

DATA SCIENCE

DATA SOURCES

LAST TIME:

I. CLEANING DATA

II. MISSING DATA

EXERCISES:

III. NUMPY

IV. PANDAS

V. BOKEH & MATPLOTLIB

QUESTIONS?

WHAT WAS THE MOST INTERESTING THING YOU LEARNT?

WHAT WAS THE HARDEST TO GRASP?

I. DATA SOURCES

II. DATA FORMATS

III. APIS

EXERCISES:

IV. RETRIEVE DATA FROM VARIOUS SOURCES

V. KIMONO LABS & OTHER APIS

- **EXPLORE VARIOUS DATA SOURCES**
- **UNDERSTAND DIFFERENT DATA FORMATS**
- **BE ABLE TO RETRIEVE DATA FROM APIS**

DATA FORMAT, ACCESS & TRANSFORMATION

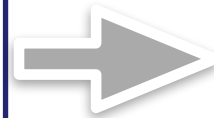
DATA SOURCES

DATA FLOW

Data Retrieval



Data ETL and Aggregation



Data Visualization

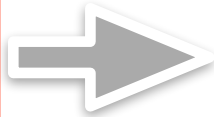


Machine Learning



DATA FLOW

Data Retrieval



Data ETL and Aggregation




Data Visualization



Machine Learning




DATA SOURCES



UCI
Machine Learning Repository
Center for Machine Learning and Intelligent Systems











[About](#) [Citation Policy](#) [Donate a Data Set](#) [Contact](#)

☒ Repository ☐ Web



[View ALL Data Sets](#)

Browse Through: **298 Data Sets** Table View [List View](#)

	Name	Data Types	Default Task	Attribute Types	# Instances	# Attributes	Year
	Abalone	Multivariate	Classification	Categorical, Integer, Real	4177	8	1995
	Adult	Multivariate	Classification	Categorical, Integer	48842	14	1996
	Annealing	Multivariate	Classification	Categorical, Integer, Real	798	38	
	Anonymous Microsoft Web Data		Recommender-Systems	Categorical	37711	294	1998
	Arrhythmia	Multivariate	Classification	Categorical, Integer, Real	452	279	1998
	Artificial Characters	Multivariate	Classification	Categorical, Integer, Real	6000	7	1992
	Audiology (Original)	Multivariate	Classification	Categorical	226		1987
	Audiology (Standardized)	Multivariate	Classification	Categorical	226	69	1992
	Auto MPG	Multivariate	Regression	Categorical, Real	398	8	1993
	Automobile	Multivariate	Regression	Categorical, Integer, Real	205	26	1987

Default Task

Classification (213)
Regression (41)
Clustering (36)
Other (50)

Attribute Type

Categorical (36)
Numerical (161)
Mixed (56)

Data Type

Multivariate (228)
Univariate (15)
Sequential (26)
Time-Series (43)
Text (27)
Domain-Theory (20)
Other (21)

Area

Life Sciences (75)
Physical Sciences (41)
CS / Engineering (78)
Social Sciences (20)
Business (14)
Game (9)
Other (59)

Attributes

Less than 10 (74)
10 to 100 (129)
Greater than 100 (46)

Instances


Less than 100 (15)
100 to 1000 (113)
Greater than 1000 (140)

Format Type





Matrix (213)
Non-Matrix (85)

Source: <http://archive.ics.uci.edu/ml/datasets.html>

DATA SOURCES



Espanol

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☆ More for Developers

- [Other USA.gov Resources](#)
- [USA.gov GitHub Account](#)

From Other Federal Agencies

- [Other Federal Government Developer Resources](#)
- [Other Federal Government GitHub Accounts](#)

About The Data

1.USA.gov URLs are created whenever anyone shortens a .gov or .mil URL using [bitly](#).

