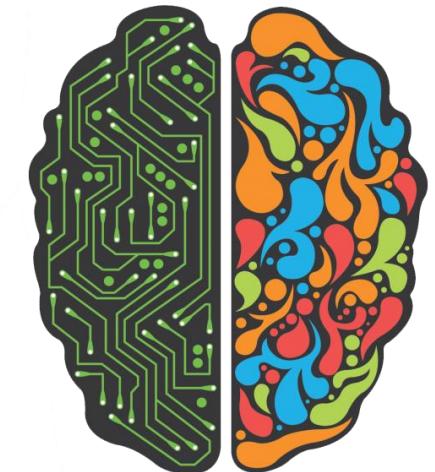


اللهم صرحي

Introduction Practical Machine Learning

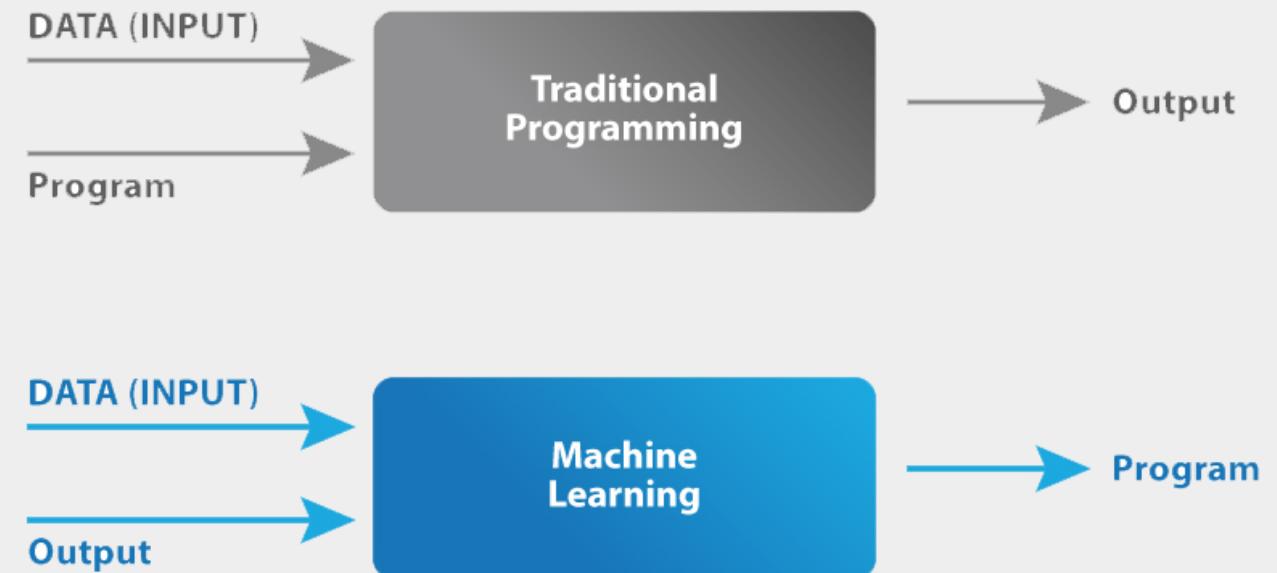
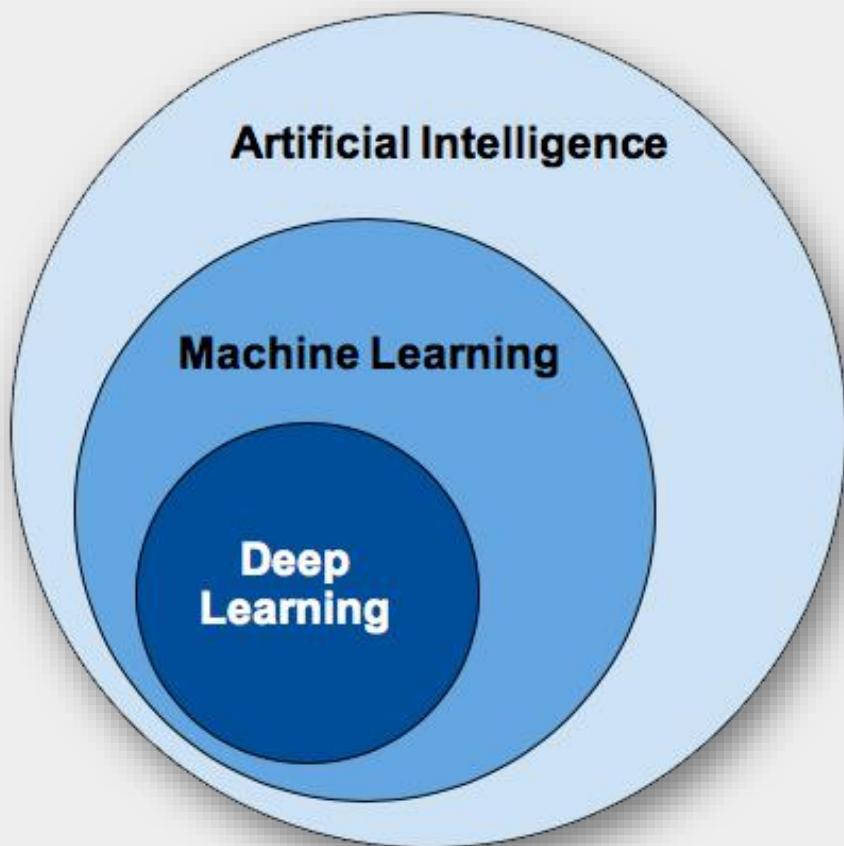


Outline

-  Machine Learning vs Deep Learning
-  Programming Language
-  Machine Learning Library
-  Development Environment (IDE)
-  DL Application and Results



