Natural Language Processing - Practical Case

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Disclaimer

- All materials provided here reflect my own views and not those of my employer.
- Please, do not take my opinions too seriously as I tend to be wrong more times than expected (on average) every single day.

https://github.com/frabanalpresa/mbds/master

Practical case: Amazon Fine Food reviews

Image from D. Chen analysis

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- CC0: Public Domain License
- J. McAuley and Jure Leskovec, From amateurs to connoisseurs: modeling the evolution of user expertise through online reviews, 2013

Data sources

http://snap.stanford.edu/data/web-FineFoods.html

https://www.kaggle.com/snap/amazon-fine-food-reviews

- Kernels
- Discussions
- Visualizations

Dataset information

Number of reviews	568,454
Number of users	256,059
Number of products	74,258
Users with >50 reviews	260
Median words per review	56
Timespan	Oct '99 - Oct '12

Other information

> From amateurs to connoisseurs: modeling the evolution of user expertise through online reviews

J. McAuley and Jure Leskovec, 2013

Different problems can be solved:

- Sentiment analysis
- Regression over ratings
- Generate synthetic reviews
- Categorize users
- Clusterize products
- Acquire knowledge about a domain

Proposal

- Have some knowledge about real-world NLP problems.
- Solve a NLP question with real data.
- Apply a NLP algorithm in R/Python to solve a problem.
- Have fun!

Introduction

- Retain only 'Text' field in each sample.
- Explore some of the reviews in the dataset visually (5-10)

Example #1

```
# Reveived my item fast! It was exactly what I ordered
# in excellent shape with safe shipping - i will came
# back and shop here again.  Thanks
```

Example #2

```
# I tasted this Matcha from Rishi the first time today.
# The flavor is bright, assertive and fresh...
```

Example #3

```
# When I was young, nearly a half century ago, Chuckles
# was a very popular candy. I really enjoyed eating
# these jellied treats...
```

Text preprocessing

```
text = ''
text = text.lower()
```

- Load sentence/text/document
- Lowercase characters

```
import string

text = \
  text.translate(str.maketrans('','',
                               string.punctuation))
```

- Remove punctuation

```
from nltk.corpus import stopwords

text = [word for word in text.split()
        if word not in stopwords.words('english')]
text = ' '.join(text)
```

- Remove stopwords
- Form a full sentence

Example #1

```
# Reveived my item fast! It was exactly what I ordered
# in excellent shape with safe shipping - i will came
# back and shop here again.  Thanks
```

```
# reveived item fast exactly ordered
# excellent shape safe shipping came back shop thanks
```

Example #2

```
# I tasted this Matcha from Rishi the first time today.
# The flavor is bright, assertive and fresh...
```

```
# tasted matcha rishi first time today flavor
# bright assertive fresh
```

Example #3

```
# When I was young, nearly a half century ago, Chuckles
# was a very popular candy. I really enjoyed eating
# these jellied treats...
```

```
# young nearly half century ago chuckles popular
# candy really enjoyed eating jellied treats
```

For starters...

Display some statistics about the text, once it has been cleaned:

Top Count Words Used In Review

br	22349	flavor	7819	product	6976	tri	6052
like	10099	coffe	7376	one	6511		
tast	9321	good	7301	love	6311		

