A data scientist’s job according to unsplash

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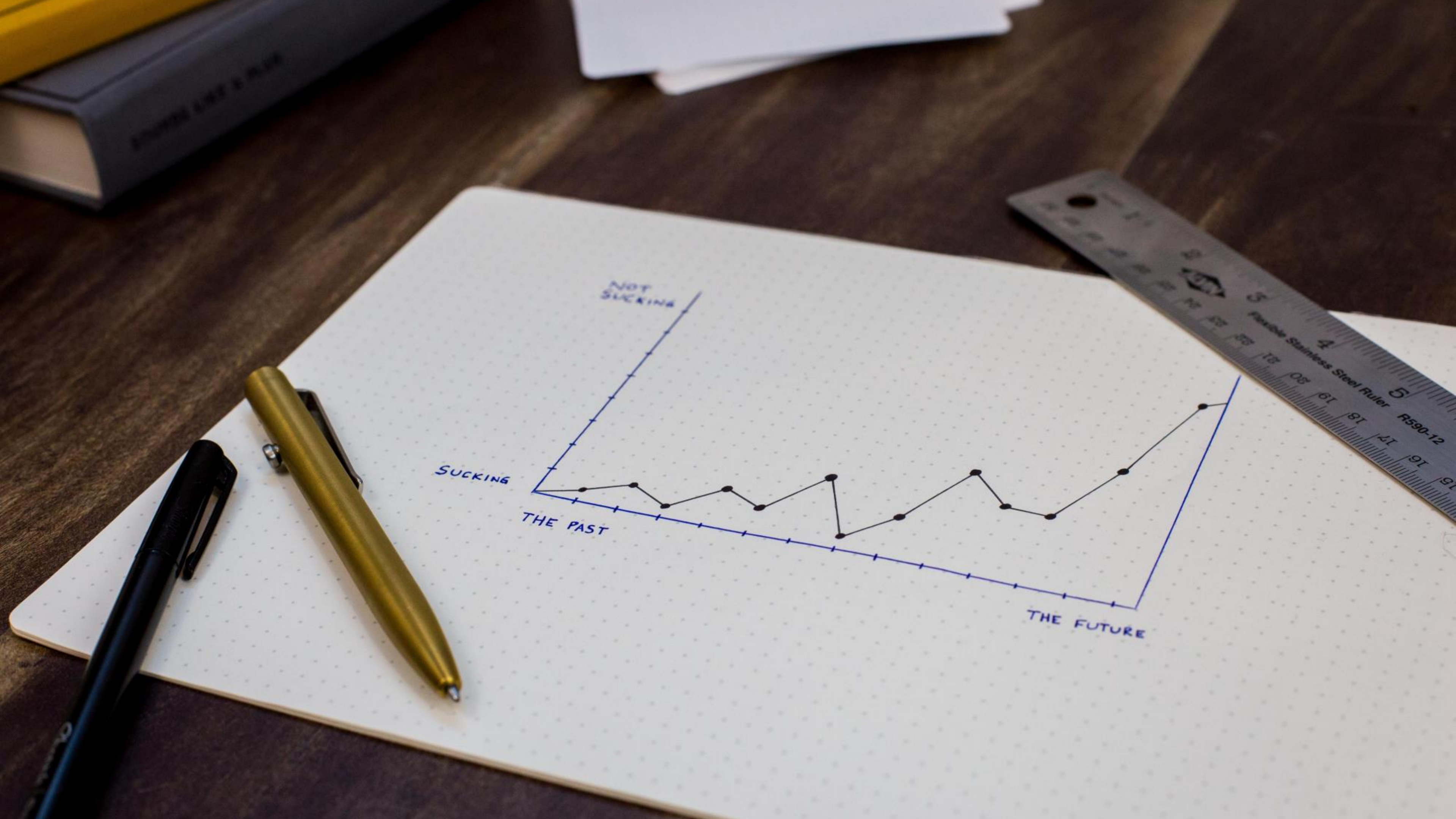
NOT SUCKING
SUCKING
THE PAST
THE FUTURE
Flexible Stainless Steel Ruler
R590-12

Rune Nielsen, PhD

Data scientist & AI specialist at SAS Institute

Agenda

- What is data ethics?
  - What should we be aware of?
- Why does it raise problems?
  - How do we handle it?
- Which opportunities does it create?