Machine Learning



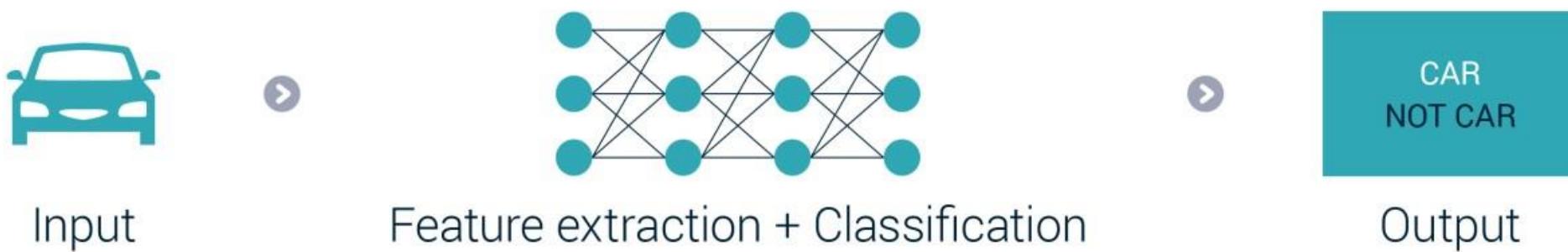


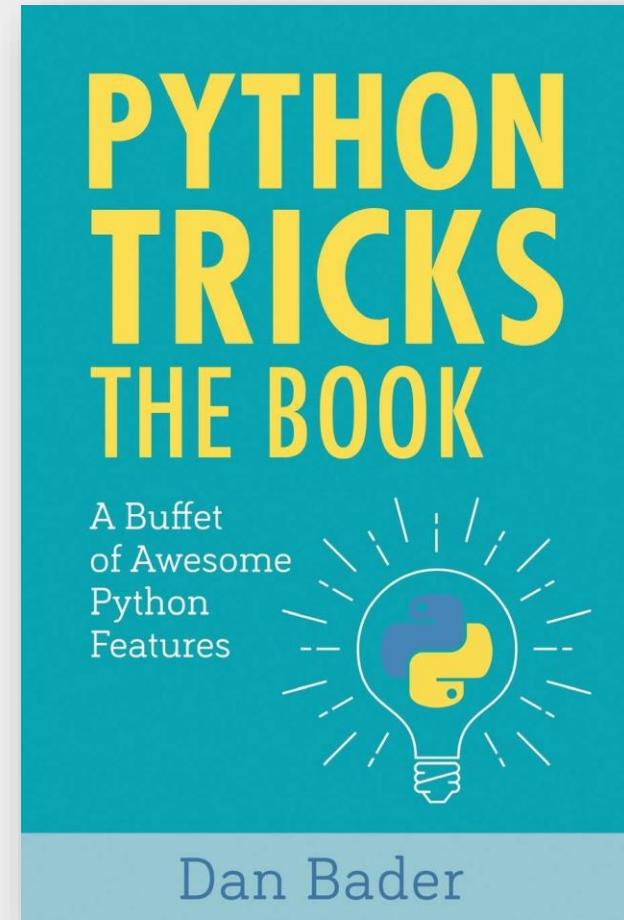
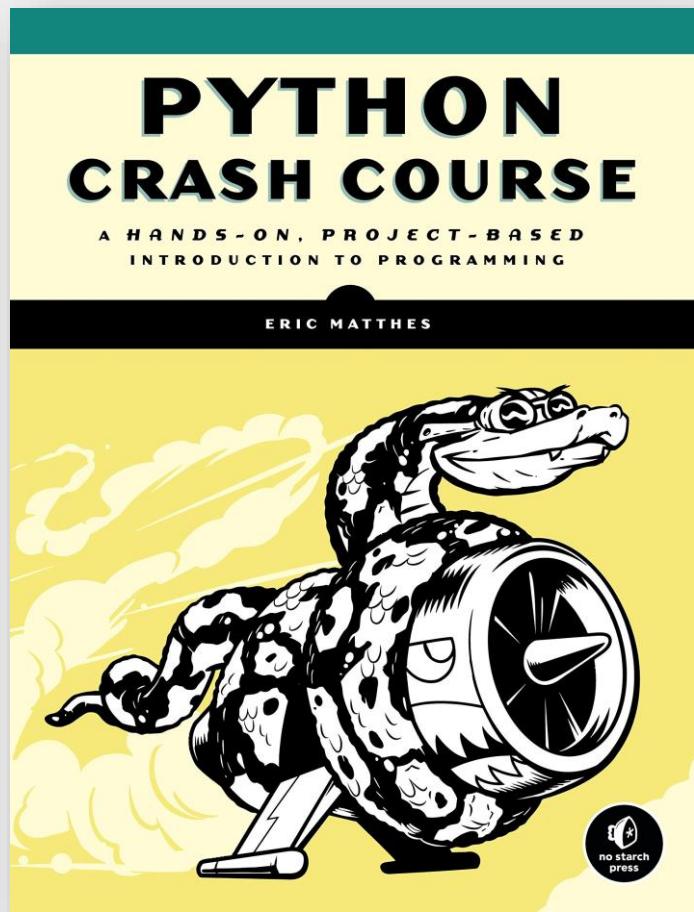
machine learning VS deep learning

Machine Learning



Deep Learning





<https://drive.google.com/file/d/1Qbwpy87Hk4vt2mc5rlhnrv199xjoPoVU/view?usp=sharing>



Learn Python Programming

TUTORIALS EXAMPLES REFERENCES ONLINE COMPILER

<https://www.programiz.com/python-programming>



<https://realpython.com/>

آموزش پایتون

۸ مقاله دوره:
این دوره توسط **ریکس اسدی** تالیف شده است.

۱۰ سطح دوره:
سطح این دوره مقدماتی است.

۲ پیش‌نیازها:
پیش‌نیاز دوره آموزش زبان پایتون، دوره آموزش اصول برنامه‌نویسی مهیاشد.

