

Promises and Perils in Artificial Intelligence

and why you shouldn't trust anyone that uses the phrase Artificial Intelligence

Andreas Müller
Columbia University, scikit-learn



Alfred P. Sloan
FOUNDATION

 COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Promises and Perils in Artificial Intelligence

and why you shouldn't trust anyone that uses the phrase Artificial Intelligence

Andreas Müller
Columbia University, scikit-learn



Alfred P. Sloan
FOUNDATION

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Promises and Perils in Artificial Intelligence

and why you shouldn't trust anyone that uses the phrase Artificial Intelligence

Andreas Müller
Columbia University, scikit-learn



Alfred P. Sloan
FOUNDATION

 COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Promises and Perils in Artificial Intelligence

and why you shouldn't trust anyone that uses the phrase Artificial Intelligence

Andreas Müller
Columbia University, scikit-learn



Alfred P. Sloan
FOUNDATION

 COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Hope and Hype

What is Data Science?

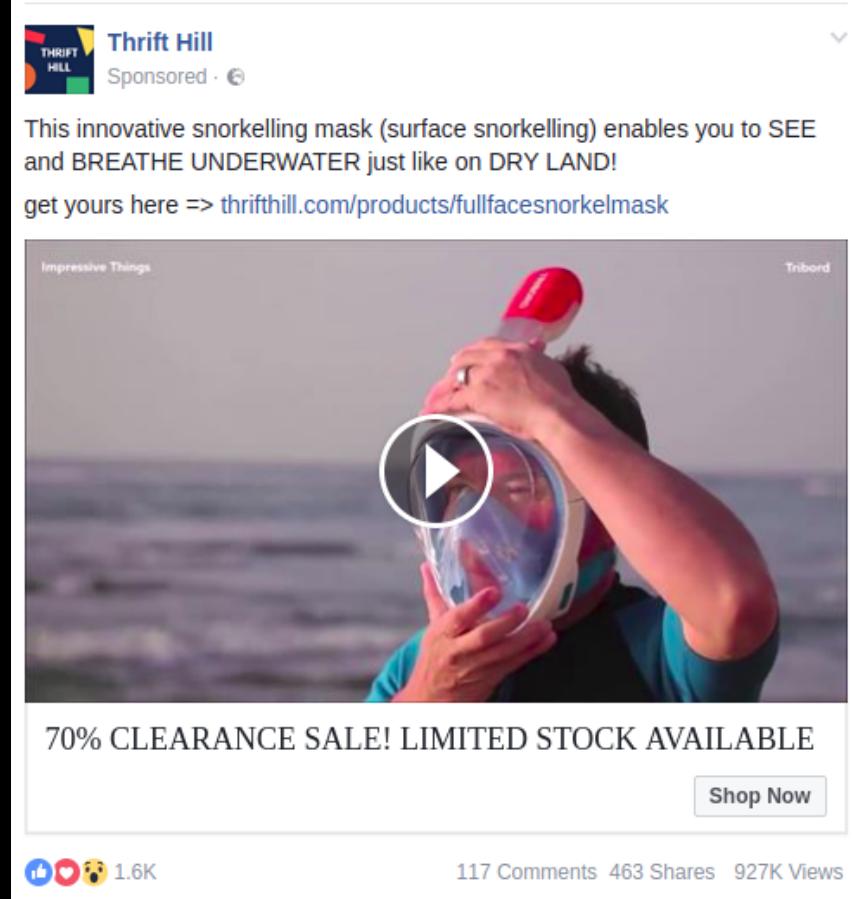
What is Data Science?

“The practice of, and methods for, reporting, inference, and decision making based on data.”

What is Machine Learning?

What is (supervised) Machine Learning?

“Extracting information from data to make predictions on new observations.”



Data Science

How many people clicked on this ad?
Are men more likely to click on this ad
than women?

Machine learning

Will Andy click on this ad given his history
of facebook activity, profile information,
and social network?

Generalization

Observe the past – predict for the future
Given examples: generalize the pattern

[Big data - Wikipedia](#)

https://en.wikipedia.org/wiki/Big_data ▾

Big data is a term for **data** sets that are so **large** or complex that traditional **data** processing application software is inadequate to deal with them. Challenges include capture, storage, analysis, **data** curation, search, sharing, transfer, visualization, querying, updating and information privacy.

[Big data - Wikipedia](#)

https://en.wikipedia.org/wiki/Big_data ▾

Big data is a term for **data** sets that are so **large** or complex that traditional **data** processing application software is inadequate to deal with them. Challenges include capture, storage, analysis, **data** curation, search, sharing, transfer, visualization, querying, updating and information privacy.