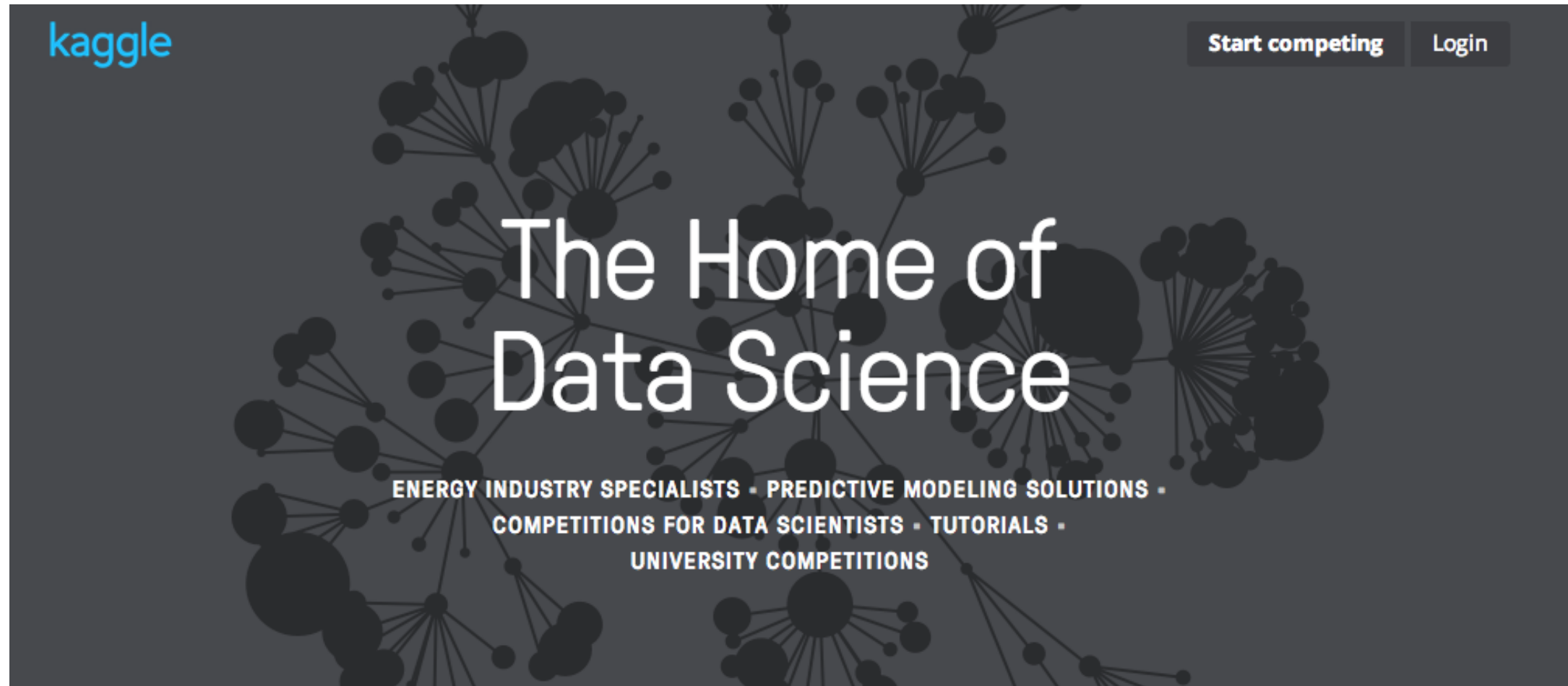
We provide a raw [pub/sub](#) feed of data created any time anyone clicks on a 1.USA.gov URL. The pub/sub endpoint responds to http requests for any 1.USA.gov URL and returns a stream of JSON entries, one per line, that represent real-time clicks.

If you are using the 1.USA.gov data and have questions, feedback, or want to tell us about your product, please [e-mail us](#).

How to Access The Data

Source: <http://www.usa.gov/About/developer-resources/1usagov.shtml>

DATA SOURCES



Source: <http://www.kaggle.com/>

- 1) PETE SKOMOROCH (LINKEDIN) [HTTPS://DELICIOUS.COM/PSKOMOROCH/DATASET](https://delicious.com/pskomoroch/dataset)
- 2) HILARY MASON (ACCEL PARTNERS, BITLY) [HTTPS://BITLY.COM/BUNDLES/HMASON/1](https://bitly.com/bundles/hmason/1)
- 3) KEVIN CHAI (U. OF NEW SOUTH WALES, SYDNEY) [HTTP://KEVINCHAI.NET/DATASETS](http://kevinchai.net/datasets)
- 4) JEFF HAMMERBACHER (CLOUDERA) [HTTP://WWW.QUORA.COM/JEFF-HAMMERBACHER/INTRODUCTION-TO-DATA-SCIENCE-DATA-SETS](http://www.quora.com/Jeff-Hammerbacher/introduction-to-data-science-data-sets)
- 5) JERRY SMITH (3I-MIND) [HTTP://DATASCIENTISTINSIGHTS.COM/2013/10/07/DATA-REPOSITORIES-MOTHERS-MILK-FOR-DATA-SCIENTISTS/](http://datascientistinsights.com/2013/10/07/data-repositories-mothers-milk-for-data-scientists/)
- 6) GREGORY PIATETSKY-SHAPIO (KDD) [HTTP://WWW.KDNUGGETS.COM/DATASETS/INDEX.HTML](http://www.kdnuggets.com/datasets/index.html)
- 7) [HTTP://WWW.QUORA.COM/DATA/WHERE-CAN-I-FIND-LARGE-DATASETS-OPEN-TO-THE-PUBLIC](http://www.quora.com/Data/Where-can-I-find-large-datasets-open-to-the-public)
- 8) [HTTPS://GITHUB.COM/CAESAR0301/AWESOME-PUBLIC-DATASETS](https://github.com/caesar0301/awesome-public-datasets)

