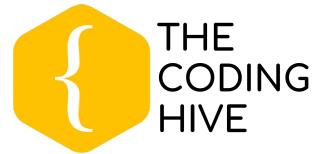




Artificial Intelligence 101

August 8th, 2020



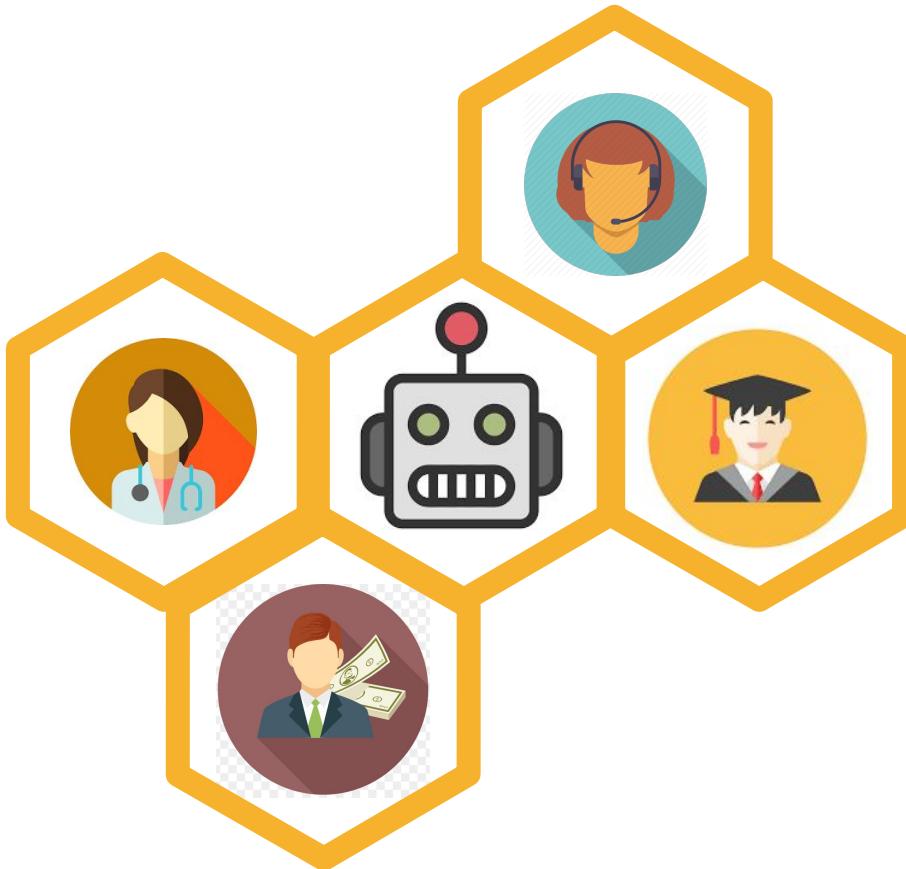


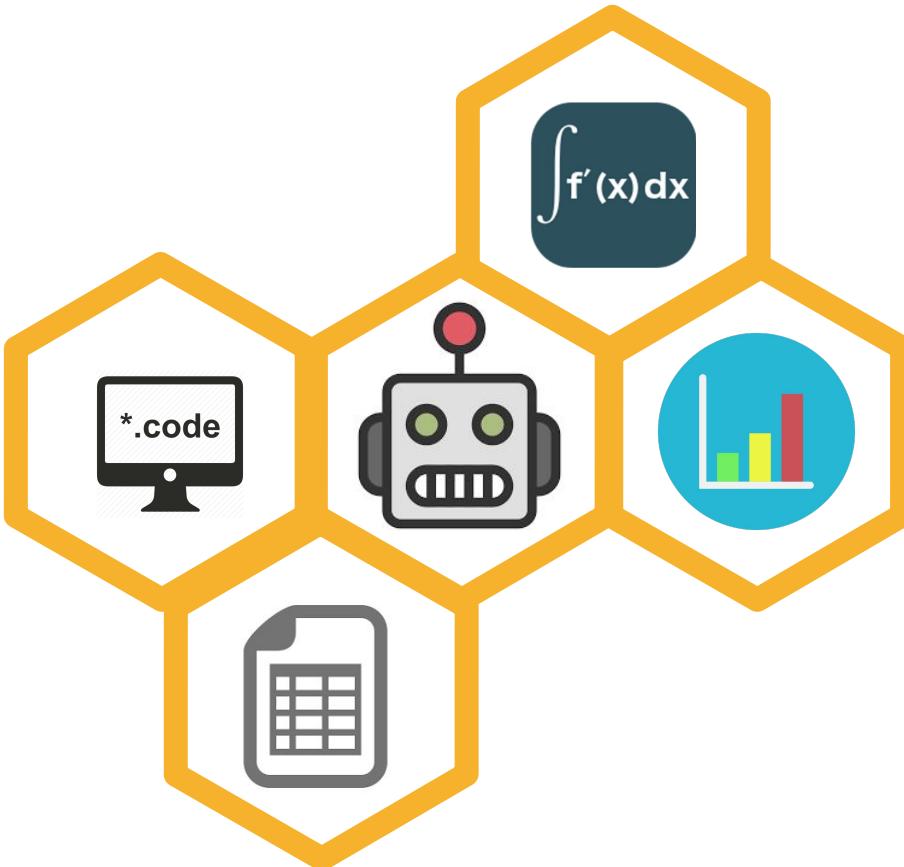
THE
CODING HIVE data mining workshops for beginners

WORKSHOPS LEARN MORE OUR TEAM



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contact@thecodinghive.com



www.thecodinghive.com



Agenda:

- 1) Data Science and its Applications
- 2) Data Science Learning Paths
- 3) Coding Session: Customer Churn Prediction
- 4) Machine Learning Deep Dive



now



Intro to Artificial Intelligence



Data Exploration



Model Implementation



Next Week



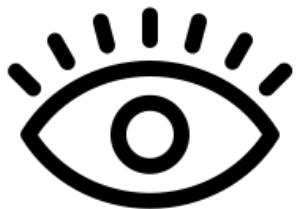


Develop an application/model
that predicts if a customer is going
to leave the company(churn)

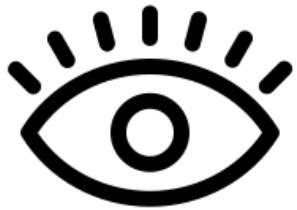




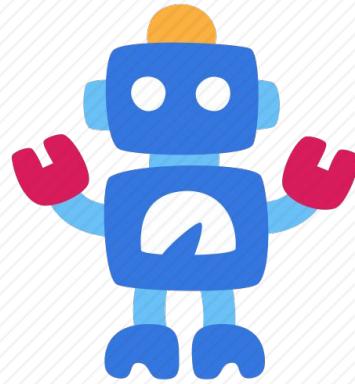
What is Data Science?