Data Science Definition | Investopedia

www.investopedia.com/terms/d/data-science.asp ▾

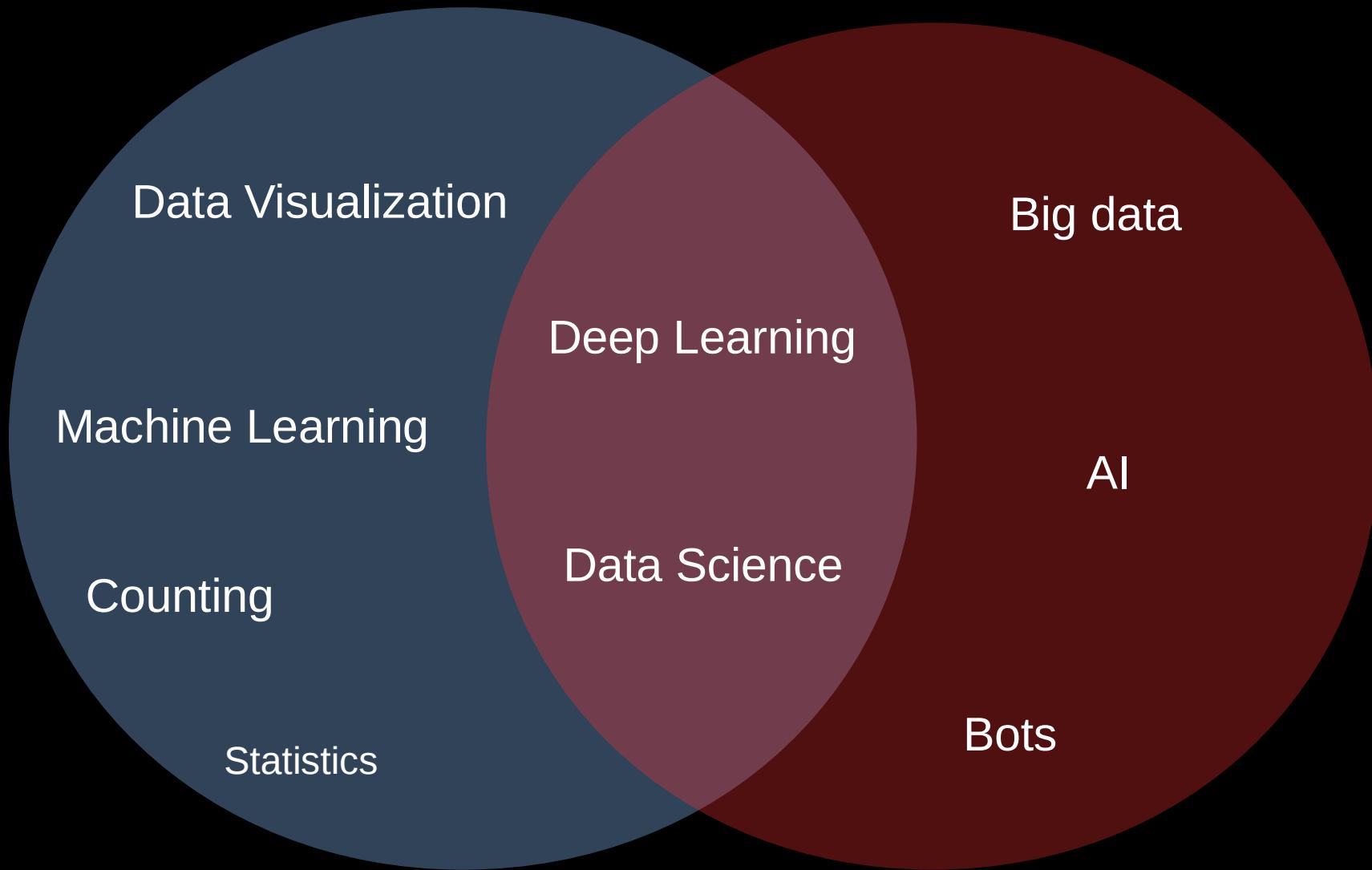
Data science is a field of Big Data which seeks to provide meaningful information from large amounts of complex data.

Artificial intelligence (AI) is [intelligence](#) exhibited by [machines](#). In [computer science](#), the field of AI research defines itself as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of success at some goal.^[1] Colloquially, the term "artificial intelligence" is applied when a machine mimics "cognitive" functions that humans associate with other [human minds](#), such as "learning" and "problem solving".^[2]

Artificial intelligence (AI) is [intelligence](#) exhibited by [machines](#). In [computer science](#), the field of AI research defines itself as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of success at some goal.^[1] Colloquially, the term "artificial intelligence" is applied when a machine mimics "cognitive" functions that humans associate with other [human minds](#), such as "learning" and "problem solving".^[2]

