

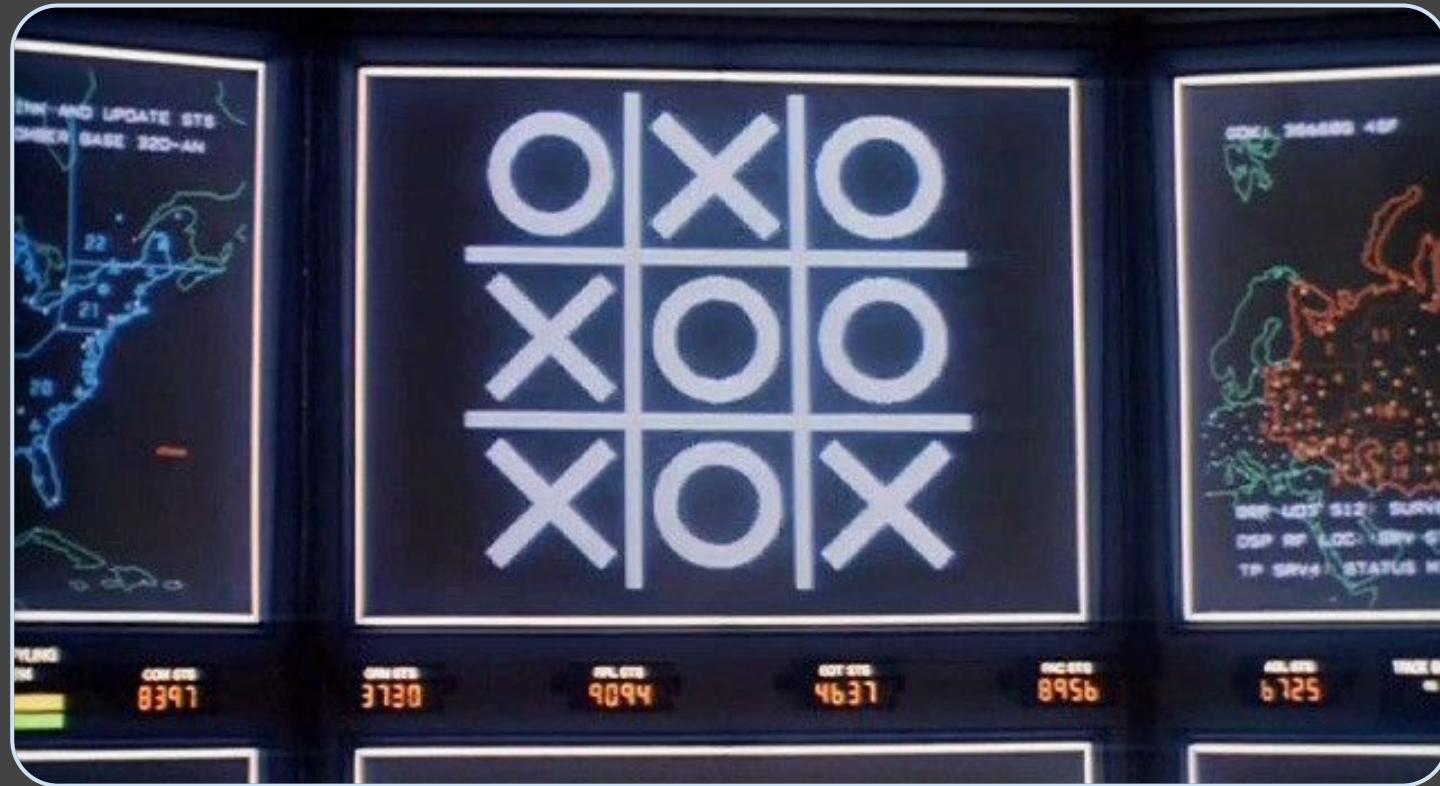
Everyone Can Data



Dalya Gartzman

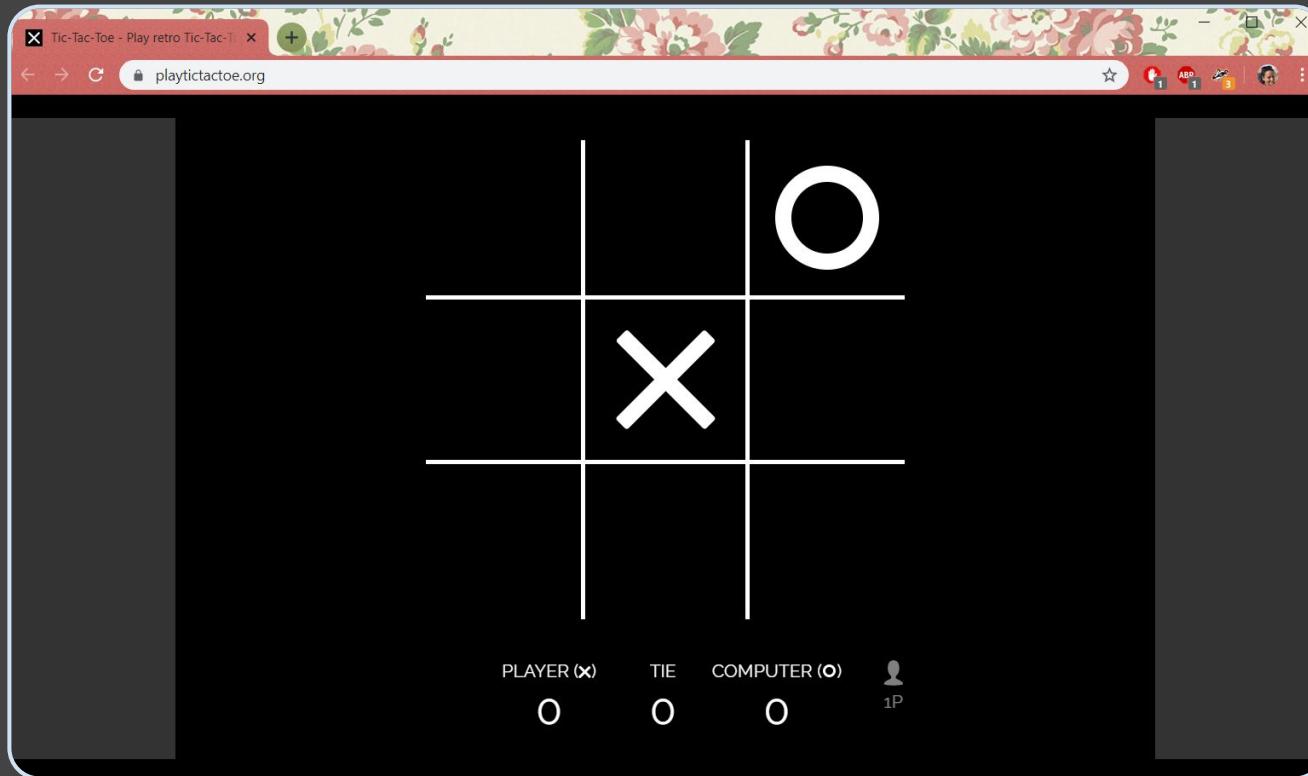
bit.ly/DSisFUN

1980's

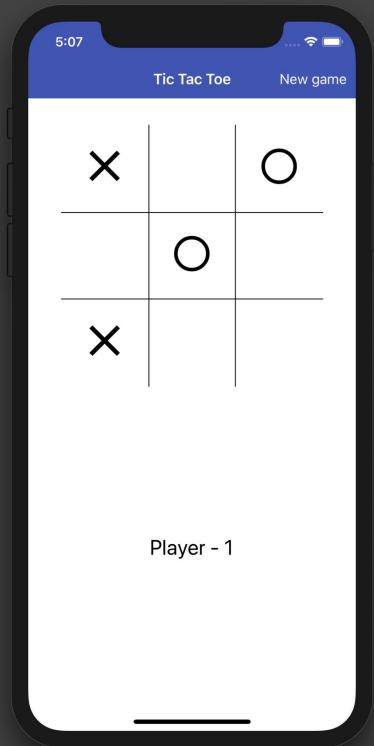


War Games, 1983

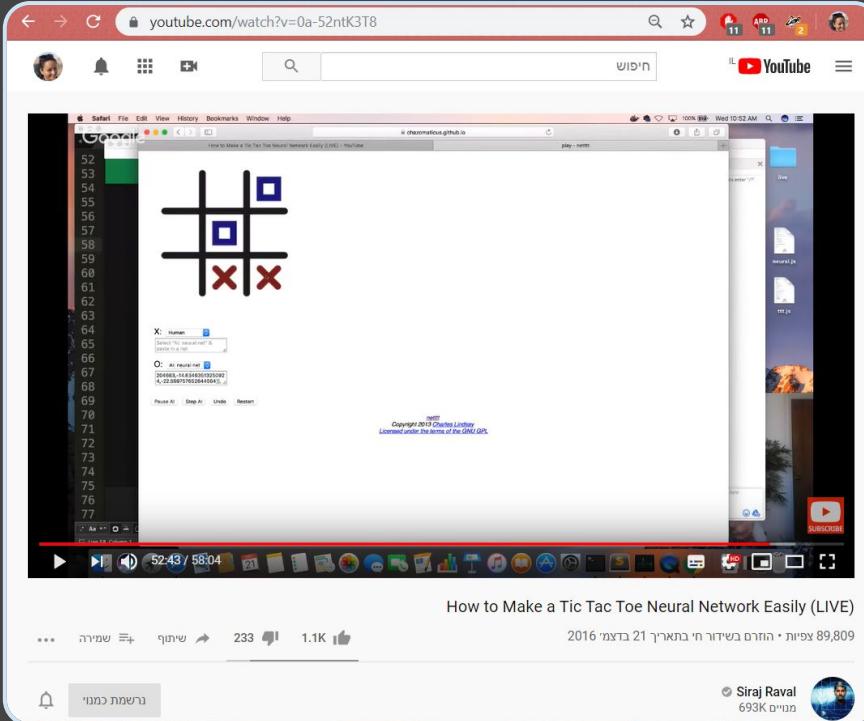
1990`s



2000`s



Today



How to Make a Tic Tac Toe Neural Network Easily (LIVE)

WAIT...

WHAT?

quickmeme

This Is Me



This Is Me



Pure
Math



This Is Me



Pure
Math

Computer
Science

Biology

This Is Me



Pure
Math

Computer
Science

Mobility

Biology

This Is Me

The Internet

Pure Math

Mobility

Computer Science

Biology



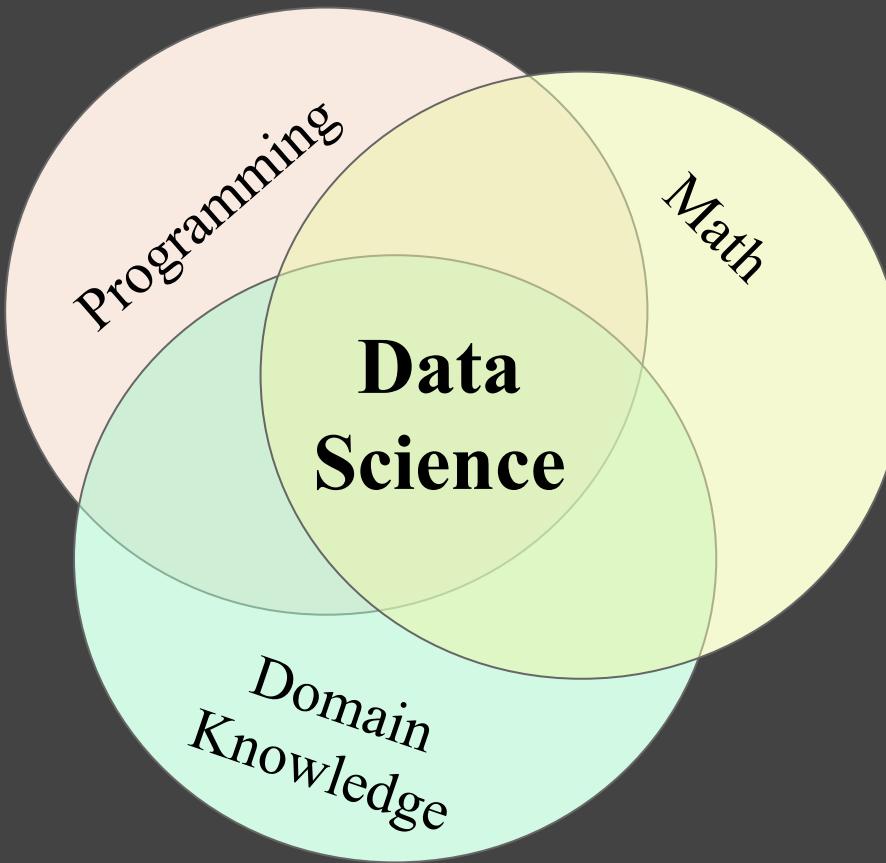
PART I - The Intro to the Intro

