

POLYFINTECH WORKSHOP

APIs for AI

Date: 14th May 2019

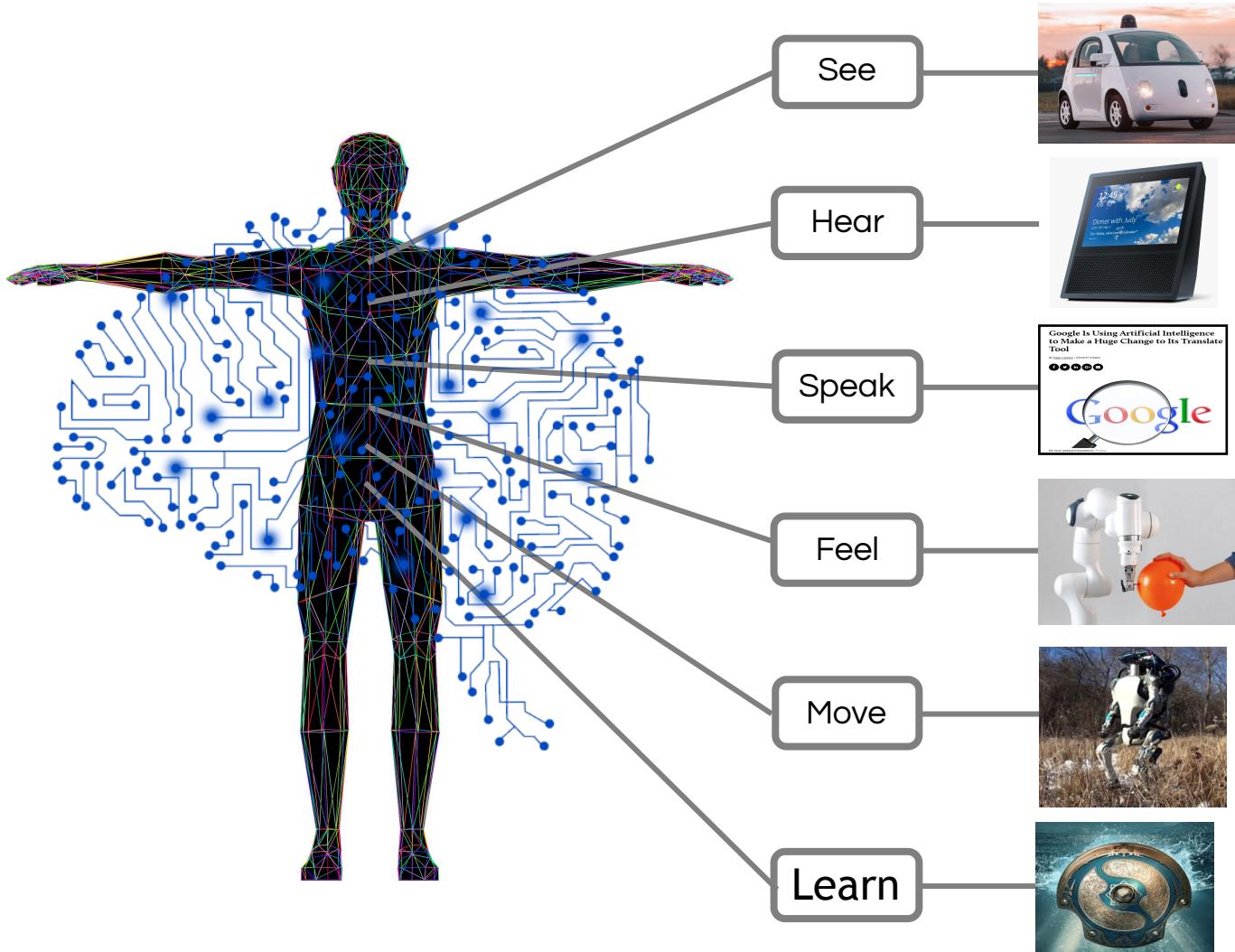
Brief/Instructions:
bit.ly/aisgpolyfin140519brief

