.2 Very expensive
  - 3.3 Sometimes impossible!

- 1. Some receive treatment, others in control group
- 2. Each group is picked completely at random
- 3. Considerations
  - 3.1 Only ethical of alternatives have a good basis (i.e. we don't ask folks to *start* smoking for a trial)
  - 3.2 Very expensive
  - 3.3 Sometimes impossible!
- 4. What about how people 'opt in'?

- 1. Some receive treatment, others in control group
- 2. Each group is picked completely at random
- 3. Considerations
  - 3.1 Only ethical of alternatives have a good basis (i.e. we don't ask folks to *start* smoking for a trial)
  - 3.2 Very expensive
  - 3.3 Sometimes impossible!
- 4. What about how people 'opt in'?
- 5. Social networks run trials on us all the time, is that okay?

1. No easy answers

- 1. No easy answers
- 2. Play, explore, think

- 1. No easy answers
- 2. Play, explore, think
- 3. Use off-the-shelf technologies wherever possible

- 1. No easy answers
- 2. Play, explore, think
- 3. Use off-the-shelf technologies wherever possible
- 4. Think about possible introduction of biases and be skeptical of 'clear' results