PART I - The Intro to the Intro

1. what is data science?
2. what is machine learning?
3. what is a neural network?

What is Data Science?

What is Data Science?



What is Data Science?

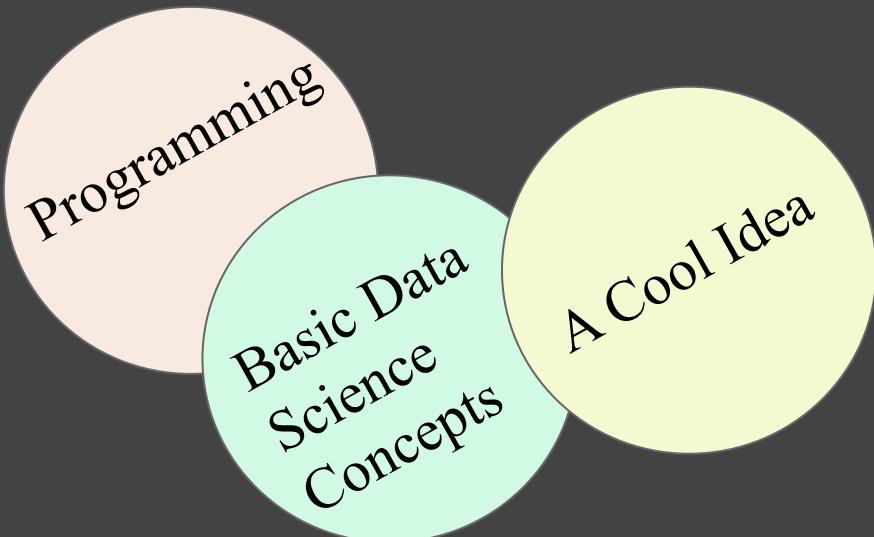


~~What is Data Science?~~

What Do I Need in My Backpack
for a Cool Data Science Project?

~~What is Data Science?~~

What Do I Need in My Backpack for a Cool Data Science Project?





What is machine learning?



What is machine learning?

human learning:

$\text{shape}(\bullet) = ?$



What is machine learning?

human learning:

If (# \sqcap) = 0
return circle

If (# \sqcap) = 4
return square

shape(●) = ?