OUTLINE

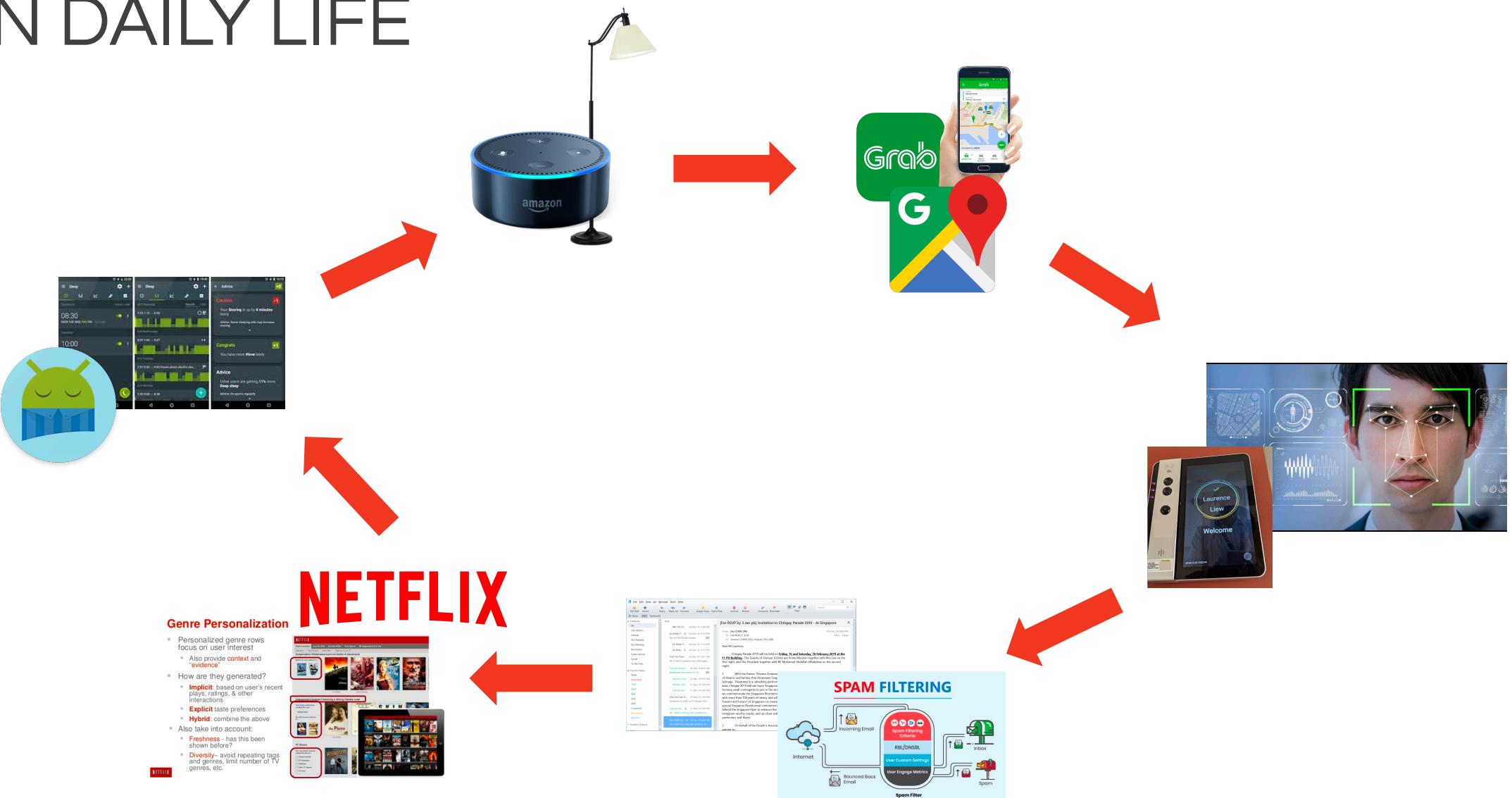
- Intro to AI
- Computer Vision API (with Clarifai)
- Natural Language API (with Wit.ai)
- Finance Data API (Financial Modeling Prep)

WHAT IS ARTIFICIAL INTELLIGENCE?

AI - Programs that can sense, reason, act and adapt.



AI IN DAILY LIFE



MAN VS MACHINE: 92 MINUTES VS 26 SECONDS



AI achieve an average 94% accuracy rate, higher than the lawyers who achieved an average rate of 85%. It took the lawyers an average of 92 minutes to complete the NDA issue spotting, compared to 26 seconds for the AI. The longest time taken by a lawyer to complete the test was 156 minutes, and the shortest time was 51 minutes.

**20 top lawyers were beaten by legal AI.
Here are their surprising responses**



Zakir Mir

"It is crucial to make mundane contract work more efficient, especially when there are 50–100+ pages of contracts for some major deals (M&A large tenders with agreements or multinational corporations). It

can really help lawyers sift through these documents, and cut down on the sometimes-deliberate obfuscity of these documents which can allow one party to mask core issues."

Zakir Mir, former regional counsel for BDP International, a \$2 billion global logistics firm, now at Allegiance International

Grant Gulovsen



"Participating in this experiment really opened my eyes to how ridiculous it is for attorneys to spend their time (as well as their clients' money) creating or reviewing documents like NDAs

which are so fundamentally similar to one another. Having a tool that could automate this process would free up skilled attorneys to spend their time on higher-level tasks without having to hire paralegal support (thereby making the services they offer more competitive in the long run)."

Grant Gulovsen, an attorney with more than 15 years' experience



Samantha Javier

"The test pointed out issues that NDA agreements generally contain and issues that lawyers look out for when drafting and reviewing NDAs. As for being automated, I think this would help clients in getting better pricing and allow lawyers to focus on more complex projects. However, I do think the test and

AI technology must be very thorough to accomplish this and business clients may prefer to have a human lawyer looking at and taking care of their business concerns."

Samantha Javier is a Lewis & Clark Law School graduate, licensed to practice law in Oregon. Her experience includes law firm, in-house, and transactional work

Justin Brown



"As a chess player and attorney I will take on Grandmaster Vishwanathan and say the future of law is 'human and computer' versus (another) 'human

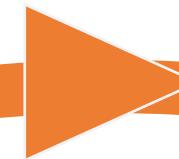
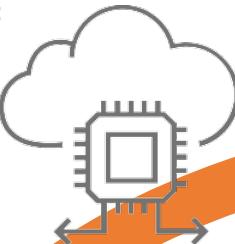
and computer.' Either working alone is inferior to the combination of both. I view AI and technology as exciting new tools that would allow such drudgework to be done faster and more efficiently."

Justin Brown, Partner at Brown Brothers Law

TRANSFORMATION TRENDS

Decreased cost of computing:

- Moore's Law
- Cloud



Data explosion!

Every minute:

