

Divining Insights: Visual Analytics Through Cartomancy

Andrew McNutt
Anamaria Crisan
Michael Correll

UChicago & Tableau Research



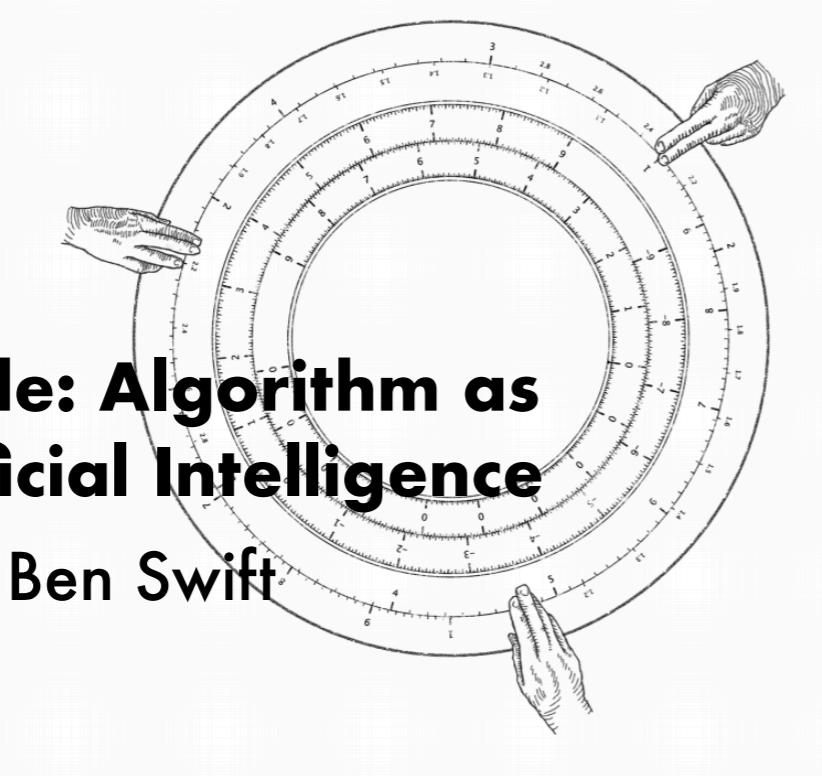
Divining Insights: Visual Analytics Through Cartomancy

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a contextualization



The Other Side: Algorithm as Ritual in Artificial Intelligence

Kieran Browne, Ben Swift



**Lickable cities:
Lick
everything in
sight and on
site**

Brueggemann et al

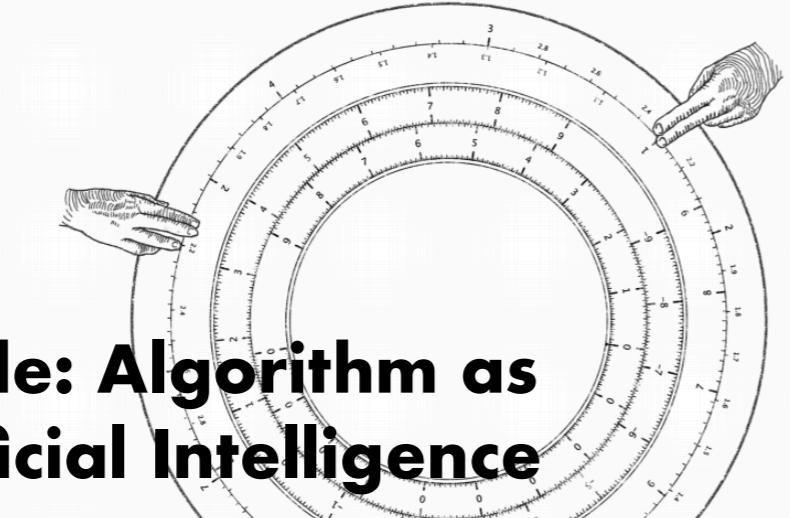
Figure 1: Chief EggnoGrapher,
Vanessa Thomas, licking history (i.e.

Let's talk about alt.chi

The official description

"alt.chi is a forum for controversial, risk-taking, and boundary pushing presentations at CHI."

What it is
**whimsical, critical, culture
jamming, experimental,
innovative, funny**



The Other Side: Algorithm as Ritual in Artificial Intelligence

Kieran Brown

Let's talk about alt.chi

The official description

"I am just terrified of my future" Epistemic
Violence in Disability Related Technology Research

Anon Ymous et al

for
-taking,
shing
CHI."

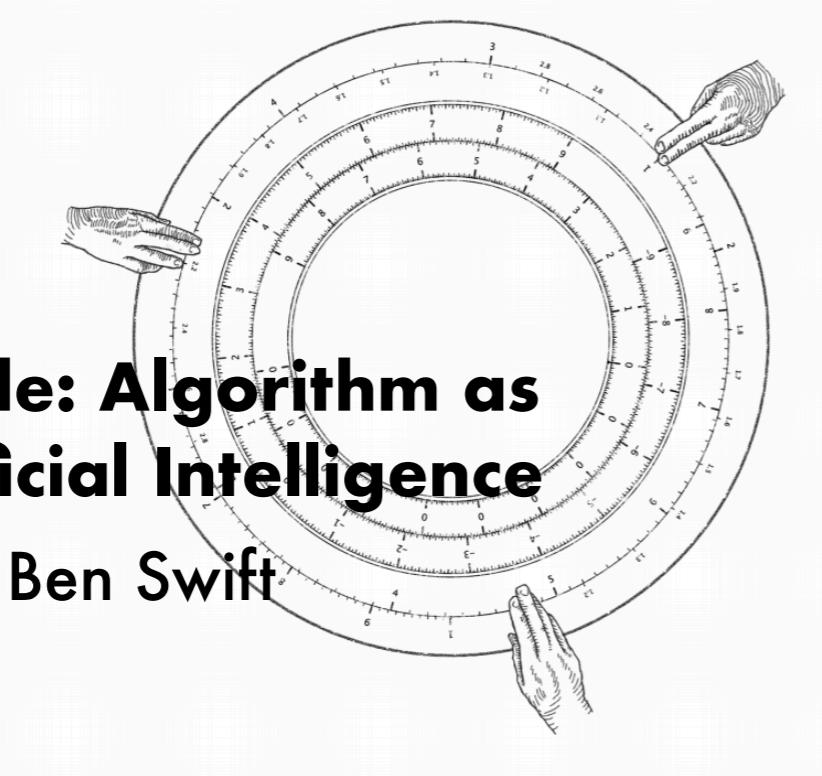
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a problem

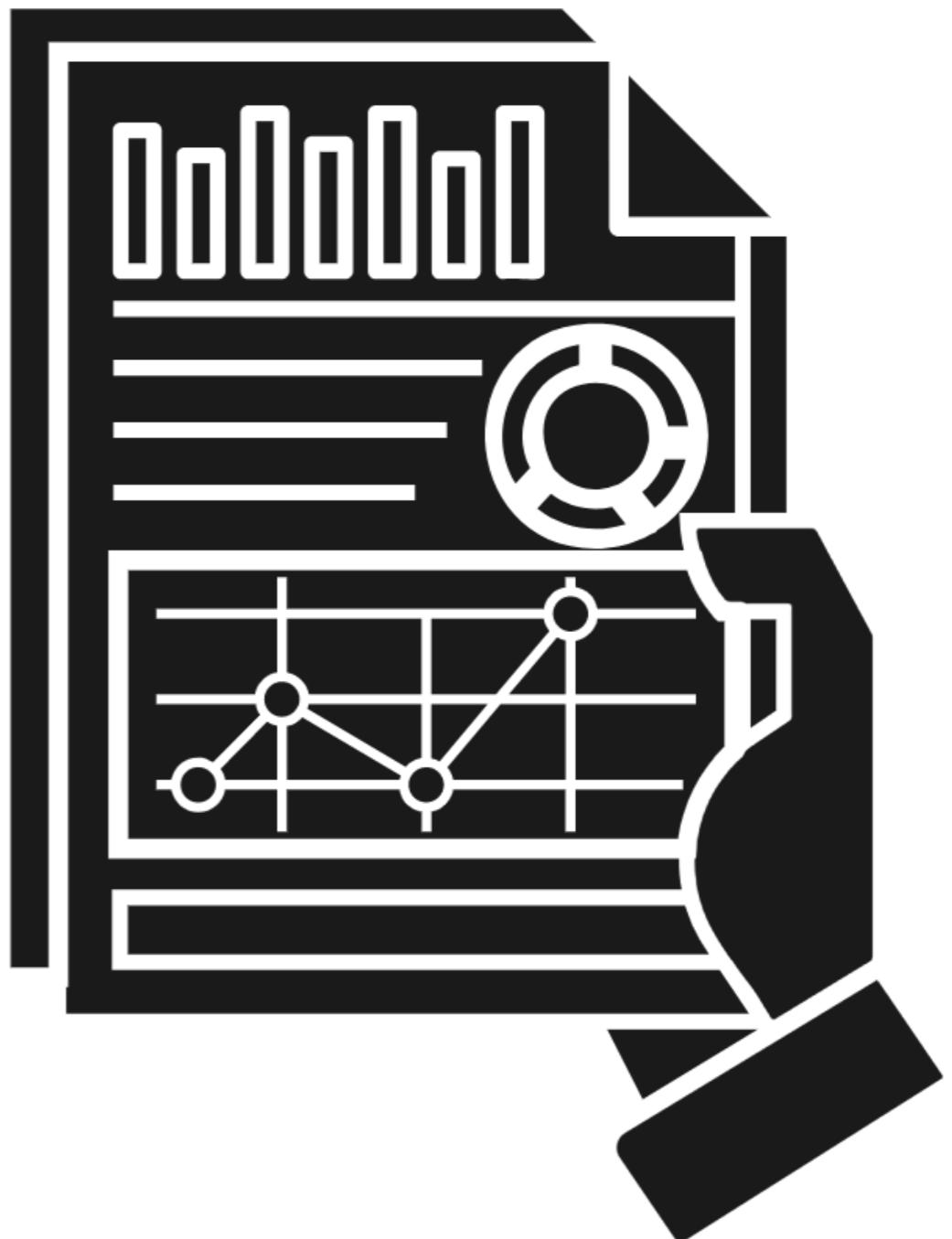


Got Data



Want Insights

**Data visualization
to the rescue!**



Data visualization to the rescue!

(right?)



Visual Analysis is hard

Chart Recommendation and Automated Analysis systems offer enticing ways to reduce that cognitive burden



Automated Visual Analysis is hard
and untrustworthy
~~Visual Analysis is hard~~

Opaque: Black boxes make
uninterpretable predictions

Inflexible: can't adapt to
domain or expand beyond
implementation boundaries

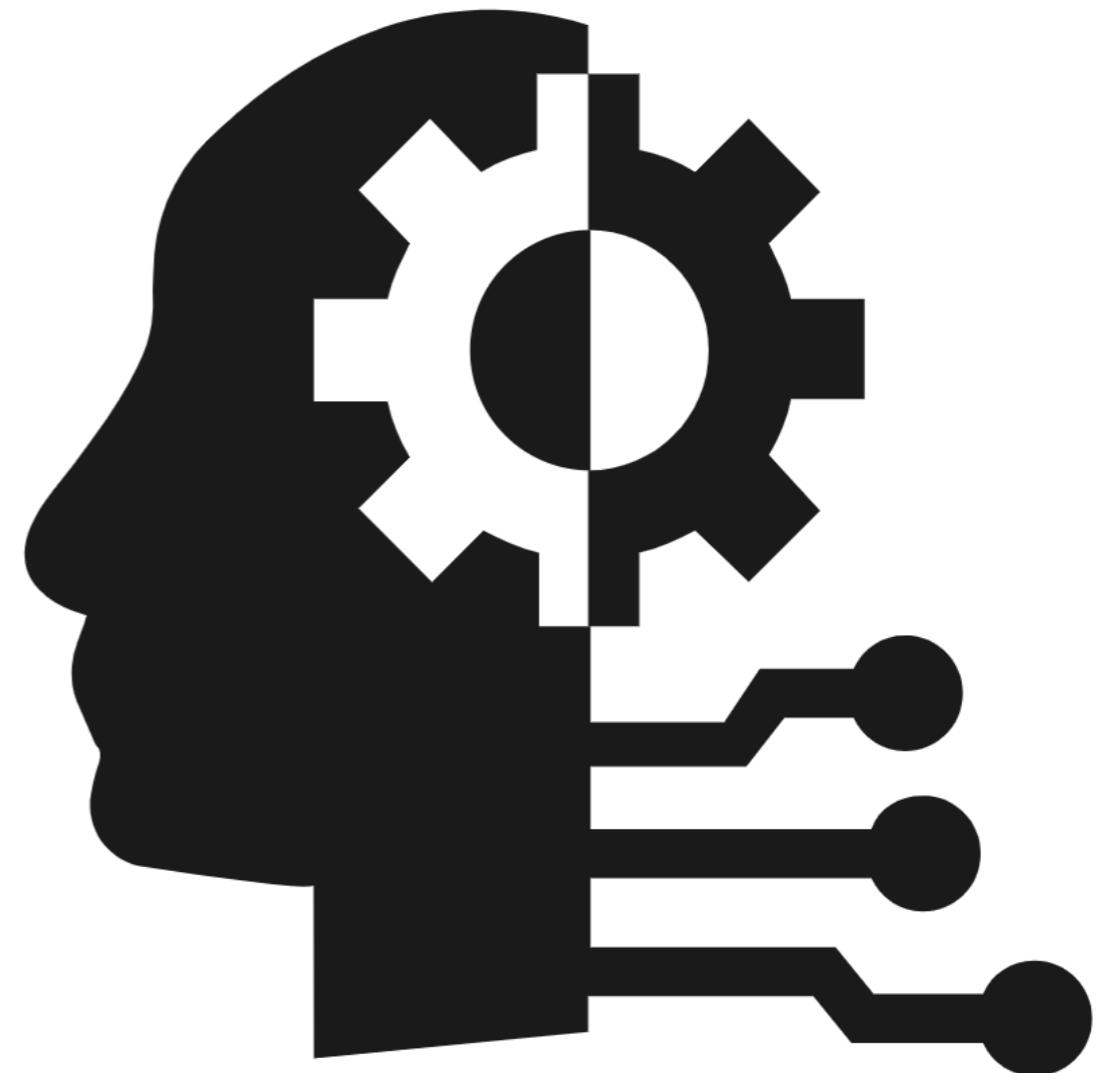
Brittle: liable to become
“p-hacking machines” that
highlight “interesting” noise