Hope

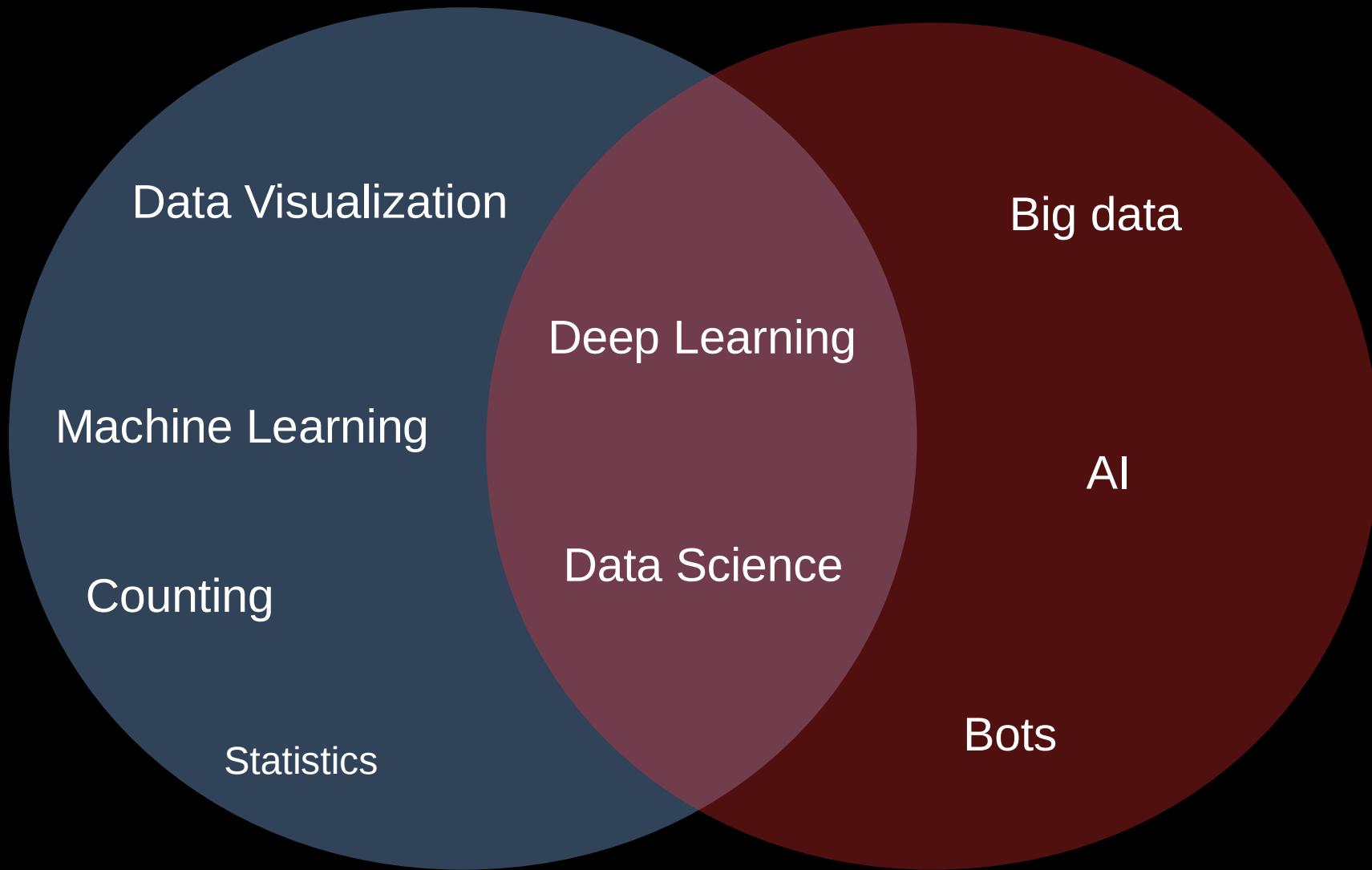
Hype





Hope

Hype



Where we are in ML

Ball Snake



Carpet Python



Ball Snake



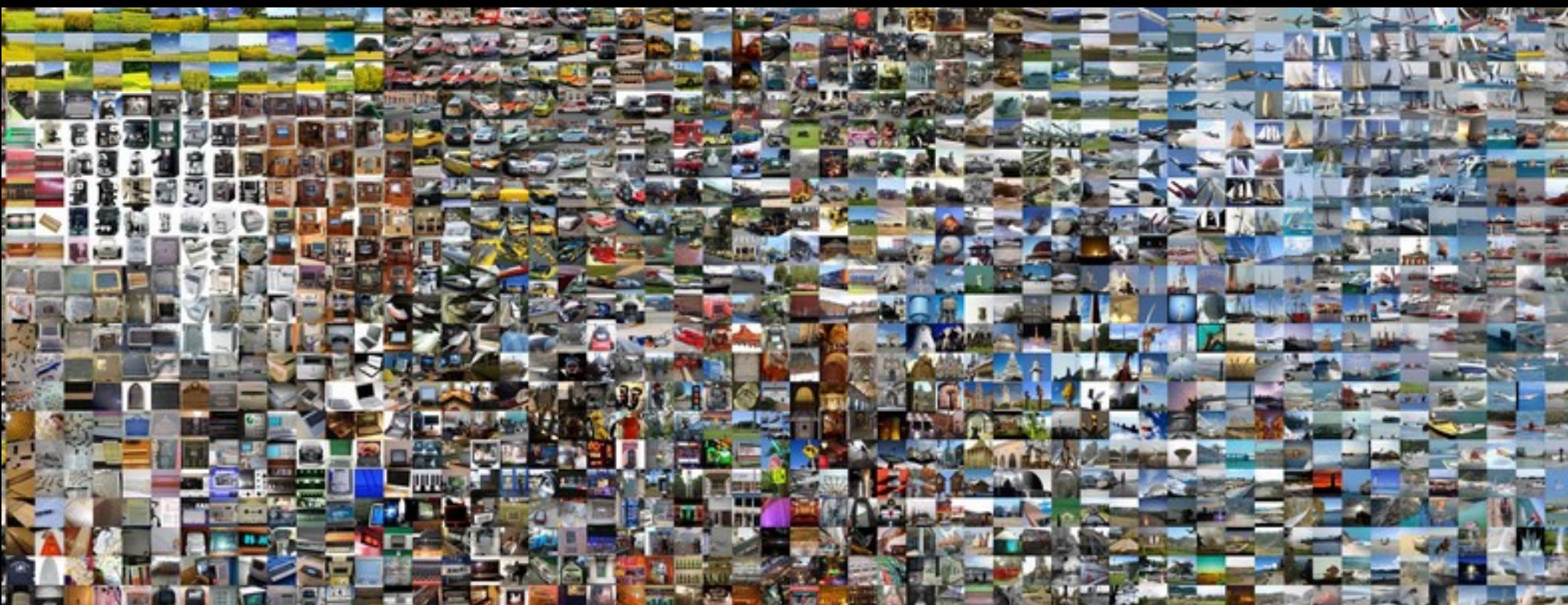
Carpet Python



x 1000



x 1000





The power of more data

The power of more data

Human learning vs machine learning

Structure is hard

Structure is hard



Knowledge is hard



Knowledge is hard



© Pete Souza / The White House