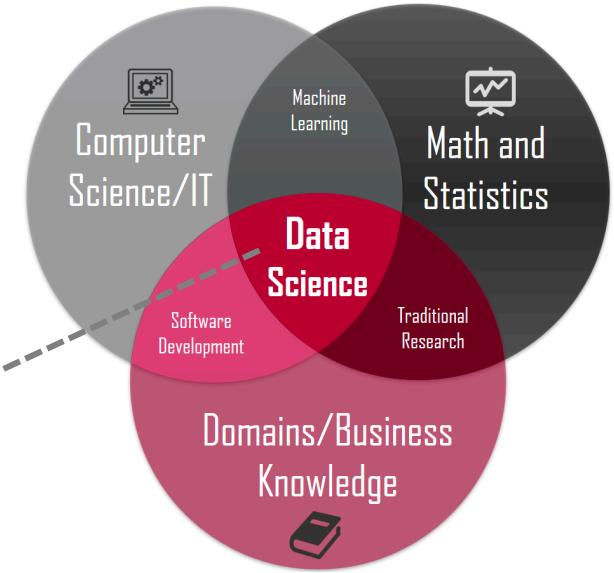
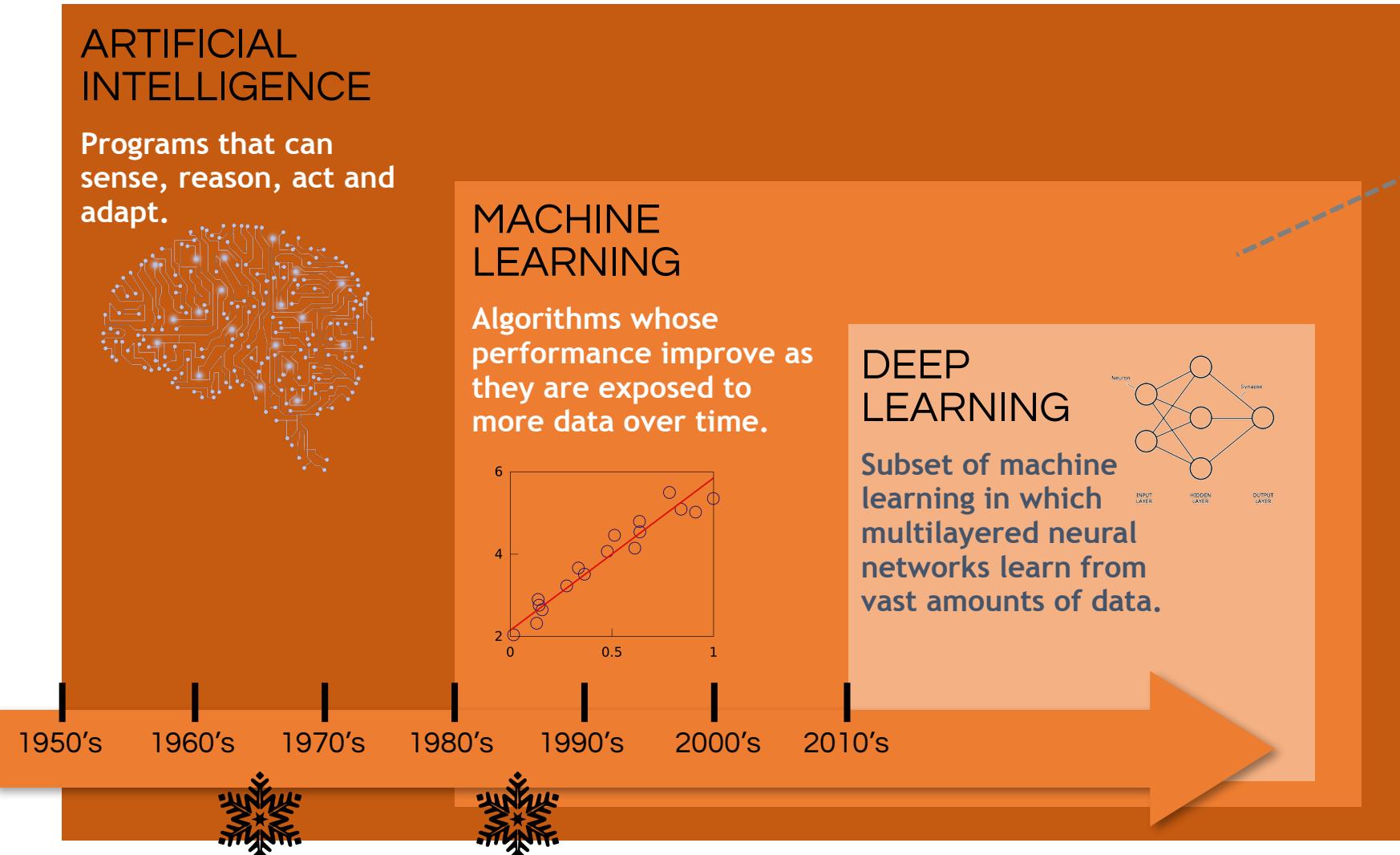
- 16 million text messages
- 156m emails sent
- 95m photos and videos on Instagram

Proliferation of specialisations



Advancement of algorithms

AI:ML:DL – DS:DA



TYPES OF MACHINE LEARNING

Supervised Learning

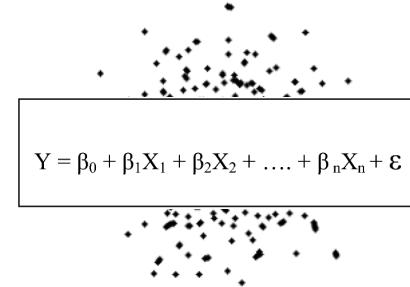
Supervised learning is the machine learning task of learning a function that maps an input to an output based on example input-output pairs. It infers a function from labeled training data consisting of a set of training examples.

Show it enough pictures of cats, it will learn to recognize a cat!

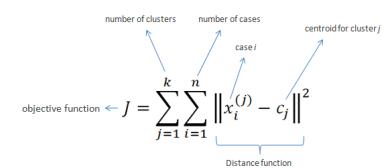
Unsupervised Learning

Unsupervised learning is a branch of [machine learning](#) that learns from test data that has not been labeled, classified or categorized. Unsupervised learning identifies commonalities in the data and segment them into groupings.

Show me the interesting patterns, how are the data organized!