Domineering: inspire too
deep a trust



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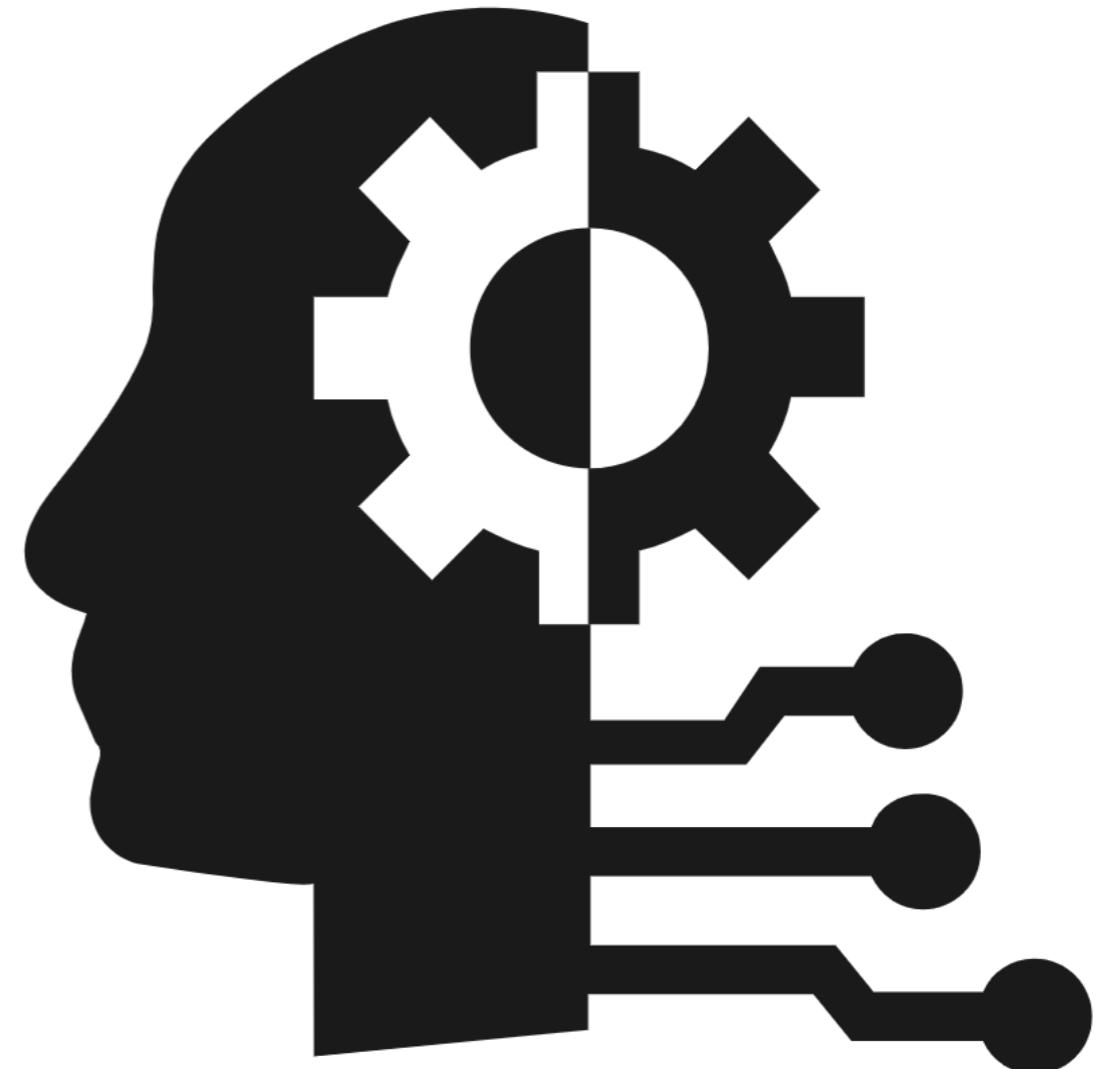


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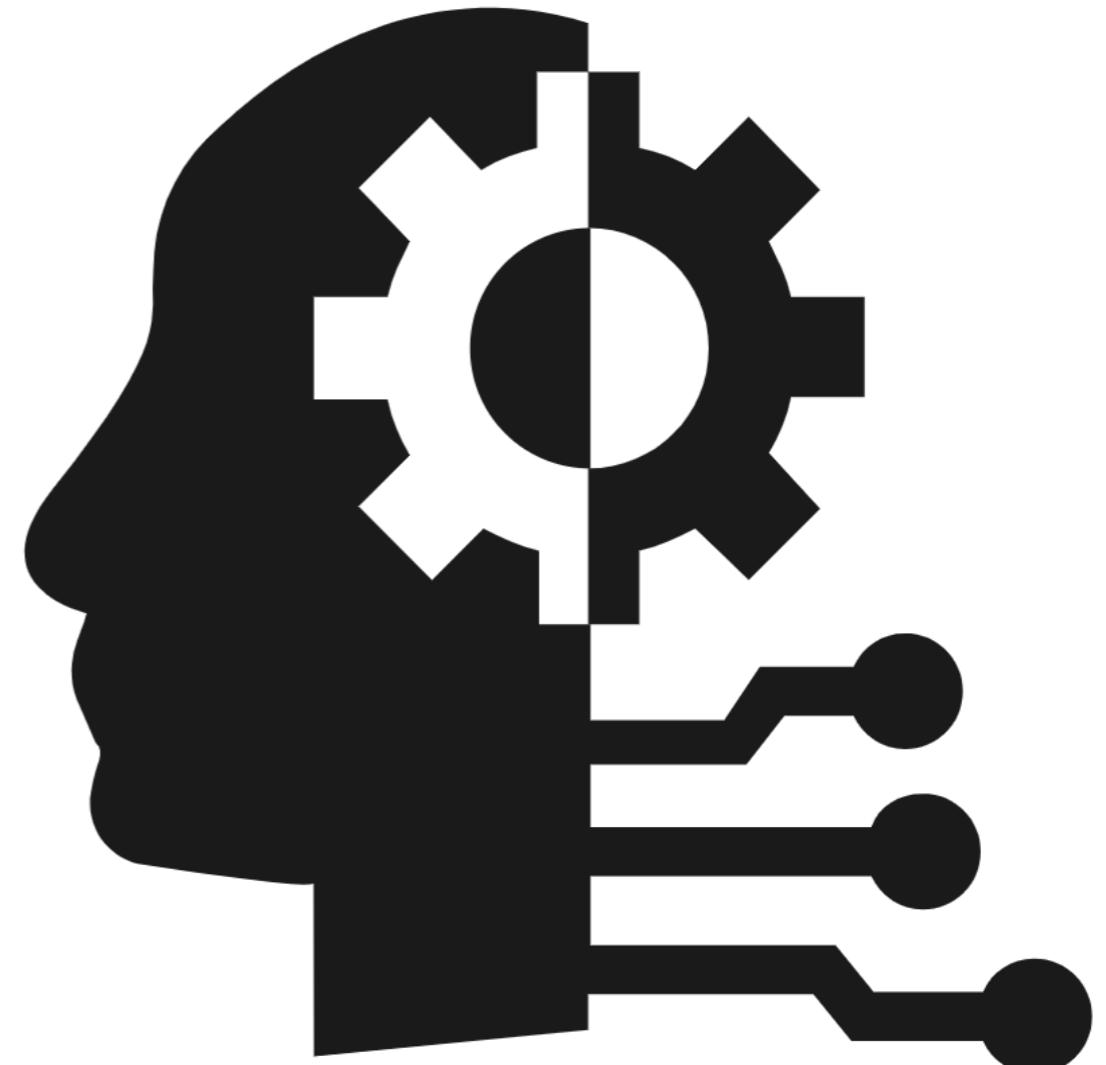
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a call to the divine

Portilège

A web-based **visual analytics** system based on the ancient practice of **cartomancy** or **tarot**

