A2 FAQ, Plotting, Text

Learning goals:

- **Go over commonly asked questions for A2.**
- **Understand how common Python plotting libraries relate with each other.**
- **Understand the basics of manipulating text in pandas.**

COGS 108 Fall 2019
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Discussion 6

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OH: Wed 10-11a in SSRB 100

PS: Sam will be giving a 108 lecture on Nov 12 :)

How do I get the latest version of pandas?

- **Select this course environment: COGS108_FA19_A00: ucsdets/datascience-notebook:2019.4.7**
- **Old environment ends in “4-stable” instead of “4.7”.**

New ->

COGS108_FA19_A00: ucsdets/datascience-notebook:2019.4.7 (2 CPU, 4G RAM)
Python 3, nbgrader, nbgitpuller

Old ->

COGS108_FA19_A00: ucsdets/datascience-notebook:2019.4-stable (2 CPU, 4G RAM)
Python 3, nbgrader, nbgitpuller

A2 Recap

Question 1f: merging DataFrames

- df_steps has 11k rows, df_income has 12k rows, but merging the two gets 9k rows. Why?
- Goal: Get you to understand how merging works in pandas.
- Default in pandas is to drop rows without matching values!
  - This is a very easy way to mess up your data.
- Answer: Some id values were missing in the other DF.

Inner join vs. Left join

Inner joins drop all rows without a matching value.

Left joins keep all rows in the left table, even if values do not have a match.

Email	Name
sam@ucsd.edu	Sam
jen@ucsd.edu	Jen
kay@ucsd.edu	Kay
min@ucsd.edu	Min

Email	Order
jen@ucsd.edu	Keyboard
sam@ucsd.edu	Mouse
kay@ucsd.edu	Cable
wade@ucsd.ed	Lamp

Inner join:

Email	Name	Order
sam@ucsd.edu	Sam	Mouse
jen@ucsd.edu	Jen	Keyboard
kay@ucsd.edu	Kay	Cable

Left join:

Email	Name	Order
sam@ucsd.edu	Sam	Mouse
jen@ucsd.edu	Jen	Keyboard
kay@ucsd.edu	Kay	Cable
min@ucsd.edu	Min	NULL

Question 4a: counting -1

- How to count number of rows that have -1 in steps column?
- Simplest method: keep only rows that have -1 in steps, then count how many rows:

```
len(df[df['steps'] == -1])
```

- Or, create boolean Series and count number of Trues:

```
sum(df['steps'] == -1)
```

Question 5c: Correlations

- **Values in correlation table are correlations between pairs of variables.**
- **Most correlated = correlation furthest away from 0. Not always the most positive value!**
- **Most correlated with age? Steps**
- **Most correlated with income? Age**

	id	age	steps	income	income10
id	1.00e+00	-6.85e-03	5.56e-03	-0.03	-7.75e-03
age	-6.85e-03	1.00e+00	-2.82e-01	0.27	1.03e-01
steps	5.56e-03	-2.82e-01	1.00e+00	0.05	2.78e-02
income	-2.57e-02	2.67e-01	5.11e-02	1.00	4.70e-01
income10	-7.75e-03	1.03e-01	2.78e-02	0.47	1.00e+00

Plotting

Why are there so many ways to make the same plot?