01101100
01101111
01110110
01100101



01101100
01101111
01110110
01100101

FIVE QUESTIONS THAT AI/ML CAN ANSWER

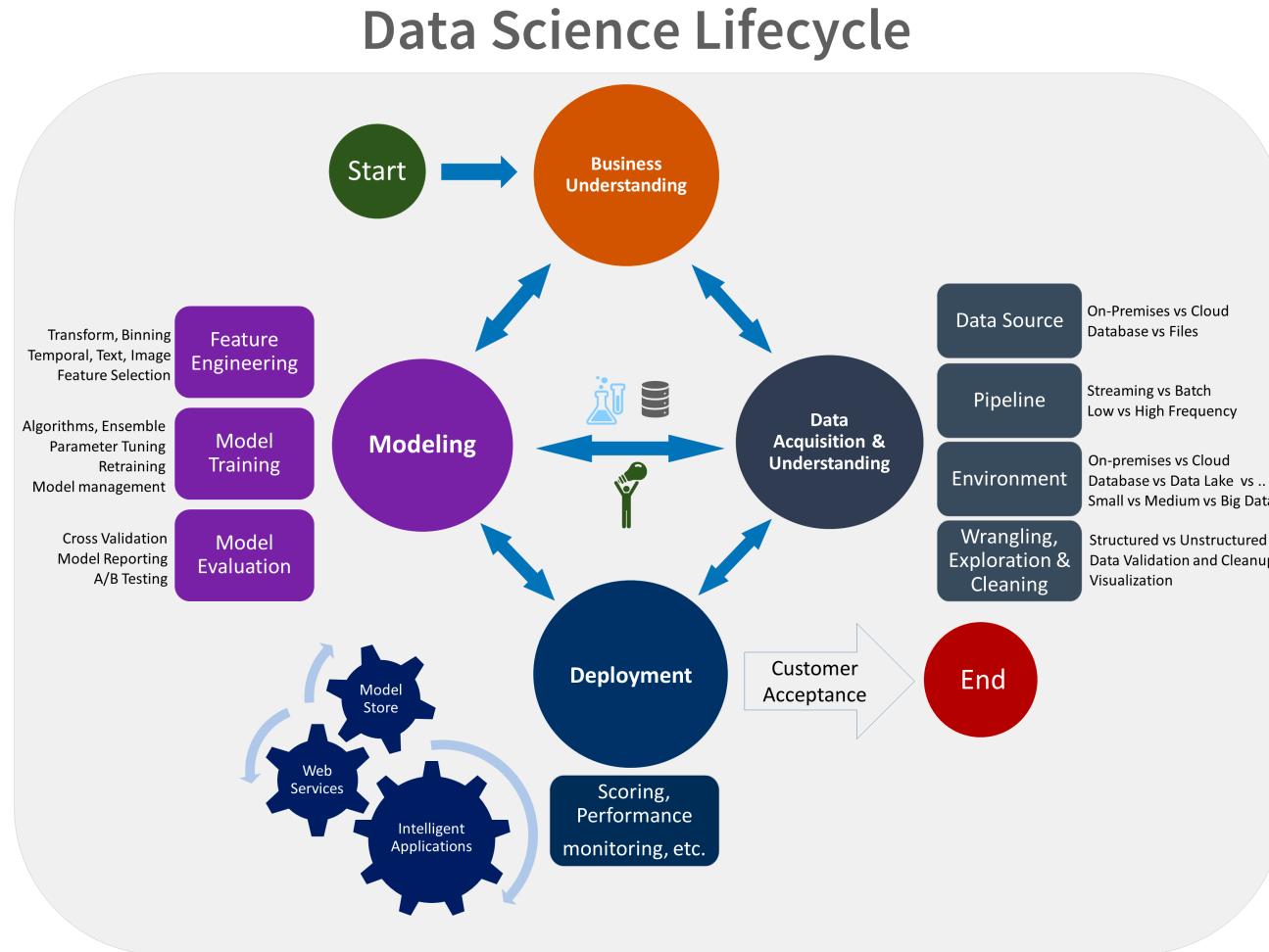
1. Is this A or B? (Classification)
2. Is this weird? (Anomaly Detection)
3. How much? How many? (Regression)
4. How is this organized? (Clustering)
5. What should I do now? (Reinforcement Learning)



Each of these questions can be answered by an algorithm by using your data

Source: <https://docs.microsoft.com/en-us/azure/machine-learning/studio/data-science-for-beginners-the-5-questions-data-science-answers>