Workflow

Querent uploads a dataset

A new deck of insights is generated

Cards are placed into a spread

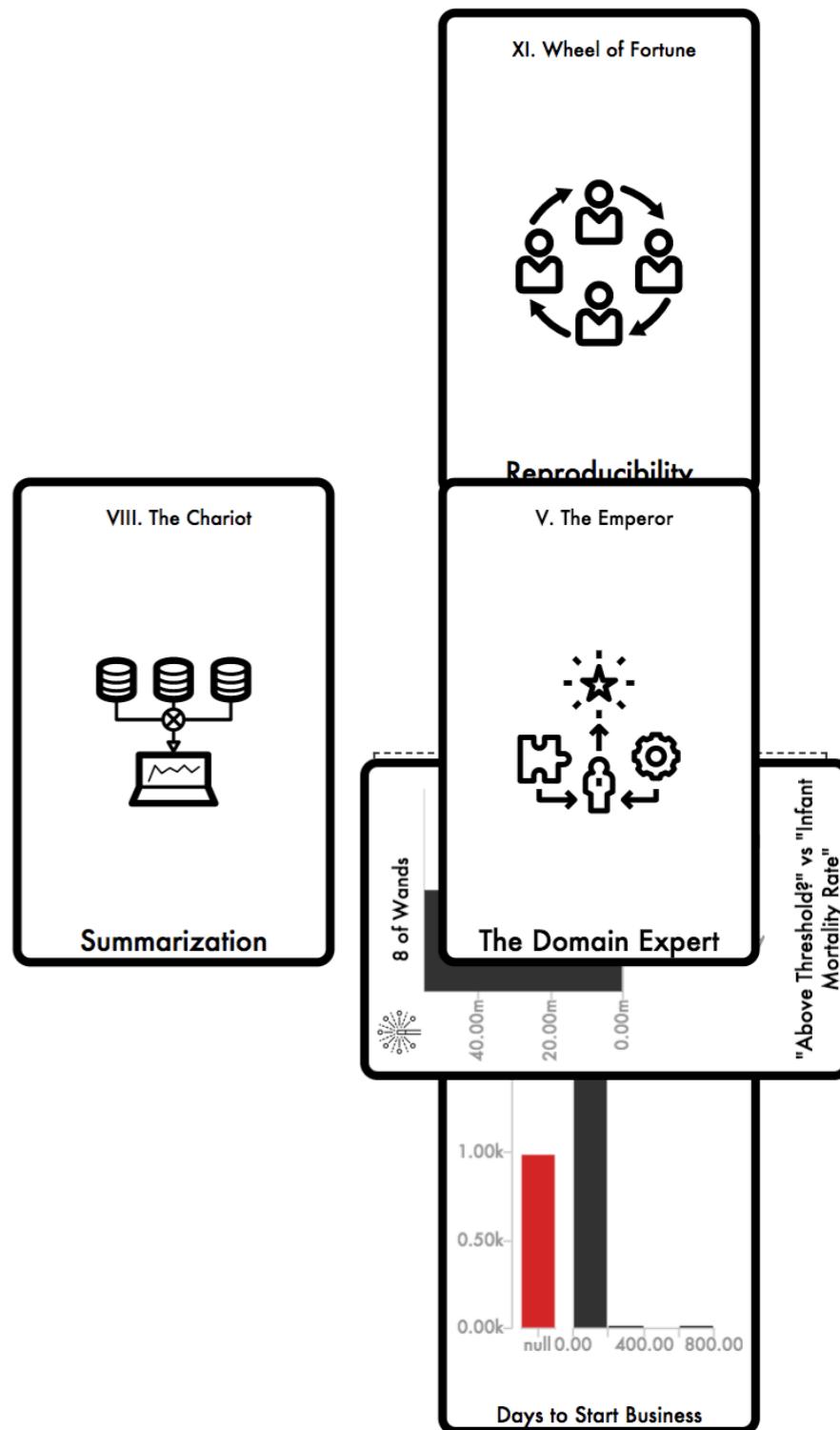
The reader finds their meanings

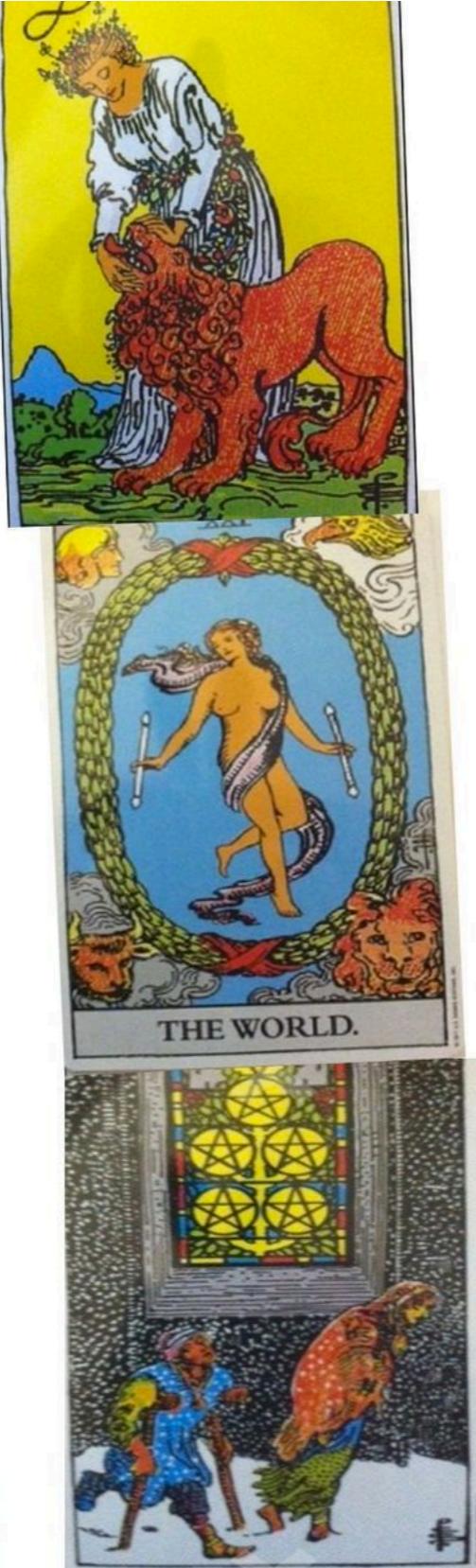
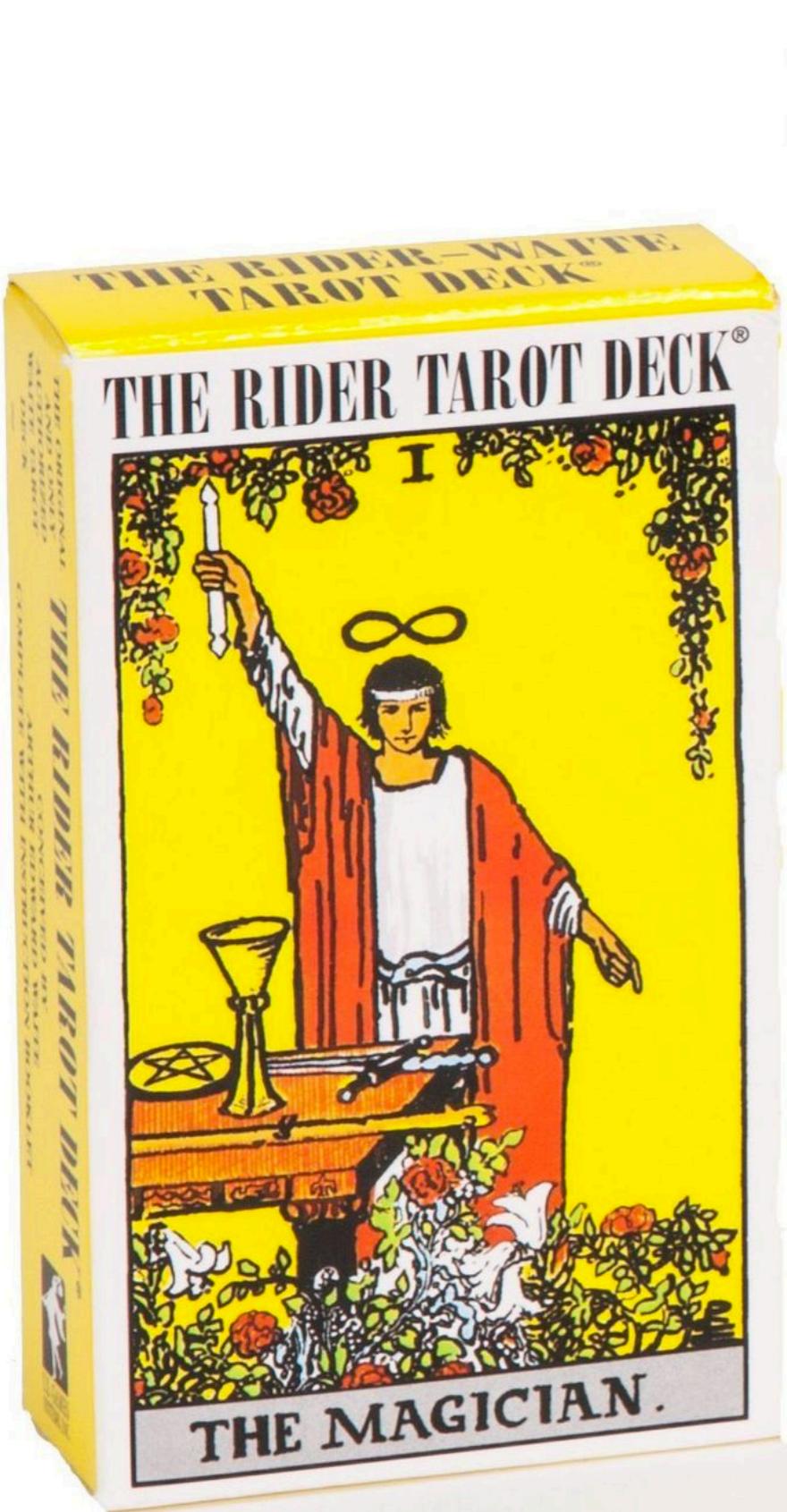
Sortilege

Data set WORLD_INDICATORS.csv
Upload (only csvs are supported)
Choose File No file chosen

Layout CELTIC CROSS
A spread of ten cards presenting additional context about a situation.

Reset current draw
Click the deck to draw a card





Tarot

A fortune-telling practice mediated by a special deck of cards

Major Arcana

22 named unique cards

Minor Arcana

56 cards in 4 suits

Basically the same as traditional deck of cards



Tarot

A fortune-telling practice
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Major Arcana

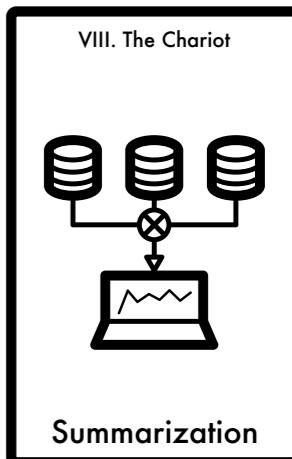
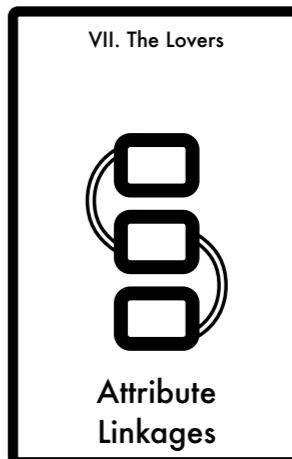
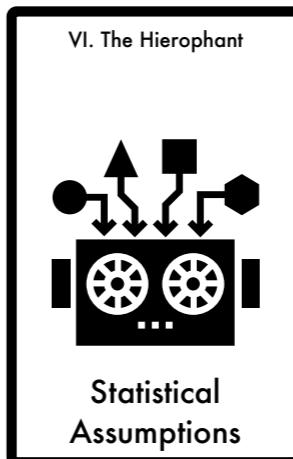
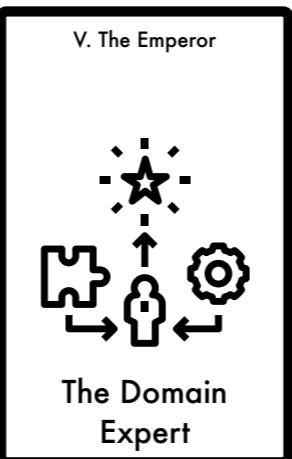
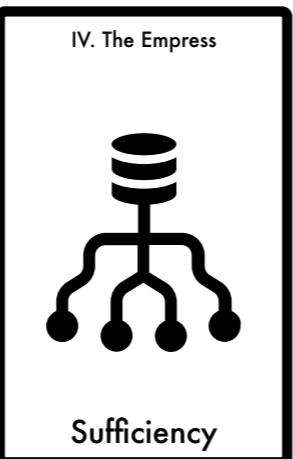
22 named unique cards

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*Basically the same as traditional
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Major Arcana



Did you consider developing a specific research question?

Did you seek advice from a statistical expert before analyzing your data?

Would others interpret the data they same way you do?

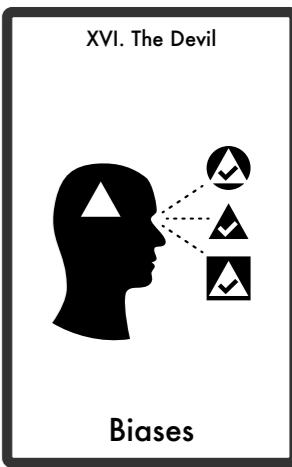
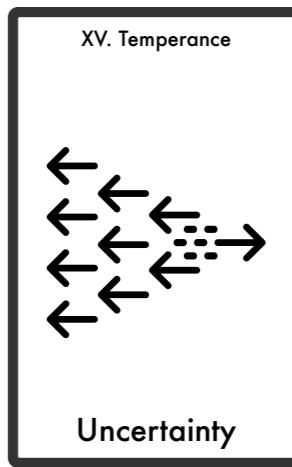
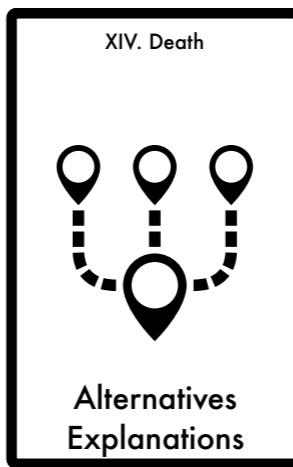
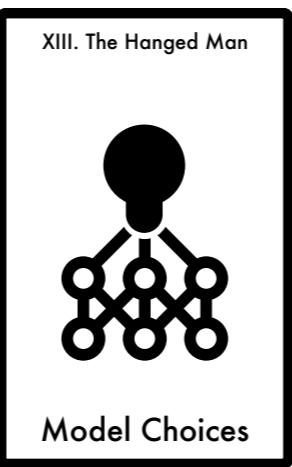
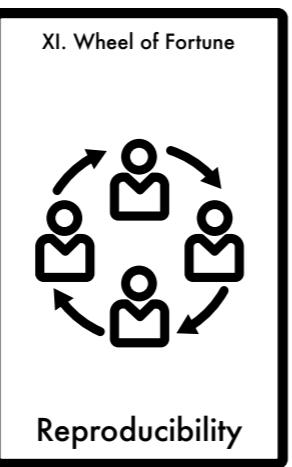
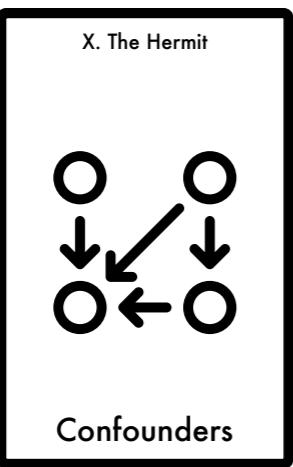
Do you have enough data to arrive at a reasonable conclusion?

Have you engaged a domain expert to be sure you understand the data?

Do you understand the assumptions made by the statistical analysis?

Did you consider the functional dependencies in your data?

Is the level of aggregation data aggregation appropriate?



Can you assess the internal and ecological validity of these results?

Have you accounted for the presence of hidden confounders in your data?

Could you reproduce these results at a later date?

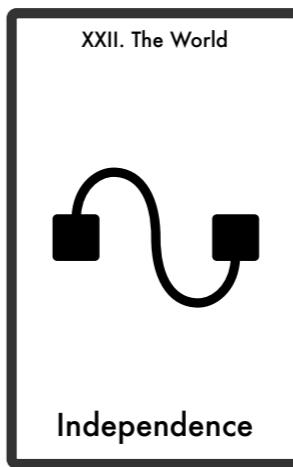
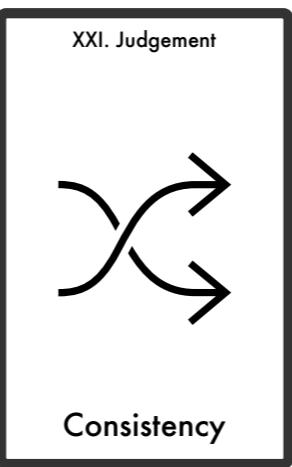
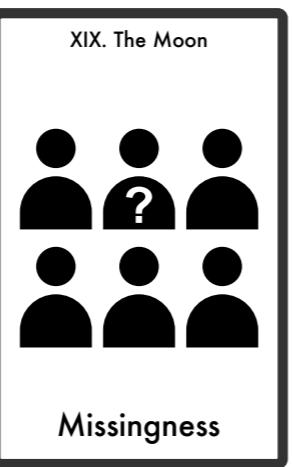
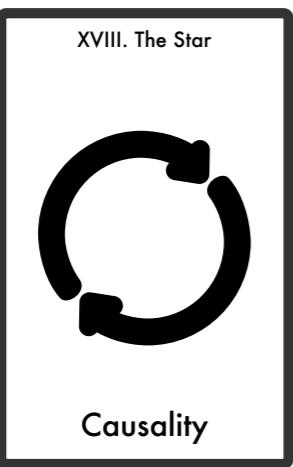
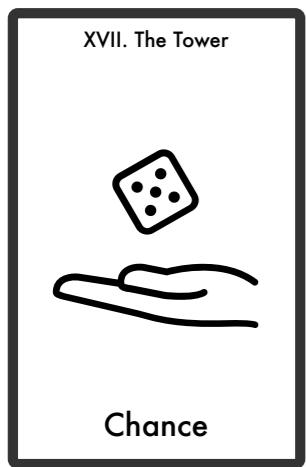
Does your data have any quality issues?

Did you use deep learning when logistic regression would have sufficed?

Have you considered alternative interpretations of these results?

Do you know what the uncertainty is in these results?

Have you considered potential sources of bias in your data collection?



Have you considered how likely is it that these results are due purely to chance?

Are you mistaking a correlative relationship for a causal one?