۵۵ تعداد آموزش‌ها:
۵۵ قسمت

برای شروع کلیک کنید <

<https://sokanacademy.com/courses/python>

Real Python Online Python Training

0:00 / 2:37

معرفی دوره آموزش پایتون مقدماتی

ثبت نام رایگان

<https://gotoclass.ir/>



Machine Learning Library



 TensorFlow

 Keras
A deep learning library

 PyTorch

scikit-learn

Machine Learning in Python

Getting Started

Release Highlights for 0.23

GitHub

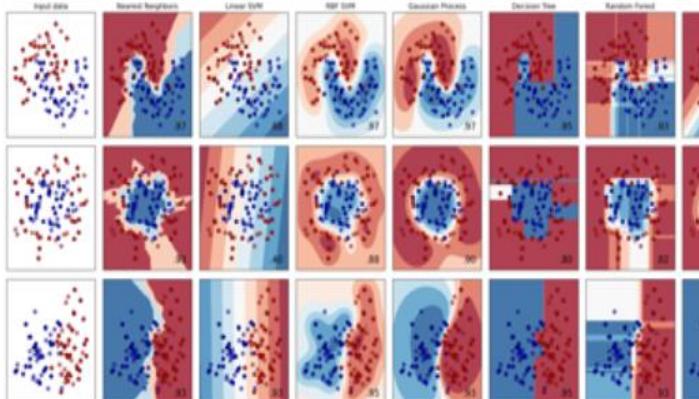
- Simple and efficient tools for predictive data analysis
- Accessible to everybody, and reusable in various contexts
- Built on NumPy, SciPy, and matplotlib
- Open source, commercially usable - BSD license

Classification

Identifying which category an object belongs to.

Applications: Spam detection, image recognition.

Algorithms: SVM, nearest neighbors, random forest, and more...

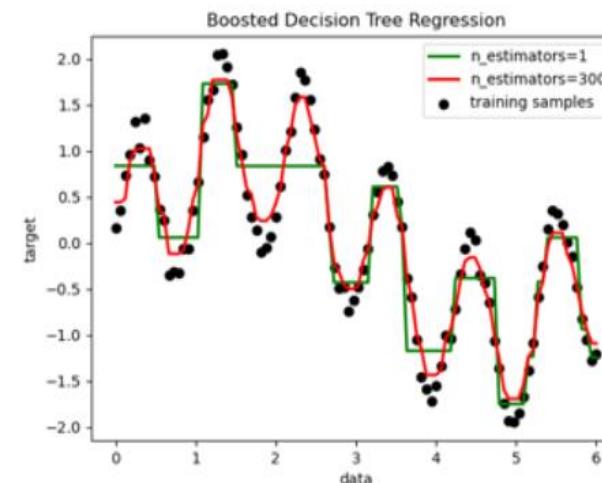


Regression

Predicting a continuous-valued attribute associated with an object.

Applications: Drug response, Stock prices.

Algorithms: SVR, nearest neighbors, random forest, and more...

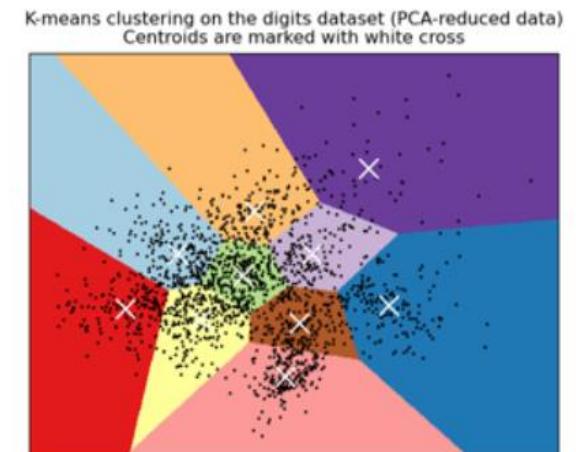


Clustering

Automatic grouping of similar objects into sets.

Applications: Customer segmentation, Grouping experiment outcomes

Algorithms: k-Means, spectral clustering, mean-shift, and more...



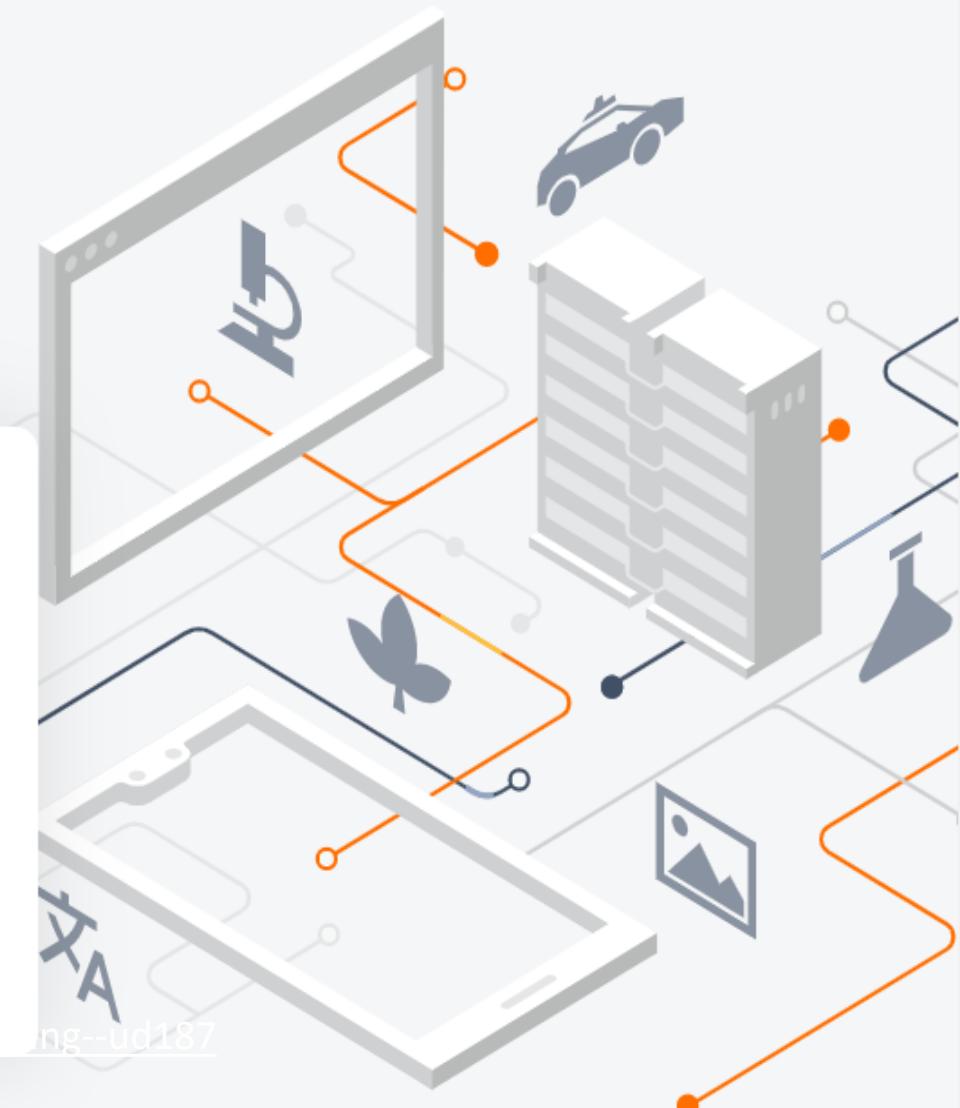
An end-to-end open source machine learning platform

[TensorFlow](#)[For JavaScript](#)[For Mobile & IoT](#)[For Production](#)

The core open source library to help you develop and train ML models. Get started quickly by running Colab notebooks directly in your browser.