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What is data ethics?

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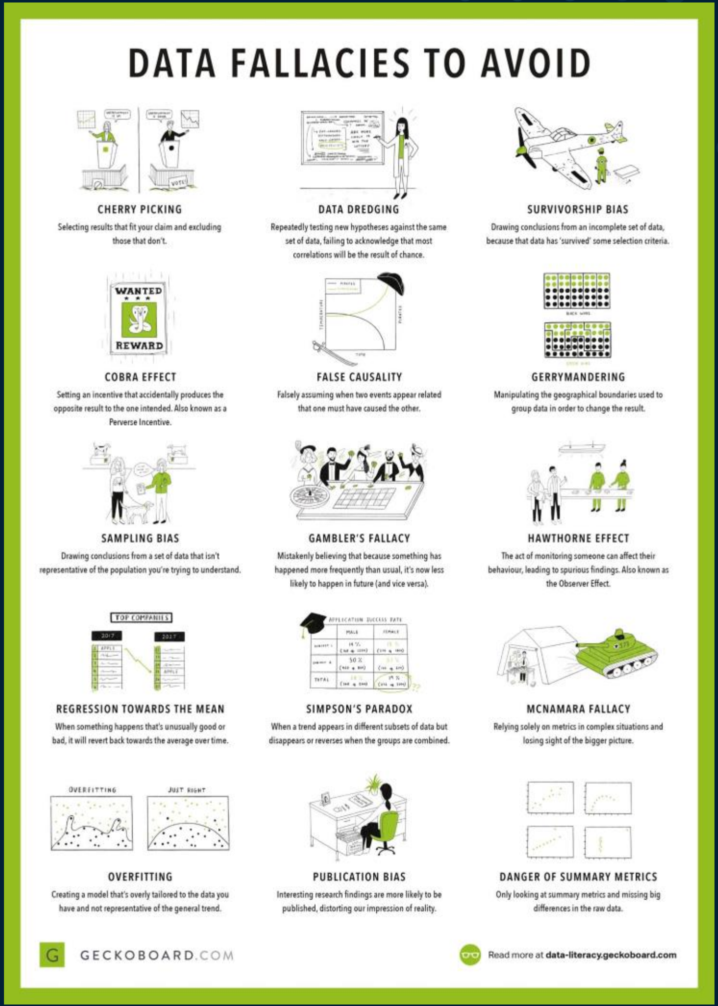
Data pitfalls

How many pitfalls are directly related to the data selection?



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Data pitfalls

How many pitfalls are directly related to the data selection?

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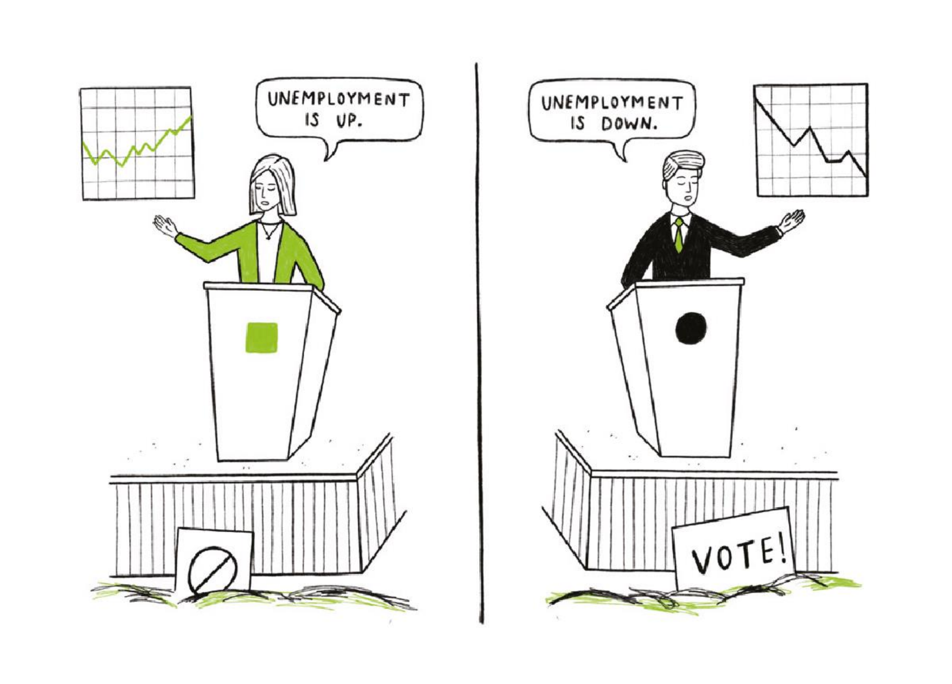
What is data ethics?

