

MACHINE LEARNING

FOR NEWSROOMS

Jonathan Soma
Columbia University
js4571@columbia.edu
[@dangerscarf](https://twitter.com/dangerscarf)

<https://bit.ly/djc-2022-ml>

MACHINE LEARNING: WHAT AND WHY?

<https://bit.ly/djc-2022-ml>

WHAT IS M.L.?

Machine learning

Artificial intelligence

Fancy statistics

Not-so-fancy statistics

Almost everything!

TWO USE CASES

ML for Business

Conversion rates

Article summaries

Content creation/article generation

ML for Investigations

Uncovering unusual data points

Finding bias

Doing large amounts of work, relatively quickly and easier

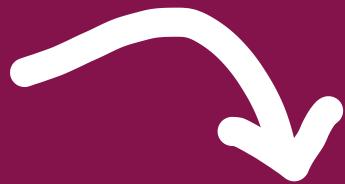
HOW M.L. WORKS

INPUT



MAGIC BOX OF
MACHINE
LEARNING!

OUTPUT

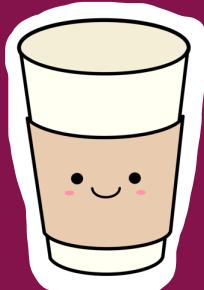


**BE A JOURNALIST,
NOT A
STATISTICIAN OR
DATA SCIENTIST**



+ tip

\$7



+ tip

\$12



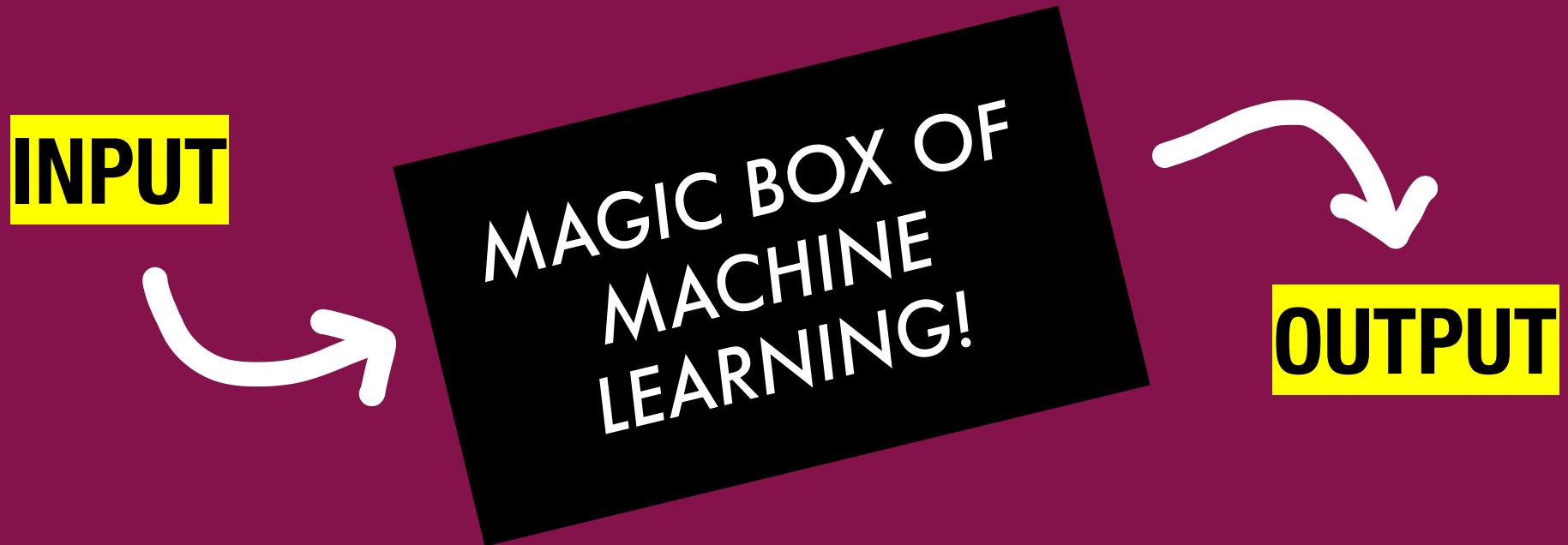
+ tip

\$15

“TRAINING” A “MODEL”