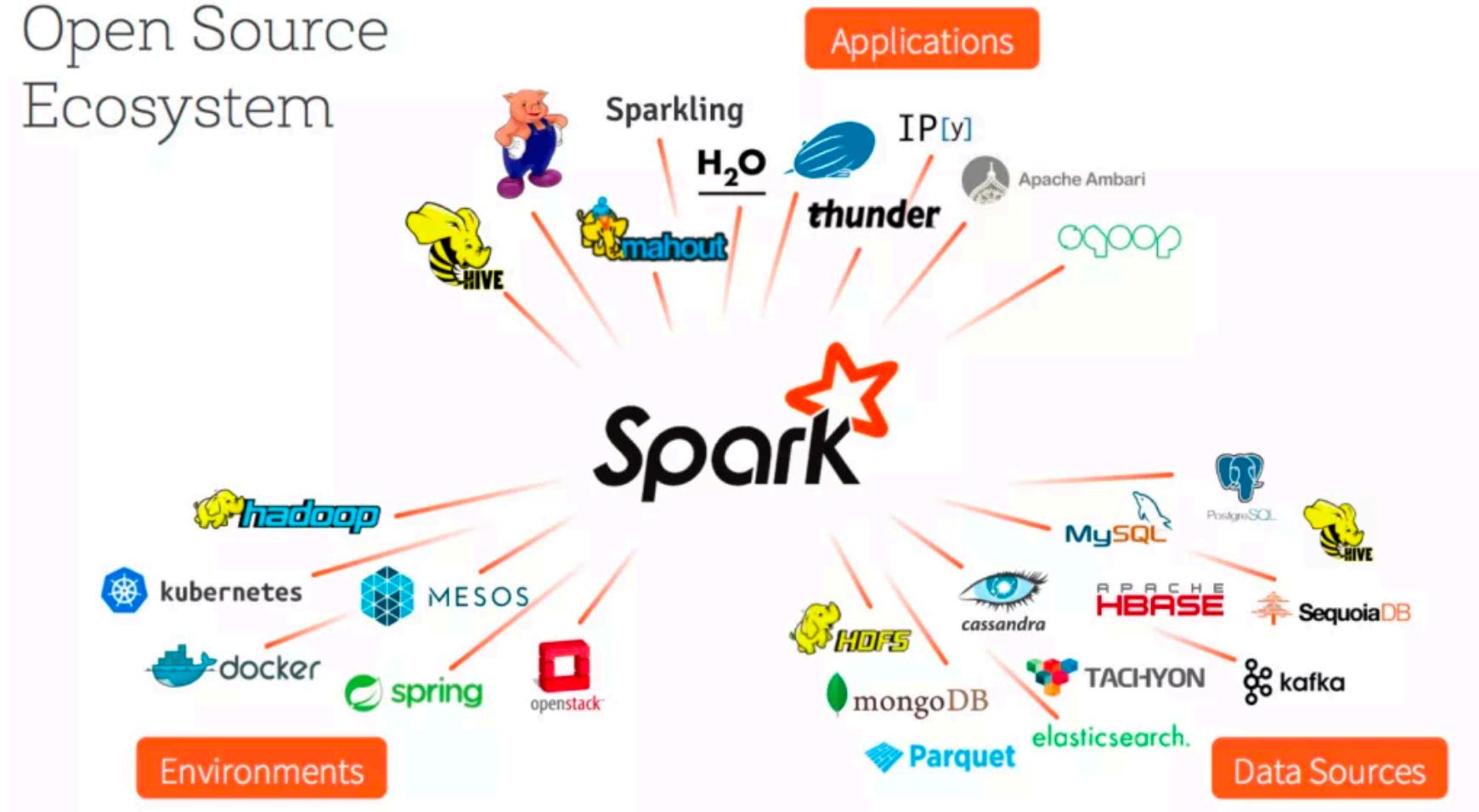
THE DATA SCIENCE (AI) PROCESS



Source: <https://docs.microsoft.com/en-us/azure/machine-learning/team-data-science-process/overview>

THE AI/ML PIPELINE

Open Source
Ecosystem



Source: <https://blog.parse.ly/post/4006/rawdata/>

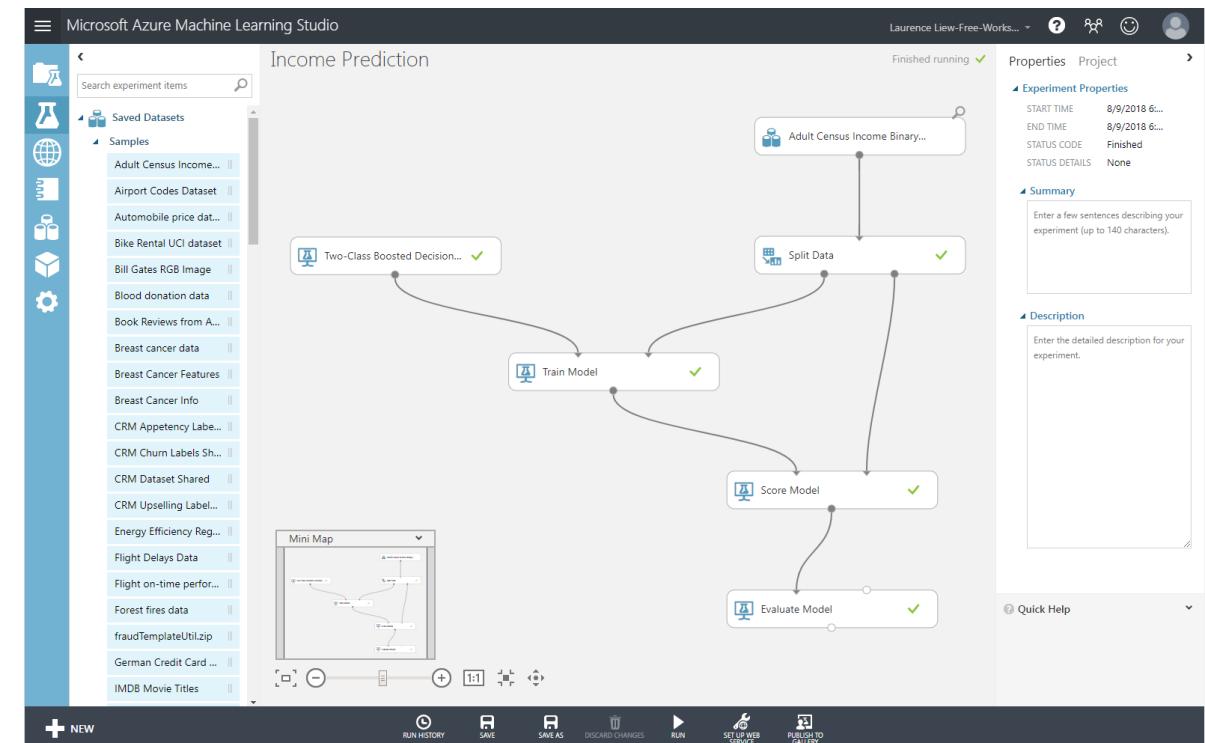
PLATFORMS AS A SERVICE (PAAS)

MICROSOFT AZURE

More than Windows!

- Data Science Virtual Machine
- Azure Machine Learning Studio
- Azure Machine Learning services
- Azure Notebooks

You can also explore other services such as AWS, GCP, IBM....