Kaggle, 2017

Choose a problem

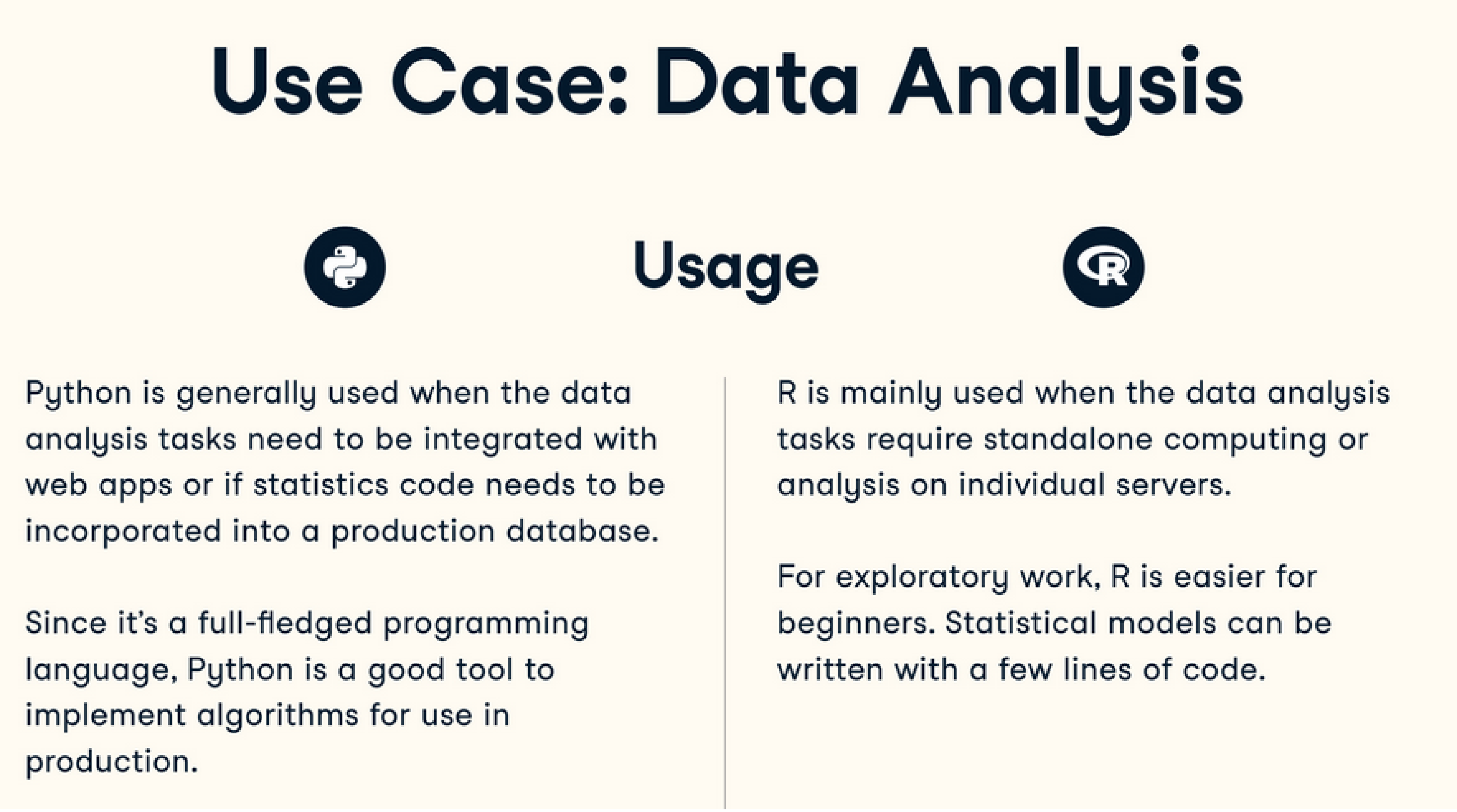
Classic NLP problems:

- Clustering: k-means, hierarchical…
- Topic modeling: LSI, LDA…

Other problems that could be solved:

- Word similarity: GLoVe, word2vec...
- Generate reviews: LSTM, GAN
- Summarize reviews
- Clusterize users
- Rating prediction
- Popularity prediction
- ...

Choose an environment



Use Case: Data Analysis

Usage

Python is generally used when the data analysis tasks need to be integrated with web apps or if statistics code needs to be incorporated into a production database.

Since it's a full-fledged programming language, Python is a good tool to implement algorithms for use in production.

R is mainly used when the data analysis tasks require standalone computing or analysis on individual servers.

For exploratory work, R is easier for beginners. Statistical models can be written with a few lines of code.

DataCamp analysis for R vs Python.