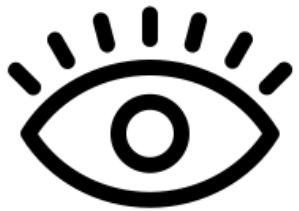
COLLECT



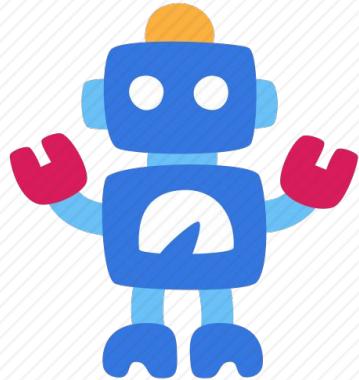
COLLECT



LEARN



COLLECT

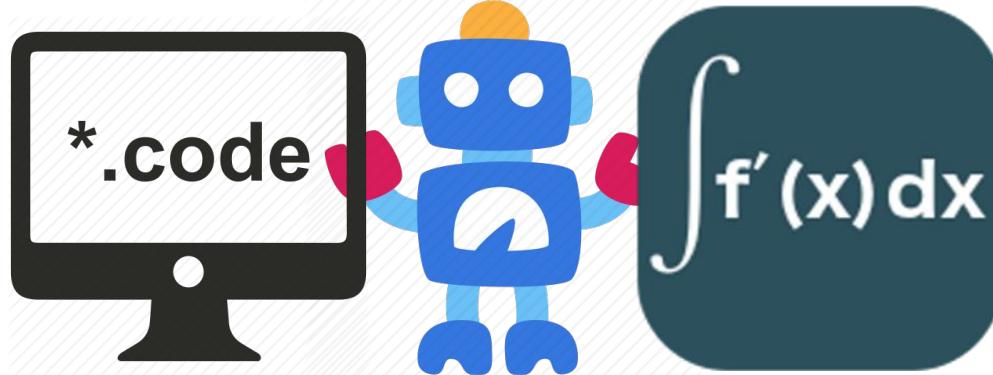


LEARN



MAKE DECISIONS





Machine Learning



TOP 10 MACHINE LEARNING ALGORITHMS YOU SHOULD KNOW

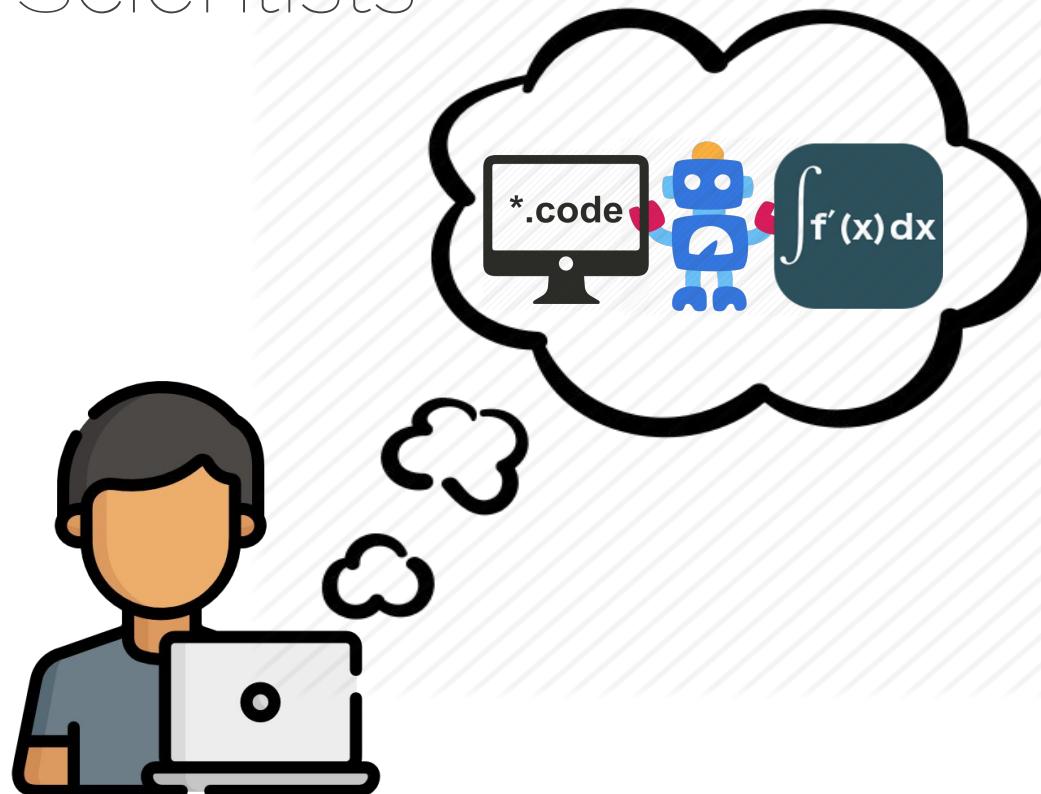




80% of the world's data is **unstructured**



Data Scientists



Data Science Applications



Banking and Securities



Education



Insurance



Media & Entertainment



Manufacturing



Retail



Healthcare Providers

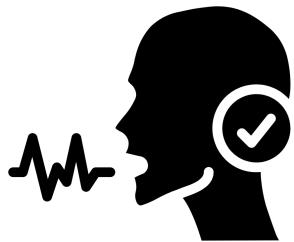


Government



Energy





Speech Recognition

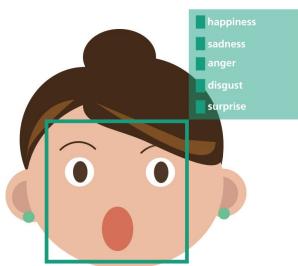
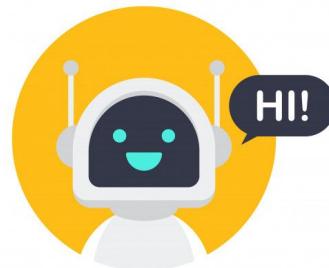
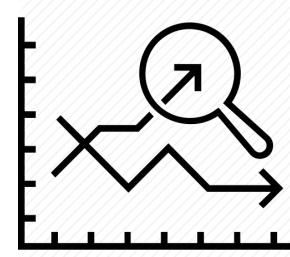