What is machine learning?

human learning:

If (# \sqcap) = 0
return circle
If (# \sqcap) = 4
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$\text{shape}(\bullet) = ?$

machine learning:

$\text{shape}(\bullet) = ?$



What is machine learning?

human learning:

If (# \sqcap) = 0
return circle

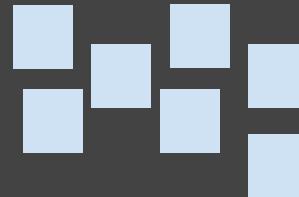
If (# \sqcap) = 4
return square

shape(\bullet) = ?

machine learning:

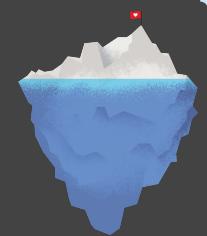


= circle

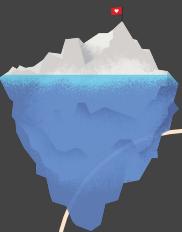


= square

shape(\bullet) = ?

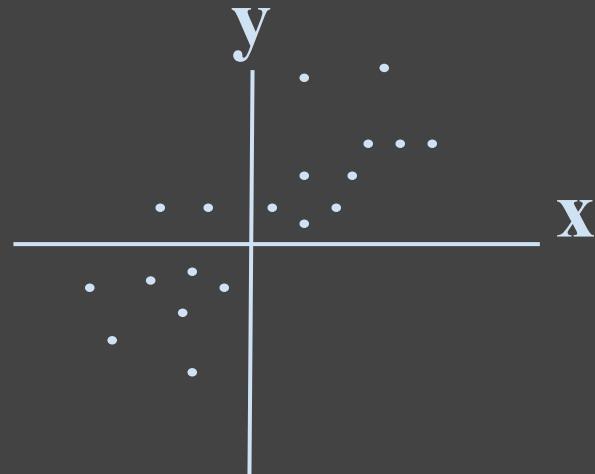


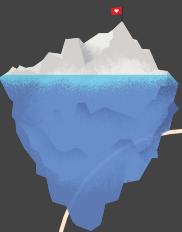
What is a neaural network?



What is a neaural network?

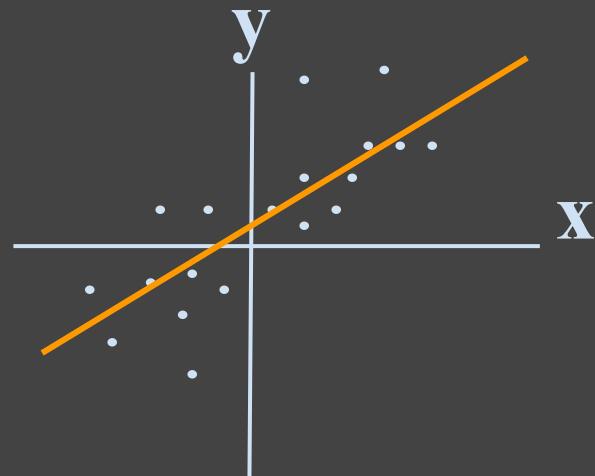
neuron:



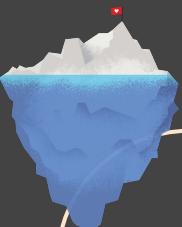


What is a neaural network?

neuron:

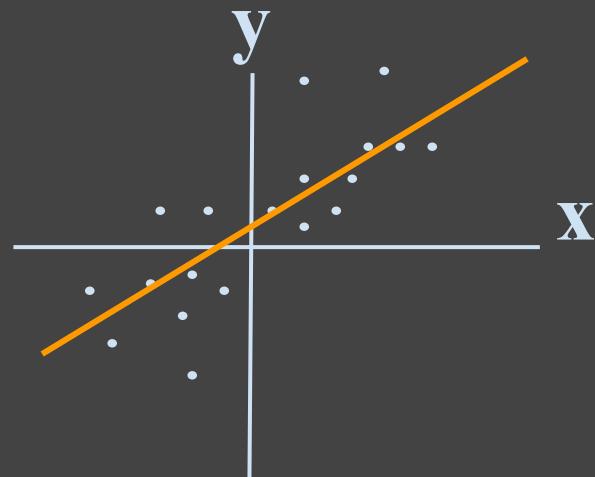


$$y=f(x)$$



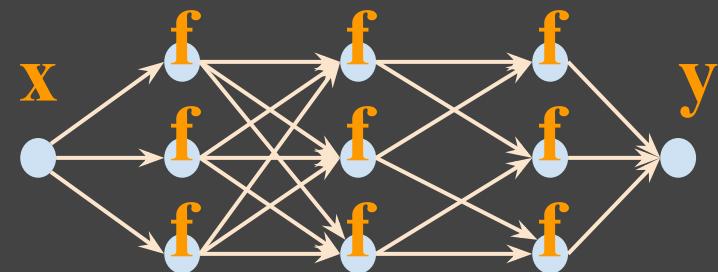
What is a neaural network?

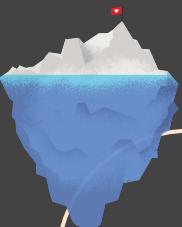
neuron:



$$y=f(x)$$

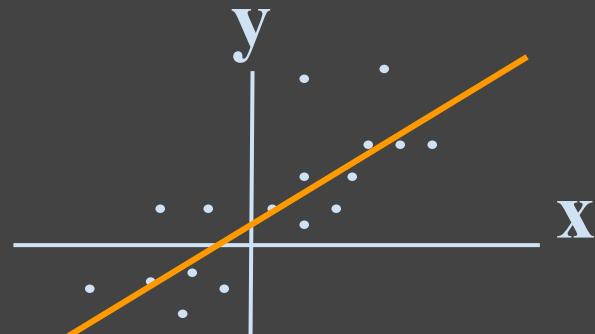
neural network:





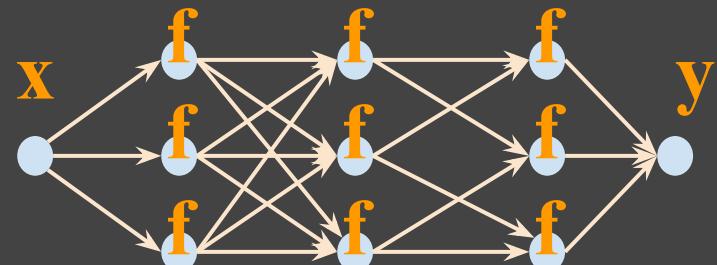
What is a neaural network?

neuron:



$$y = f(x)$$

neural network:



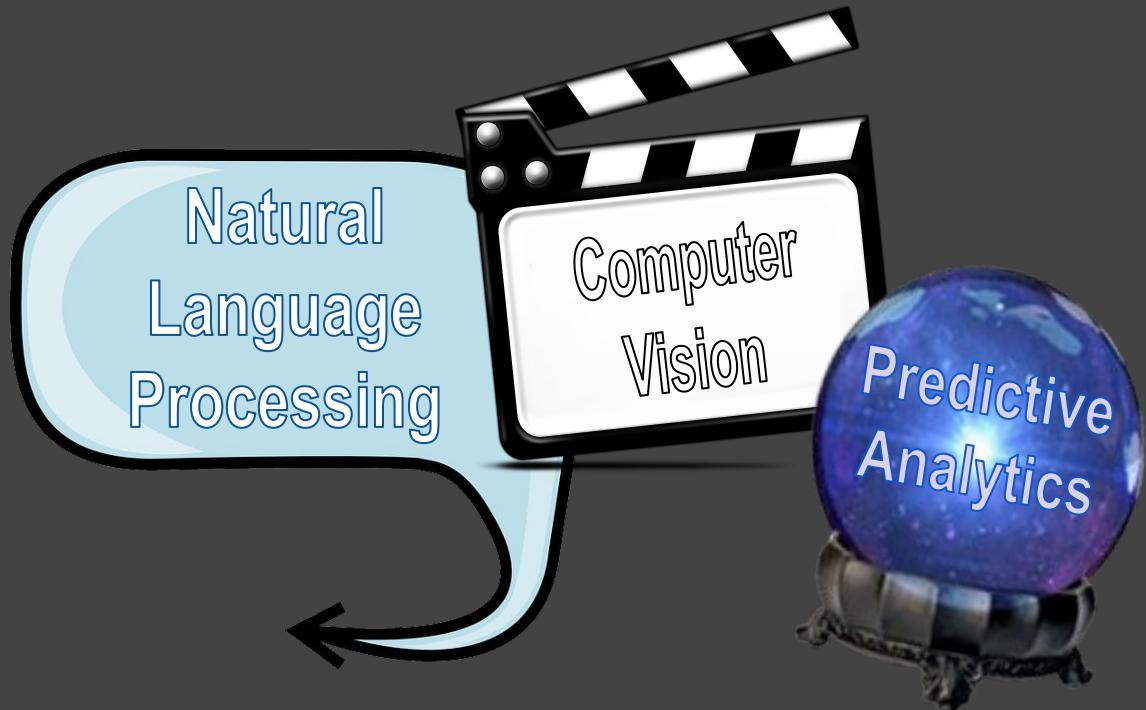
- **architechture**
- **what are “f”?**
- **more stuff...**