R

Formats	Packages
R scripts	tm
RMarkdown	tidytext
R Notebook	

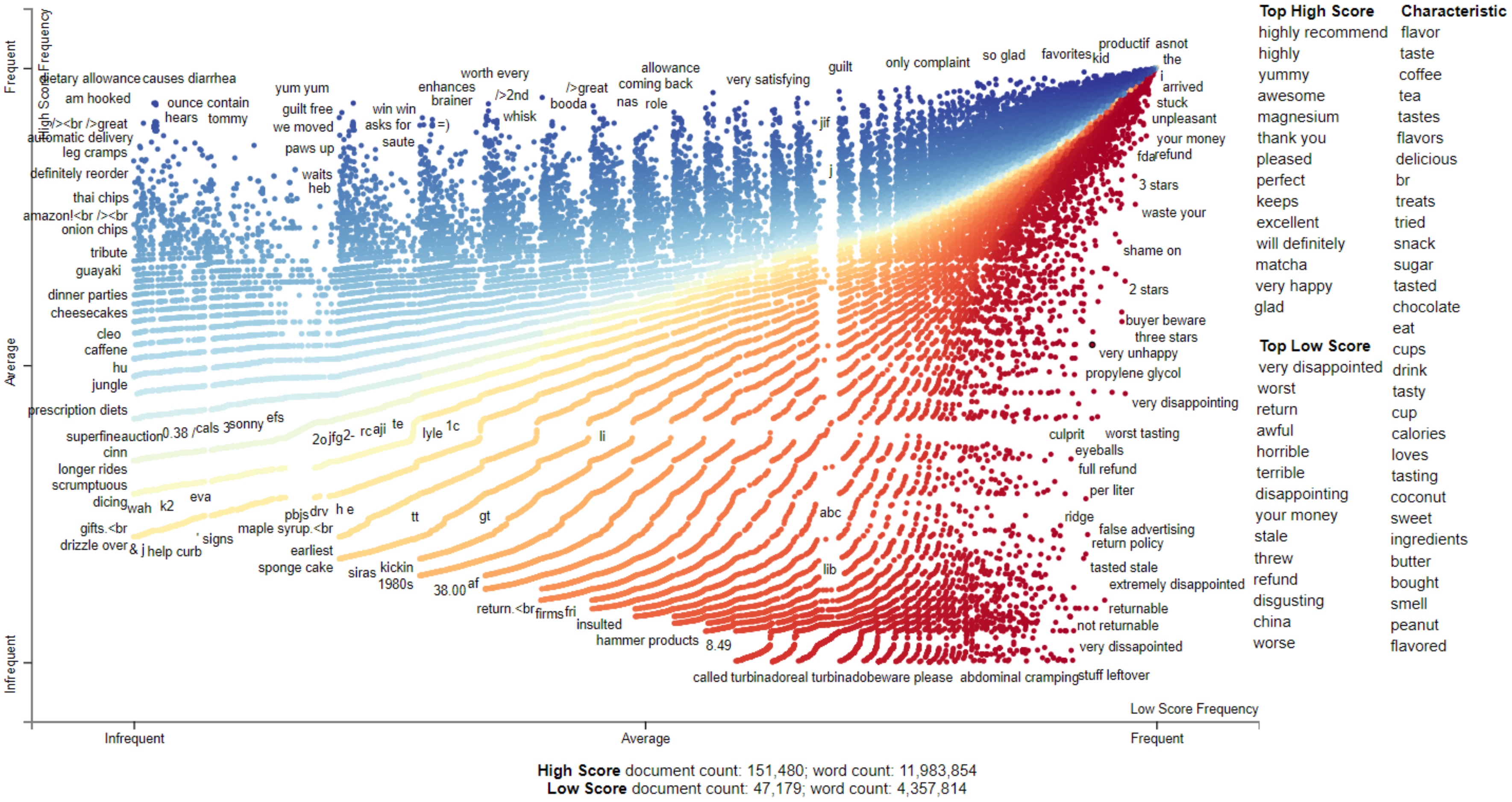
Python

Formats	Packages
Scripts	NLTK, gensim
Jupyter Notebook	scikit-learn
Python module	pandas

Have fun!

like
coffee
taste
good
product
flavor
one
great
just
can
love
will
much
really
find
dont
tried
also
make
amazon
best
cup
price
buy
use
time
get
food
tea
try
chocolate
delicious
better
little
sweet
sugar
chips
well
drink
made
even
order
recommend
excellent
coffees
husband
actually
flavors
shipping
different
family
favorite
found
give
fresh
never
think
store
tastes
used
way
know
strong
still
mix
easy
water
milk
cup
now
enjoy
natural
something
eat
box
two
say
bag
organic
healthy
nice
dog
free
many
bought
ingredients
juice
always
bitter
bags
thought
ordered
beans

Kaggle home page for dataset, SNAP group, 2016.



High Score document count: 151,480; word count: 11,983,854
Low Score document count: 47,179; word count: 4,357,814

An interesting analysis by Daniel Chen

Additional challenges

- Yelp Dataset, also in Kaggle Datasets.
- Open Food Facts, also in Kaggle Datasets.