Have you considered whether there is missing data?

How representative is your data sample relative to the population it was drawn from?

Are you applying a consistent criteria for analyzing your results?

Have you considered the role of seasonality or intrasample correlation in your data?

Major Arcana



Did you consider developing a specific research question?

Did you seek advice from a statistical expert before analyzing your data?

Would other data they s



Validity



Confounders



Can you assess the internal and ecological validity of these results?

Have you accounted for the presence of hidden confounders in your data?

Could you results c



Chance



Causality



Have you considered how likely is it that these results are due purely to chance?

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Have you c there is

I. The Magician



The Analyst

Did you seek advice from a statistical expert before analyzing your data?



Attribute Linkages

Do you consider the functional dependencies in your data?



Summarization

Is the level of aggregation data appropriate?



Uncertainty

Do you know what the uncertainty is in these results?



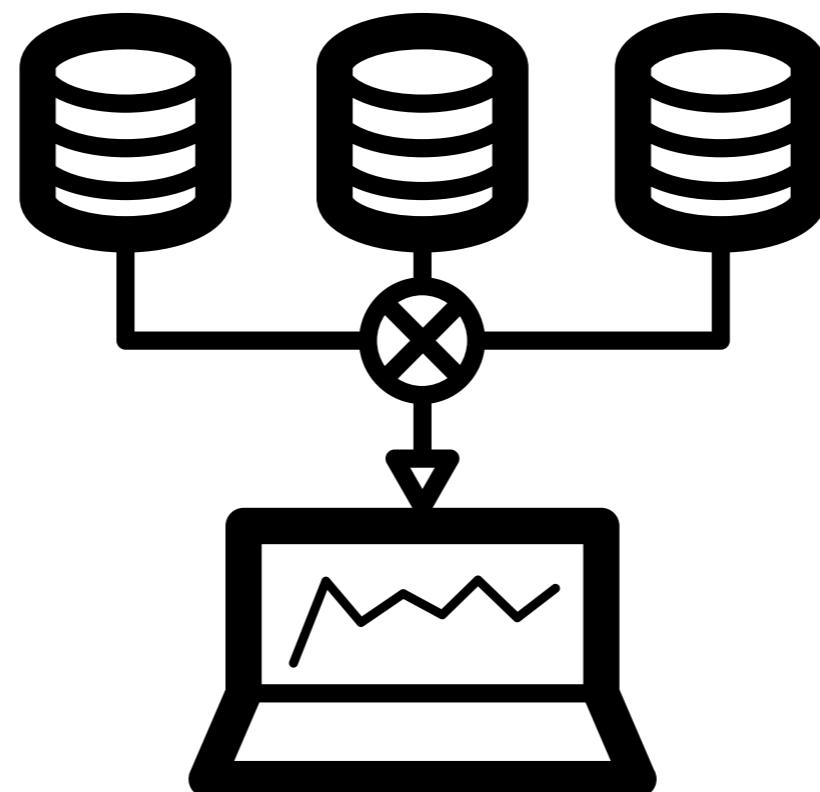
Biases

Have you considered potential sources of bias in your data collection?

Major Arcana



VIII. The Chariot

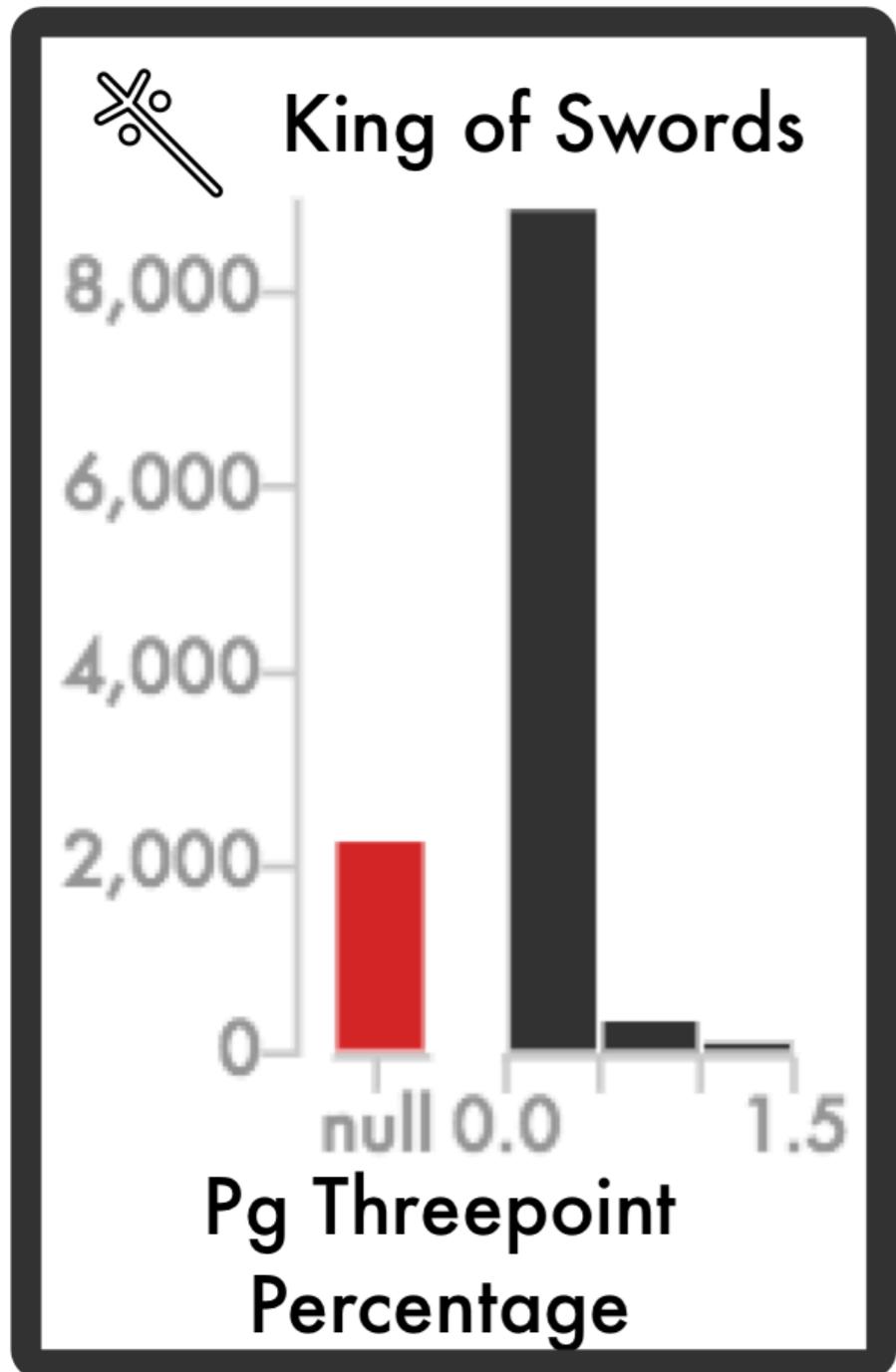


Summarization

Is the level of data aggregation appropriate?



Minor Arcana



Suit indicates the type of insight

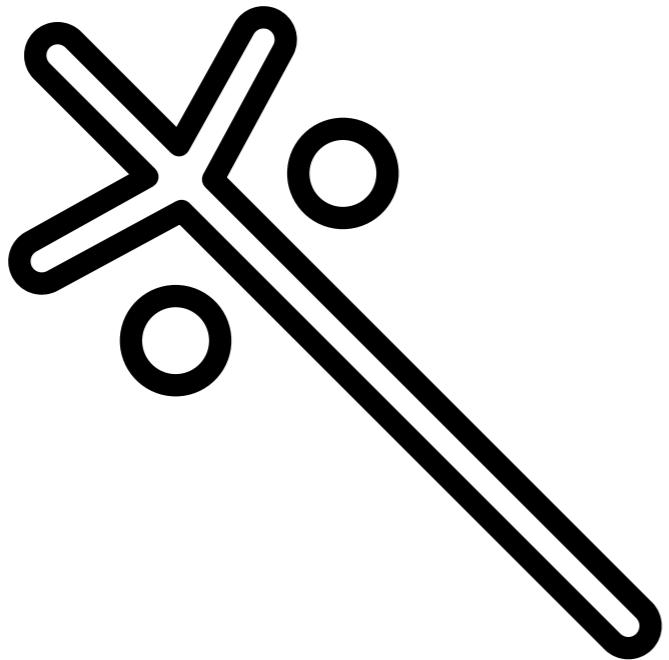
Value of the card indicates the strength of the insight (King high)