THE AI/ML PIPELINE

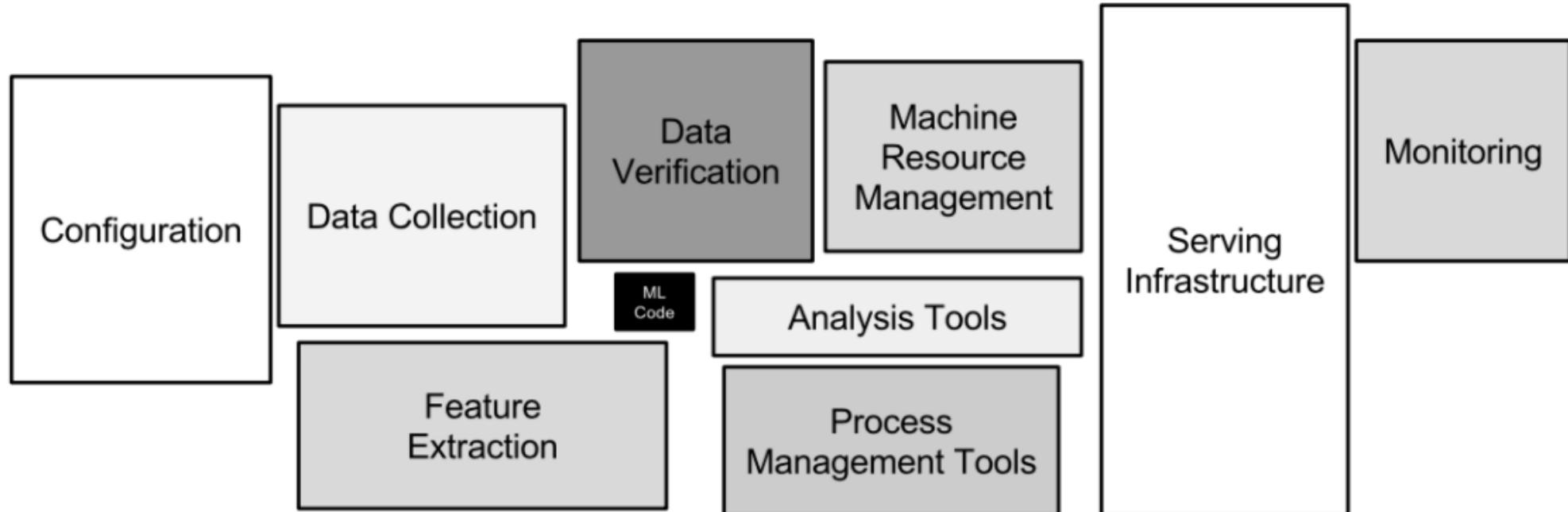


Figure 1: Only a small fraction of real-world ML systems is composed of the ML code, as shown by the small black box in the middle. The required surrounding infrastructure is vast and complex.

Source: [Hidden Technical Debt in Machine Learning Systems](#)

LANGUAGES FOR AI/ML

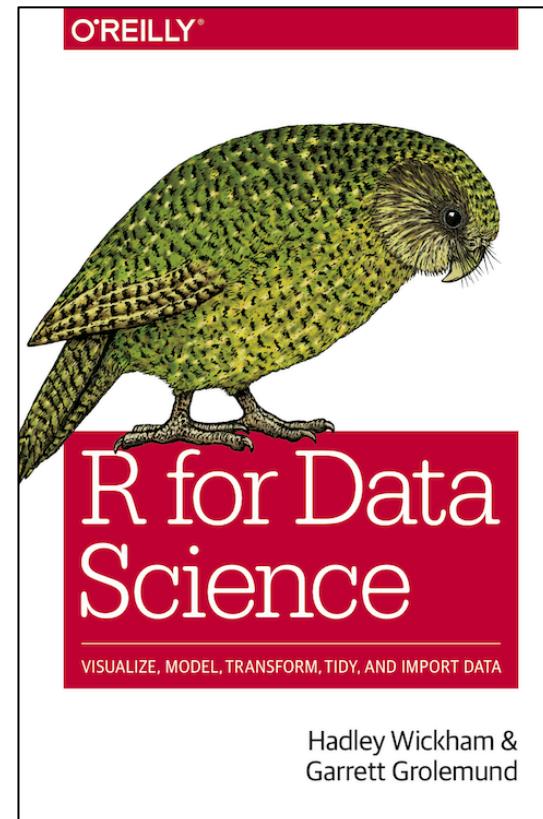
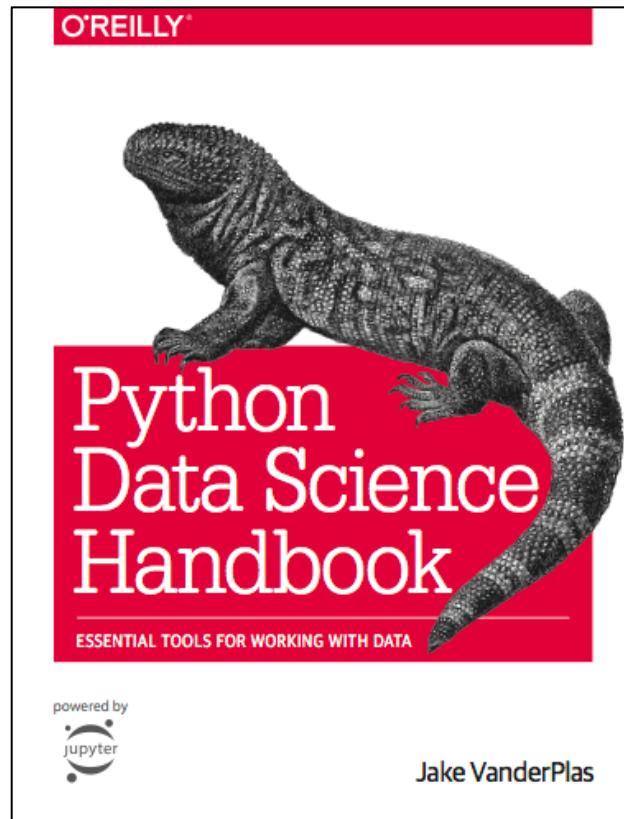
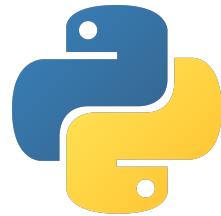
Python VS R