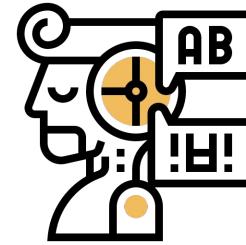
Image Recognition



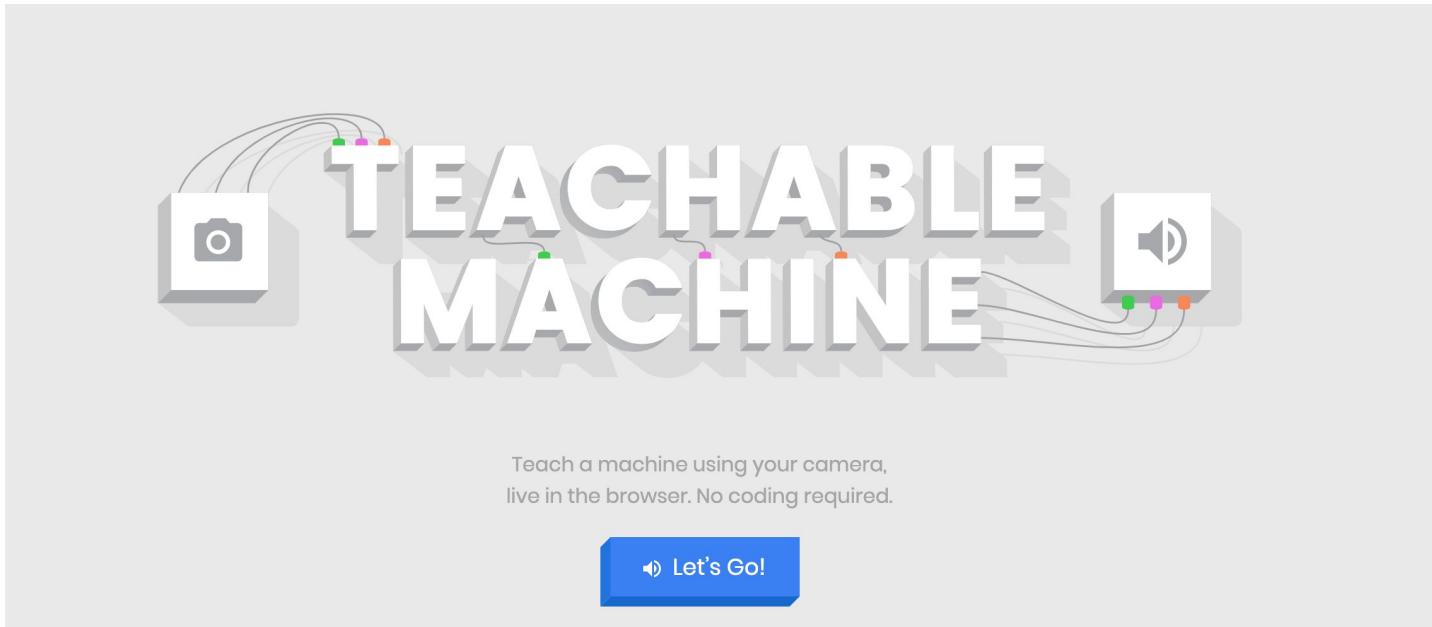
Chatbots



Predictive Analytics



Text Classification



The image shows the Teachable Machine landing page. At the top, there's a large, stylized 3D text "TEACHABLE MACHINE". To the left of the text is a camera icon, and to the right is a speaker icon, both connected by a network of colored wires (red, green, blue). Below the main title, there's a subtitle: "Teach a machine using your camera, live in the browser. No coding required." At the bottom center is a blue button with the text "Let's Go!" and a small speaker icon.

TEACHABLE
MACHINE

Teach a machine using your camera,
live in the browser. No coding required.

Let's Go!

<https://teachablemachine.withgoogle.com/>

Sentiment Analysis



Demo

API

Integrate

 Sentiment Analysis
English

This is a generic sentiment analysis classifier for texts in English. It works great in any kind of texts. If you are not sure of which sentiment analysis classifier to use, use this one.

Negative Neutral Positive

Test with your own text

Artificial intelligence is really cool!