Classifying with many examples

Works in the real world,
sometimes superhuman

Generalizing to new concepts
using few examples

“works” in papers

Producing text or complex objects

“works” in papers

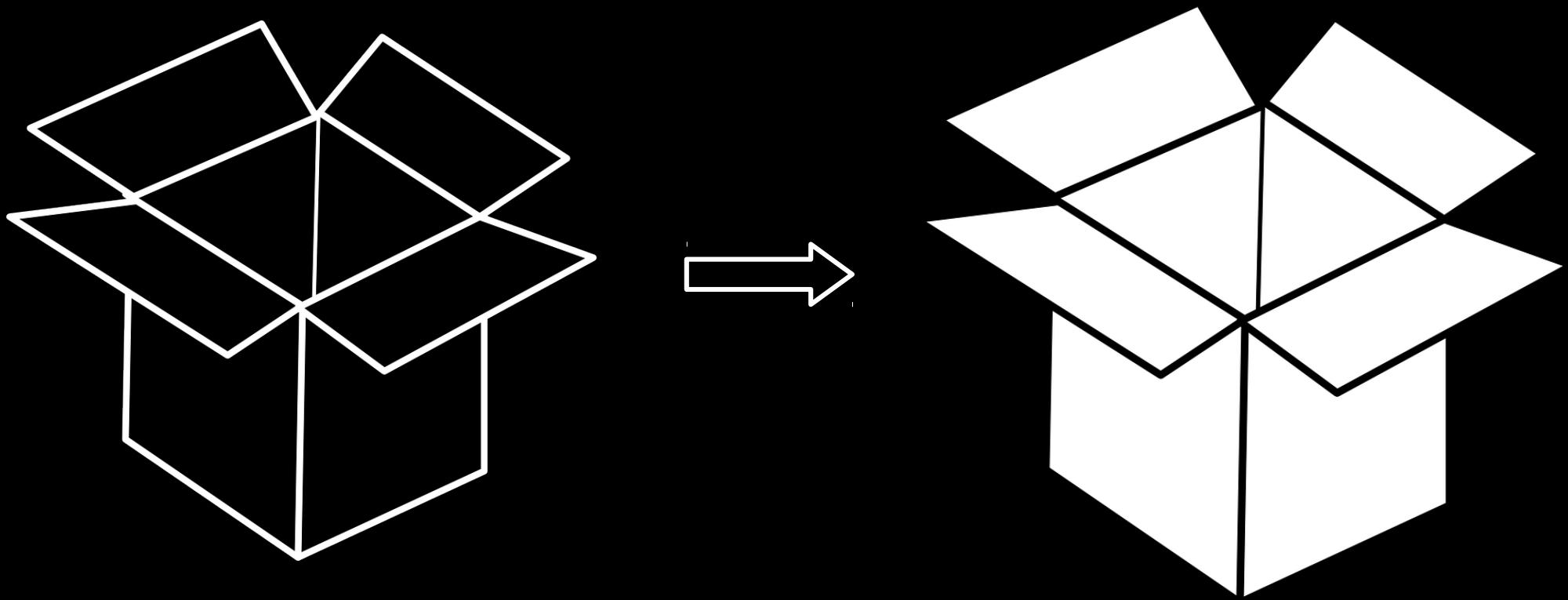
Reasoning with world-knowledge

no-one knows

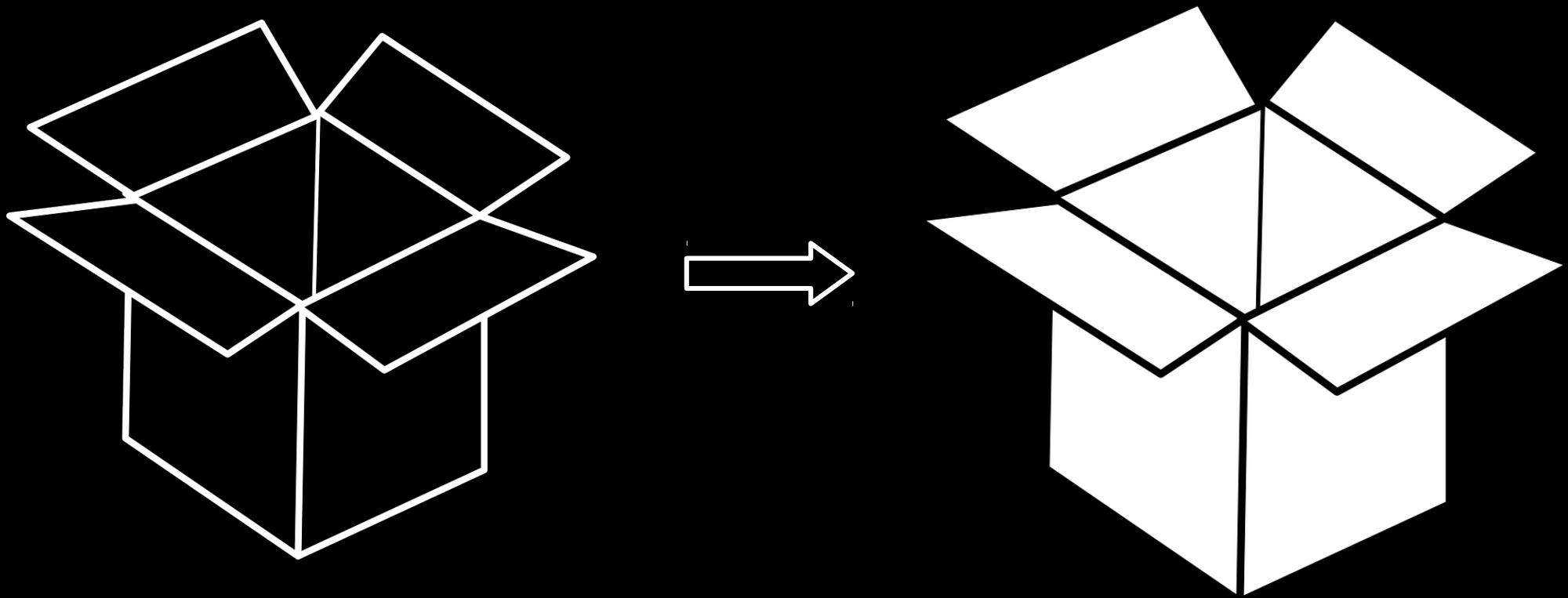
Where is ML? Everywhere!

Perils (in ML and counting)