PART I Recap

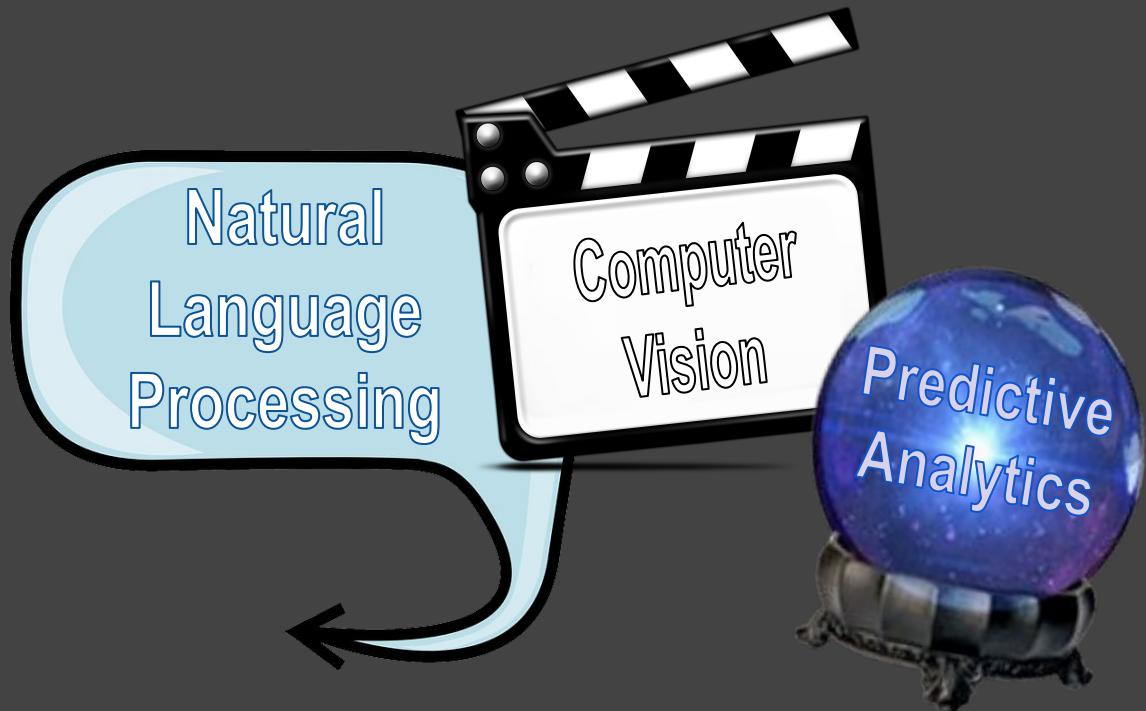


PART II - so what can I do?

PART II - so what can I do?



PART II - so what can I do?



Part III - Music



Natural Language Processing

Natural Language Processing

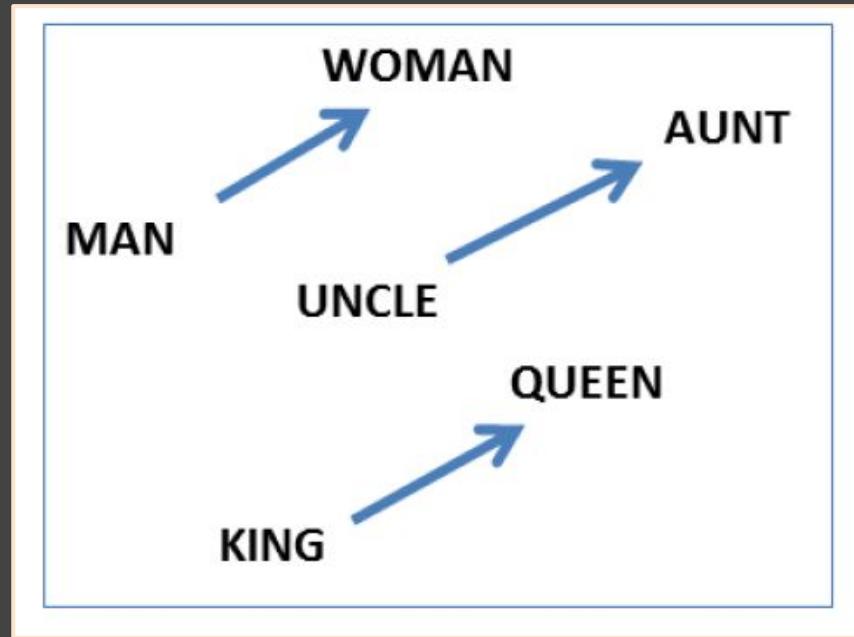
1. how i started

CS224n: Natural Language Processing with Deep Learning

Syllabus (Slides, etc.) Office Hours Stanford Lecture Videos Piazza forum Project page

Natural Language Processing

1. how i started
2. what i learned



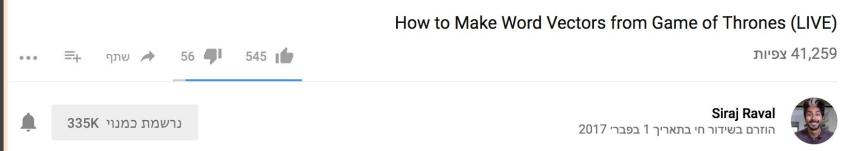
Natural Language Processing

1. how i started
2. what i learned
3. inspiration

```
In [37]: def nearest_similarity_cosmul(start1, end1, end2):
    similarities = thrones2vec.most_similar_cosmul(
        positive=[end2, start1],
        negative=[end1]
    )
    start2 = similarities[0][0]
    print('{start1} is related to {end1}, as {start2} is related to {end2}'.format(start1=start1, end1=end1, start2=start2, end2=end2))
    return start2

In [38]: nearest_similarity_cosmul("Stark", "Winterfell", "Riverrun")
nearest_similarity_cosmul("Jaime", "sword", "wine")
nearest_similarity_cosmul("Arya", "Nymeria", "dragons")

Stark is related to Winterfell, as Tully is related to Riverrun
Jaime is related to sword, as Tyrian is related to wine
Arya is related to Nymeria, as Dany is related to dragons
Out[38]: u'Dany'
```