Classify Text

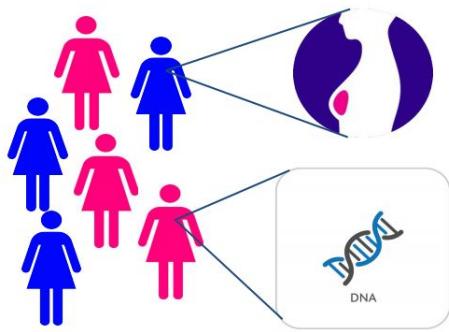
LIST JSON

TAG	CONFIDENCE
Positive	80.1%

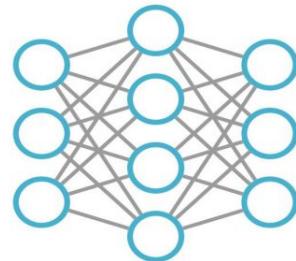
http://bit.ly/sentiment_tool



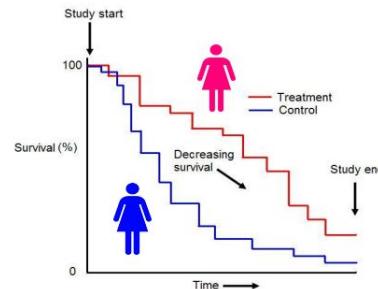
Cancer Research



Cancer Patients



Features



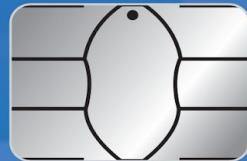
Machine Learning



Classification/Biomarker

Treatment





4514 1234 5678 1234

4514

EXPIRATION: END OF ►

MONTH/YEAR

00/00

G RAYMOND

VISA*

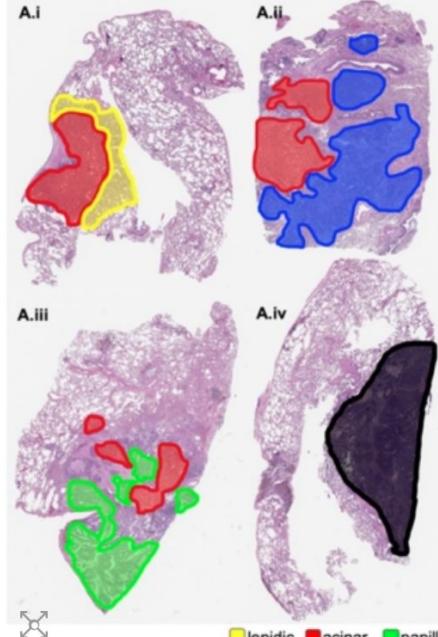


BIOPHYSICS AND BIOENGINEERING RESEARCH UPDATE

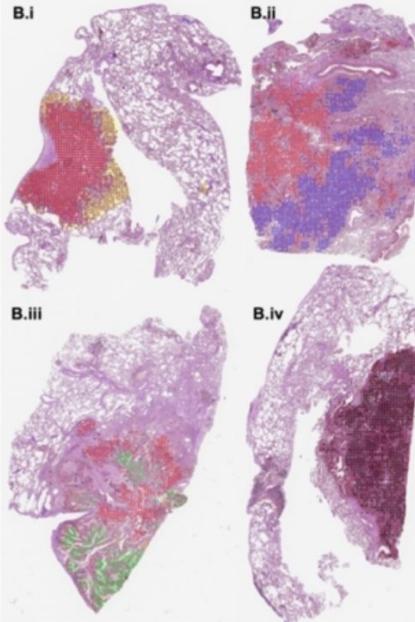
Deep-learning model analyses lung cancer histopathology slides

26 Apr 2019 Catherine Steffel

Pathologists' Annotation



Deep Learning Model



lepidic acinar papillary micropapillary solid

Colour-coded histologic patterns identified by pathologists (left) and the researchers' deep-learning model (right). (Courtesy: Hassanpour Lab, Dartmouth's Norris Cotton Cancer Center)



X-Ray Analyzer



Chester the AI Radiology Assistant

NOT FOR MEDICAL USE. This is a web based (but locally run) prototype system for diagnosing chest X-ray images. The patient data remains on your computer and all computation occurs in your browser. The goals of this system are:

1. Let people play with deep learning tools to know how they work and their limitations.
2. Show the potential of open data (needed to build a public system like this).
3. Create a tool to help teach radiology.
4. Demonstrate a model delivery system that can scale to provide free medical tools to the world.

The screenshot shows a YouTube video player with the following details:

- Title:** Intro to Chester the AI Radiology Assistant
- Uploader:** Chester the AI Radiology Assistant
- Date:** By Joseph Paul Cohen, Paul Berlin, and Vincent Frappier 2019
- Views:** Done in 14226ms
- Made by:** Mila Medical
- Description:** Process an image locally. Choose file. No file chosen. Download example files
- Content:** Example Image (00000001_001-Cardiomegaly-Emphysema.png). It shows two X-ray images side-by-side. The left image is labeled "Input Image" and the right is "Predictive image regions". Below the images is a heatmap showing regions of influence. To the right is a "Disease Predictions" chart with a color scale from green (Healthy) to red (Risk of disease). The diseases listed are: Atelectasis, Cardiomegaly, Effusion, Infiltration, Mass, Nodule, Pneumonia, Pneumothorax, Edema, Emphysema, Fibrosis, Pleural Thickening, and Hemato.
- Right Panel:** A file explorer window titled "Watch later" showing a list of files related to the X-ray images, including "side-cardiomegaly1.png", "side-cardiomegaly1-oed.png", "pneu-Chest-X-ray-showing...lower lobe-pneumonia.png", "Pneumonia-X-ray-Pictures-7.jpg", "overview.pdf", "oschner-archdischild-2012_97-Suppl 1-A10-F1large.jpg", "oschner-archdischild-2012_97-Suppl 1-A10-F1large-oed.png", "knee.png", "knee-oed.png", "cat.jpg", "cat-oed.png", "41654.png", "41654_oed.png", "00000001_002-Cardiomegaly-Effusion2.png", "00000001_000-Cardiomegaly.png", "00000001_000-Cardiomegaly-pred.png", "00000001_000-Cardiomegaly-oed.png", and "00000001_002-Cardiomegaly-oed.png".
- Bottom:** YouTube controls including play, volume, and progress bar (2:17 / 4:09), and a "Send Feedback" button.

<https://mlmed.org/tools/xray/>



60%

expected increase in a
retailer's operating margin
who uses big data

Source: mckinsey.com



The Business Benefits of AI

We surveyed 250 executives who were familiar with their companies' use of cognitive technologies to learn about their goals for AI initiatives. More than half said their primary goal was to make existing products better. Reducing head count was mentioned by only 22%.