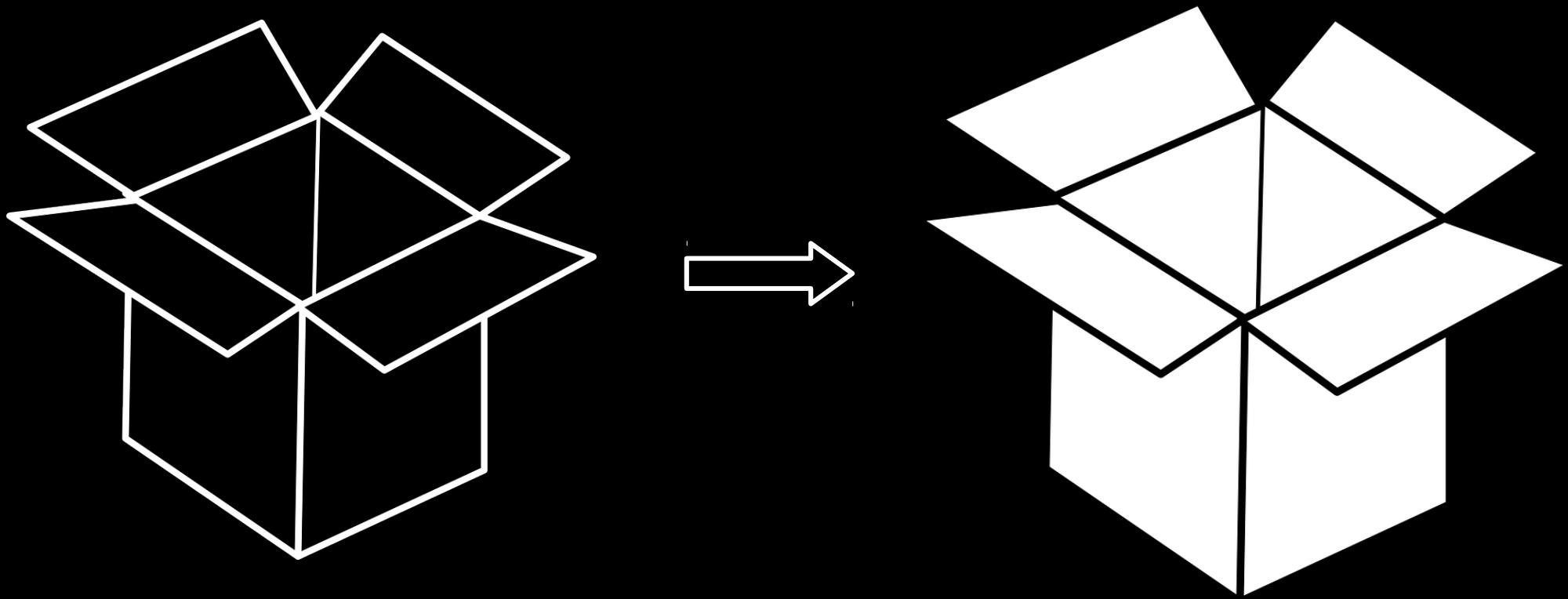
Interpretability / Understandability

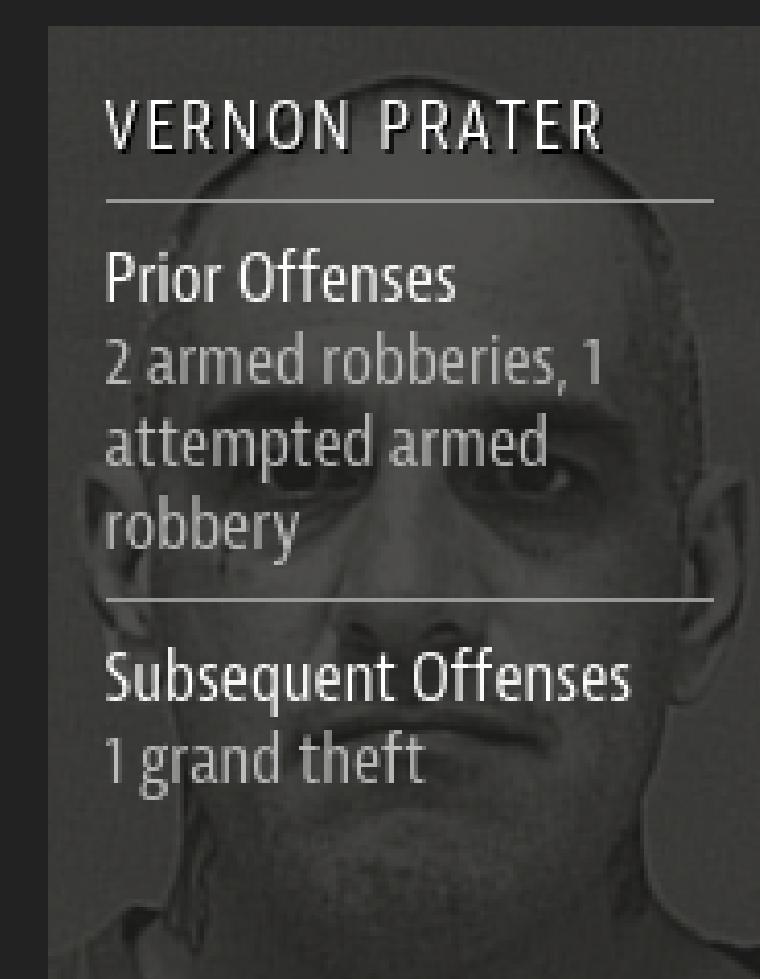


Interpretability / Understandability



Interpretability / Understandability





VERNON PRATER

Prior Offenses

2 armed robberies, 1
attempted armed
robbery

Subsequent Offenses

1 grand theft

LOW RISK

3



BRISHA BORDEN

Prior Offenses

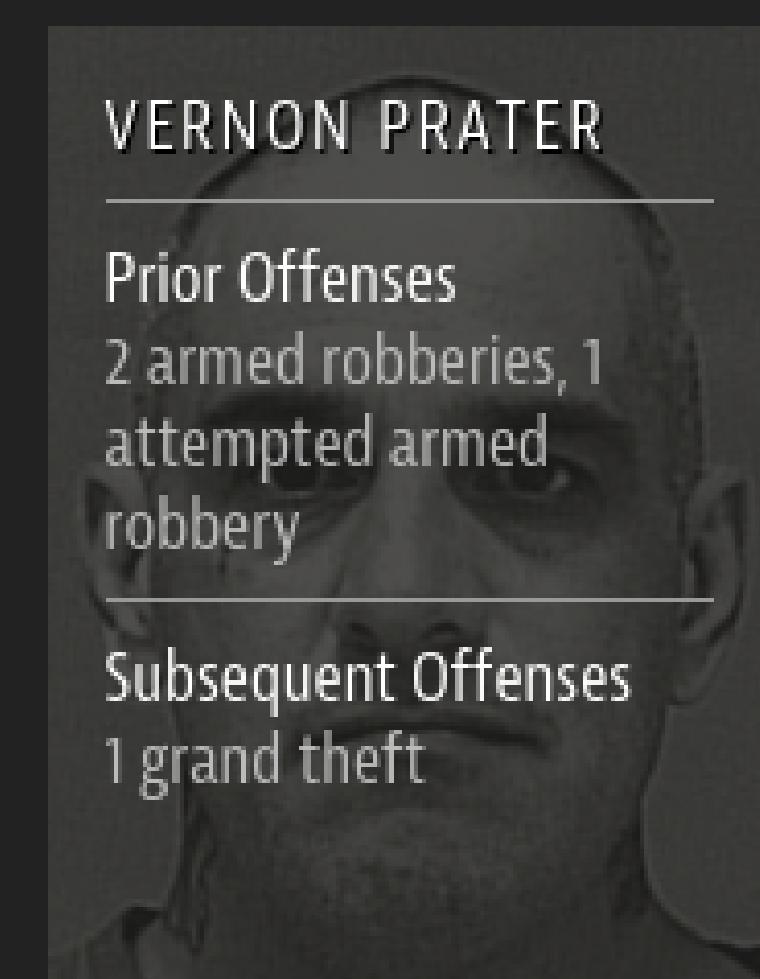
4 juvenile
misdemeanors

Subsequent Offenses

None

HIGH RISK

8



VERNON PRATER

Prior Offenses

2 armed robberies, 1
attempted armed
robbery

Subsequent Offenses

1 grand theft

LOW RISK

3



BRISHA BORDEN

Prior Offenses

4 juvenile
misdemeanors

Subsequent Offenses

None

HIGH RISK

8



Fairness, Accountability, and Transparency in Machine Learning

fatml.org

WHAT ARE
YOU
LOOKING AT?