Natural Language Processing

1. how i started
2. what i learned
3. inspiration
4. implementation

Ender2Vec

```
In [43]: nearest_similarity_cosmul("Ender", "Valentine", "Bean")
# interesting: http://enderverse.wikia.com/wiki/Suriyawong
Ender is related to Valentine, as Suriyawong is related to Bean
Out[43]: 'Suriyawong'
```

```
In [44]: nearest_similarity_cosmul("Peter", "Valentine", "Locke")
# amazing!!
Peter is related to Valentine, as Demosthenes is related to Locke
Out[44]: 'Demosthenes'
```

```
In [61]: nearest_similarity_cosmul("run", "slow", "fight")
run is related to slow, as survive is related to fight
Out[61]: 'survive'
```

```
In [64]: nearest_similarity_cosmul("love", "hate", "formics")
love is related to hate, as officers is related to formics
Out[64]: 'officers'
```

```
In [ ]:
```

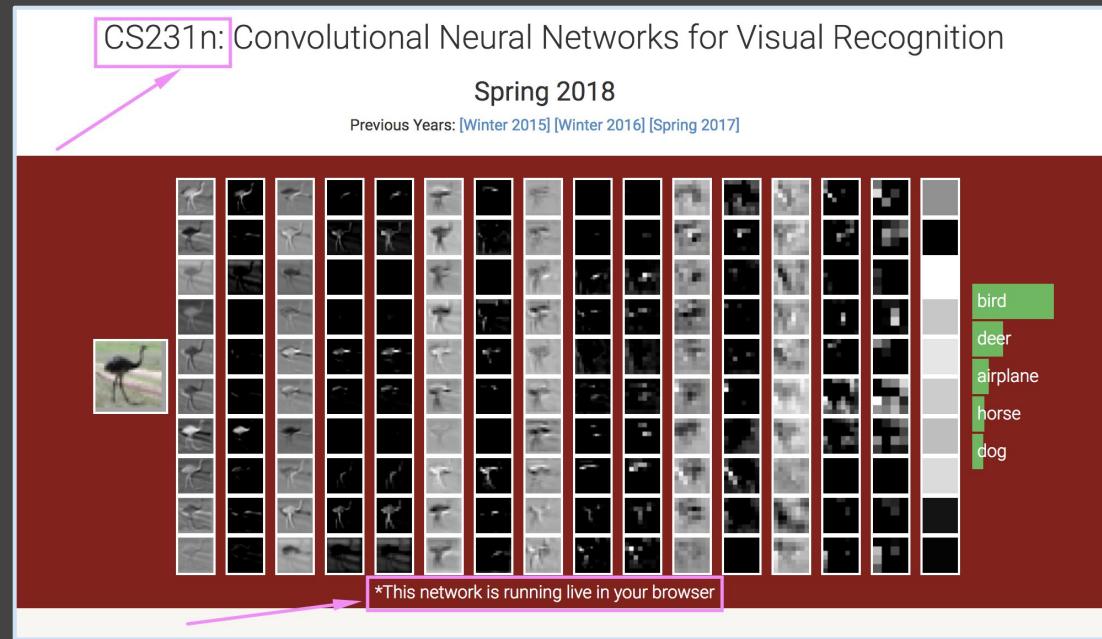
Natural Language Processing

1. how i started => web.stanford.edu/class/cs224n/
2. what i learned => www.tensorflow.org/tutorials/word2vec
3. inspiration => www.youtube.com/watch?v=pY9EwZ02sXU
4. implementation => github.com/DalyaG/Ender2Vec