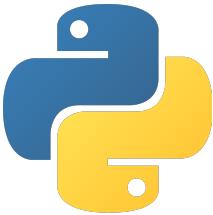
VS



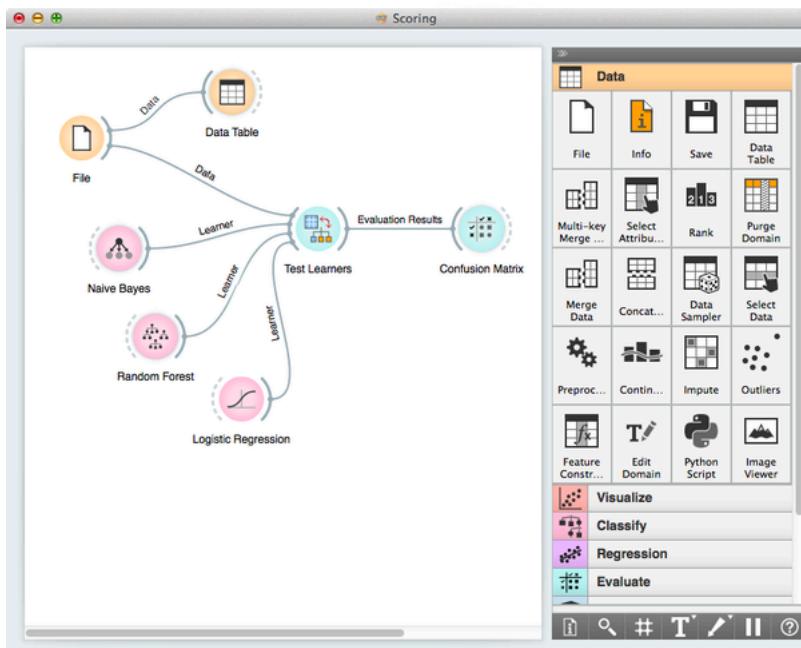
LANGUAGES FOR AI/ML



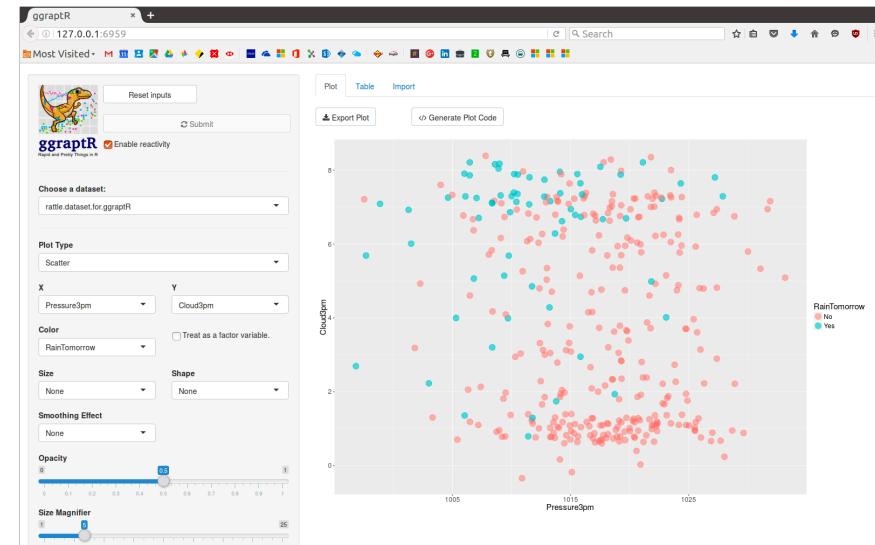
GUI TOOLS FOR AI/ML (BASICS)