Cherry Picking



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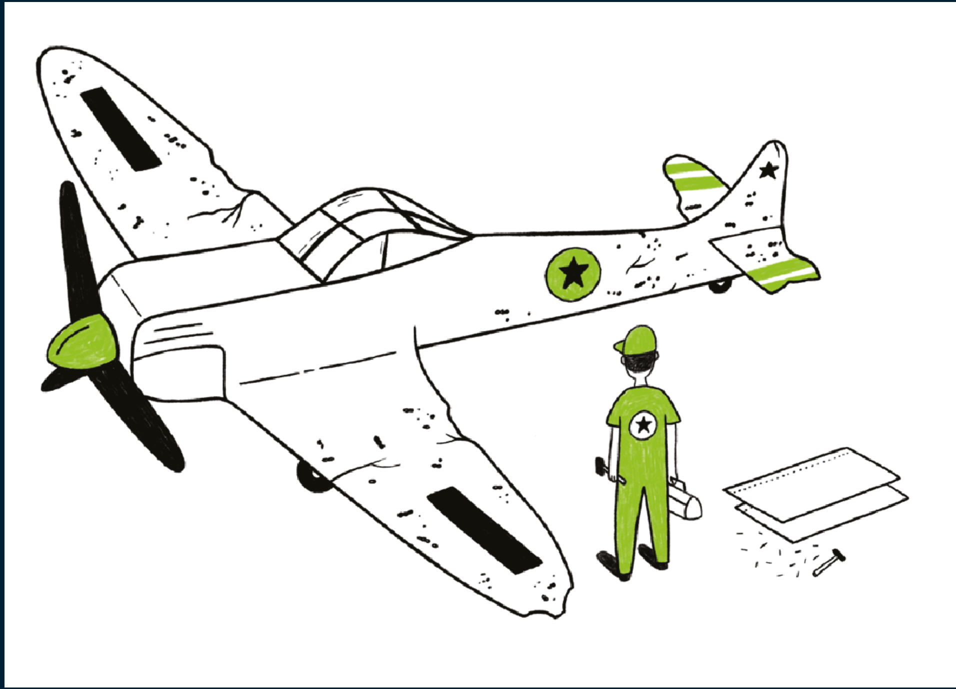
What is data ethics?

Survivorship bias



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What is data ethics?

Sampling bias

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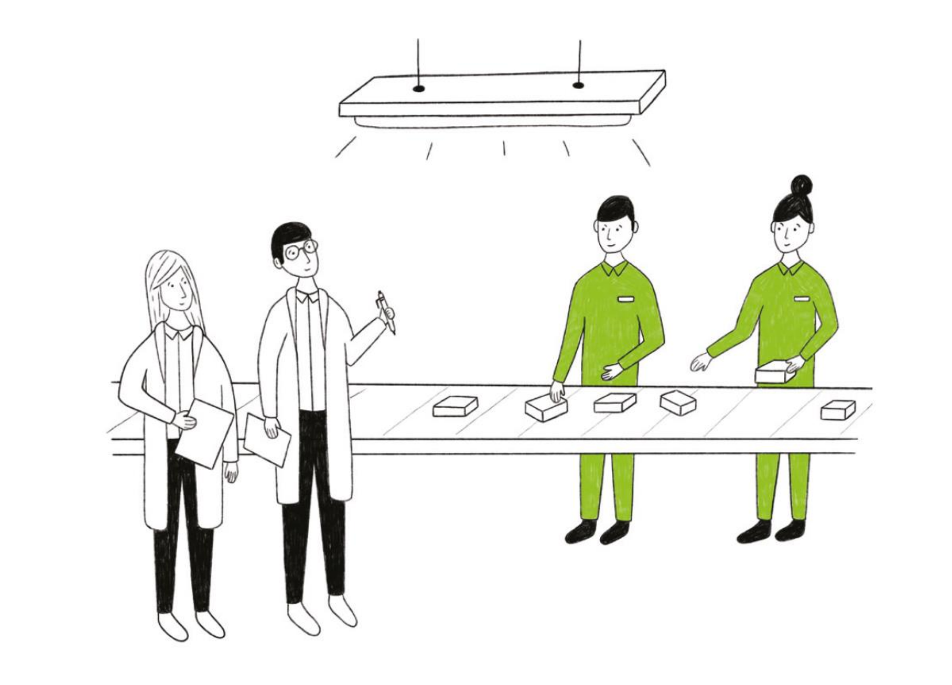
What is data ethics?