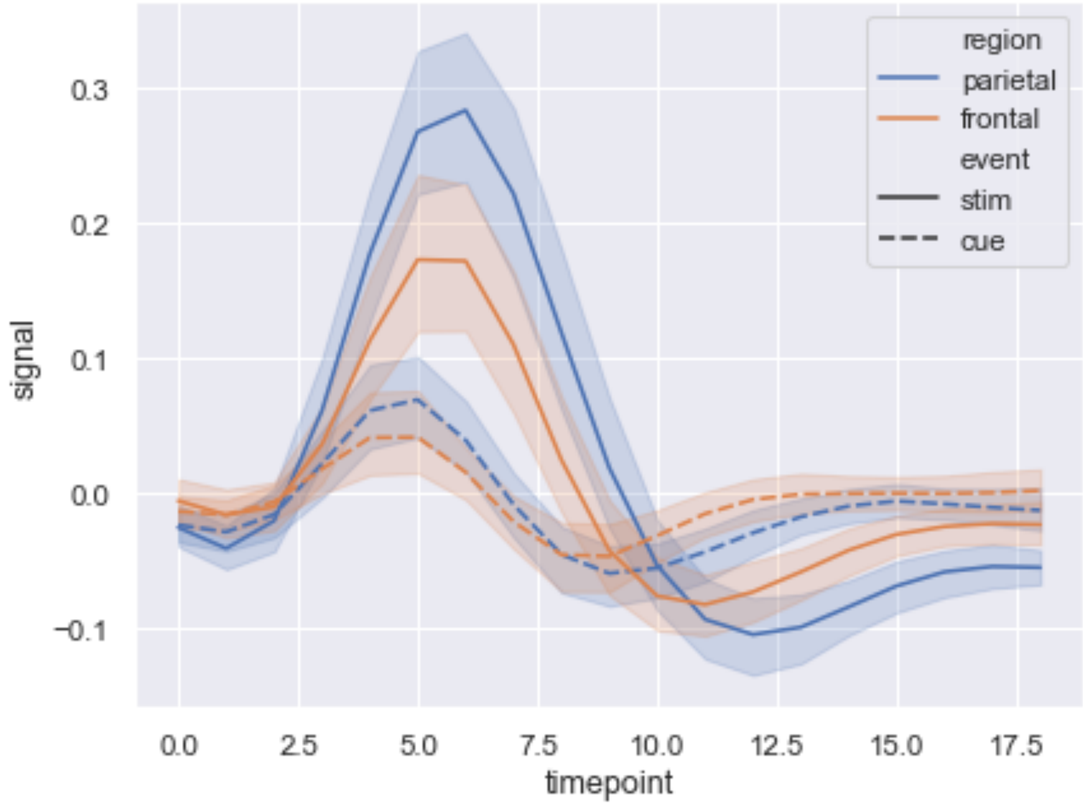
- **All of these do the same thing:**

```
plt.hist(df['income10'], 25)
df['income10'].hist(bins=25)
df.hist('income10', bins=25)
```

- **In Python, most image-based plots created using Matplotlib.**
  - **`plt.hist`, `plt.bar`, `plt.plot`, etc.**
- **Pandas gives shortcuts for matplotlib plots. Lines 2 and 3 are shortcuts for line 1.**

Seaborn

- **My personal favorite is the seaborn library.**
- **Makes common statistical charts easy to create, like bar plots with confidence intervals.**
- **Again, seaborn is really just a bunch of shortcuts for matplotlib.**



https://seaborn.pydata.org/tutorial.html

For more details

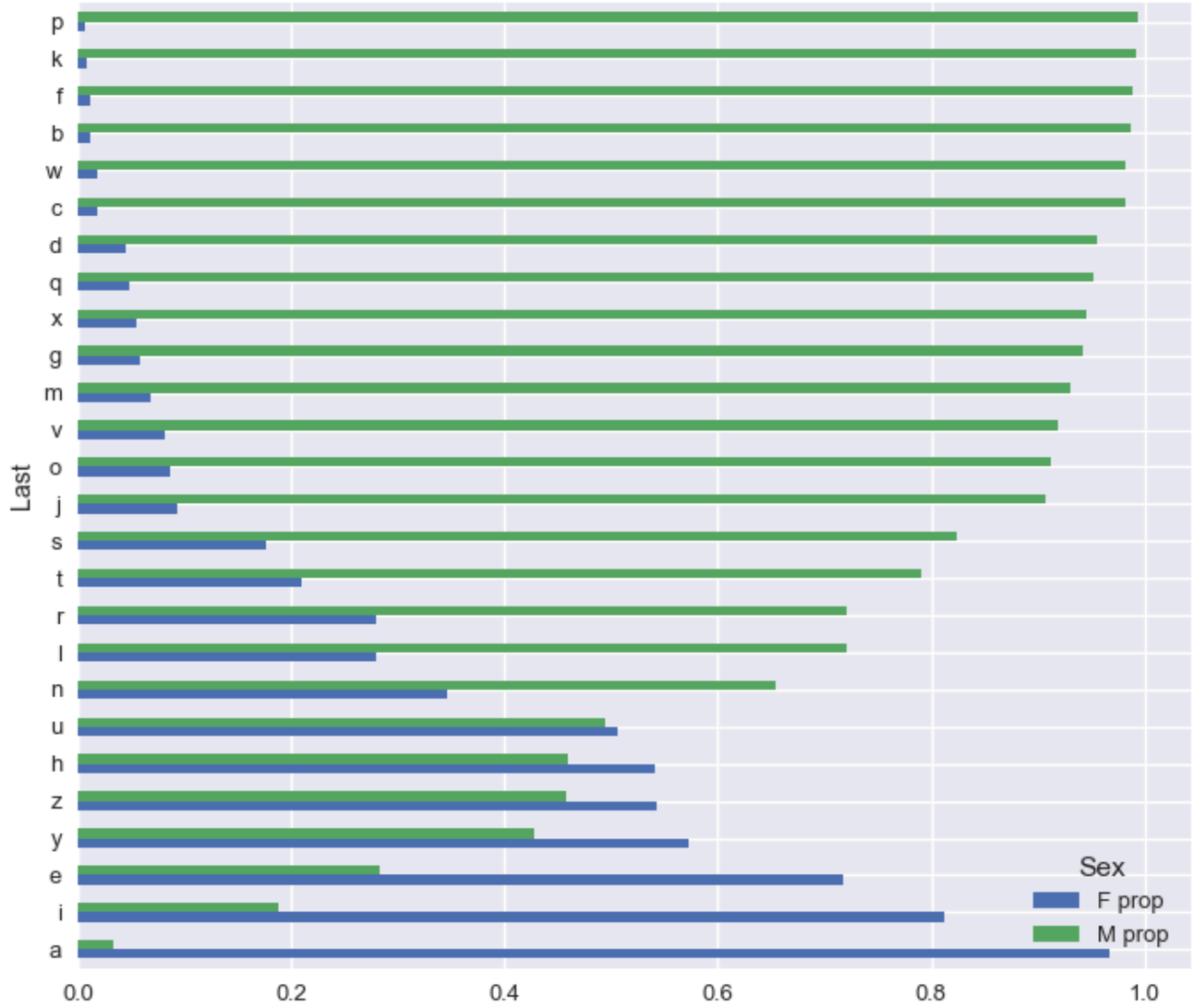
- **Making good plots is a key skill! This just scratches surface.**
- **You can get many great jobs just by being able to make informative data visualizations.**
- **For more, see Ch 6 of textbook.ds100.org.**