A visualization showing the insight

The title of the card

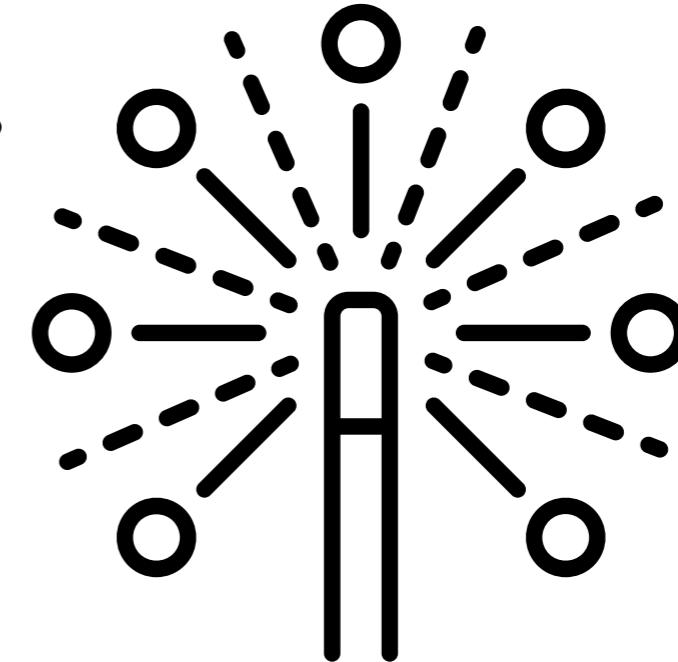
Minor Arcana

Swords



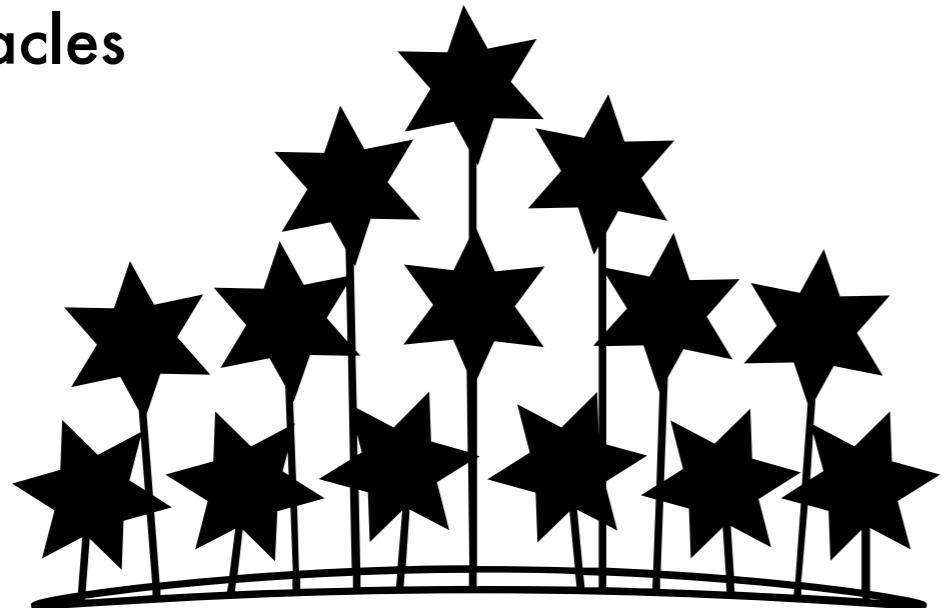
Data Quality Concerns
and Issues

Wands



Patterns of Categorical
Variance

Pentacles



Patterns of Extreme of
Unexpected Numerical Values

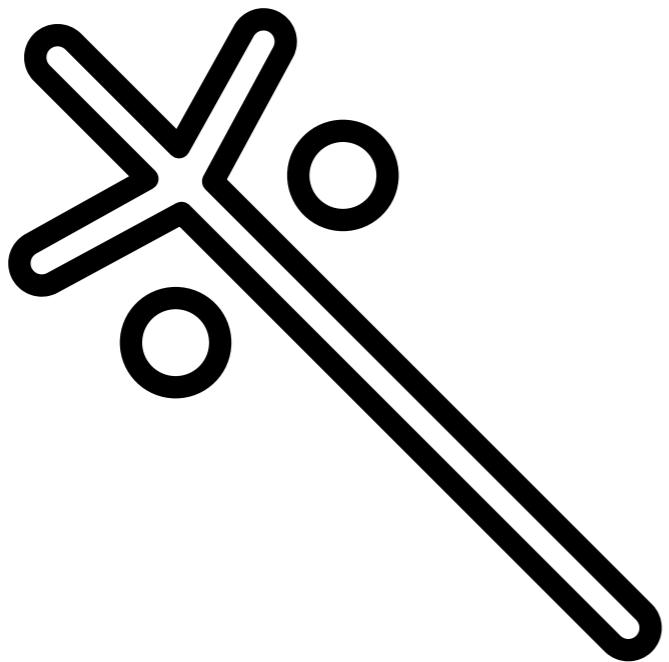
Cups



Patterns of Correlation and
Relationships between fields

Minor Arcana

Swords



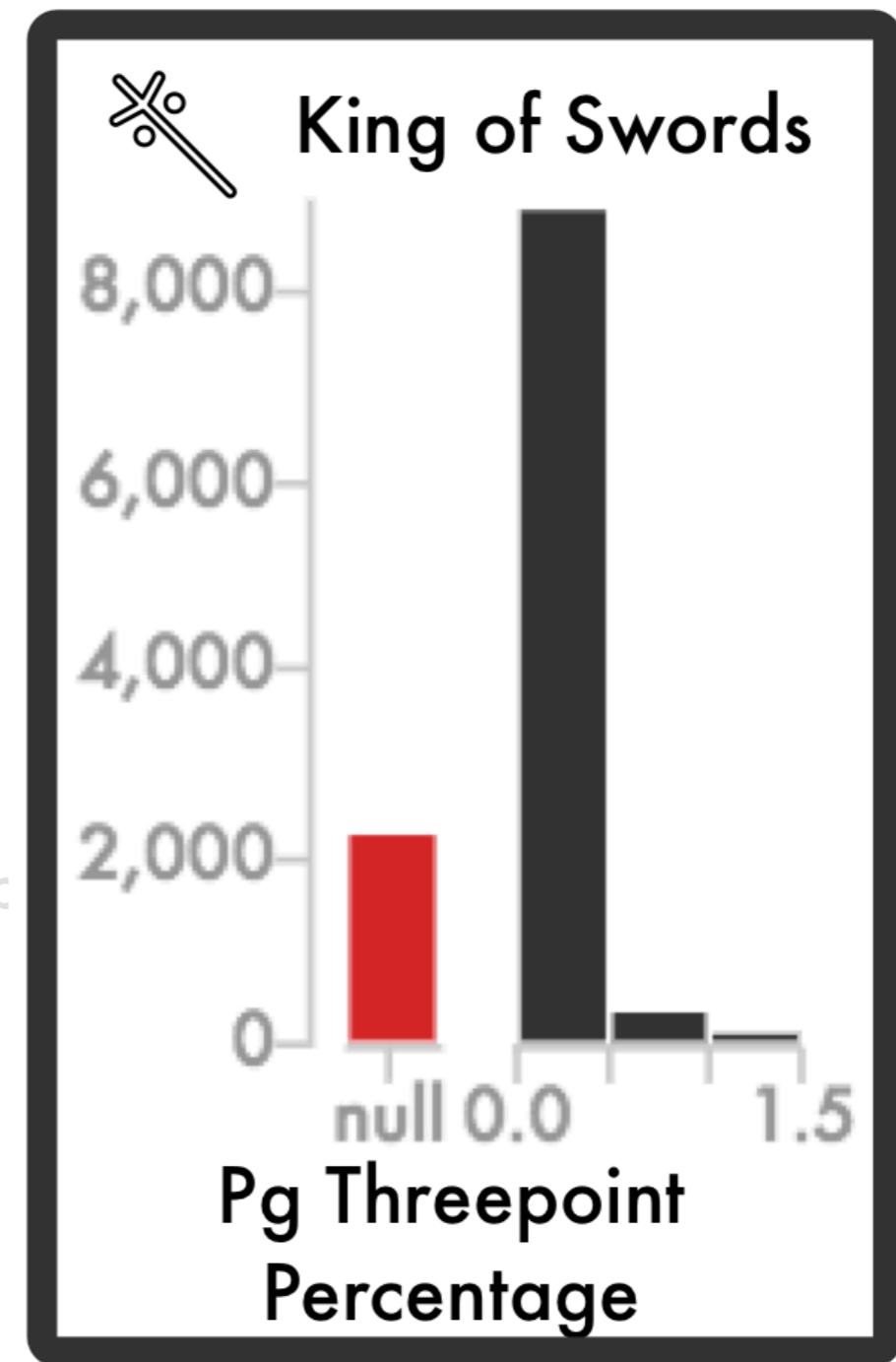
**Data Quality Concerns
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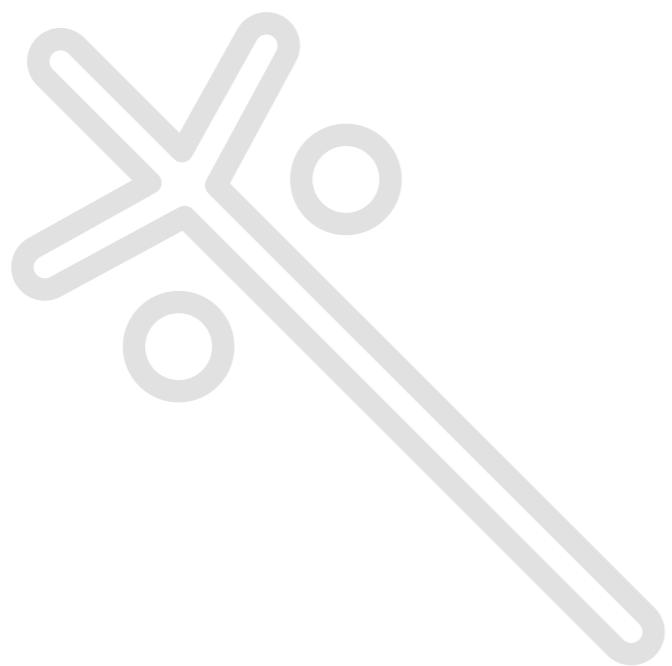
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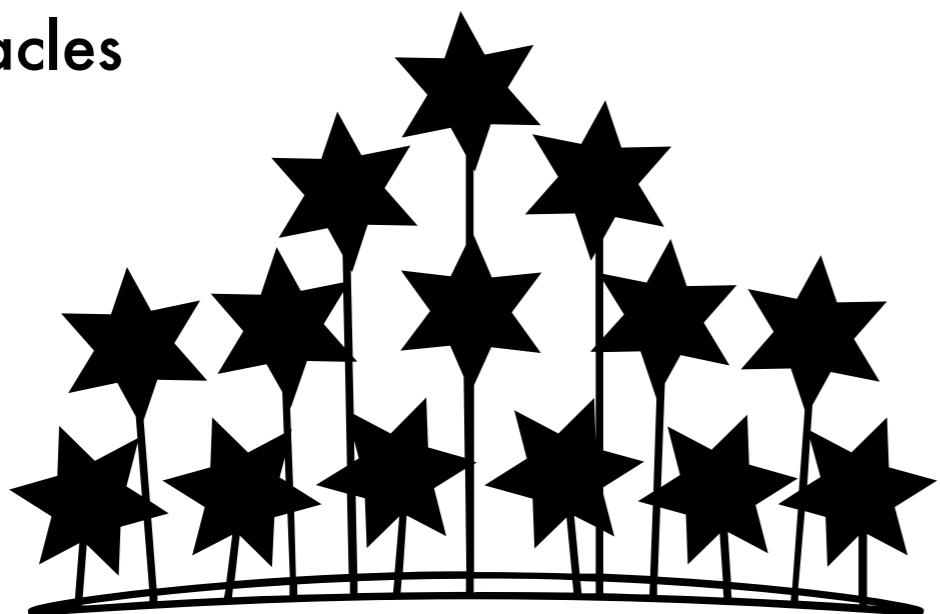
Minor Arcana

Swords



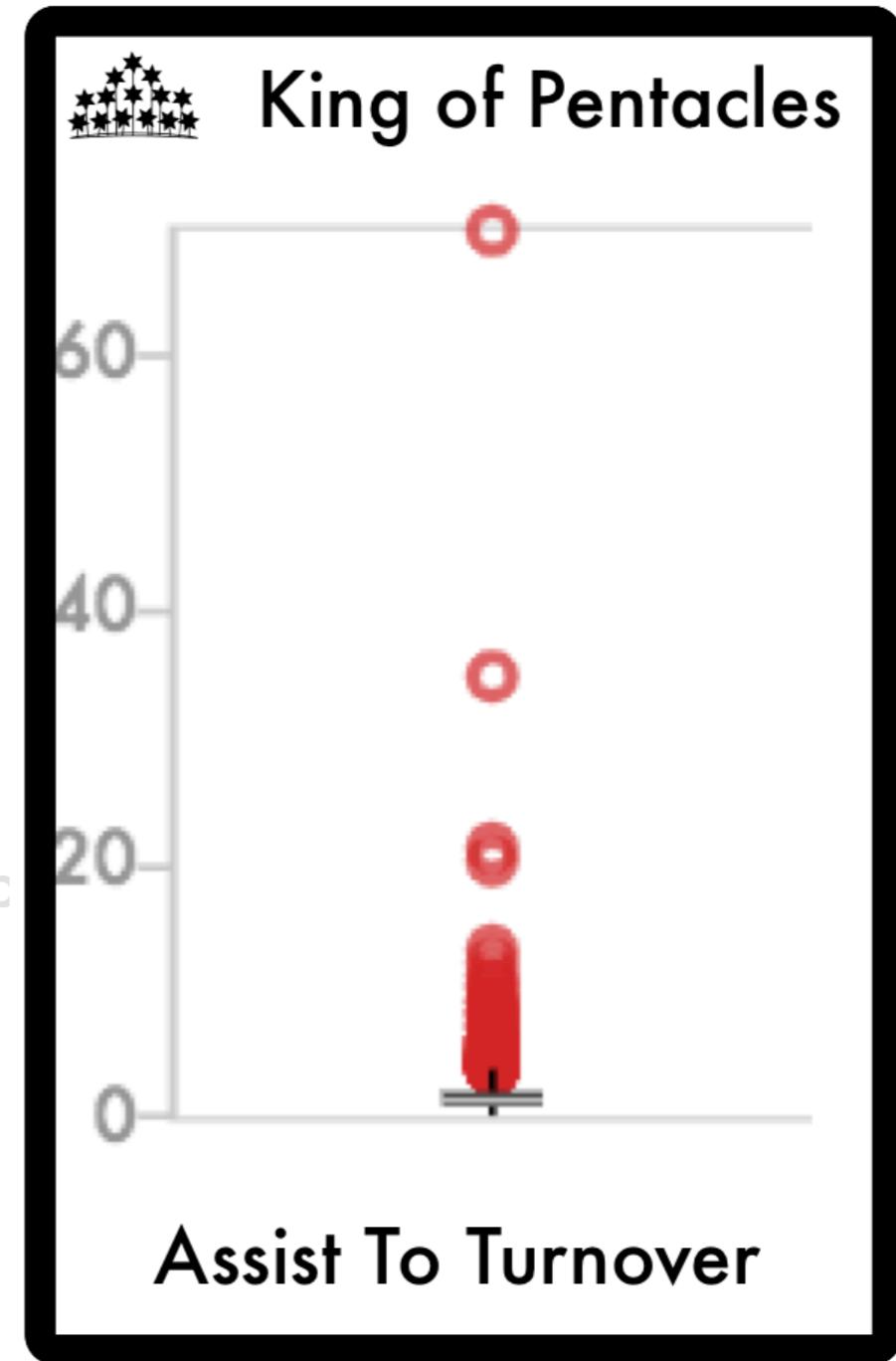
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Patterns of Extreme of
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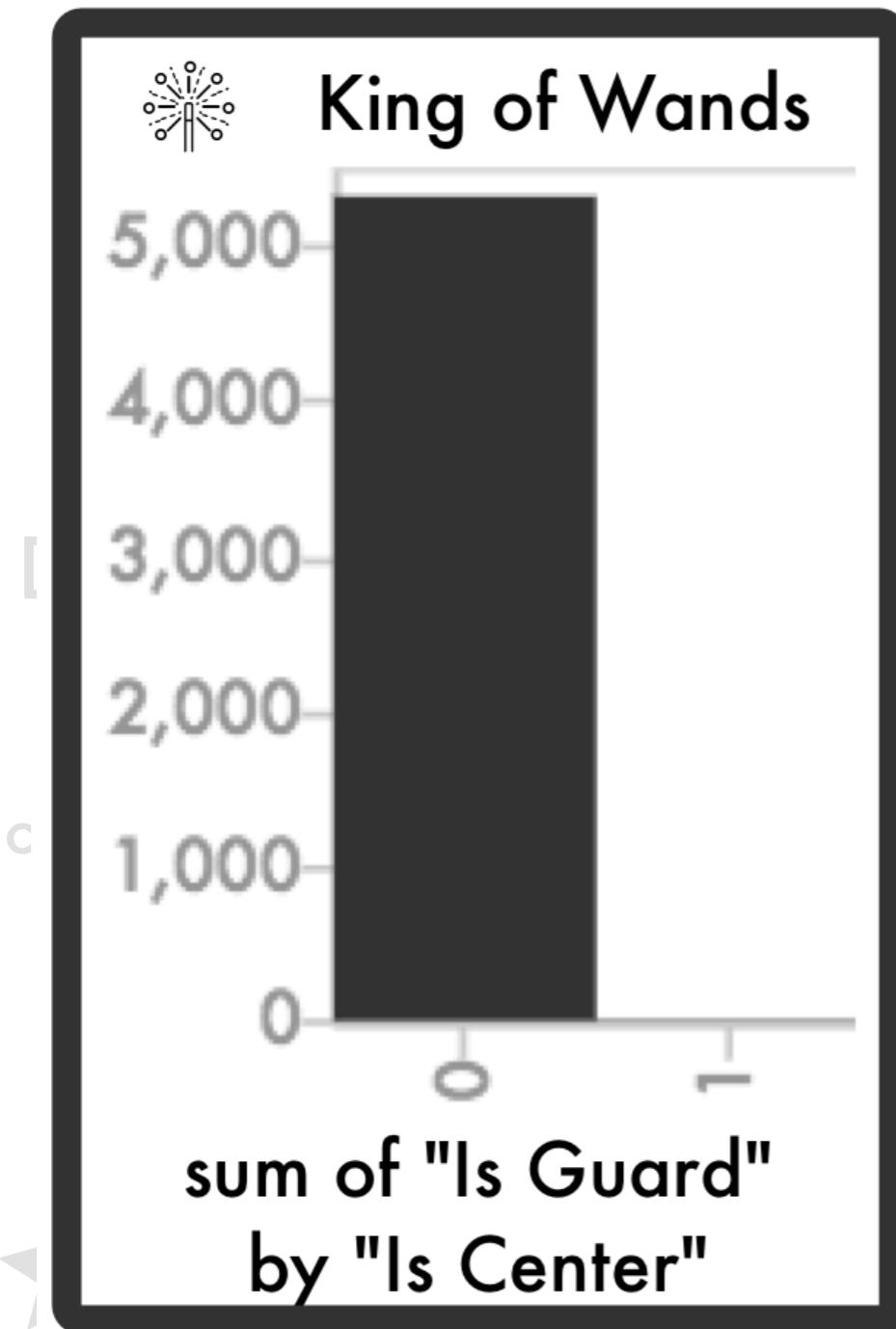
Wands