PAIR EXERCISE:

CHOOSE A DATA SOURCE AND LOOK AT WHAT DATA YOU CAN GET

DISCUSS HOW YOU WOULD USE THE DATA

DATA FORMAT, ACCESS & TRANSFORMATION

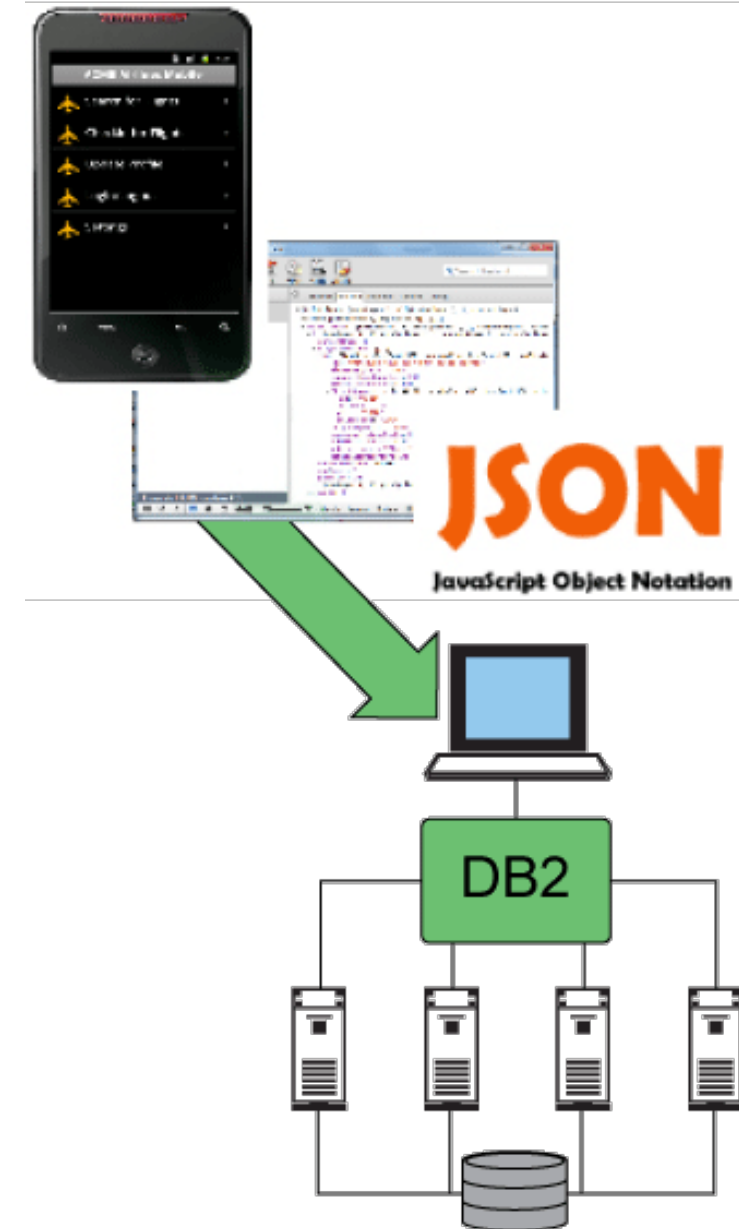
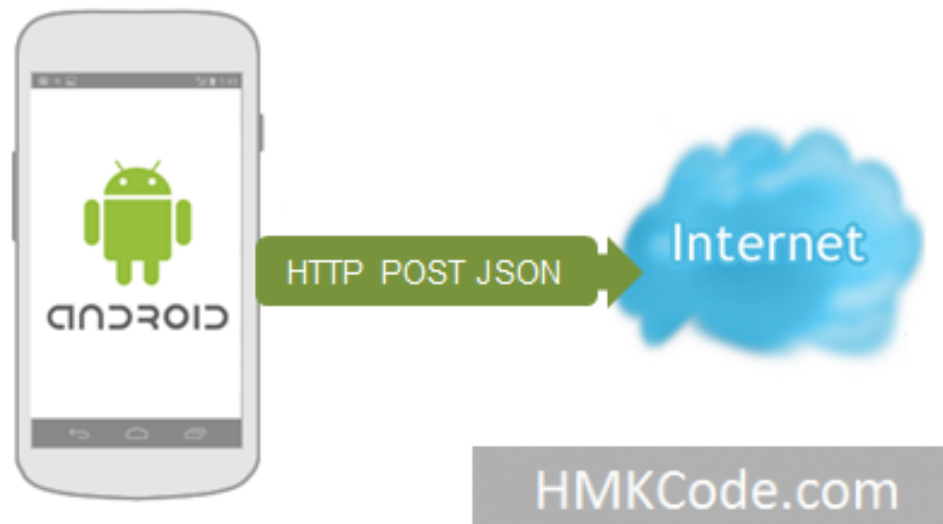
QUESTIONS?