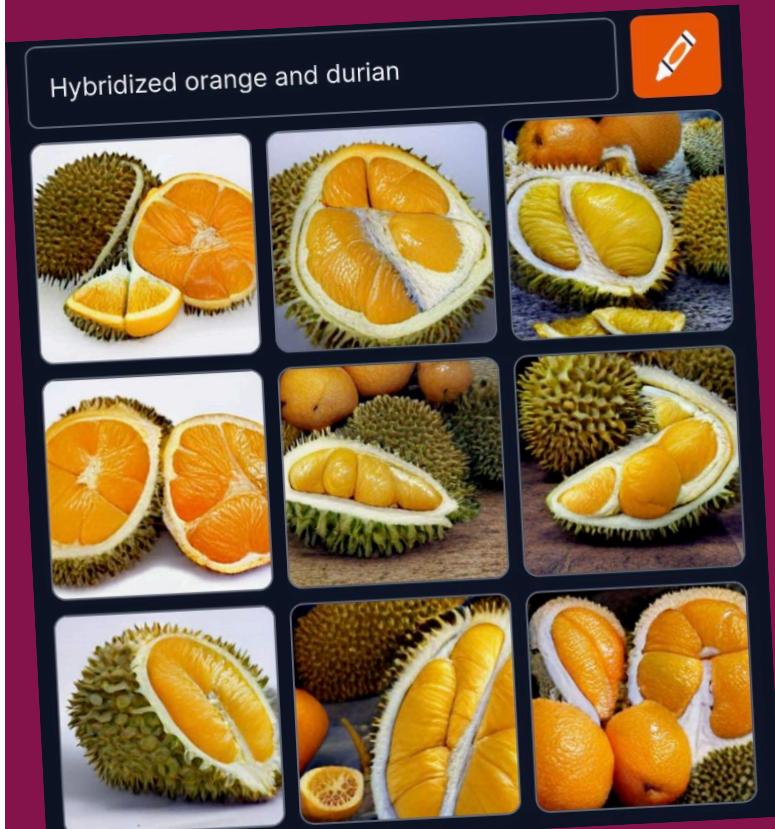


WHAT IS A “MODEL”?