[Get started with TensorFlow](#)

- <https://www.udacity.com/course/intro-to-tensorflow-for-deep-learning--ud187>
- <https://www.coursera.org/specializations/tensorflow-in-practice>



K Keras

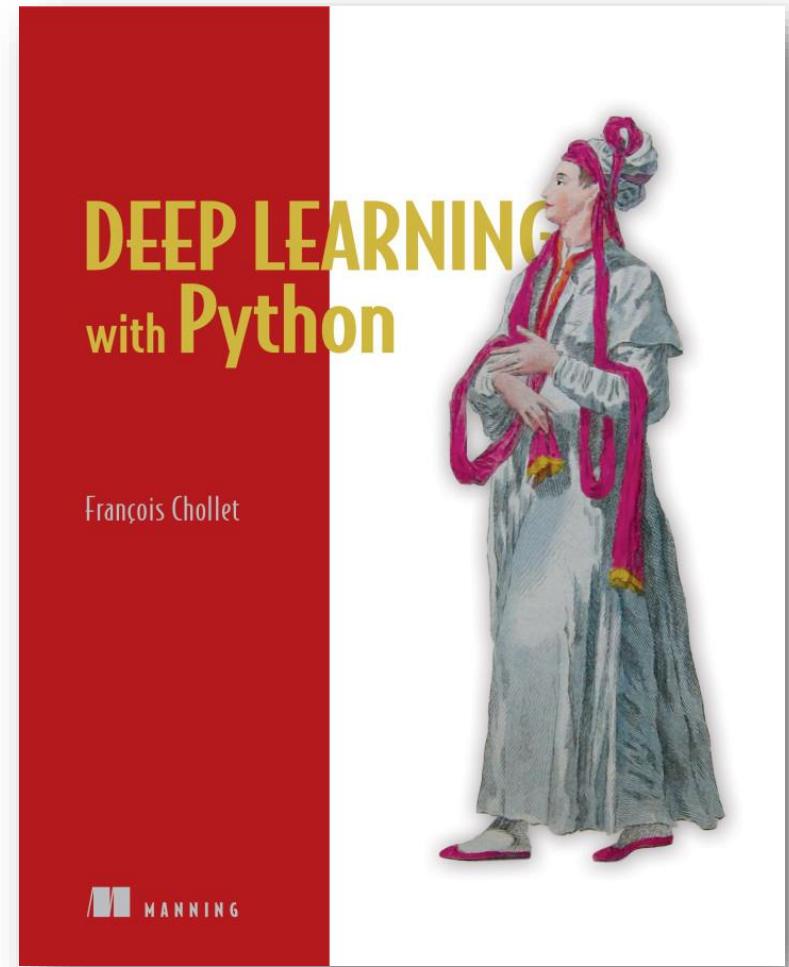
```
from tensorflow import keras
```

From straightforward

```
model = tf.keras.models.Sequential([
    tf.keras.layers.Flatten(),
    tf.keras.layers.Dense(512, activation='relu'),
    tf.keras.layers.Dropout(0.2),
    tf.keras.layers.Dense(10, activation='softmax')
])
model.compile(optimizer='adam',
              loss='sparse_categorical_crossentropy',
              metrics=['accuracy'])

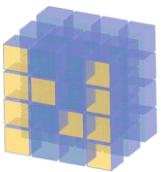
model.fit(x_train, y_train, epochs=5)
model.evaluate(x_test, y_test)
```

<https://keras.io/>

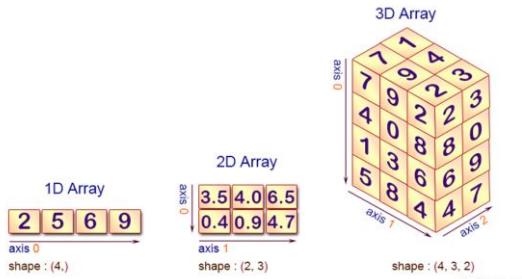


<https://www.manning.com/books/deep-learning-with-python>

Machine learning Tools



NumPy



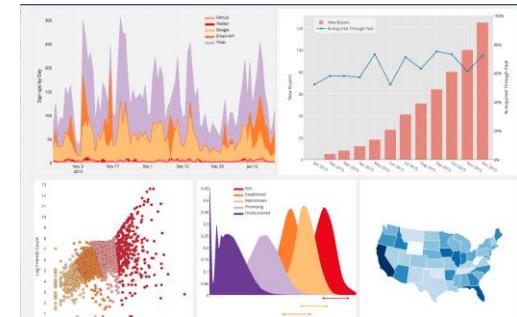
Pandas

A diagram illustrating the structure of a Pandas DataFrame:

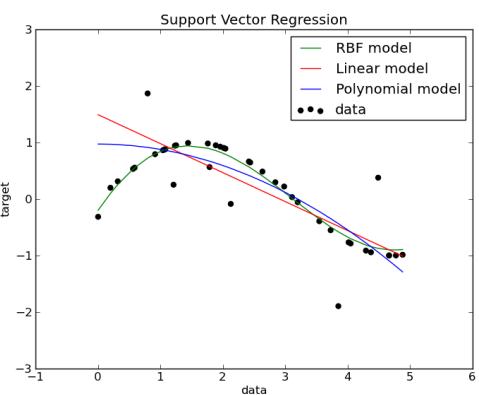
- Columns:** Name, Score, Attempts, Qualify
- Rows:** 0, 1, 2, 3, 4
- Data:** A table with the following data points:

	Name	Score	Attempts	Qualify
0	Anastasia	12.5	1	yes
1	Dima	9.0	3	no
2	Katherine	16.5	2	yes
3	James	NaN	3	no
4	Emily	9.0	2	no

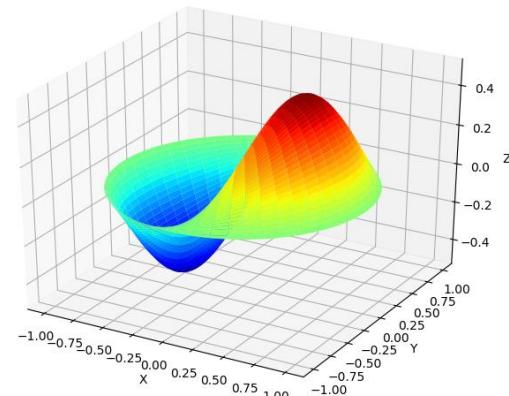
matplotlib



scikit
learn

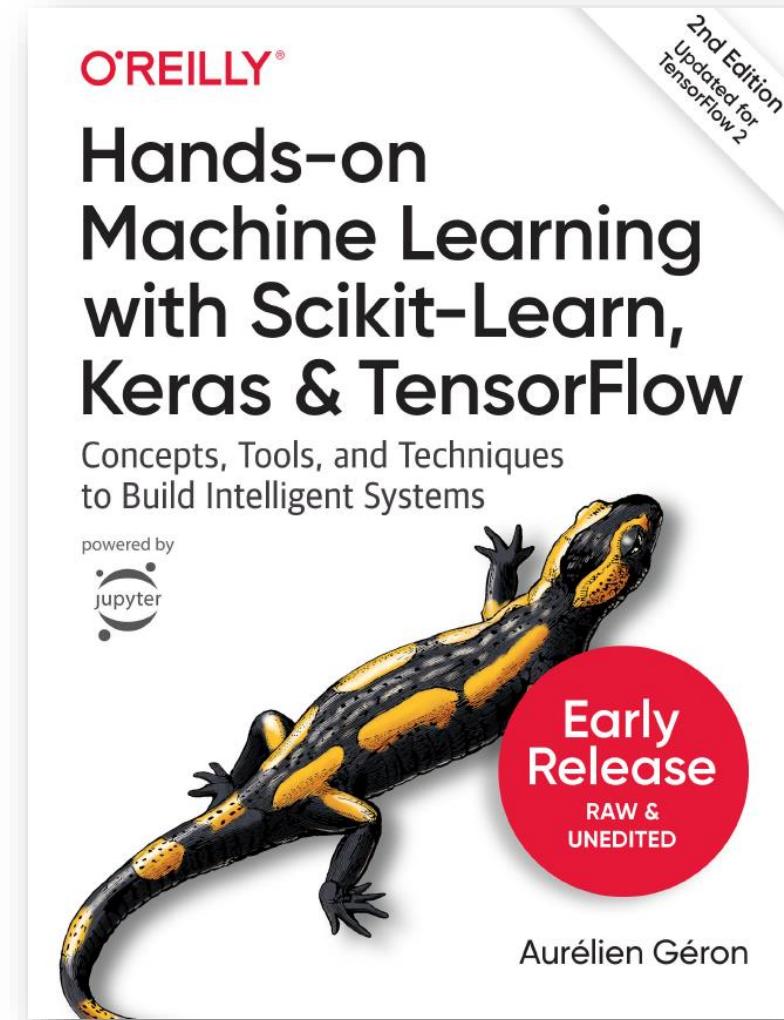


SciPy



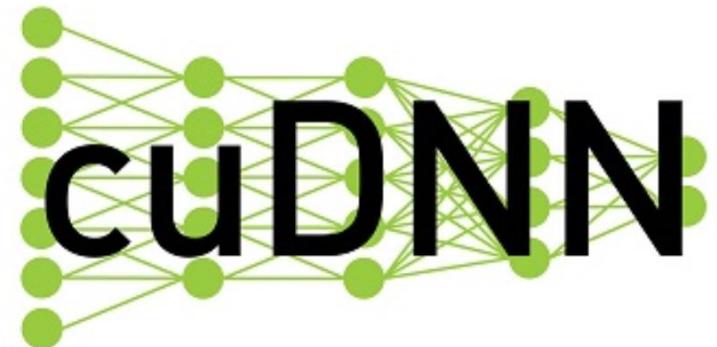


Machine Learning Book





Graphics processing unit

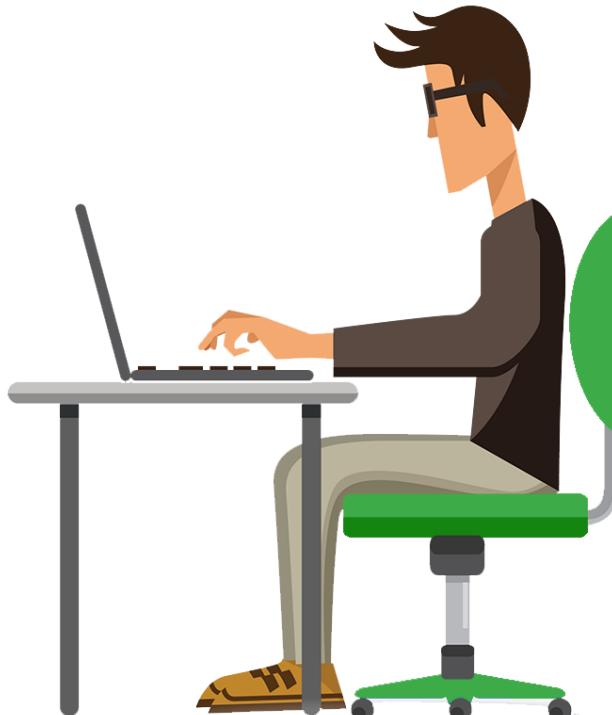




Ways to Running Deep Learning Model



On your Laptop



Professors' Lab



Google Colab



Google Colab

<https://colab.research.google.com/>

Copy of transfer learning ResNet 152.ipynb ☆

File Edit View Insert Runtime Tools Help Last edited on January 6

+ Code + Text

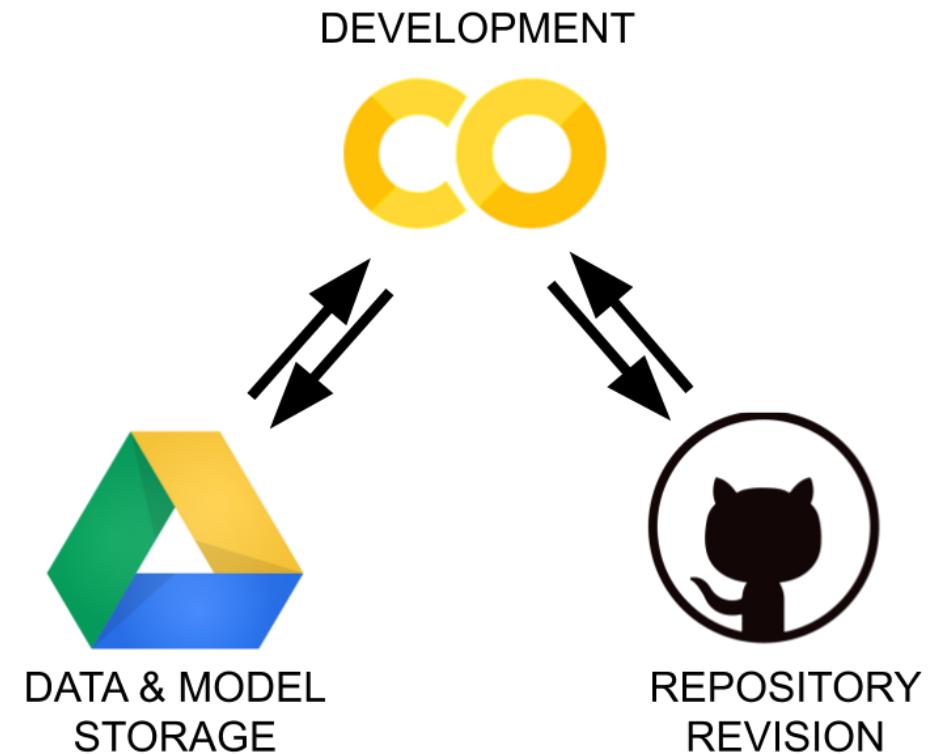
```
[ ] from google.colab import drive
drive.mount('/content/drive')

↳ Go to this URL in a browser: https://accounts.google.com/o/oauth2/auth?cli
Enter your authorization code:
.....
Mounted at /content/drive

[ ] %cd "/content/drive/My Drive/Colab Notebooks"

↳ /content/drive/My Drive/Colab Notebooks
```

- Nvidia Tesla T4
- RAM 12 GB
- 12 hours





<https://jupyter.org/>

IP[y]: Notebook spectrogram Last Checkpoint: a few seconds ago (autosaved) IPython (Python 3)

File Edit View Insert Cell Kernel Help Cell Toolbar: None

Simple spectral analysis

An illustration of the [Discrete Fourier Transform](#) using windowing, to reveal the frequency content of a sound signal.

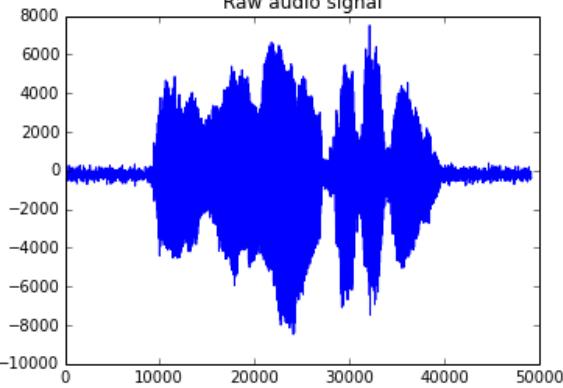
$$X_k = \sum_{n=0}^{N-1} x_n e^{-\frac{2\pi i}{N} kn} \quad k = 0, \dots, N - 1$$