DATA FORMAT, ACCESS & TRANSFORMATION

JSON, CSV, ETC...

JSON (JavaScript Object Notation) is:
a lightweight **data-interchange** format
a **string**

JSON can be passed
between **applications**
easy for **machines** to parse and generate



JSON are passed through applications
as **strings**
and converted into native objects per language.

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```
{ "empinfo" :  
  {  
    "employees" : [  
      {  
        "name" : "Scott Philip",  
        "salary" : f44k,  
        "age" : 27,  
      },  
      {  
        "name" : "Tim Henn",  
        "salary" : f40k,  
        "age" : 27,  
      },  
      {  
        "name" : "Long Yong",  
        "salary" : f40k,  
        "age" : 28,  
      }  
    ]  
  }  
}
```

```
import json  
  
py_object = [ { 'a':'A', 'b':(2, 4), 'c':3.0 } ]  
  
json_string = json.dumps(py_object)  
  
print 'JSON:', json_string
```

JSON: [{"a": "A", "c": 3.0, "b": [2, 4]}]

```
decoded = json.loads(json_string)
```

<https://docs.python.org/2/library/json.html>

CSV (Comma Separated Values):

```
name,game,points  
John,basketball,3  
Mary,volleyball,5  
James,ping pong,2  
...
```

CSV (Comma Separated Values):

- easy to read and write
- structured like a table
- very common
- can export to/from MS Excel

<https://docs.python.org/2/library/csv.html>

OTHER DATA FORMATS

txt

tsv

xml

dat

images

binary

etc...

DATA FORMAT, ACCESS & TRANSFORMATION

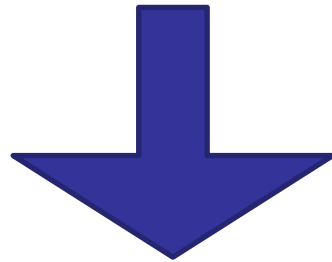
APIs

APIs (Application Programming Interface)
allow people to **interact** with the structures of
an application

- get
- put
- delete
- update
- ...

Best practices for APIs are to
use **RESTful** principles.

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use **RESTful** principles.



Representational State Transfer (REST)

RESTFUL EXAMPLE

RESTful API HTTP methods

Resource	GET	PUT	POST	DELETE
Collection URI, such as <code>http://example.com/resources/</code>	List the URIs and perhaps other details of the collection's members.	Replace the entire collection with another collection.	Create a new entry in the collection. The new entry's URI is assigned automatically and is usually returned by the operation. ^[9]	Delete the entire collection.
Element URI, such as <code>http://example.com/resources/item17</code>	Retrieve a representation of the addressed member of the collection, expressed in an appropriate Internet media type.	Replace the addressed member of the collection, or if it does not exist, create it.	Not generally used. Treat the addressed member as a collection in its own right and create a new entry in it. ^[9]	Delete the addressed member of the collection.

- The Base URL
- An interactive media type (usually JSON)
- Operations (GET, PUT, POST, DELETE)
- Driven by http requests

REST API EXAMPLE

Collection



GET <https://api.instagram.com/v1/users/10>



Operation

REST API EXAMPLE

**GET https://api.instagram.com/v1/users/
search/?q=andy**



Querystring

<https://dev.twitter.com/rest/public>

<https://developer.linkedin.com/docs/signin-with-linkedin>

<http://www.pythonapi.com/>

PAIR EXERCISE:

<http://www.pythonapi.com/>

- 1) CHOOSE 1 API: WHAT DATA YOU CAN GET?**
- 2) INSTALL PYTHON MODULE, TRY TO EXTRACT DATA**
- 3) DISCUSS: HOW COULD YOU LEVERAGE THAT API? HOW COULD YOU USE THE DATA?**

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DATA FORMAT, ACCESS & TRANSFORMATION

QUESTIONS?