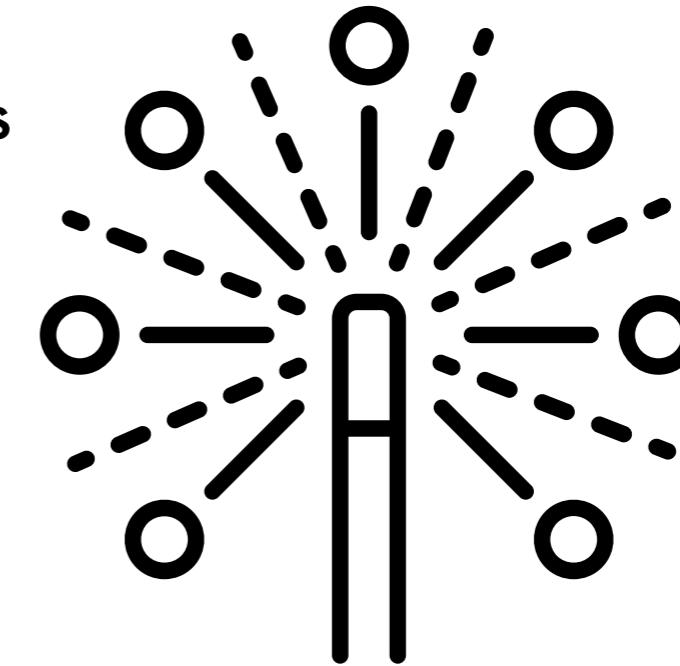
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Patterns of Categorical Variance

Pentac

Cups

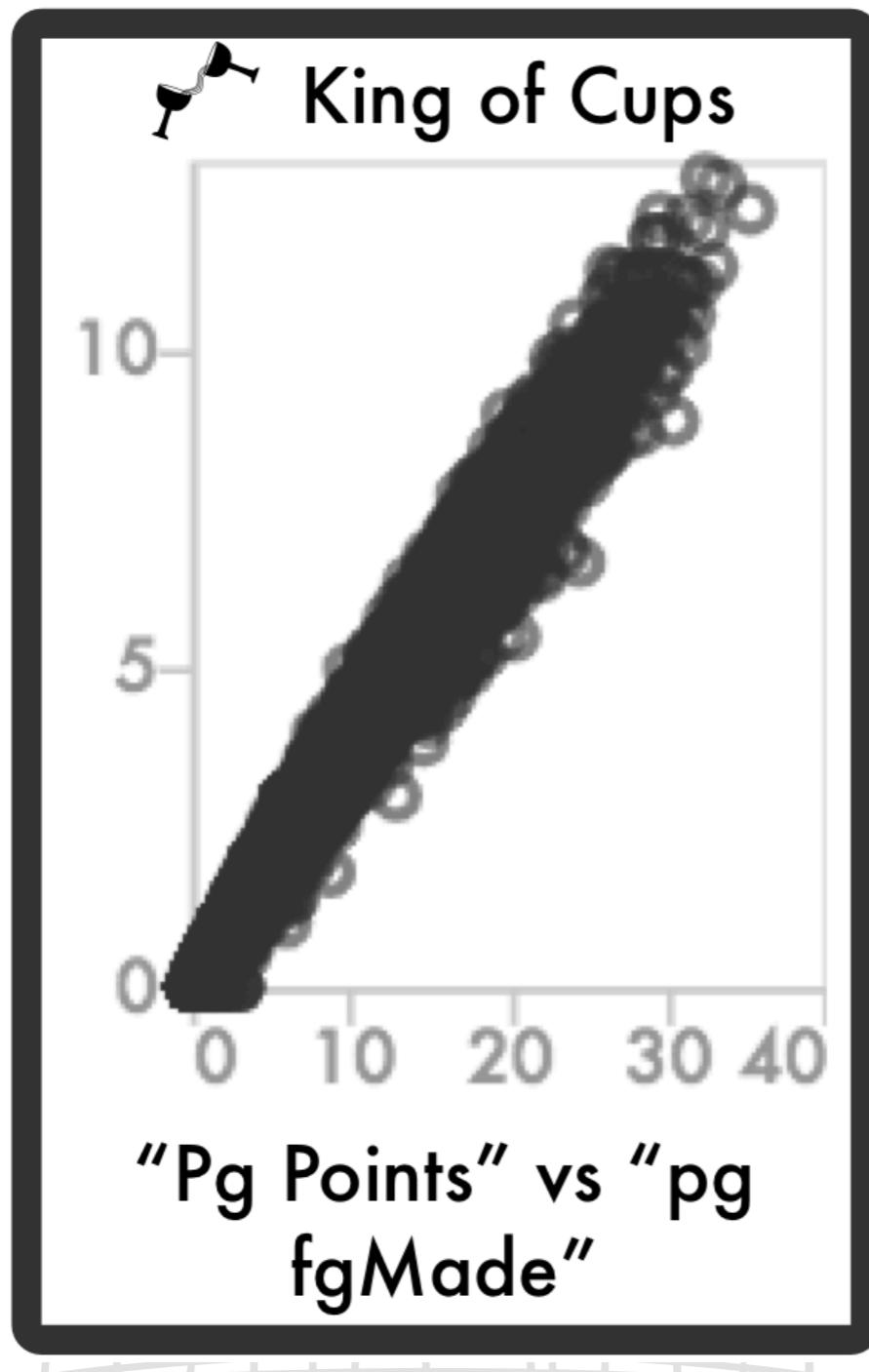


Patterns of Extreme of
Unexpected Numerical Values

Patterns of Correlation and
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Minor Arcana

Swords



Pentacles

Wands



Patterns of Categorical Variance

Cups



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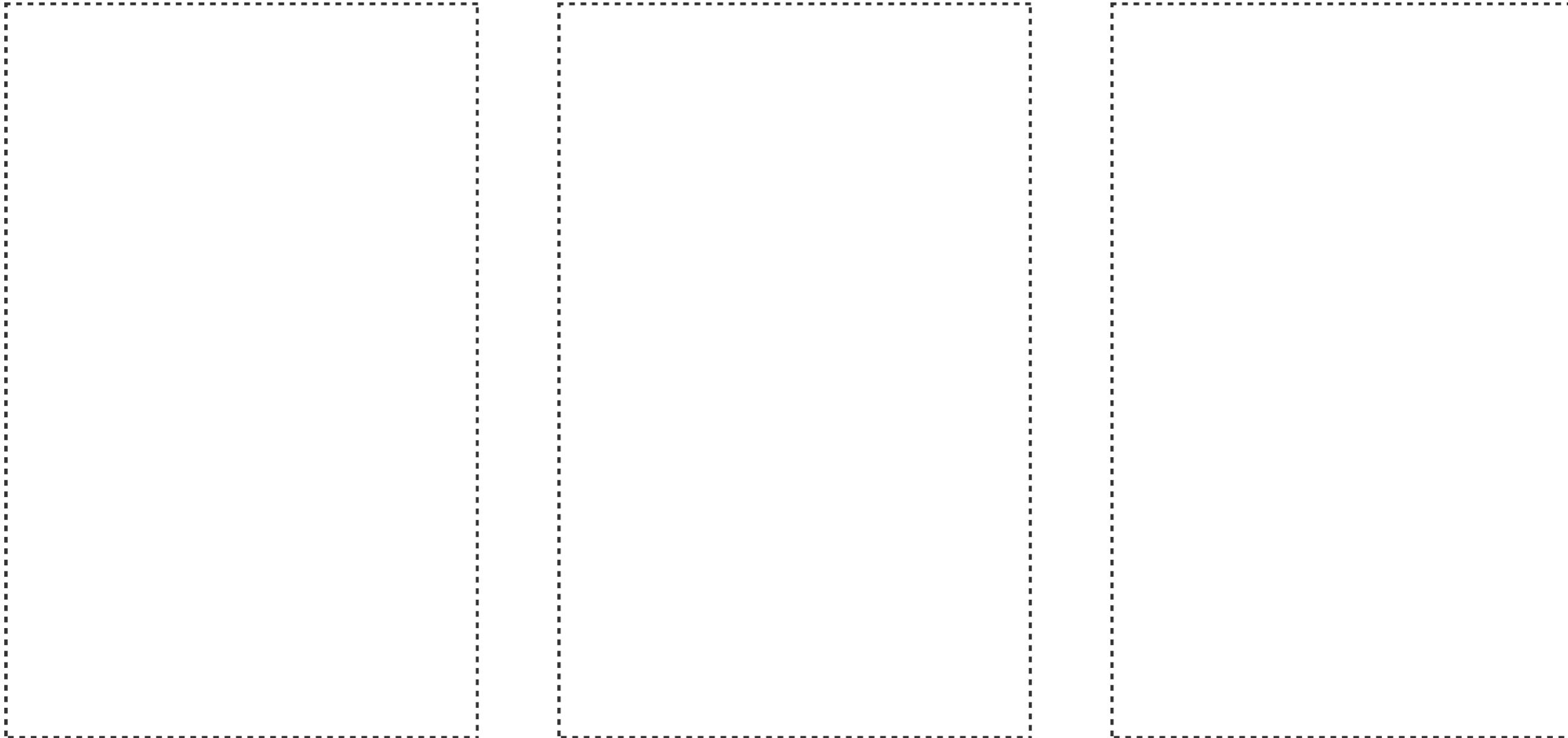
Data set **SELECT A DATASET** 
Upload (only csvs are supported)
 Choose File No file chosen

Layout **SELECT A LAYOUT** 
Select a layout & Dataset to begin

SELECT A DATASET & LAYOUT TO BEGIN

a staged reading

What may be divined from the world indicators dataset?