PERCENTAGE OF EXECUTIVES WHO CITE THE FOLLOWING AS BENEFITS OF AI

Enhance the features, functions,
and performance of our products **51%**

Optimize internal
business operations **36**

Free up workers to be more
creative by automating tasks **36**

Make better
decisions **35**

Create new
products **32**

Optimize external processes
like marketing and sales **30**

Pursue new
markets **25**

Capture and apply scarce
knowledge where needed **25**

Reduce head count
through automation **22**

SOURCE: DELOITTE 2017
FROM "ARTIFICIAL INTELLIGENCE FOR THE REAL WORLD,"
BY THOMAS H. DAVENPORT AND RAJEEV RONANKI, JANUARY-FEBRUARY 2018

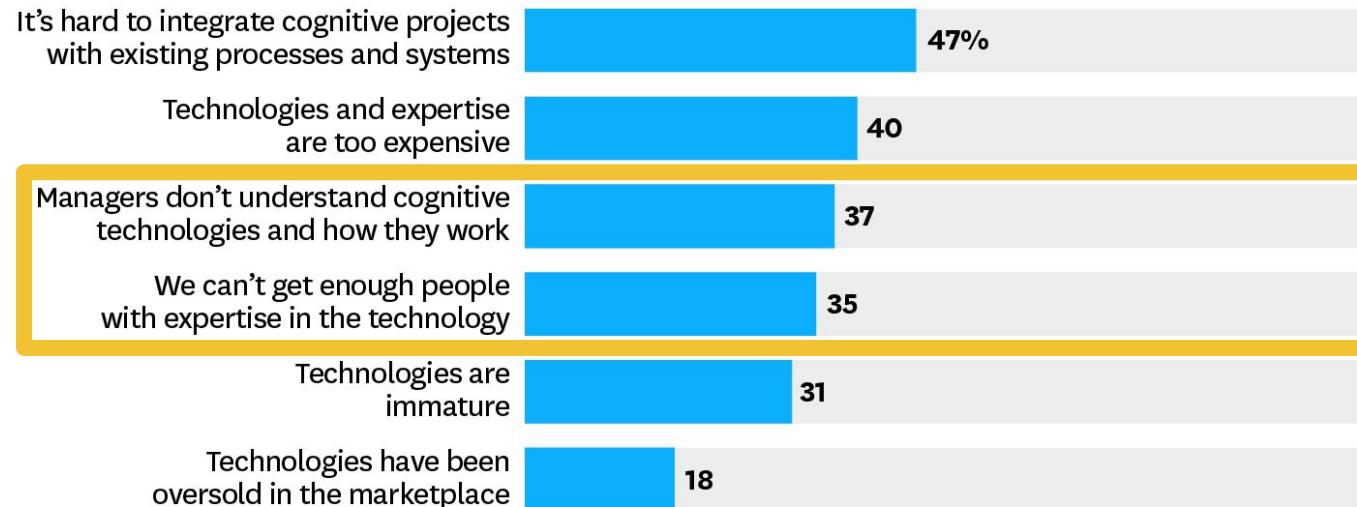
© HBR.ORG



The Challenges of AI

Executives in our survey identified several factors that can stall or derail AI initiatives, ranging from integration issues to scarcity of talent.

PERCENTAGE WHO CITE THE FOLLOWING AS OBSTACLES

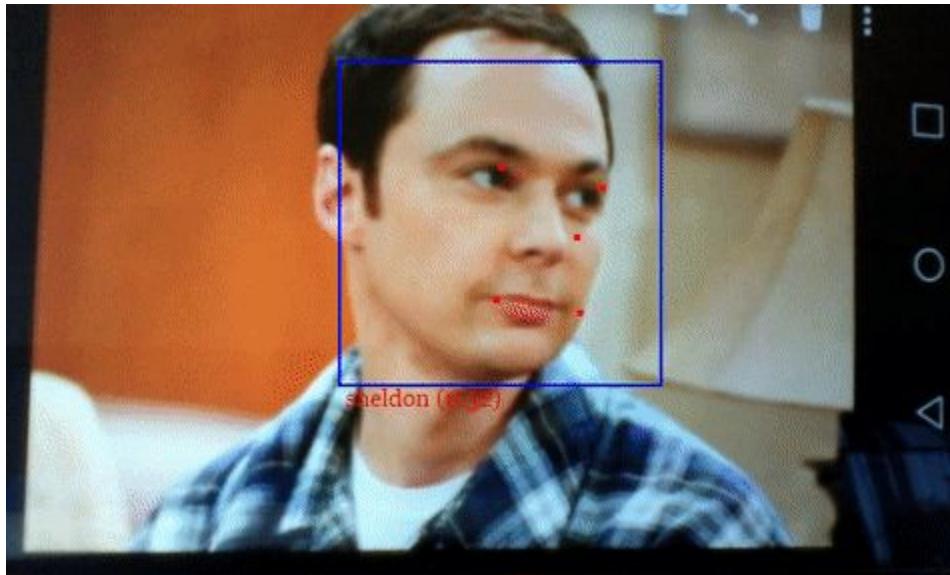


SOURCE DELOITTE 2017
FROM "ARTIFICIAL INTELLIGENCE FOR THE REAL WORLD,"
BY THOMAS H. DAVENPORT AND RAJEEV RONANKI, JANUARY-FEBRUARY 2018

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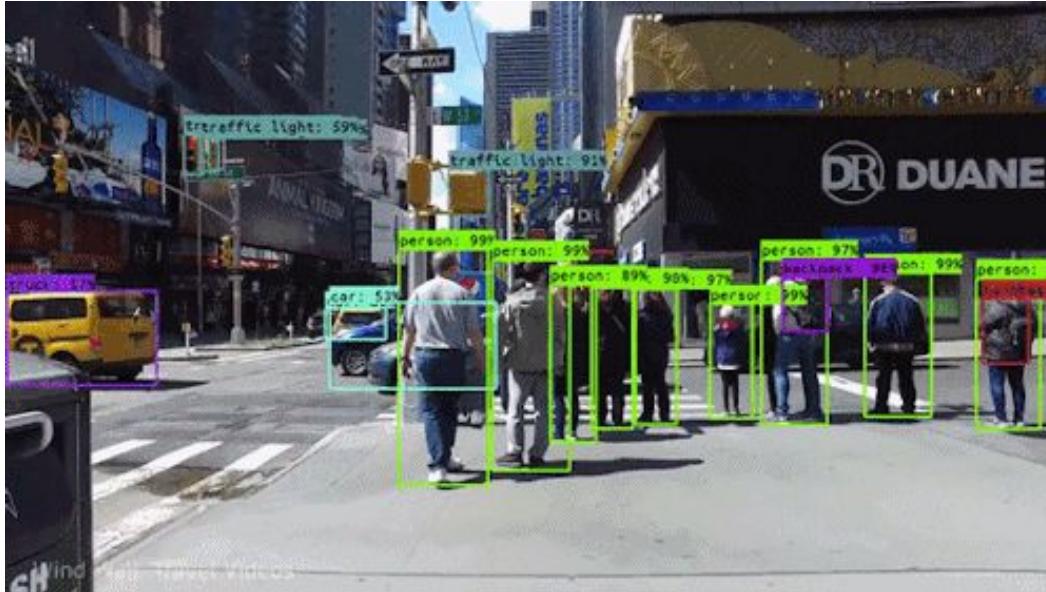