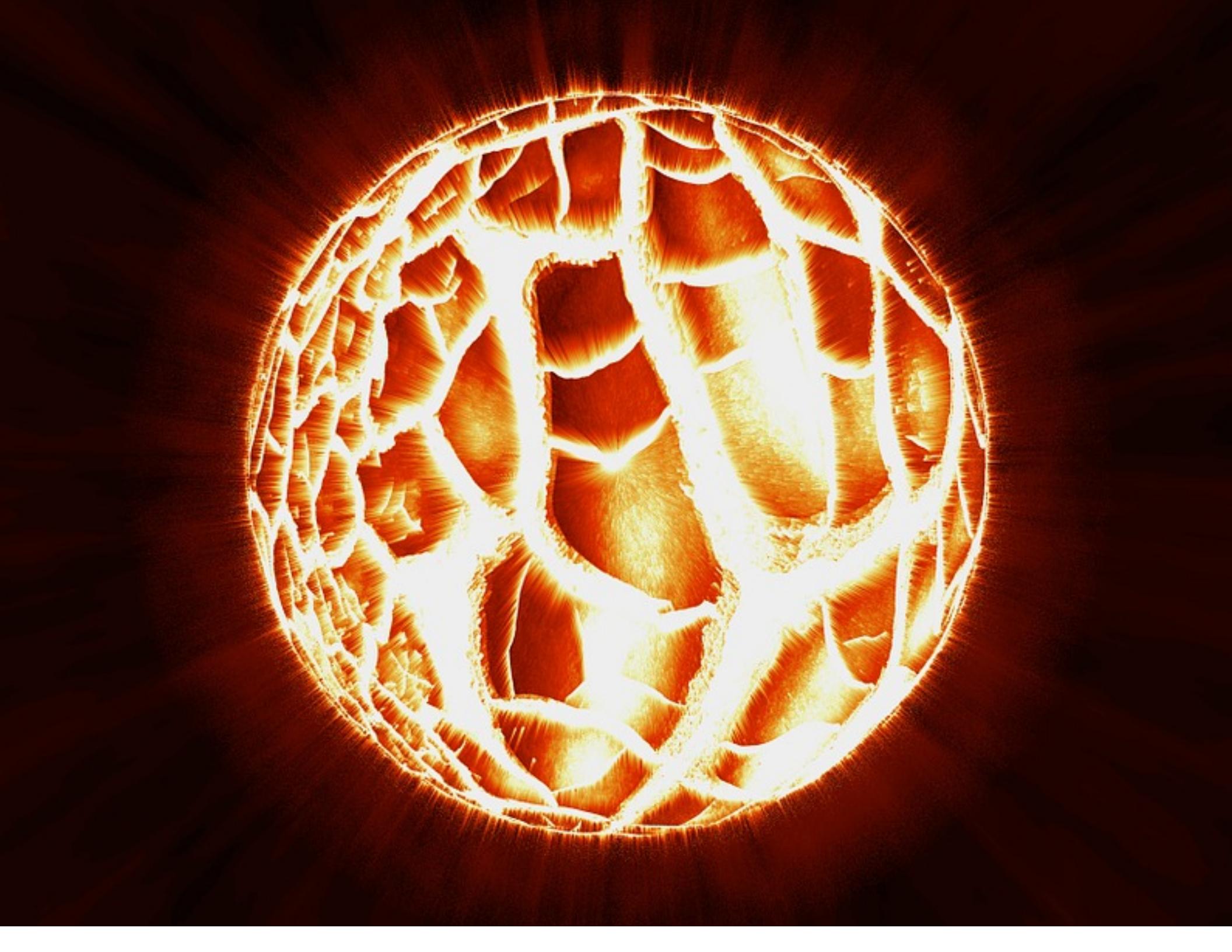
some optimism

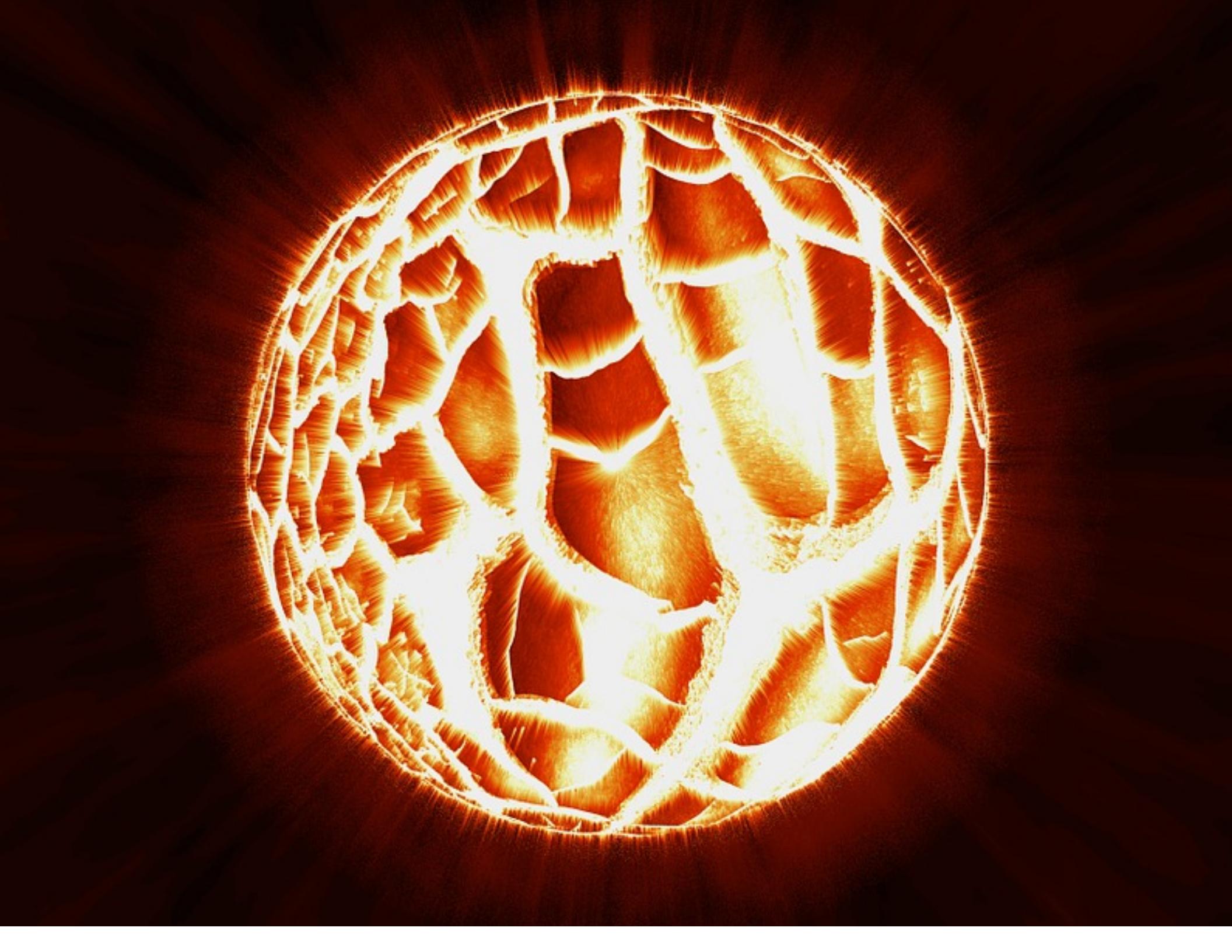
Where does Python (and scikit-learn fit in)?



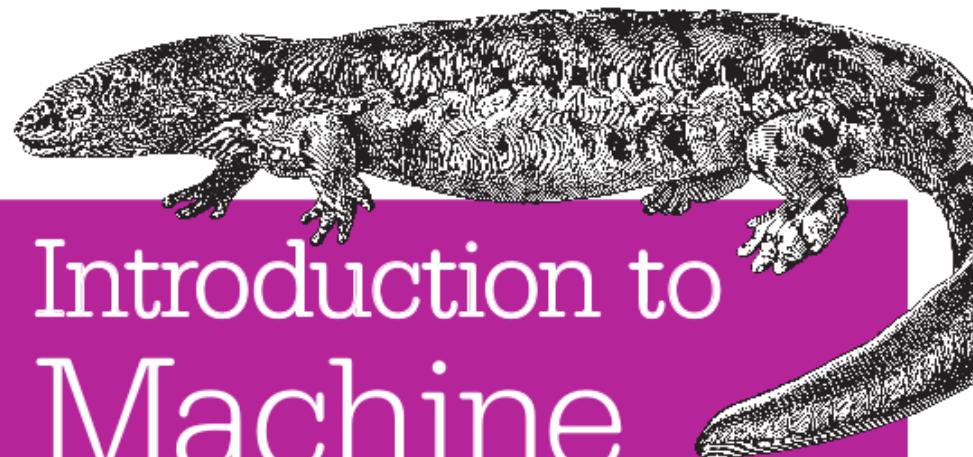
Where does Python (and scikit-learn fit in)?







O'REILLY®



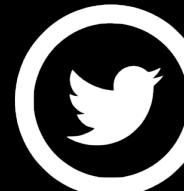
Introduction to Machine Learning with Python

A GUIDE FOR DATA SCIENTISTS

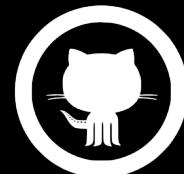
Andreas C. Müller & Sarah Guido



amueller.github.io



@amuellerml



@amueller



t3kcit@gmail.com

https://github.com/amueller/talks_odt/