Computer Vision

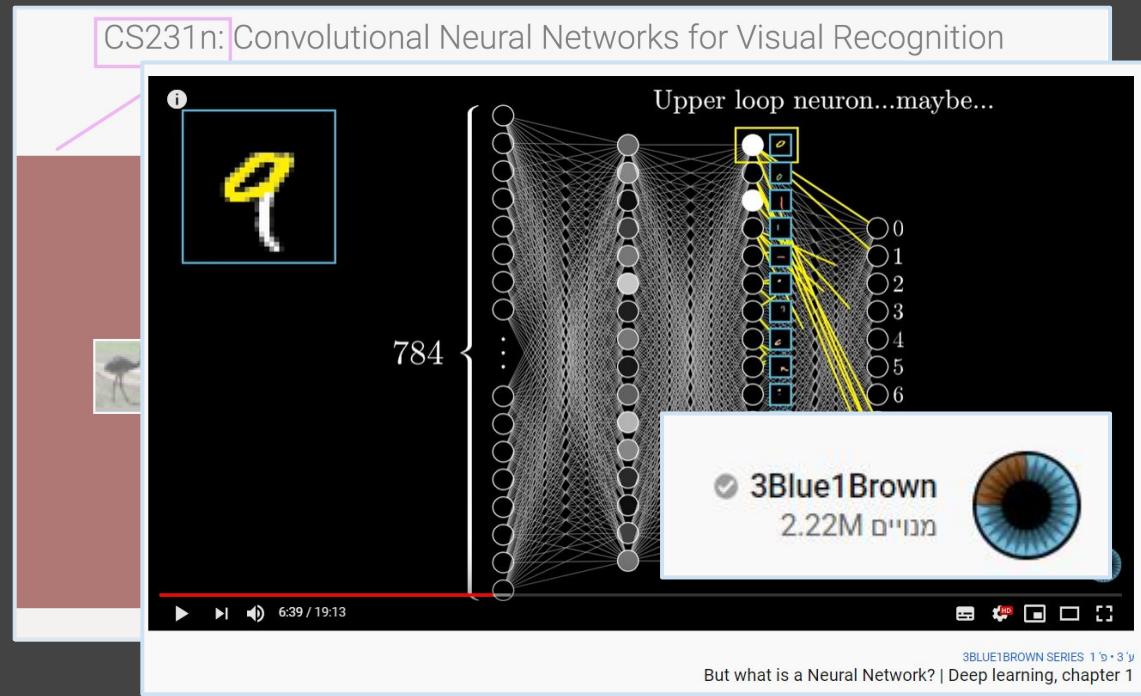
Computer Vision

1. some background



Computer Vision

1. some background



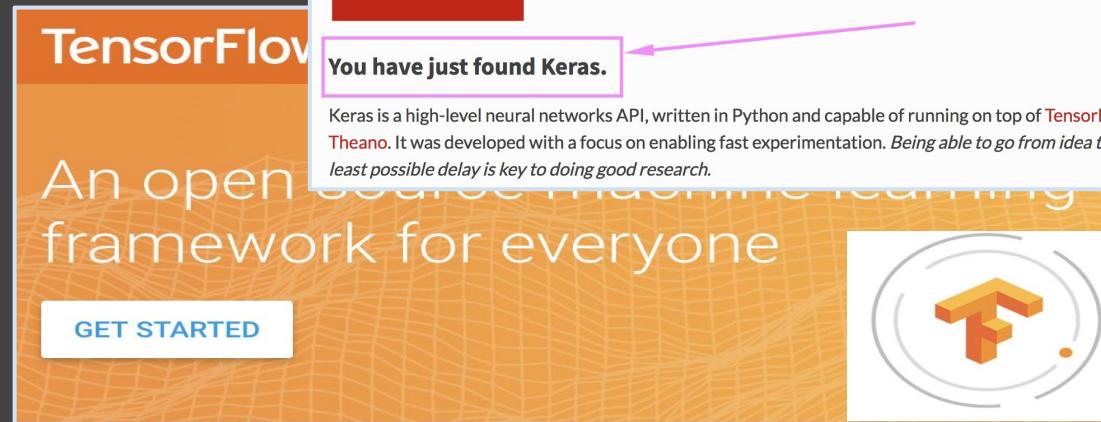
Computer Vision

1. some background
2. useful tools



Computer Vision

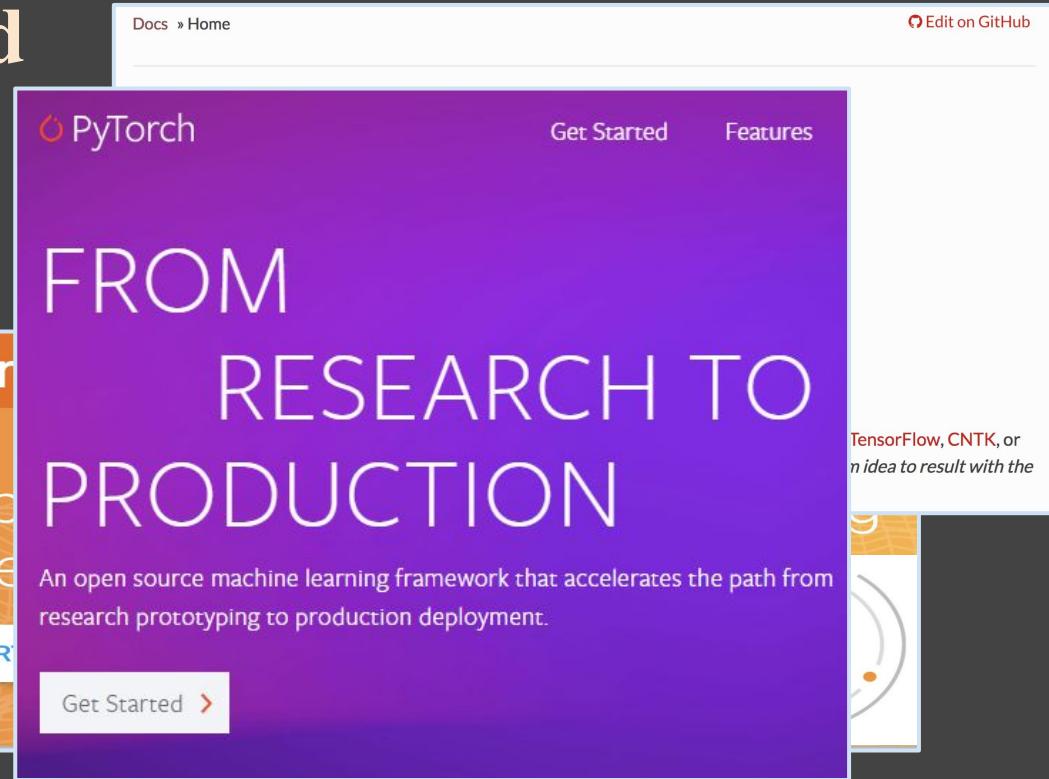
1. some background
2. useful tools



[Edit on GitHub](#)

Computer Vision

1. some background
2. useful tools



The screenshot shows the PyTorch homepage. At the top, there is a navigation bar with links for "Docs" and "Home". On the right side of the bar is a "Edit on GitHub" button. The main title "PyTorch" is displayed with its orange logo. To the right of the title are "Get Started" and "Features" buttons. The central part of the page features large, bold text: "FROM RESEARCH TO PRODUCTION". Below this, a subtitle reads: "An open source machine learning framework that accelerates the path from research prototyping to production deployment." A "Get Started" button with a right-pointing arrow is located at the bottom of this section. To the right of the main content area, there is a sidebar with the text "TensorFlow, CNTK, or n idea to result with the" and a small decorative graphic of a brain and neural connections.

Computer Vision

1. some background
2. useful tools
3. don't sweat it

Usage examples for image classification models

Classify ImageNet classes with ResNet50

```
from keras.applications.resnet50 import ResNet50
from keras.preprocessing import image
from keras.applications.resnet50 import preprocess_input, decode_predictions
import numpy as np

model = ResNet50(weights='imagenet')

img_path = 'elephant.jpg'
img = image.load_img(img_path, target_size=(224, 224))
x = image.img_to_array(img)
x = np.expand_dims(x, axis=0)
x = preprocess_input(x)

preds = model.predict(x)
# decode the results into a list of tuples (class, description, probability)
# (one such list for each sample in the batch)
print('Predicted:', decode_predictions(preds, top=3)[0])
# Predicted: [(u'n02504013', u'Indian_elephant', 0.82658225), (u'n01871265', u'tusker', 0.1122357), (u'
```

Computer Vision

1. some background
2. useful tools
3. don't sweat it

Usage examples for image class

Classify ImageNet classes with ResNet

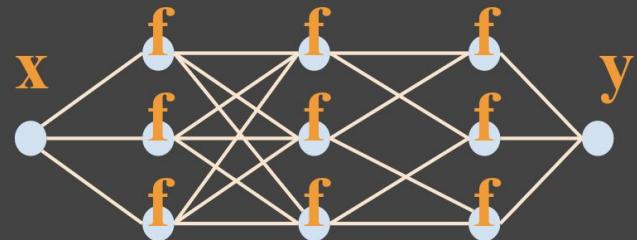
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from keras.applications.resnet50 import ResNet50
from keras.preprocessing import image
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import numpy as np

model = ResNet50(weights='imagenet')

img_path = 'elephant.jpg'
img = image.load_img(img_path, target_size=(224, 224))
x = image.img_to_array(img)
x = np.expand_dims(x, axis=0)
x = preprocess_input(x)