DeepFace: Closing the Gap to Human-Level Performance in Face Verification

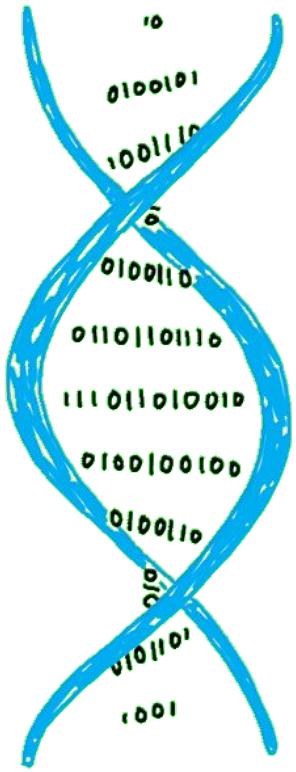


facebook research

Self-Driving Cars



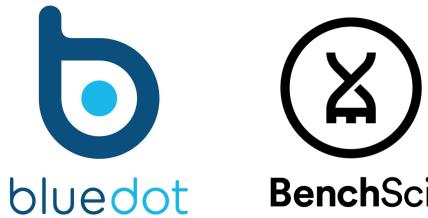
Uber Engineering



SickKids®



deep
genomics





BOREALIS AI

RBC Institute for Research



Wealthsimple



LoblawDIGITAL





AI Application in Startups



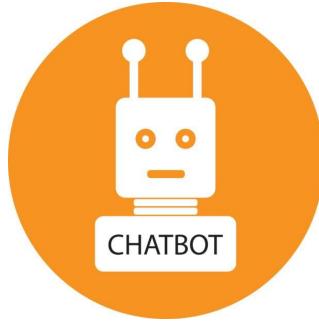
Human Resources



RESTLESS BANDIT



Customer Service



Watson Assistant, Bold360 Rulai, LivePerson, Inbenta, and Ada



Management and Organization





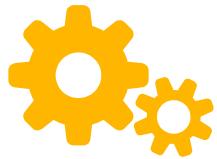
Marketing and Business Insights



<https://www.adext.ai/>



Data Science Workflow

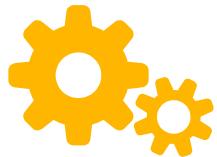


A Day in The Life of a Data Scientist



1

Define
problem



A Day in The Life of a Data Scientist

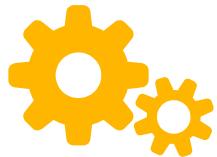


1

Define
problem

2

Explore data



A Day in The Life of a Data Scientist



1

Define
problem

2

Explore data

3

Model



A Day in The Life of a Data Scientist



1

Define
problem

2

Explore data

3

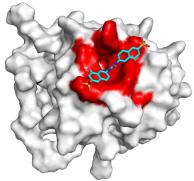
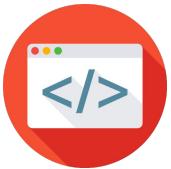
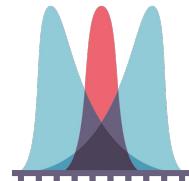
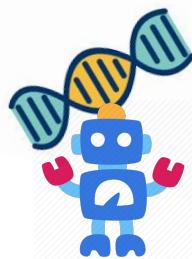
Model