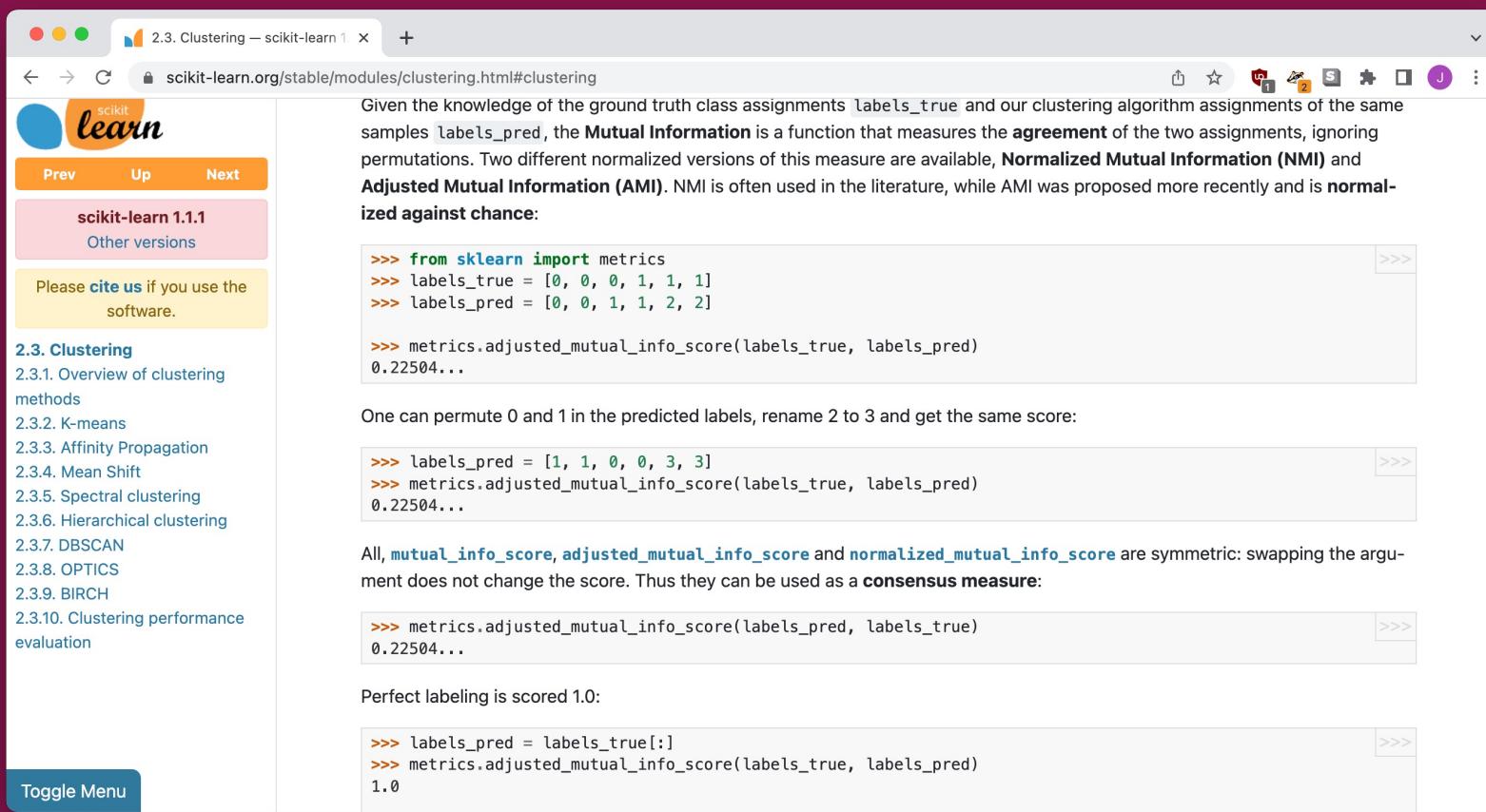


**IT'S NOT THE
TOOL, IT'S HOW
YOU USE IT.**

DALL-E, MIDJOURNEY



SKLEARN, TENSORFLOW



The screenshot shows a web browser displaying the scikit-learn documentation for clustering. The page title is "2.3. Clustering — scikit-learn 1". The left sidebar contains navigation links for "scikit-learn 1.1.1" and "Other versions", along with a note to "Please cite us if you use the software." The main content area discusses the Mutual Information metric, showing code examples for calculating it with different label permutations. It also notes the symmetry of the metric and perfect labeling.

Given the knowledge of the ground truth class assignments `labels_true` and our clustering algorithm assignments of the same samples `labels_pred`, the **Mutual Information** is a function that measures the **agreement** of the two assignments, ignoring permutations. Two different normalized versions of this measure are available, **Normalized Mutual Information (NMI)** and **Adjusted Mutual Information (AMI)**. NMI is often used in the literature, while AMI was proposed more recently and is **normalized against chance**:

```
>>> from sklearn import metrics
>>> labels_true = [0, 0, 0, 1, 1, 1]
>>> labels_pred = [0, 0, 1, 1, 2, 2]

>>> metrics.adjusted_mutual_info_score(labels_true, labels_pred)
0.22504...
```

One can permute 0 and 1 in the predicted labels, rename 2 to 3 and get the same score:

```
>>> labels_pred = [1, 1, 0, 0, 3, 3]
>>> metrics.adjusted_mutual_info_score(labels_true, labels_pred)
0.22504...
```