Hawthorne's effect



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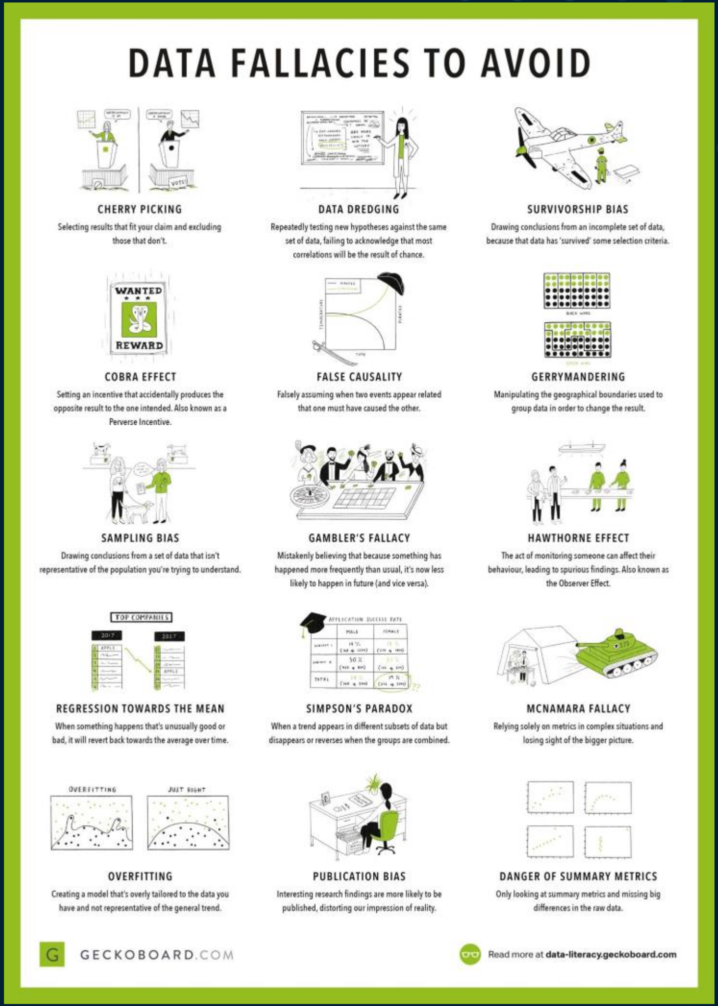
Data pitfalls

How many pitfalls are directly related to how we treat data under the model development?