We begin by loading a datafile using SciPy's audio file support:

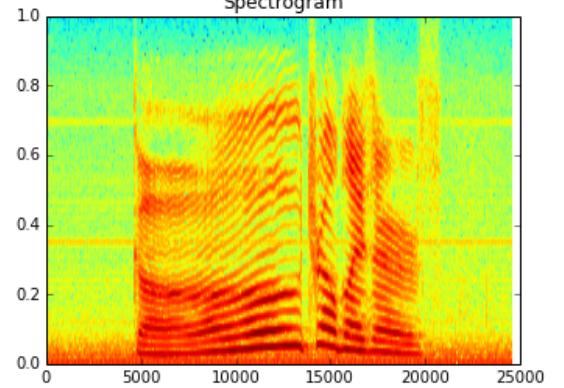
```
In [1]: from scipy.io import wavfile  
rate, x = wavfile.read('test_mono.wav')
```

And we can easily view its spectral structure using matplotlib's builtin specgram routine:

```
In [2]: %matplotlib inline  
from matplotlib import pyplot as plt  
fig, (ax1, ax2) = plt.subplots(1, 2, figsize=(12, 4))  
ax1.plot(x); ax1.set_title('Raw audio signal')  
ax2.specgram(x); ax2.set_title('Spectrogram');
```



A line plot titled "Raw audio signal" showing a waveform. The x-axis ranges from 0 to 50,000, and the y-axis ranges from -10,000 to 8,000. The signal consists of several sharp, periodic pulses.



A spectrogram titled "Spectrogram" showing frequency components over time. The x-axis ranges from 0 to 25,000, and the y-axis ranges from 0.0 to 1.0. The plot shows vertical bands of color representing power at different frequencies, with a prominent vertical line at approximately 14,000 Hz.



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Applications on

root

Channels

Refresh



jupyterlab

0.27.0

An extensible environment for interactive and reproducible computing, based on the Jupyter Notebook and Architecture.

[Launch](#)

notebook

5.0.0

Web-based, Interactive computing notebook environment: Edit and run human-readable docs while describing the data analysis.

[Launch](#)

qtconsole

4.3.1

PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more.