4

Communicate



Becoming A Data Scientist

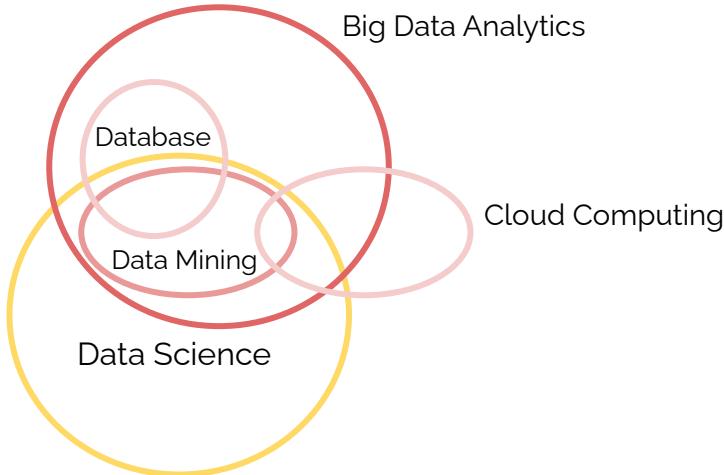


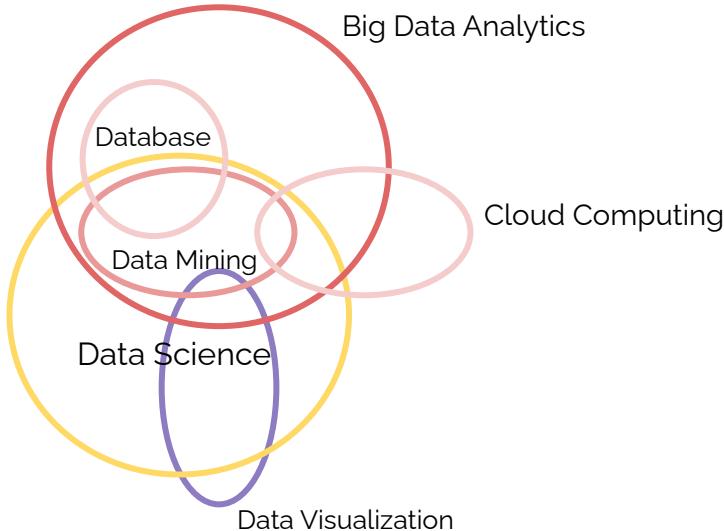
Seneca

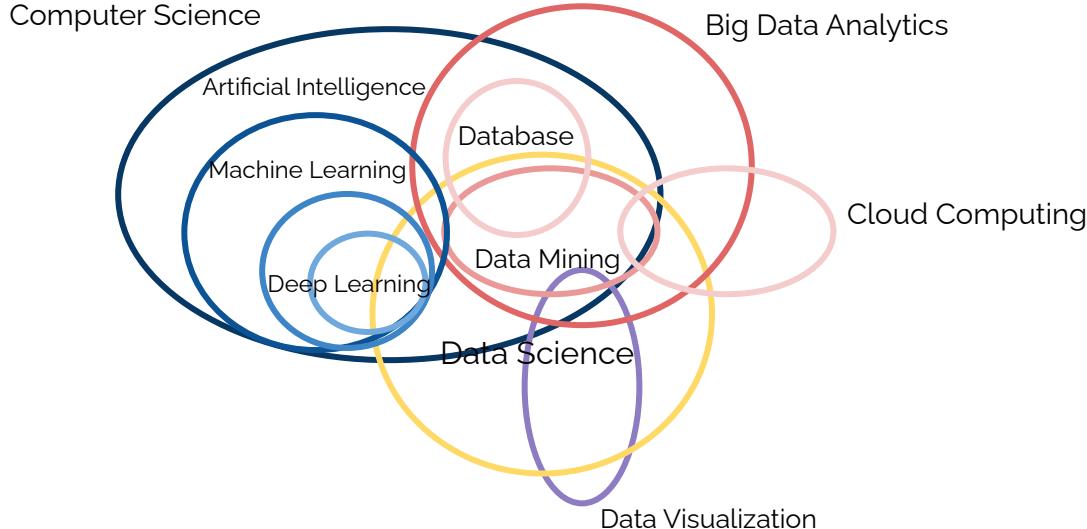


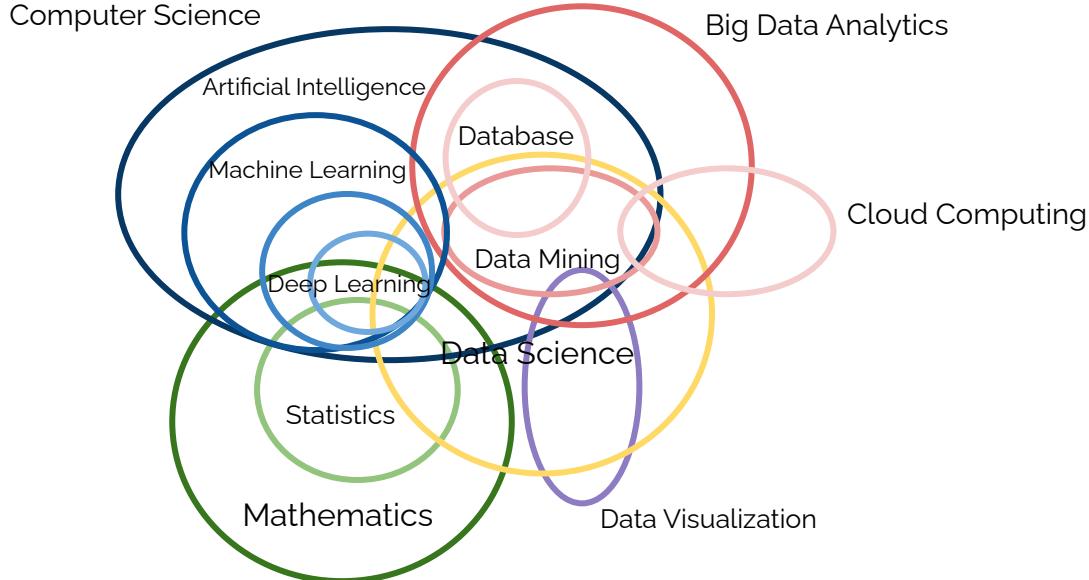
Data Science Skills

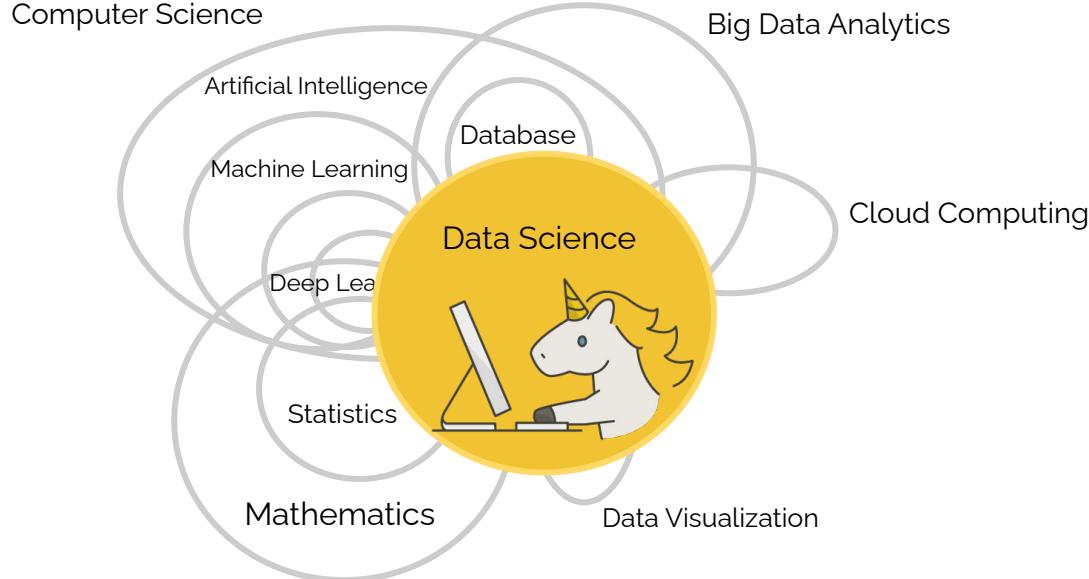




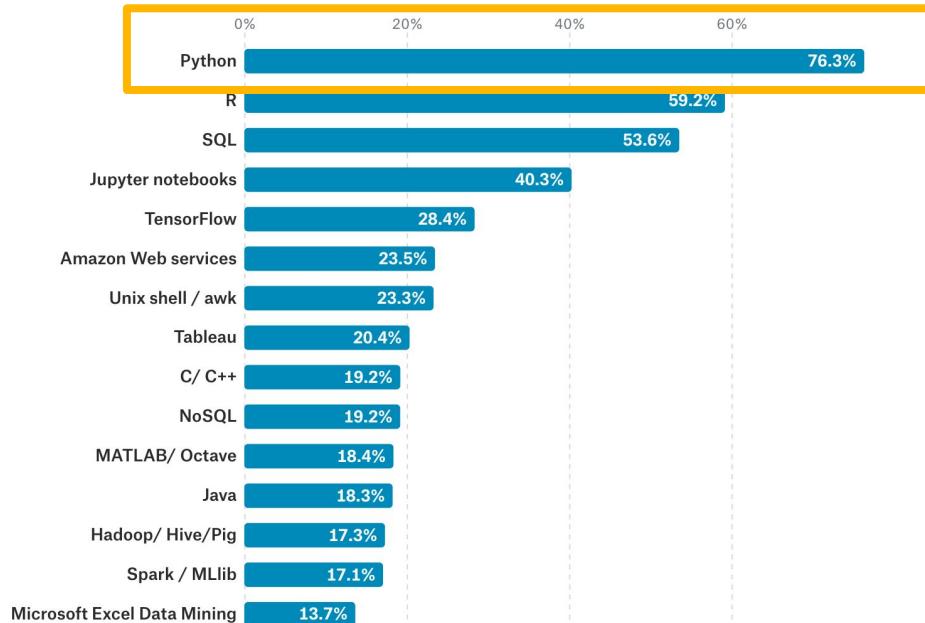








Data Science Tools

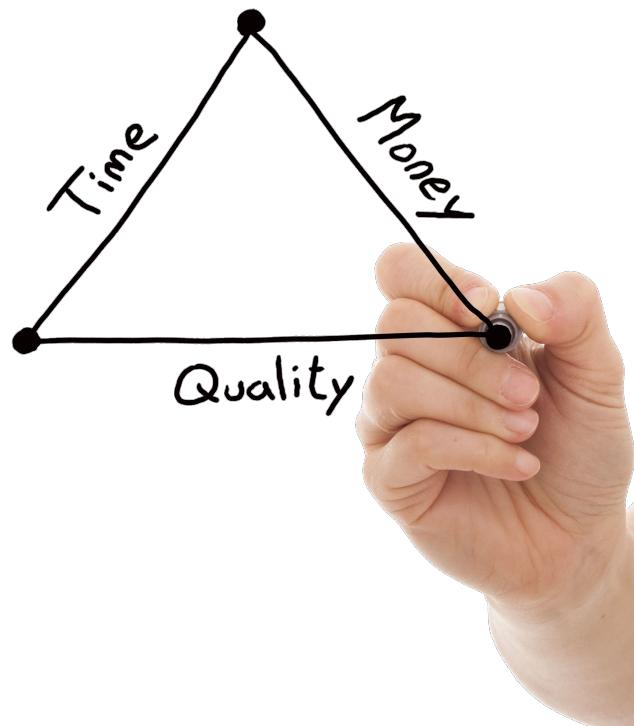


7,955 responses

Only displaying the top 15 answers. There are 38 answers not shown.

View code in Kaggle Kernels

Learning Resources



Blogs (10-30 min)



- **Towards Data Science** (towardsdatascience.com)
- **Machine Learning Mastery** (machinelearningmastery.com)
- **R-Bloggers** (r-bloggers.com)
- **KDnuggets** ([kdnuggets.com](https://www.kdnuggets.com))
- **Explained.ai** (explained.ai)
- **Analytics Vidhya** ([analyticsvidhya.com](https://www.analyticsvidhya.com))

Online Courses (weeks/months)



UDACITY

Online Courses (weeks/months)



- Introduction to Data Science in Python (University of Michigan, 16 hours)

coursera

- Learn Data Science with R (9 hours)

Udemy

- I Heart Stats: Learning to Love Statistics (4 weeks)

edX

- Machine Learning for Data Science and Analytics (5 weeks)

edX

Data Science Programs



UNIVERSITY OF TORONTO
SCHOOL OF CONTINUING STUDIES

<https://learn.utoronto.ca/programs-courses/certificates/data-science>



<https://continue.yorku.ca/certificates/big-data-analytics-program/certificate-in-advanced-data-science-and-predictive-analytics/>



<https://coned.georgebrown.ca/courses-and-certificates/data-science-program/>



<https://pd.uwaterloo.ca/DataScienceCertificate.aspx>



The Chang School
of Continuing
Education

<https://continuing.ryerson.ca/public/category/courseCategoryCertificateProfile.do?method=load&certificateId=171618>

Data Science Training





Customer Churn Prediction

HACKATHON





Develop a model that predicts if a customer is going to leave the company(churn)





Each row represents a customer (~7000), each column contains customer's attributes described on the column Metadata (21 features).

The data set includes information about:

- Customers who left within the last month – the column is called Churn
- Services that each customer has signed up for – phone, multiple lines, internet, online security, online backup, device protection, tech support, and streaming TV and movies
- Customer account information – how long they've been a customer, contract, payment method, paperless billing, monthly charges, and total charges
- Demographic info about customers – gender, age range, and if they have partners and dependents



Next Week



Machine Learning Elevator Pitch

- Split into teams
- Prepare a 5 min presentation on how you can utilize machine learning in your startup



AI LOADING
PLEASE WAIT...

Customer Churn Prediction

HACKATHON