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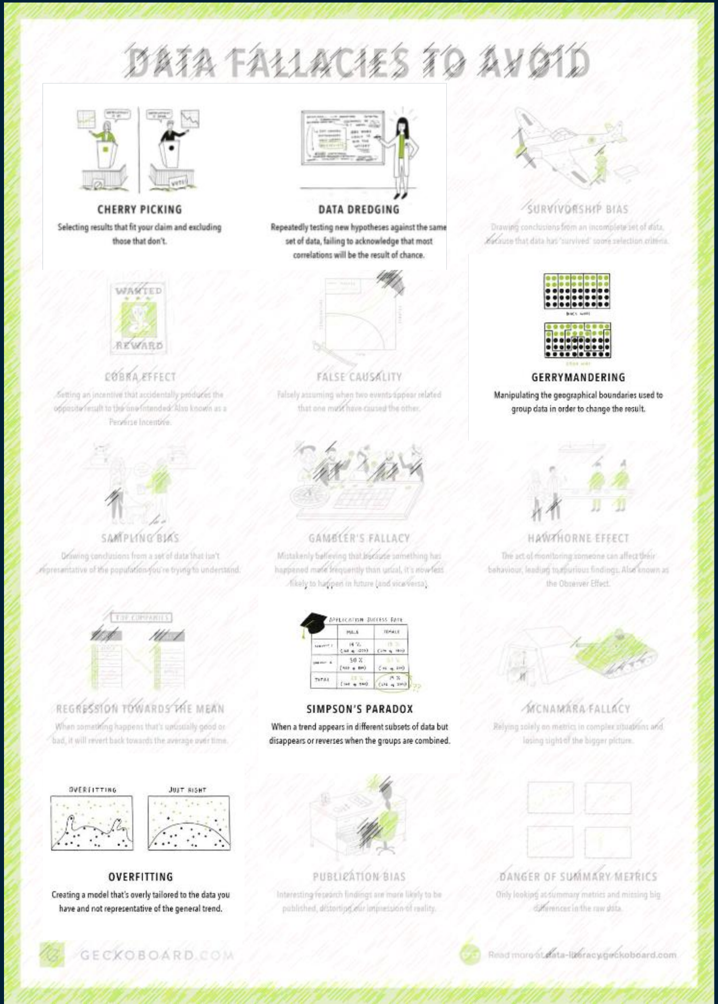

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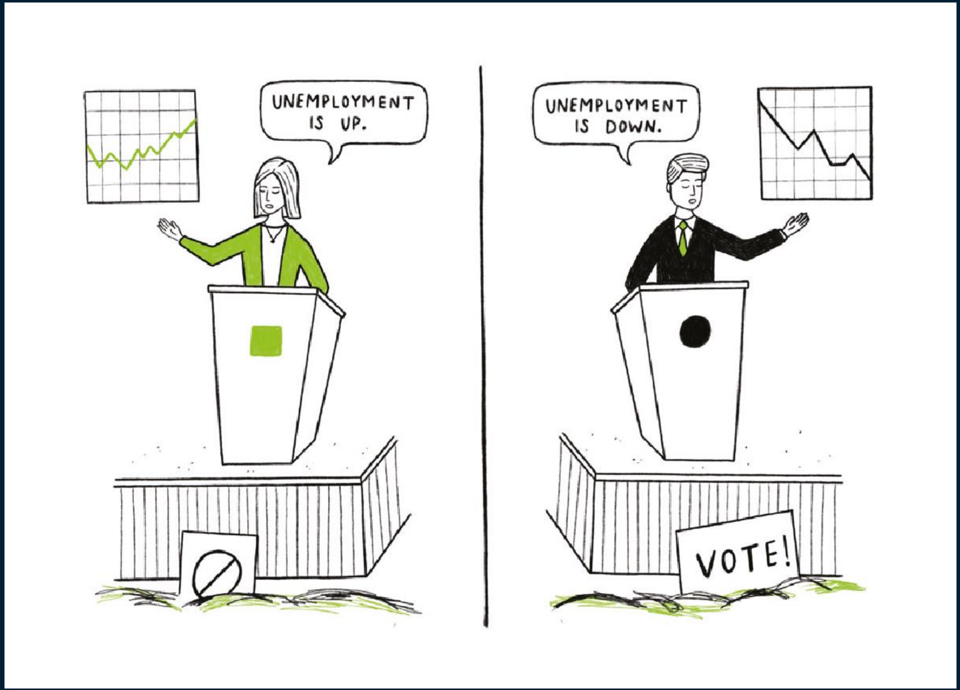
What is data ethics?