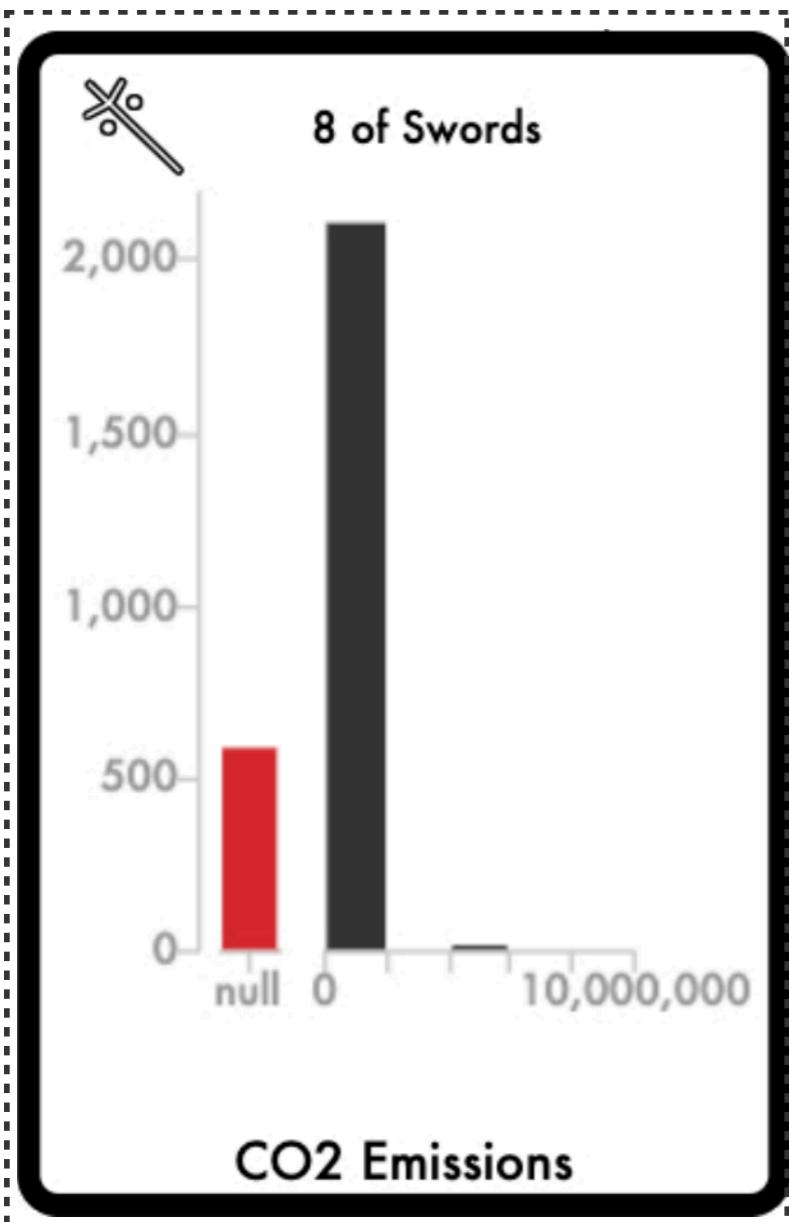


Context

**Hidden
Influences**

Advice

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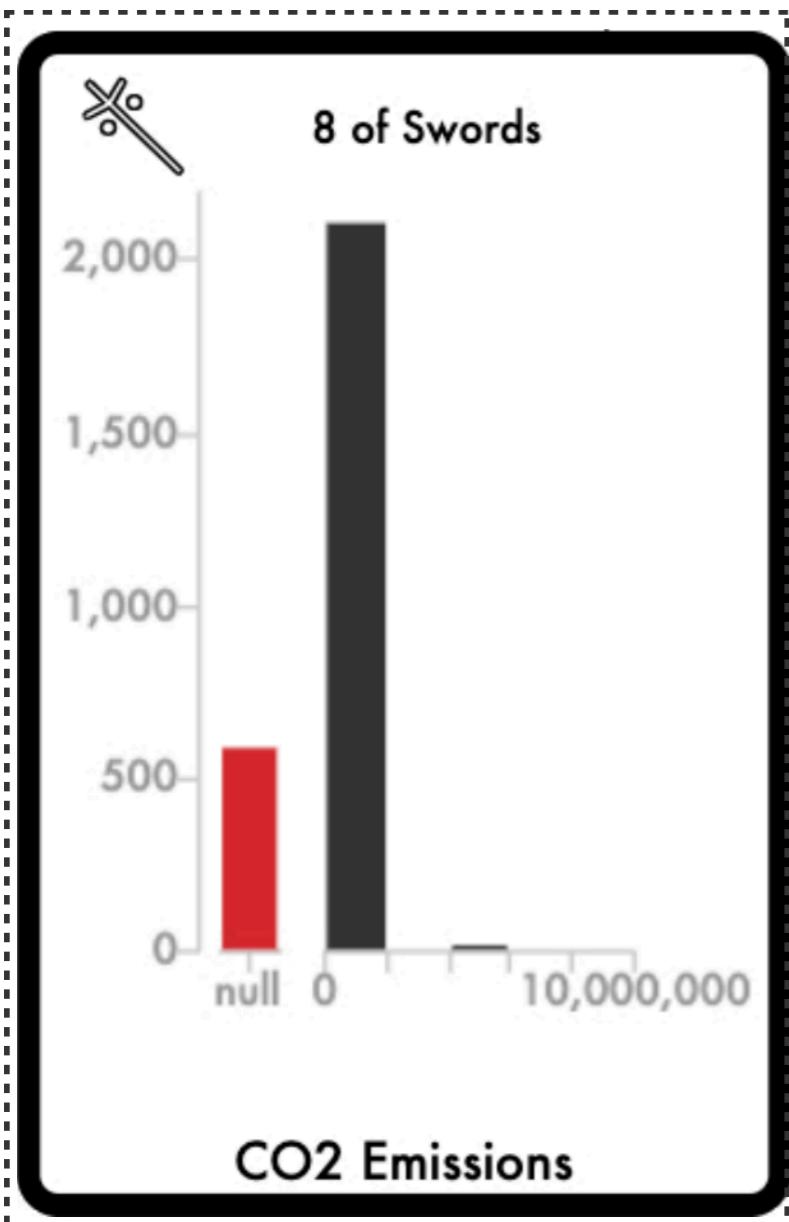


Context

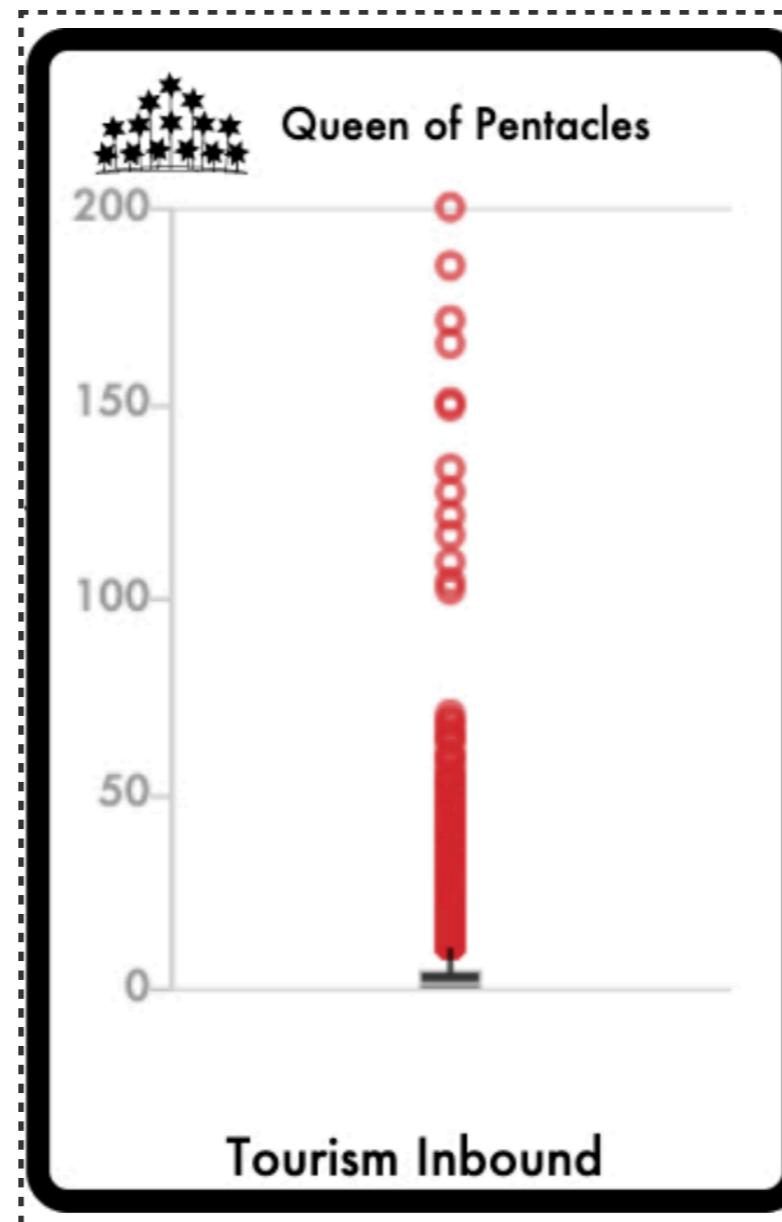
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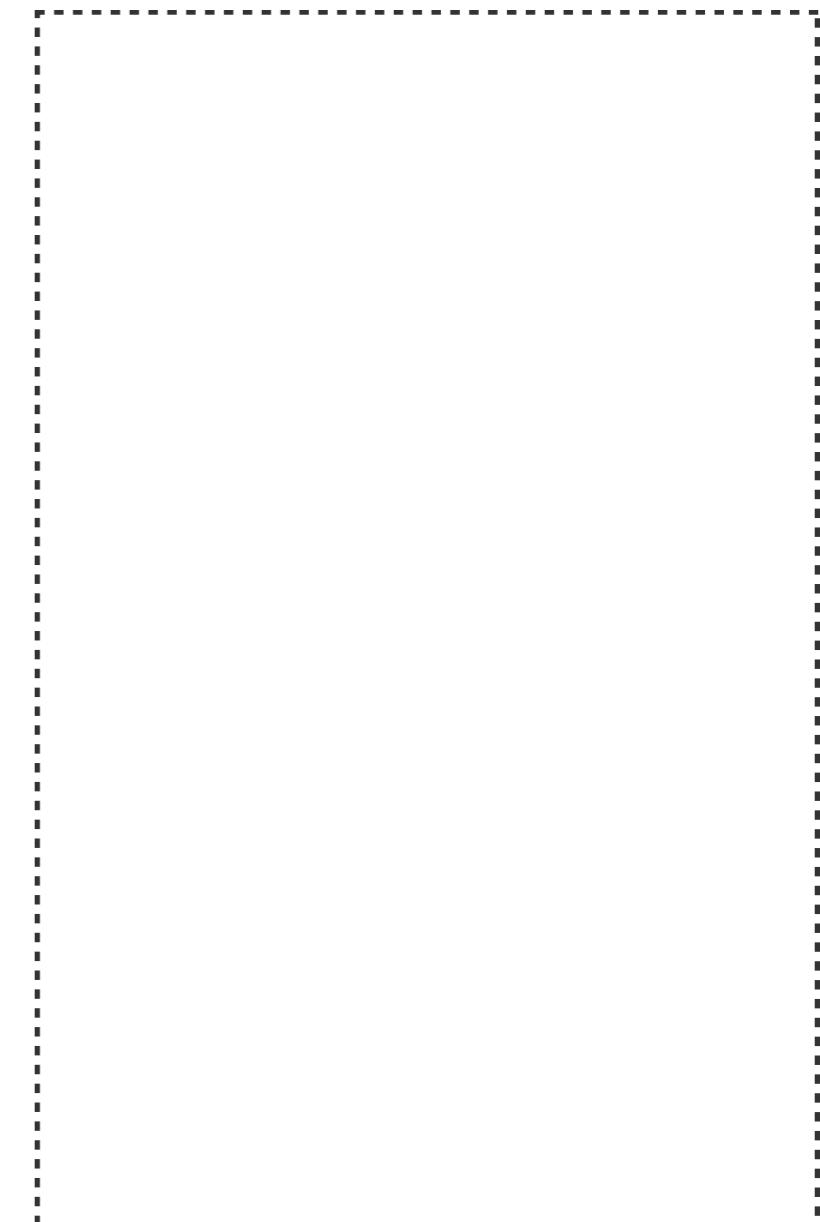
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Context