preds = model.predict(x)
# decode the results into a list of tuples
# (one such list for each sample in the batch)
print('Predicted:', decode_predictions(preds, top=5)[0])
# Predicted: [(u'n02504013', u'Indian_elephant', 0.82658225), (u'n01871265', u'tusker', 0.1122357), (u'n02504020', u'elephant', 0.07946027), (u'n02504029', u'Asian_elephant', 0.04119451), (u'n02504036', u'elephant_calf', 0.03812928)]
```

neural network:



- architechture
- what are “f”?
- more stuff...

Computer Vision

1. some background
2. useful tools
3. don't sweat it
4. here's an idea:



Computer Vision

1. **some background** => cs231n.stanford.edu/
youtube.com/watch?v=aircAruvnKk
2. **useful tools** => www.tensorflow.org keras.io pytorch.org
3. **don't sweat it** => keras.io/applications

Predictive Analytics

Predictive Analytics

1. some background

Machine Learning

About this course: Machine learning is the science of getting computers to act without being explicitly programmed. In the past decade, machine learning has given us self-driving cars, practical speech recognition, effective web search, and a vastly improved understanding of the human genome. Machine learning is so pervasive today that you probably use it dozens of times a day without knowing it. Many

▼ More

Created by: Stanford University



Taught by: [Andrew Ng](#), Co-founder, Coursera; Adjunct Professor, Stanford University; formerly head of Baidu AI Group/Google Brain

Predictive Analytics

1. some background
2. useful tools

The image shows two screenshots of data science tool websites. The top screenshot is for scikit-learn, featuring a grid of 24 small plots illustrating various machine learning models like logistic regression and decision trees. The bottom screenshot is for pandas, showing three large data visualization charts (bar, line, and area) and a mathematical formula $y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$.

scikit-learn
Machine Learning in Python

- Simple and efficient tools for data mining and data analysis
- Accessible to everybody, and reusable in various contexts
- Built on NumPy, SciPy, and matplotlib
- Open source, commercially usable - BSD license

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$

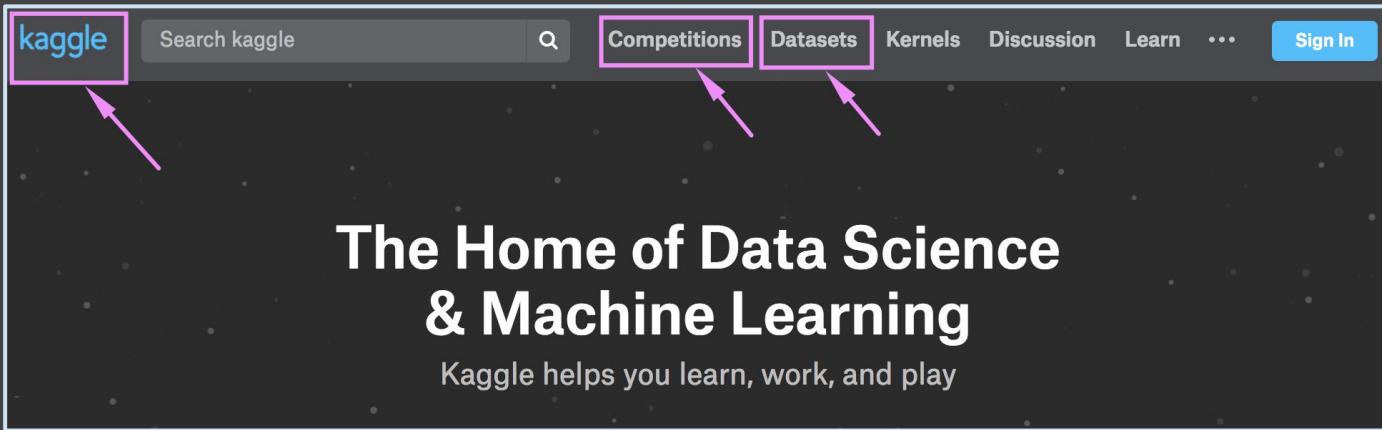
home // about // get pandas // documentation // community // talks // donate

Python Data Analysis Library

VERSIONS

Predictive Analytics

1. some background
2. useful tools
3. challenge yourself!



Predictive Analytics

1. some background
2. useful tools