Cherry Picking



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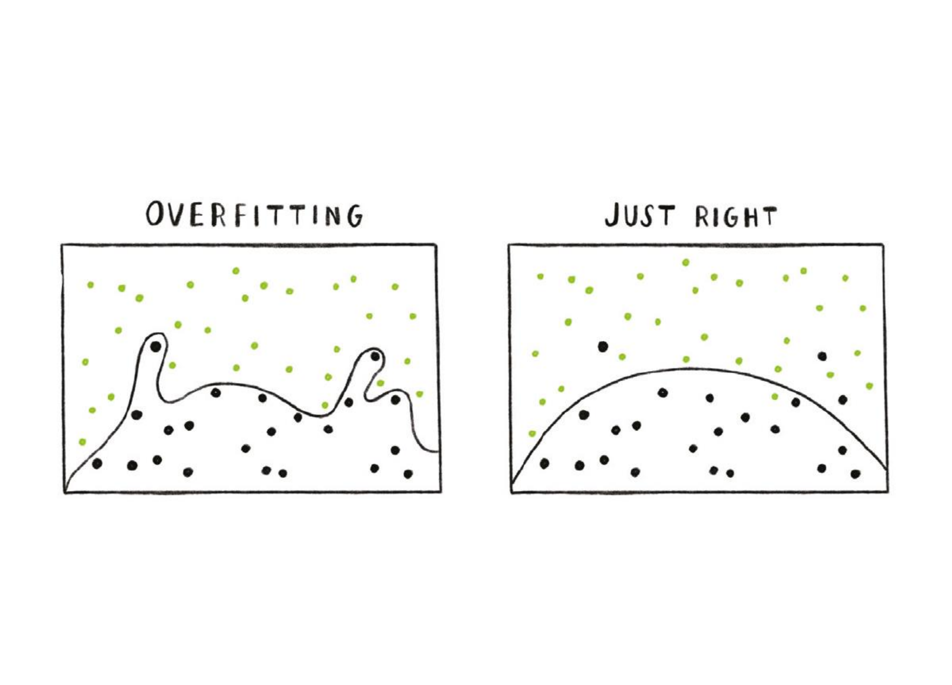
What is data ethics?

Overfitting



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What is data ethics?

Data dredging

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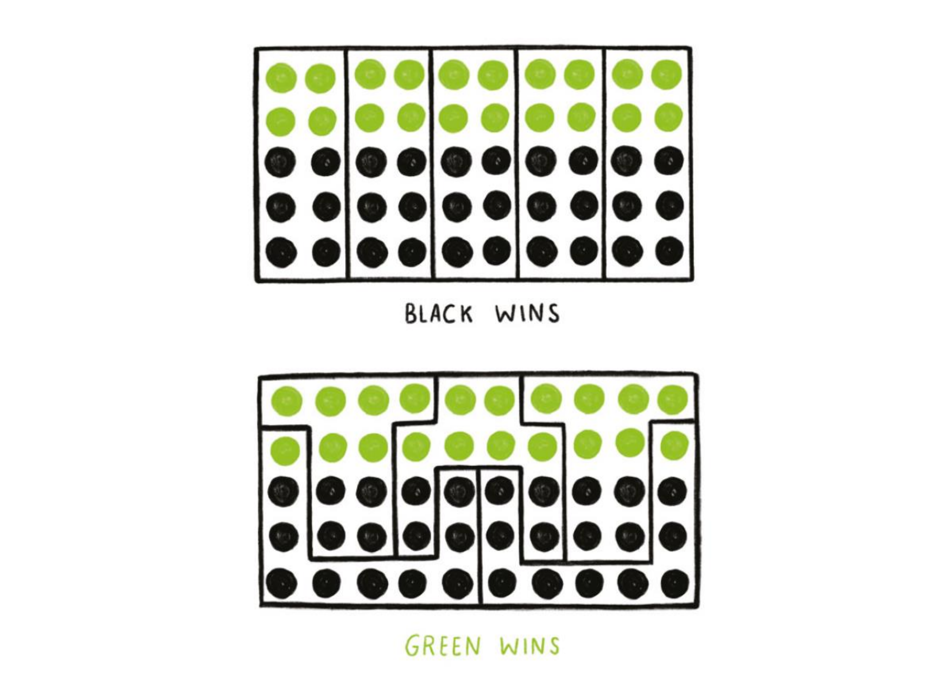
What is data ethics?

Gerrymandering



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What is data ethics?

Simpson's Paradox

APPLICATION SUCCESS RATE

	MALE	FEMALE
SUBJECT 1	14 % (168 of 1200)	15 % (270 of 1800)
SUBJECT 2	50 % (400 of 800)	51 % (102 of 200)
TOTAL	28 % (568 of 2000)	19 % (372 of 2000)