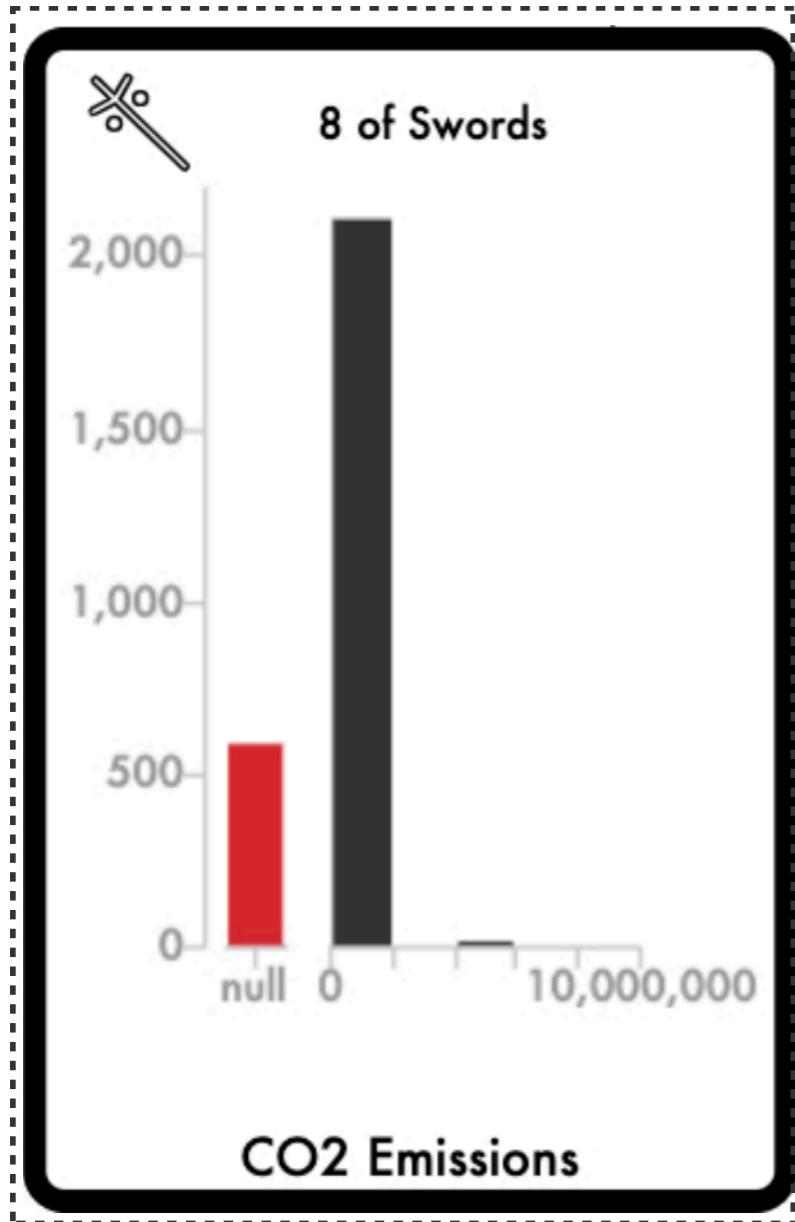


Hidden
Influences

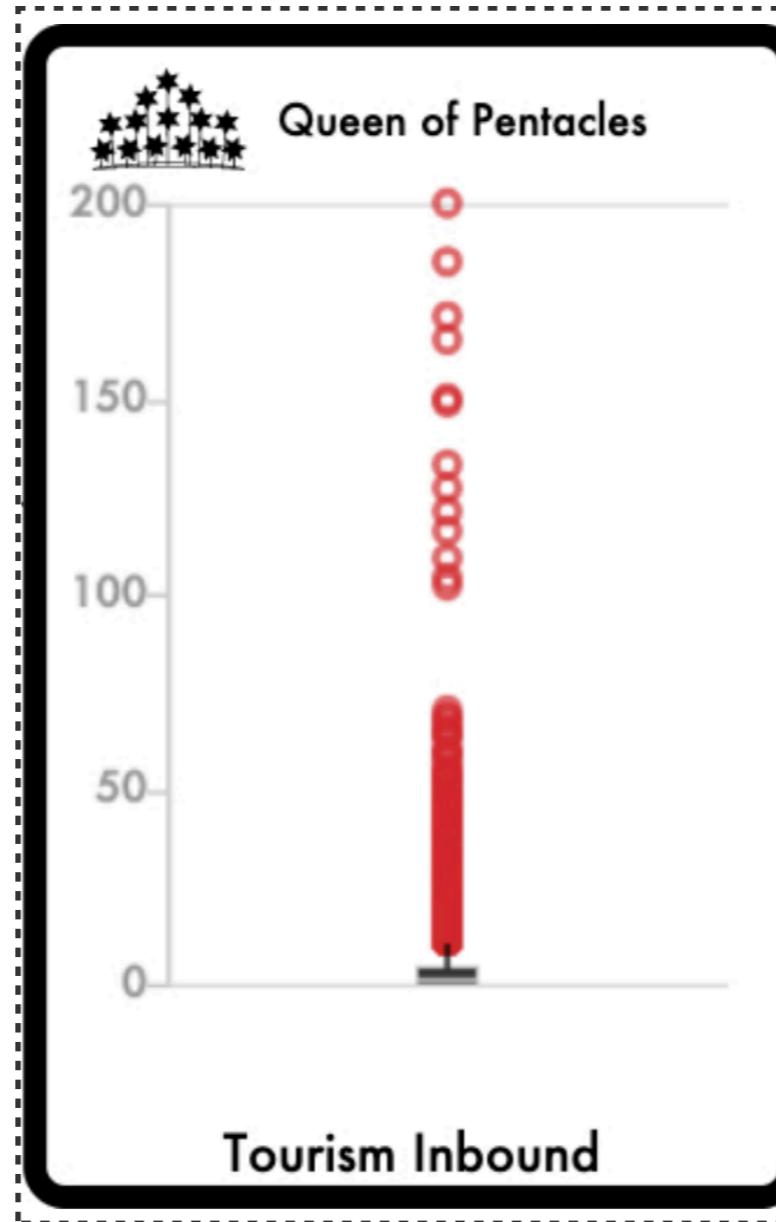


Advice

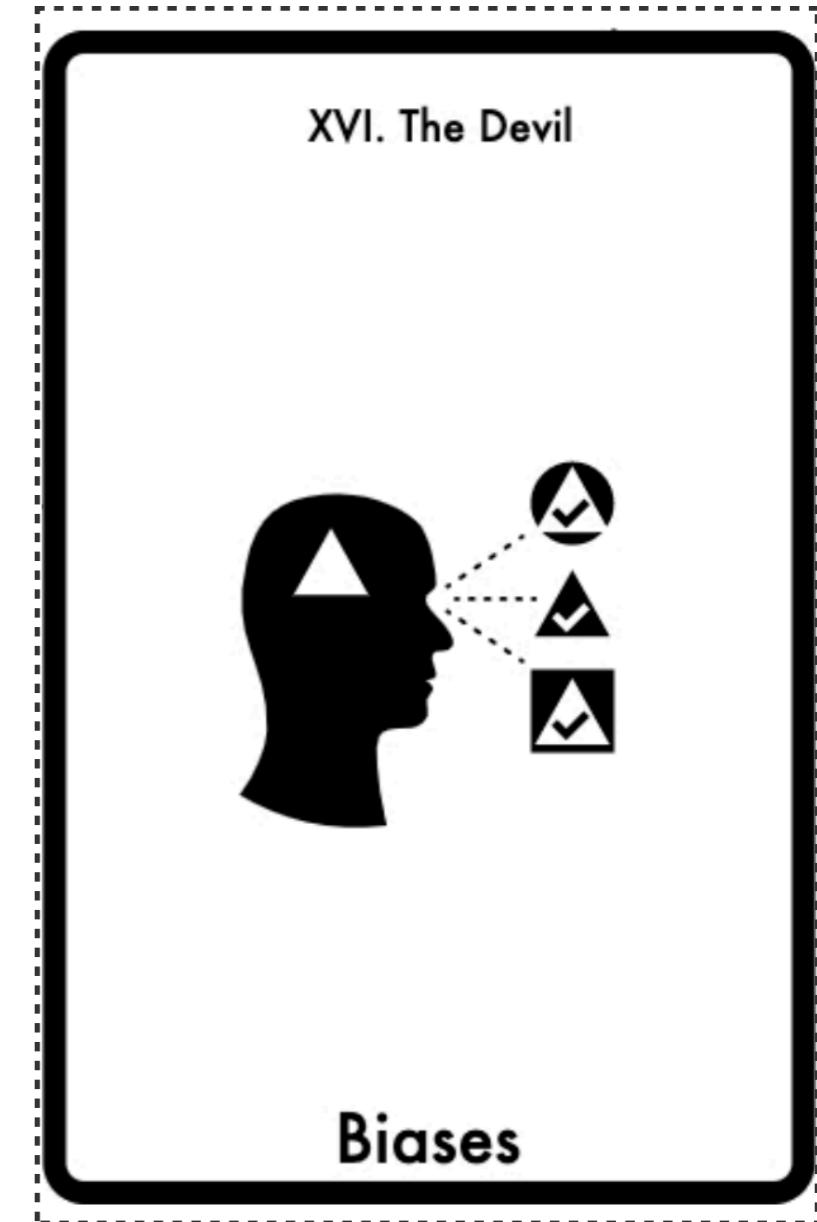
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Context



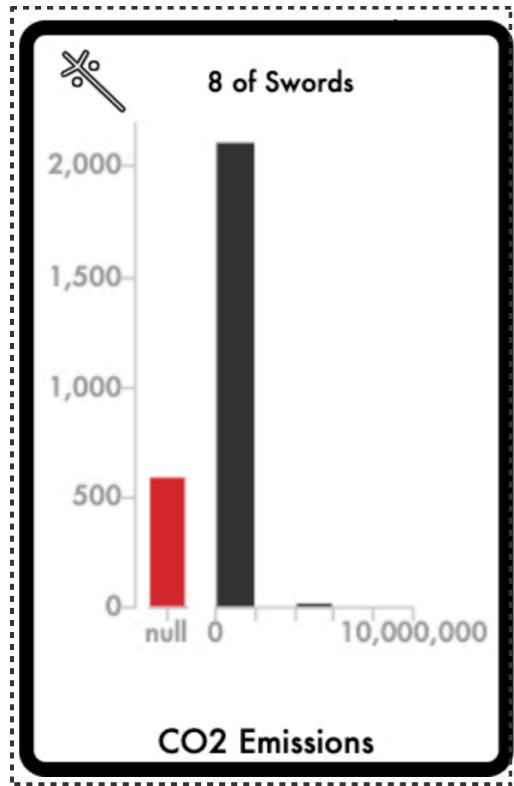
Hidden
Influences



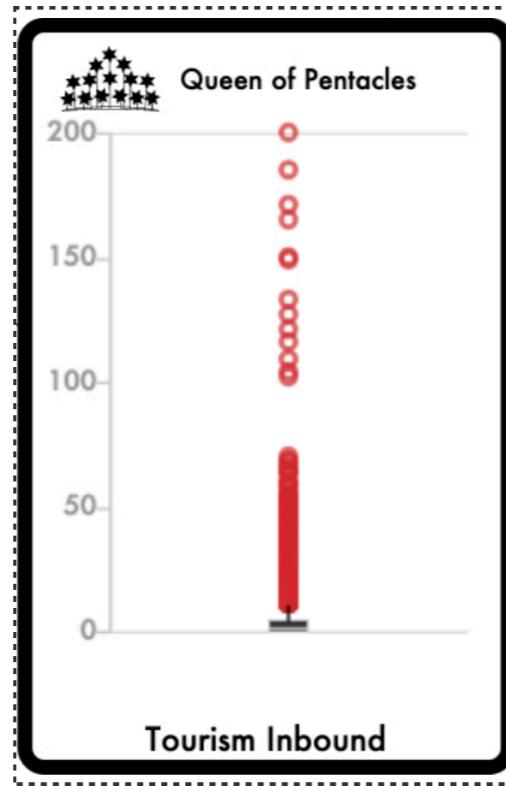
Biases

Advice

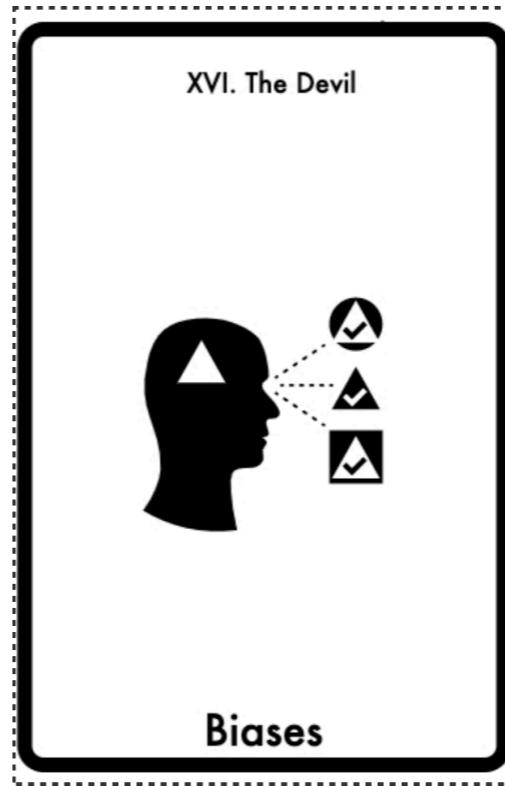
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Context



Hidden
Influences



Advice

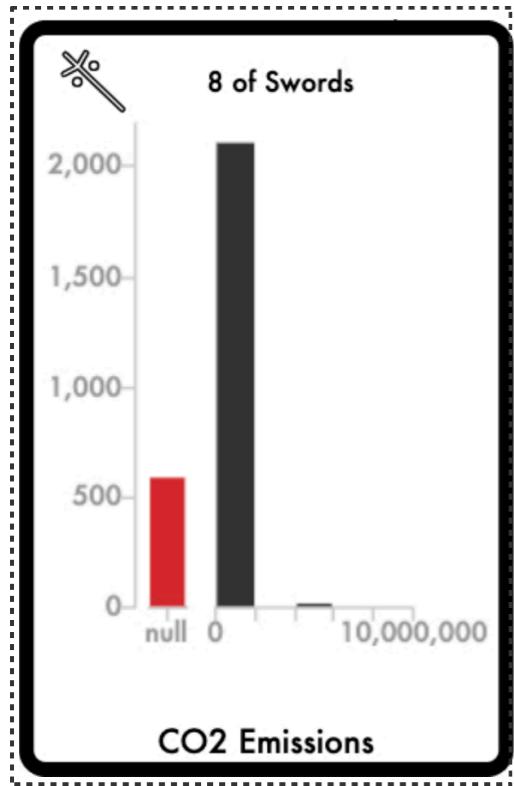
Questions remain

How bad are the data issues?

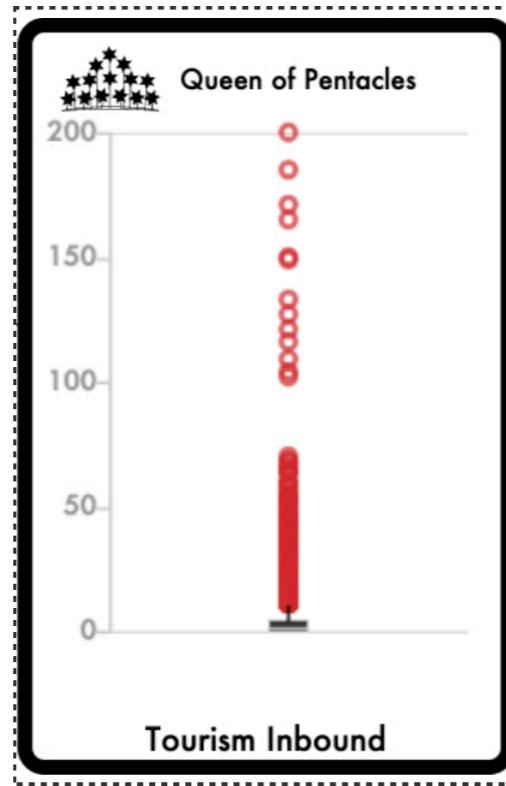
How bad has the data been skewed?

What is left unseen?

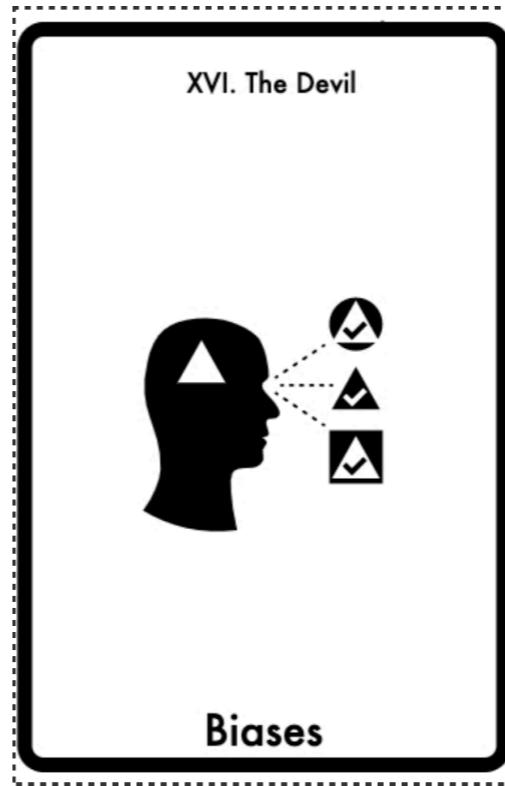
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Hidden
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What is left unseen?

Sortilège

Offers a safer black
box than existing
designs

Artificial Intelligence
Free

Physicalizable



Sortilège

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**Artificial Intelligence
Free**

Physicalizable



Sortilège

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Artificial Intelligence
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Physicalizable



a commentary

for

**One Weird Trick for
Data Science**

a conclusion

Divining Insights



**Don't blindly trust
automated analytics**



**Think more carefully
about the who-how-
and-why of your data**



**Question all of your
assumptions**



Divining Insights

Happy to take any questions



Find out more about this work at:

vis-tarot.github.io

Ask me internet questions



@_mcnutt_