3. challenge yourself!

The screenshot shows the Kaggle homepage. At the top left is the 'kaggle' logo with a pink arrow pointing to it. To its right is a search bar labeled 'Search kaggle'. On the right side of the page, there's a large image of the Titanic ship. Overlaid on this image is a competition card for 'Titanic: Machine Learning from Disaster'. The card has a 'Getting Started Prediction Competition' badge at the top. Below it, the title 'Titanic: Machine Learning from Disaster' is displayed in bold, followed by the subtitle 'Start here! Predict survival on the Titanic and get familiar with ML basics'. At the bottom of the card, it says 'Kaggle · 10,926 teams · 2 years to go'. The bottom half of the page features the text 'The Home of Data Science & Machine Learning' in large white font, with the tagline 'Kaggle helps you learn, work, and play' below it.

Predictive Analytics

1. some background
2. useful tools
3. challenge yourself!
4. here's an idea:

★ Featured Dataset

Brewer's Friend Beer Recipes

Data on over 75,000 homemade beers



Predictive Analytics

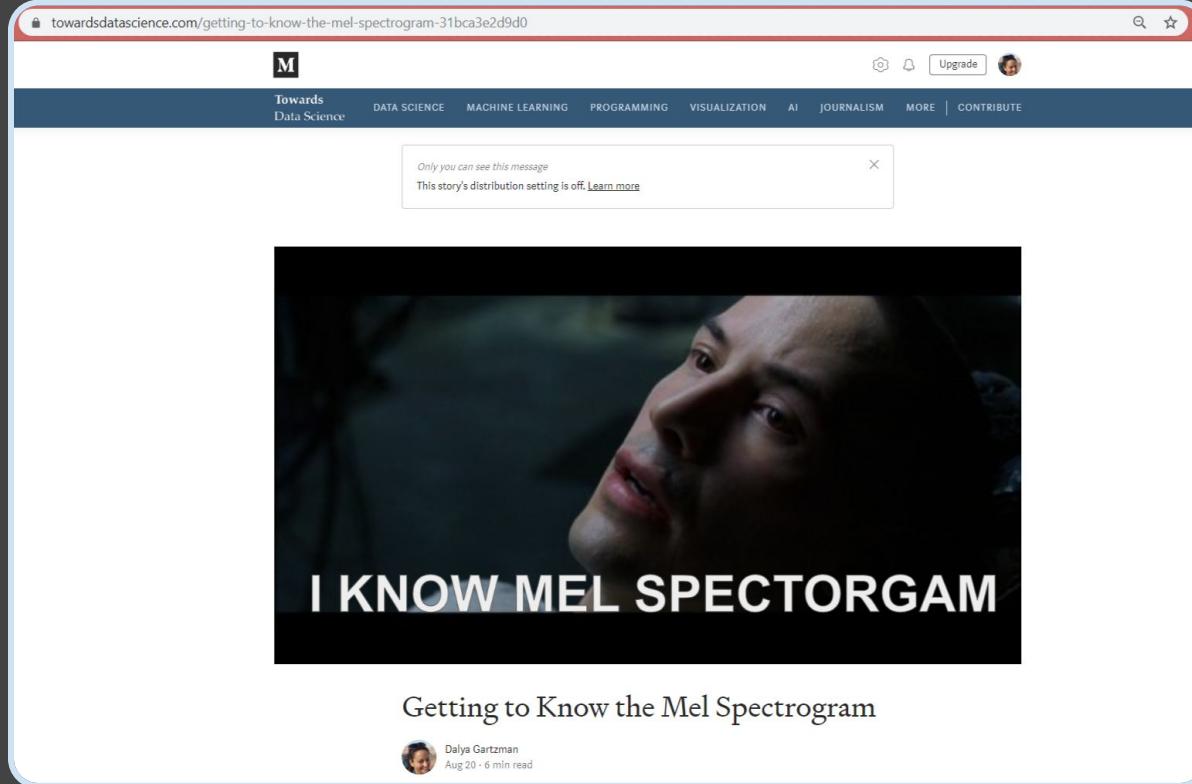
1. some background => www.coursera.org/learn/machine-learning
2. useful tools => pandas.pydata.org scikit-learn.org/
3. challenge yourself! => www.kaggle.com www.kaggle.com/c/titanic
4. here's an idea: => www.kaggle.com/jtrofe/beer-recipes

PART II Recap



PART III - Music!

PART III - Music!



towardsdatascience.com/getting-to-know-the-mel-spectrogram-31bca3e2d9d0

M

Towards
Data Science

DATA SCIENCE MACHINE LEARNING PROGRAMMING VISUALIZATION AI JOURNALISM MORE | CONTRIBUTE

Only you can see this message
This story's distribution setting is off. [Learn more](#)

I KNOW MEL SPECTORGAM

Getting to Know the Mel Spectrogram

Dalya Gartzman Aug 20 · 6 min read

bit.ly/MelSpec

VideoThat



github.com/Sharonio/VideoThat

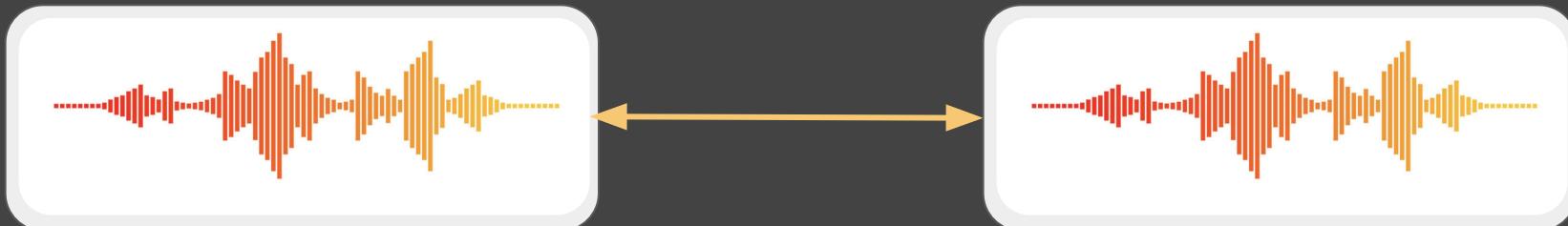
Our Goal

Automagically Generate a Music Video for Your Input Audio



The Premise

When the music is correlated the video is correlated

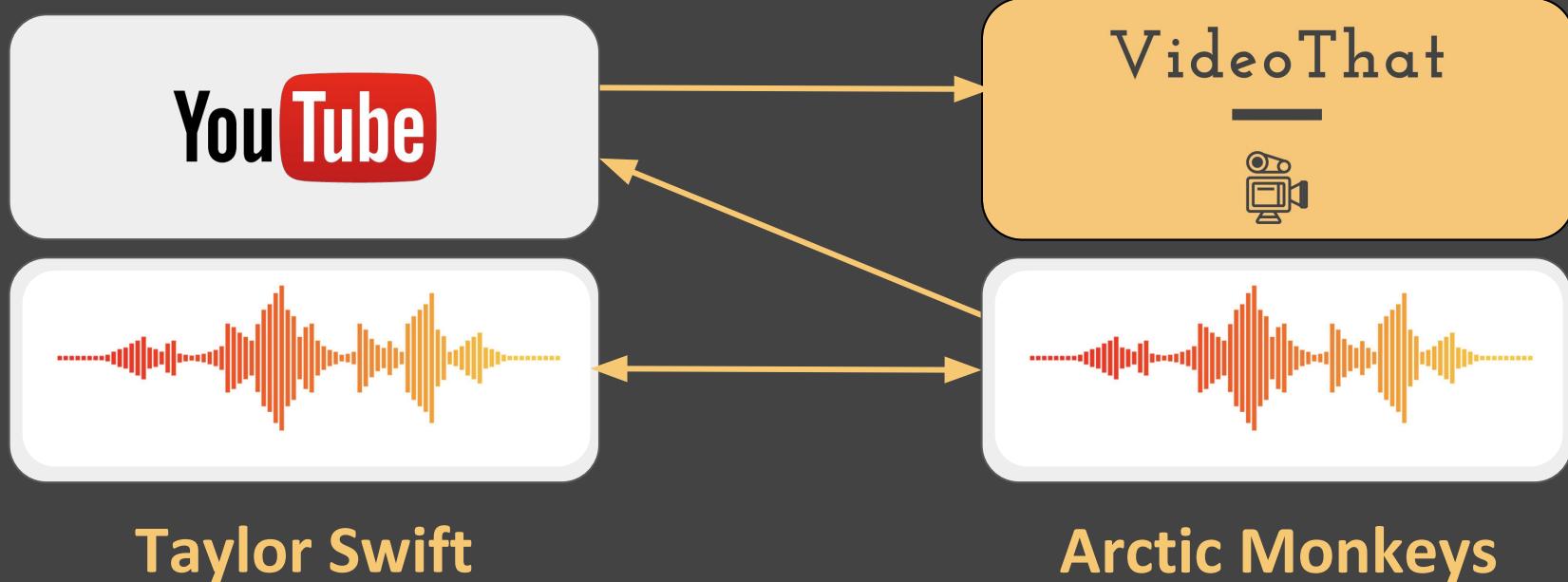


Taylor Swift

Arctic Monkeys

The Premise

When the music is correlated the video is correlated



The Data

youtube-dl

Scrape YouTube and download Taylor Swifts videos

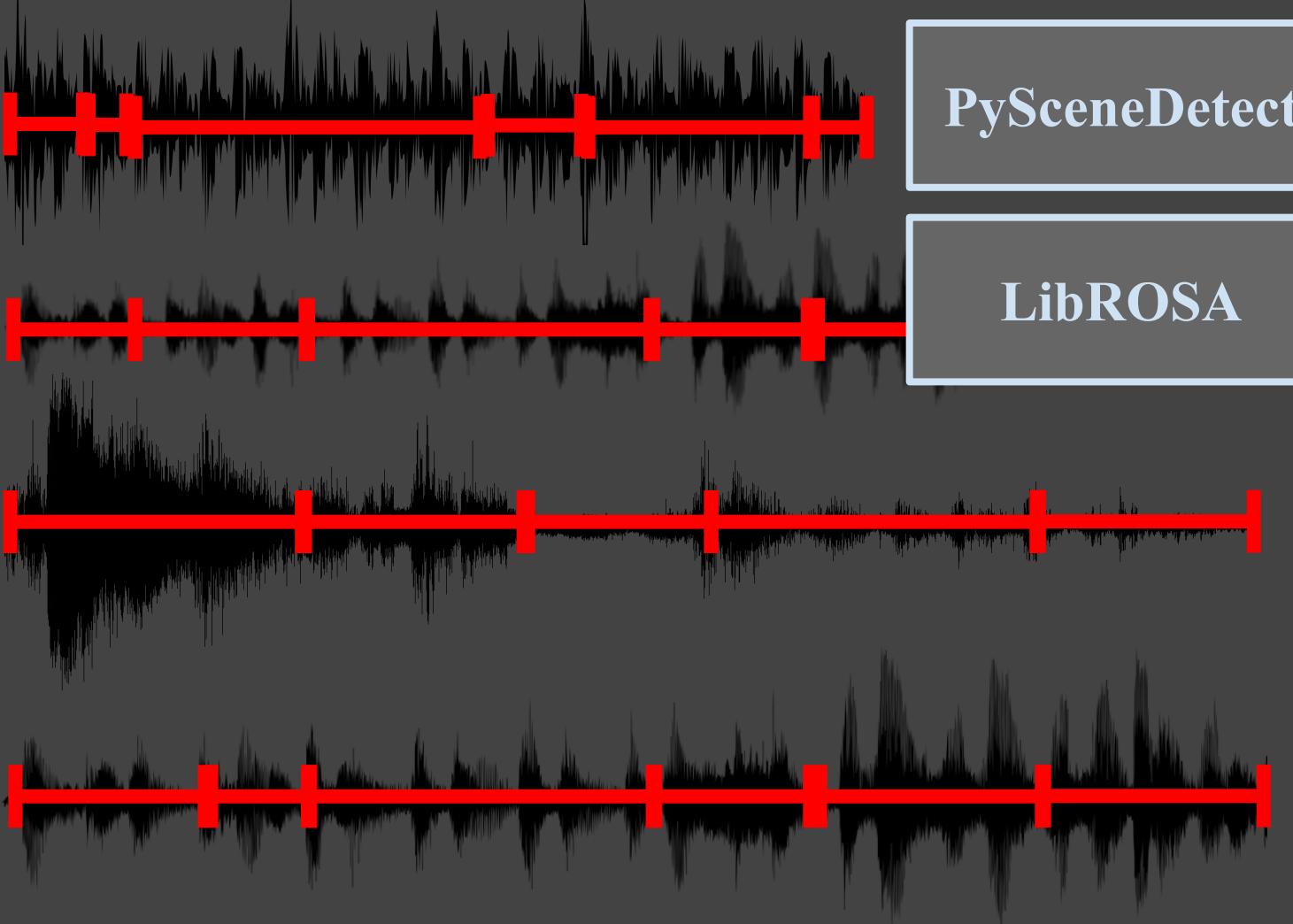






PySceneDetect



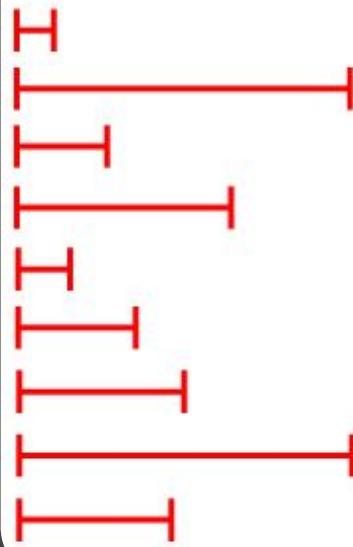


PySceneDetect

LibROSA

The Matching

Scenes from video clips db



Theme Song



The Results



meimadix.com/videos/videoThat_snippet.mp4

Take Home Message



DalyaG@gmail.com

bit.ly/DSisFUN