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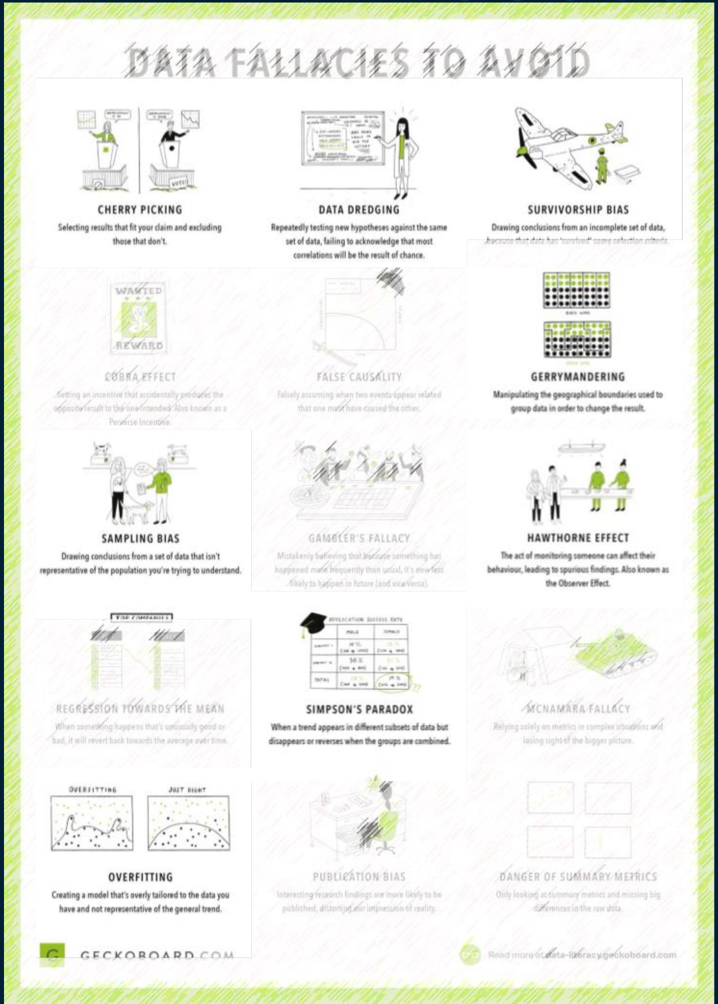
Data pitfalls in relation to data treatment.



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What is the cause of the issue?

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What is the cause of the issue?

Ordinary least squares (OLS)

OLS assumptions:

1. Random sample
2. Linear in parameters
3. No multi-collinearity
4. The independent variables are exogenous
5. The error term is homoscedastic
6. The error term is normally distributed with mean 0 and constant variance (Hypothesis test)

Only one point is about data?

Are you allowed to plot your data before an hypothesis test?

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Culture as a part of the modelling toolbox

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How do we handle the pitfalls?

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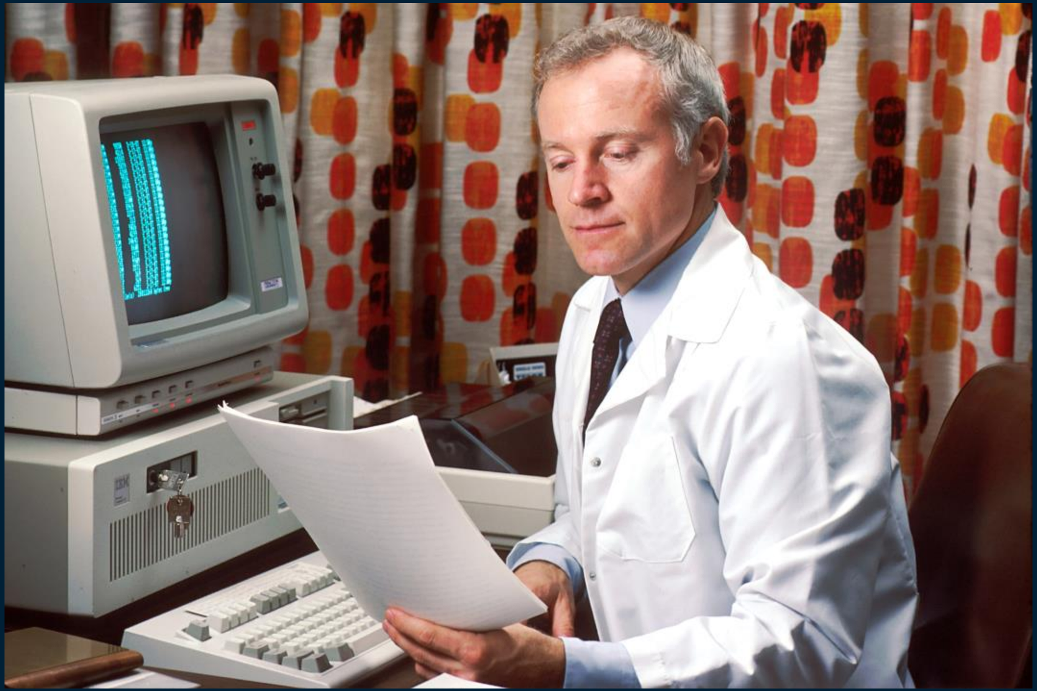
How do we handle the pitfalls?