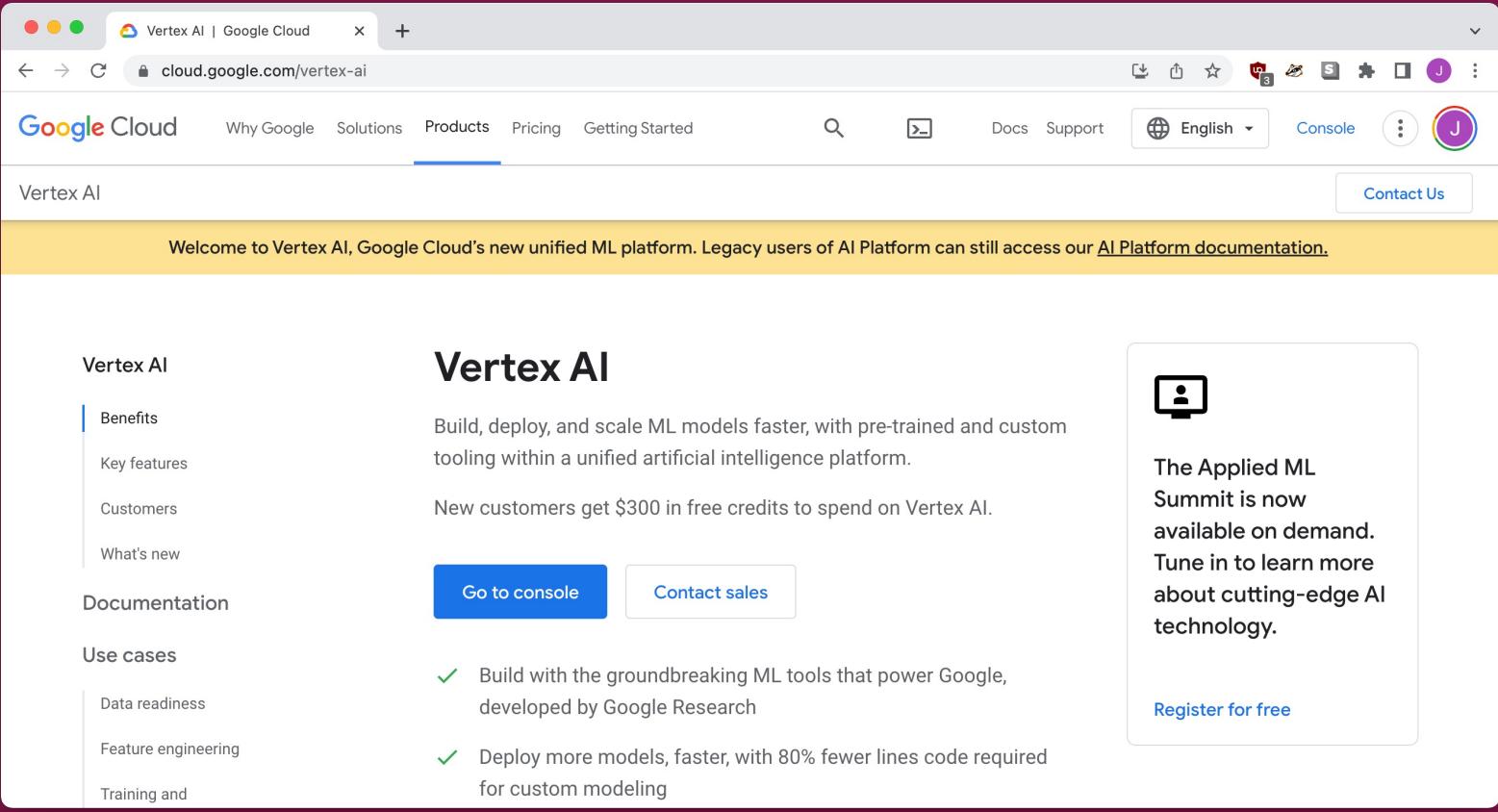
All, `mutual_info_score`, `adjusted_mutual_info_score` and `normalized_mutual_info_score` are symmetric: swapping the argument does not change the score. Thus they can be used as a **consensus measure**:

```
>>> metrics.adjusted_mutual_info_score(labels_pred, labels_true)
0.22504...
```

Perfect labeling is scored 1.0:

```
>>> labels_pred = labels_true[:]
>>> metrics.adjusted_mutual_info_score(labels_true, labels_pred)
1.0
```

REFINERY, VERTEX AI, ETC...



A screenshot of a web browser displaying the Vertex AI page on Google Cloud. The URL in the address bar is `cloud.google.com/vertex-ai`. The page features a navigation bar with links for Google Cloud, Why Google, Solutions, Products (which is underlined), Pricing, Getting Started, Docs, Support, English, Console, and a user profile icon. A yellow banner at the top says "Welcome to Vertex AI, Google Cloud's new unified ML platform. Legacy users of AI Platform can still access our [AI Platform documentation](#)." On the left, there's a sidebar with sections for Vertex AI (Benefits, Key features, Customers, What's new), Documentation, and Use cases (Data readiness, Feature engineering, Training and). The main content area has a title "Vertex AI" and text about building, deploying, and scaling ML models faster. It also mentions new customers getting \$300 in free credits. Below this are two buttons: "Go to console" (blue) and "Contact sales" (white). To the right, there's a callout box with a person icon and text about the Applied ML Summit being available on demand, with a "Register for free" button.

Welcome to Vertex AI, Google Cloud's new unified ML platform. Legacy users of AI Platform can still access our [AI Platform documentation](#).

Vertex AI

Benefits

Key features

Customers

What's new

Documentation

Use cases

Data readiness

Feature engineering

Training and

Vertex AI

Build, deploy, and scale ML models faster, with pre-trained and custom tooling within a unified artificial intelligence platform.