Working with Text

Text is useful!

Turns out that the last letter of a person's first name is a good predictor of sex.

Demo: [bit.ly/108-sam06](bit.ly/108-sam06)



Sentiment analysis

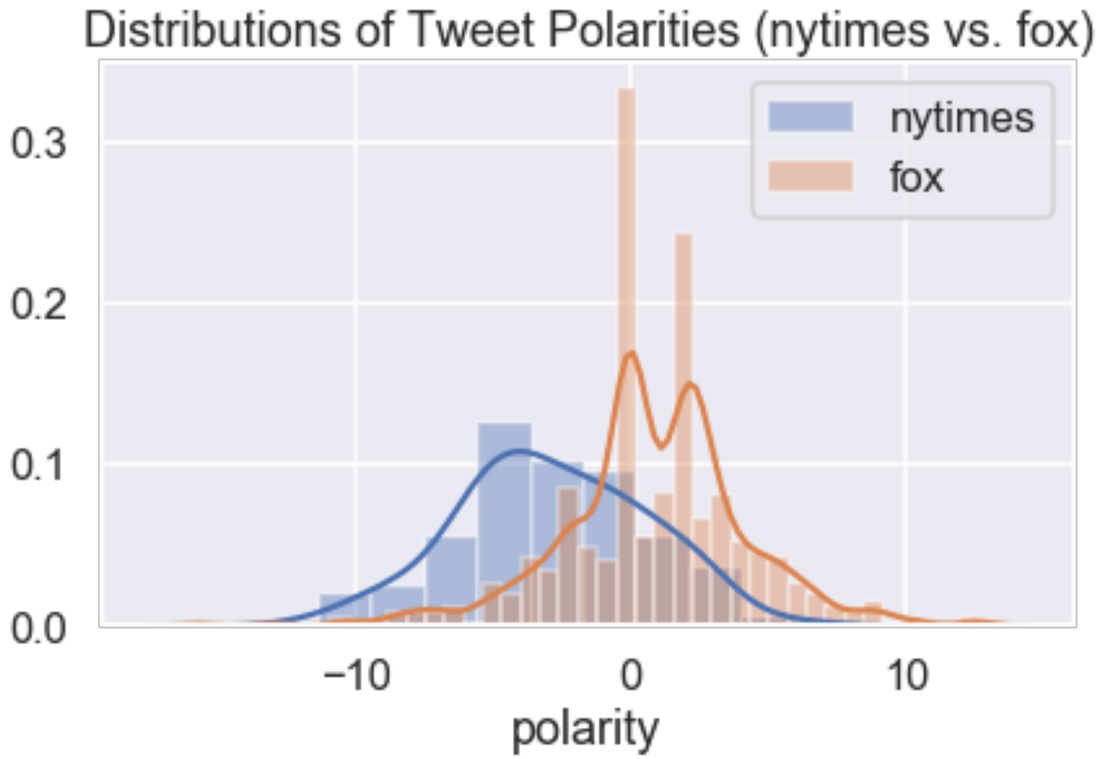
Basic idea:

1. Match each word with its sentiment.

2. Average the word sentiments together.

See VADER package for Python.

For example, Trump tweets more positively about Fox than NYT:



Preview of next week

An easy way to set up a personal website using Jupyter notebooks and GitHub.

How to conduct complicated data manipulations.

AKA: Walking through a few challenging problems on A3.