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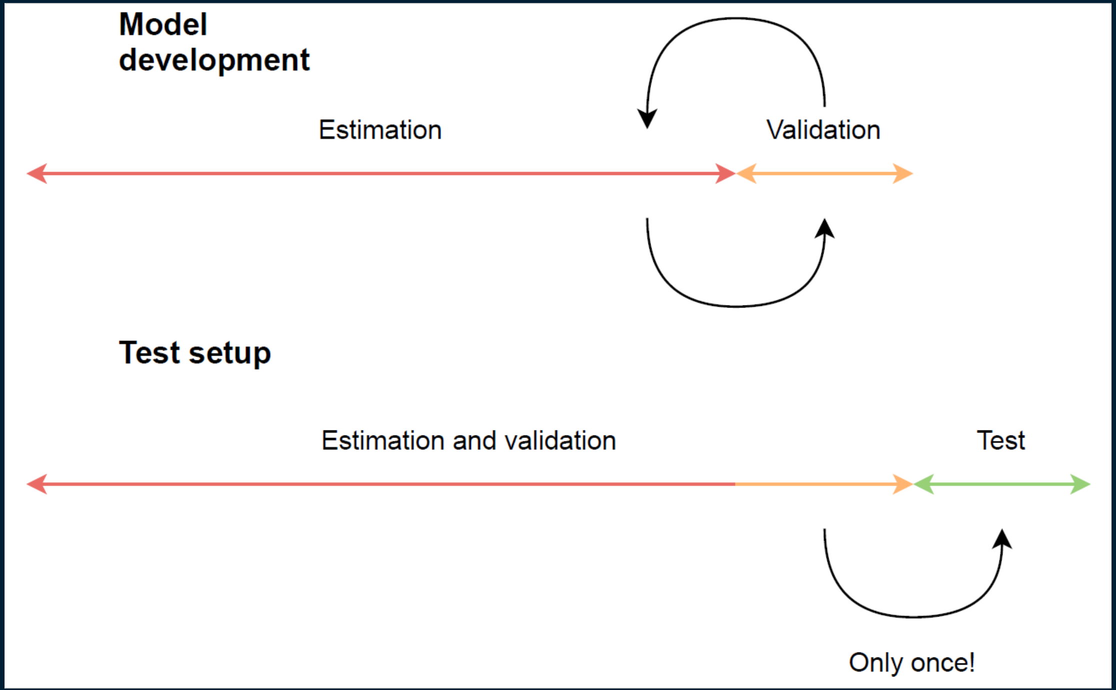
How do we handle the pitfalls?



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How do we handle the pitfalls?

```
proc forest data=mycas.inData;
   partition fraction(test=0.25 validate=0.25);
   ...
run;
```

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Which opportunities does it create?

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Which opportunities does it create?

Ordinary least squares (OLS)

1. Random sample
2. Linear in parameters
3. No multi-collinearity
4. The independent variables are exogenous
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6. The error term is normally distributed with mean 0 and constant variance (Hypothesis test)

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Which opportunities does it create?

- Flexible model development
  - Enabling iterative model development
- Business focus
  - Focus on the performance of the model (e.g. forecast precision)
  - Less time on assumptions

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References

- Data fallacies to avoid: Geckoboard
- Billeder fra Unsplash: Ramón Salinero, Myriam Jessier, Joshua Sortino, David Pupaza, ThisisEngineering RAEng, Firmbee.com, Isaac Smith, C Drying, h heyerlein, Emily Morter, National Cancer Institute, Patrick Weissenberger

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Providing insights within data science and AI
for SAS customer advisory

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