New customers get \$300 in free credits to spend on Vertex AI.

Go to console

Contact sales

✓ Build with the groundbreaking ML tools that power Google, developed by Google Research

✓ Deploy more models, faster, with 80% fewer lines code required for custom modeling

The Applied ML Summit is now available on demand. Tune in to learn more about cutting-edge AI technology.

Register for free

CAUTION: THE
MACHINE ONLY
REPRODUCES
WHAT IT'S SEEN.

RESUME SCREENER

A screenshot of a web browser displaying an article from Popular Mechanics. The title of the article is "Amazon Fired Its Resume-Reading AI for Sexism". The article discusses the risks of training artificial intelligence on biased data. The author is David Grossman, and the date is OCT 10, 2018. The image shows an office environment with several people working at their desks.

Amazon Fired Its Resume-Reading AI for Sexism

Now abandoned, the project shows the risks of training artificial intelligence on biased data.

BY DAVID GROSSMAN OCT 10, 2018



“BIAS LAUNDERING”

A screenshot of a web browser displaying an article from MIT Technology Review. The article title is "Predictive policing algorithms are racist. They need to be dismantled." by Will Douglas Heaven, published on July 17, 2020. The page has a dark blue background with white text. The browser's address bar shows the URL: technologyreview.com/2020/07/17/1005396/predictive-policing-algorithms-racist-dismantled-mac... . The browser interface includes standard controls like back, forward, and search, along with a tab labeled "Predictive policing algorithms".

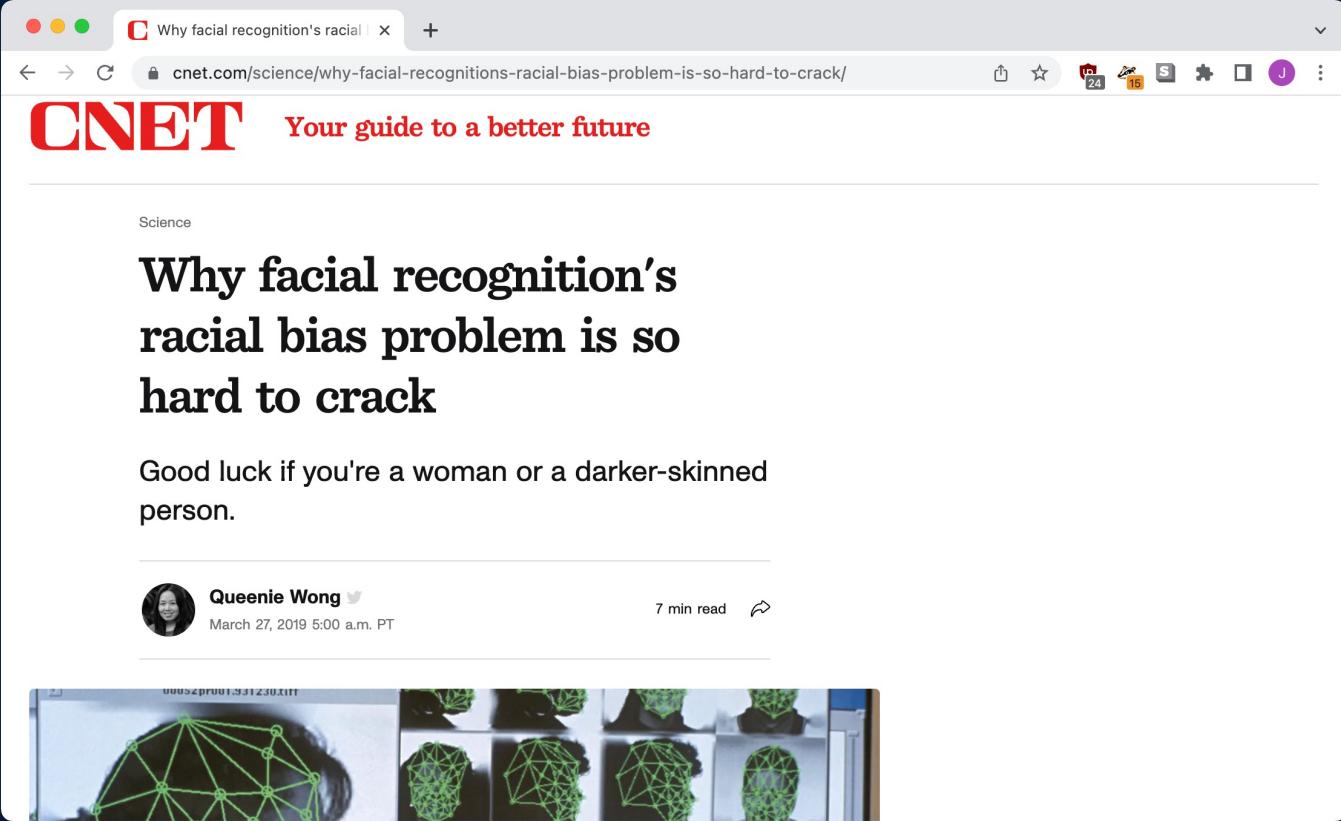
Predictive policing algorithms are racist. They need to be dismantled.