[Launch](#)

spyder

3.2.3

Scientific PYTHON Development EnvIRonment: Powerful Python IDE with advanced editing, interactive testing, debugging and introspection features

[Launch](#)

glueviz

0.10.4

Multidimensional data visualization across files. Explore relationships within and among related datasets.

[Install](#)

orange3

3.4.1

Component based data mining framework. Data visualization and data analysis for novice and expert. Interactive workflows with a large toolbox.

[Install](#)

rstudio

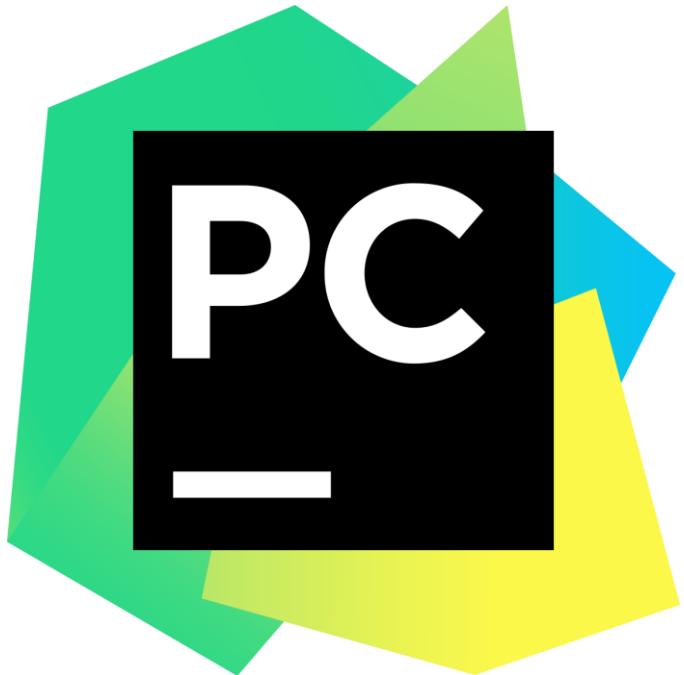
1.0.153

A set of integrated tools designed to help you be more productive with R. Includes R essentials and notebooks.