Lack of transparency and biased training data mean these tools are not fit for purpose. If we can't fix them, we should ditch them.

By Will Douglas Heaven

July 17, 2020

IS YOUR DATA COMPLETE?



A screenshot of a web browser displaying a CNET article. The title of the article is "Why facial recognition's racial bias problem is so hard to crack". The author is Queenie Wong, and the article was published on March 27, 2019, at 5:00 a.m. PT. The estimated reading time is 7 minutes. Below the article title, there is a small thumbnail image showing several faces with green wireframe overlays, likely illustrating the facial recognition process.

Why facial recognition's racial bias problem is so hard to crack

Good luck if you're a woman or a darker-skinned person.

Queenie Wong  March 27, 2019 5:00 a.m. PT 7 min read 



WHERE'S YOUR DATA FROM?

		content	textblob	textblob_bayes	nltk
0		I love love love love this kitten	0.5	-0.0879325	0.9571
1		I hate hate hate hate this keyboard	-0.8	-0.214151	-0.9413
2		I'm not sure how I feel about toast	-0.25	0.394659	-0.2411
3		Did you see the baseball game yesterday?	-0.4	0.61305	0
4		The package was delivered late and the contents were broken	-0.35	-0.57427	-0.4767
5		Trashy television shows are some of my favorites	0	0.0400757	0.4215
6		I'm seeing a Kubrick film tomorrow, I hear not so great things about it.	0.8	0.717875	-0.6296
7		I find chirping birds irritating, but I know I'm not the only one	-0.2	0.257148	-0.25

“TESTING” YOUR MODEL

The screenshot shows a web browser window with the URL buzzfeednews.com/article/peteraldhous/hidden-spy-planes. The page title is "We Trained A Computer To See". The main content is a 2x2 grid table comparing predicted surveillance status against actual surveillance status.

	Predicted not surveil	Predicted surveil
Is not surveil	120	4
Is surveil	2	24

Below the table, the text reads: "A secret spy plane operated by the US Marshals hunted drug cartel kingpins in Mexico. A military contractor that tracks terrorists in Africa is also flying surveillance aircraft over US cities. In two".

Small icons for Twitter, Facebook, and a link are visible, along with a "Be one of the first to comment" button. The post was updated on August 8, 2017 at 10:47 am and posted on August 7, 2017 at 12:33 pm.

“TESTING” YOUR MODEL



	Predicted negative	Predicted positive
Is negative	0.944704	0.169266
Is positive	0.121842	0.627031

night in February 2013 because she hadn't bought him a Valentine's Day gift. He beat and choked her before stabbing her in the face with a screwdriver and throwing her down a flight of stairs at their apartment in South L.A., according to police and court records.

Hunter, 55, was convicted of felony spousal abuse and sentenced to six

IMAGE
Mike Davis is still a damn good storyteller

CALIFORNIA
California drought official quits, blasting Newsom for ‘gut wrenching’ inaction

**LET'S PRODUCE
SOME STORIES!**

FINDING UNUSUAL DATA

Does reality match what you'd expect?

1. Collect your data
2. Train your model
3. Make predictions: what outcomes doesn't match?

FINDING BIAS

What *really* affects an outcome?

1. Find a situation where the outcome might be biased
2. Decide what might affect the outcome
3. Collect your data
4. Train your model
5. What inputs are most important to the outcome?

AUTOMATING WORKFLOWS

Tell the computer: “do what I just did, but faster”

1. Collect the data you'd like to organize or sort
2. Label some of the items
3. Train your model
4. Predict labels for the unlabeled data