[Install](#)<https://www.anaconda.com/>



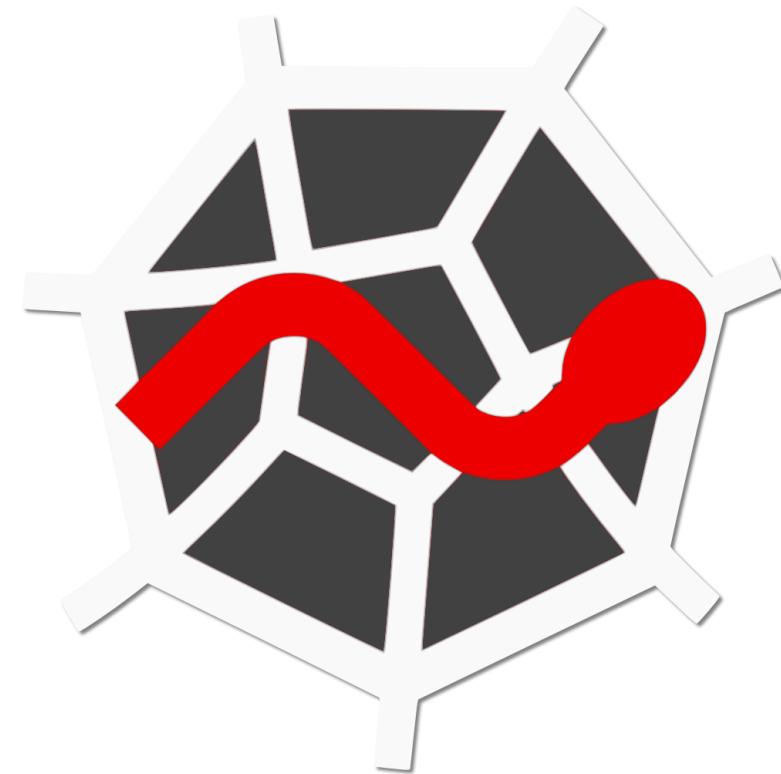
Popular IDE



Pycharm



Visual Studio Code



Spyder



In Class Competitions

- Home
- Compete
- Data
- Notebooks
- Discuss
- Courses
- More

Recently Started • Ongoing • 10222 Teams

All Competitions

Active Completed InClass All Categories ▾ Reward ▾

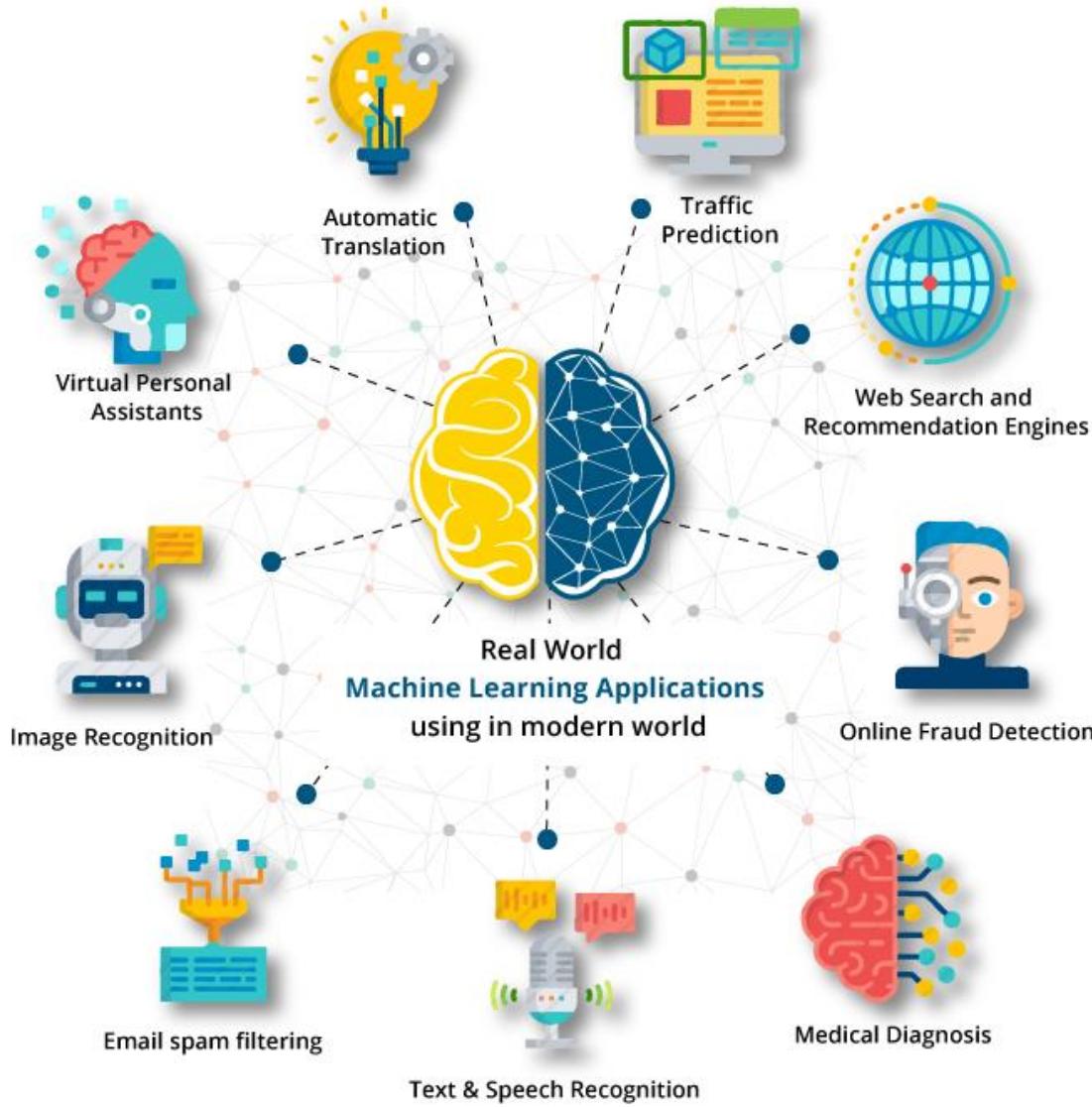
#DFDC	Deepfake Detection Challenge Identify videos with facial or voice manipulations Featured • a month to go • Code Competition • 1822 Teams	\$1,000,000
	Google Cloud & NCAA® ML Competition 2020-NCAAM Apply Machine Learning to NCAA® March Madness® Featured • a month to go • 195 Teams	\$25,000
	Google Cloud & NCAA® ML Competition 2020-NCAAW Apply Machine Learning to NCAA® March Madness® Featured • a month to go • 120 Teams	\$25,000
	DS4G: Environmental Insights Explorer Exploring alternatives for emissions factor calculations Analytics • a month to go	\$25,000
	Google Cloud & NCAA® March Madness Analytics Uncover the madness of March Madness® Analytics • 2 months to go	\$25,000

<https://www.kaggle.com/c/deepfake-detection-challenge>

<https://www.kaggle.com/competitions>

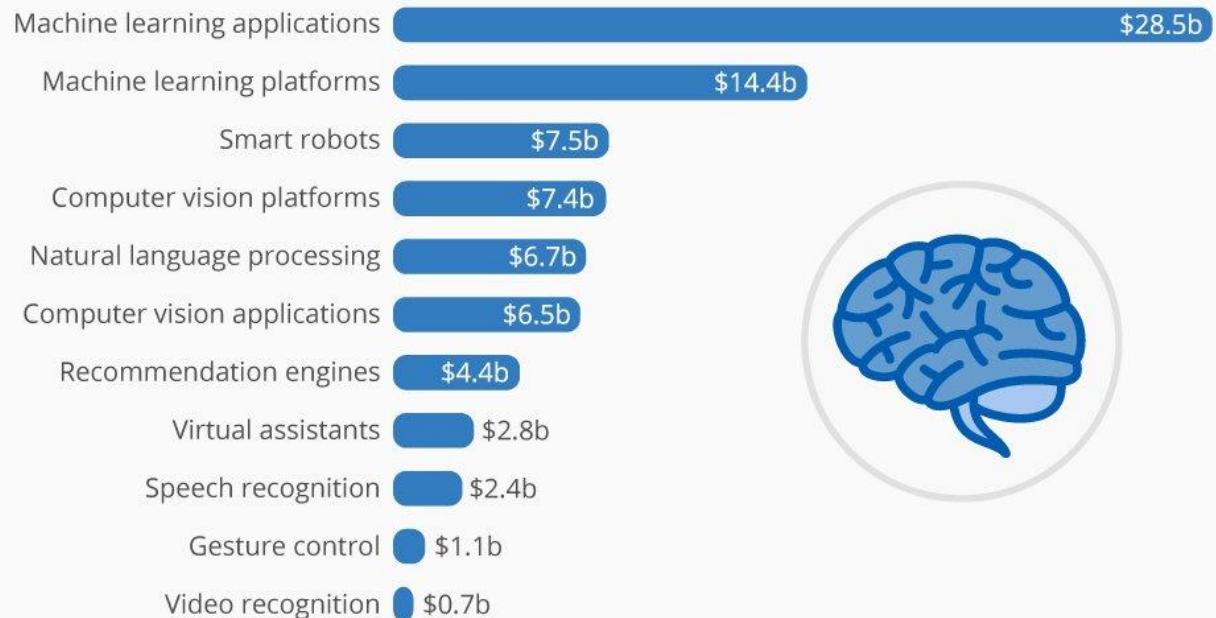


Real-world Application of Machine learning



Machine Learning Tops AI Dollars

AI funding worldwide cumulative through March 2019 (in billion U.S. dollars), by category



@StatistaCharts

Sources: Venture Scanner, Statista estimates

RESULTS





thank
YOU
so MUCH

The image features the words "thank", "YOU", and "so MUCH" in a stylized, hand-drawn font. "thank" is written in a teal, textured font at the top. "YOU" is in a large, bold, red font in the center, flanked by three small gold stars. "so MUCH" is written in a teal, textured font at the bottom. The design is accented with decorative elements: two red teardrop shapes at the top and bottom, a gold ribbon-like swirl behind "YOU", and a gold arrow pointing from each end of the swirl towards the bottom. Red diagonal hatching is at the bottom.