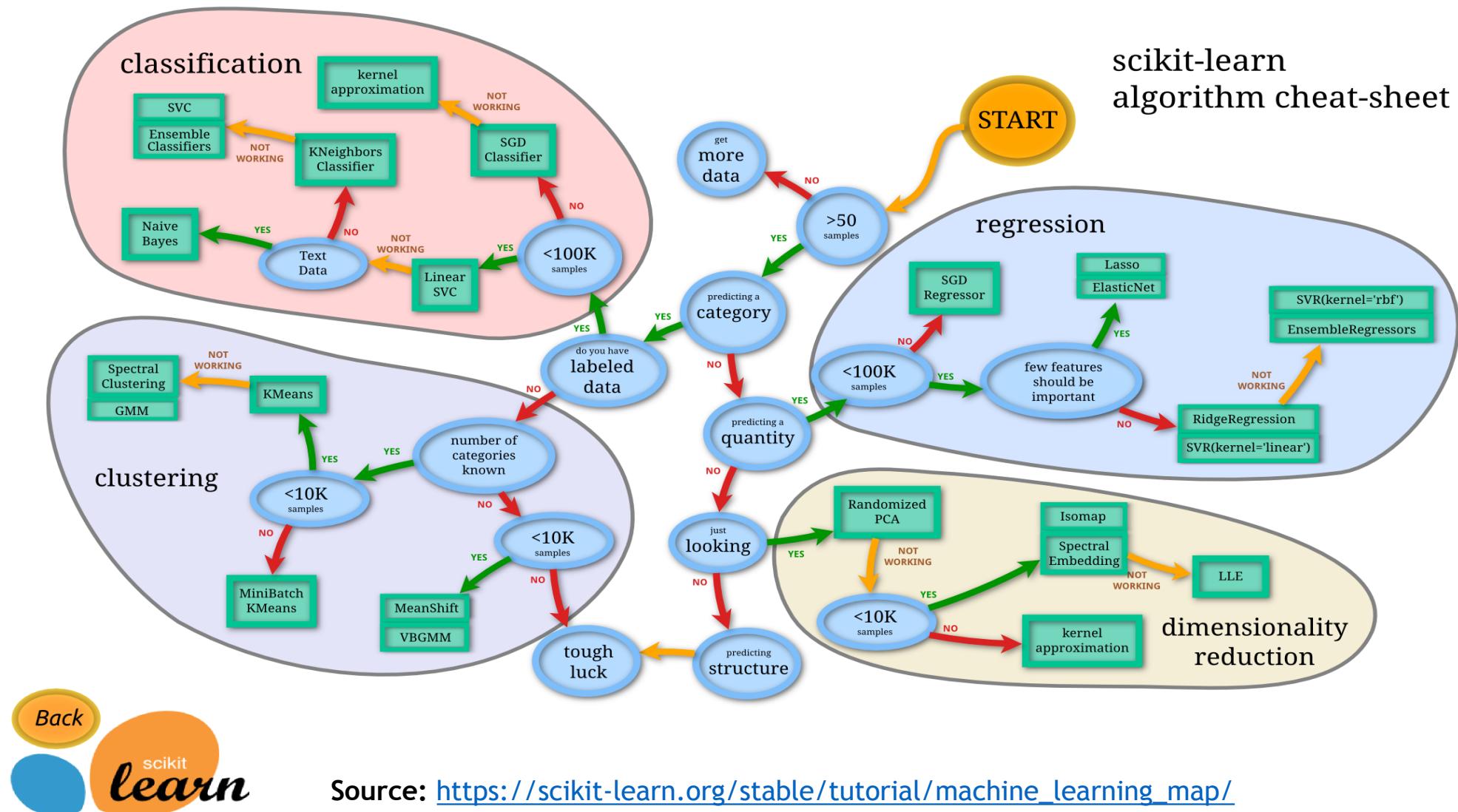
orange
DATA MINING
FRUITFUL&FUN



togaware
Rattle



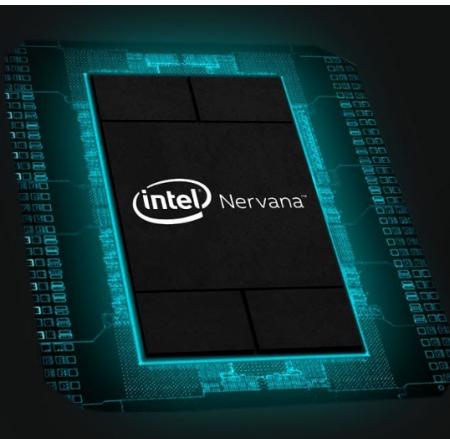
WHICH ALGORITHM?



HARDWARE



HARDWARE



HUAWEI Kirin 970

The World's First Smartphone AI Computing Platform with a Dedicated NPU

Leading Process Technology
10nm Process Technology

Mobile AI Computing NPU
Up to 25x performance
Up to 50x power efficiency

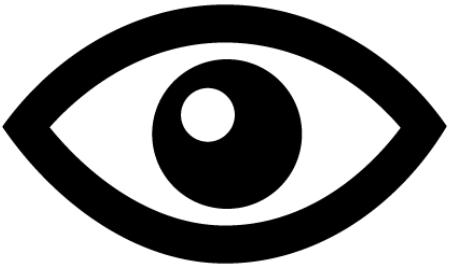
High Performance 8-Core CPU
4xA73 @2.4GHz
4xA53 @1.8GHz

Advanced Dual ISP 4-Hybrid Focus
Low-light & Motion Shooting

Ultra-Fast 4.5G LTE Modem
4.5G LTE Cat.18 up to 1.2Gbps Download speeds

NPU: Neural Network Processing Unit

MAJOR DEEP LEARNING APPLICATIONS



COMPUTER VISION

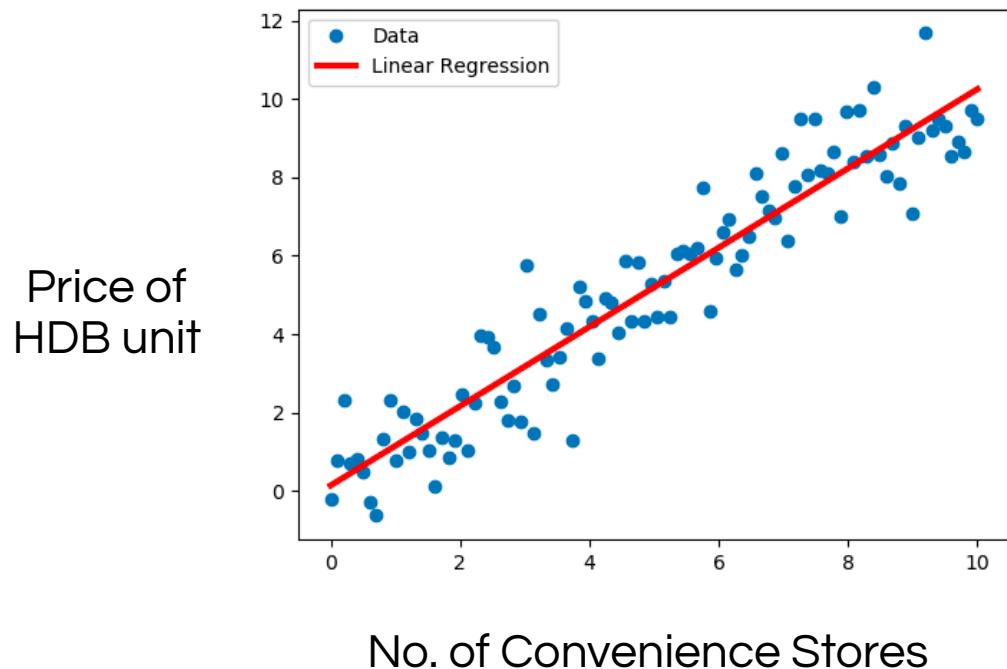


NATURAL LANGUAGE PROCESSING
& SPEECH RECOGNITION

DEEP LEARNING & NEURAL NETWORKS

Artificial Neural Network (Prologue)

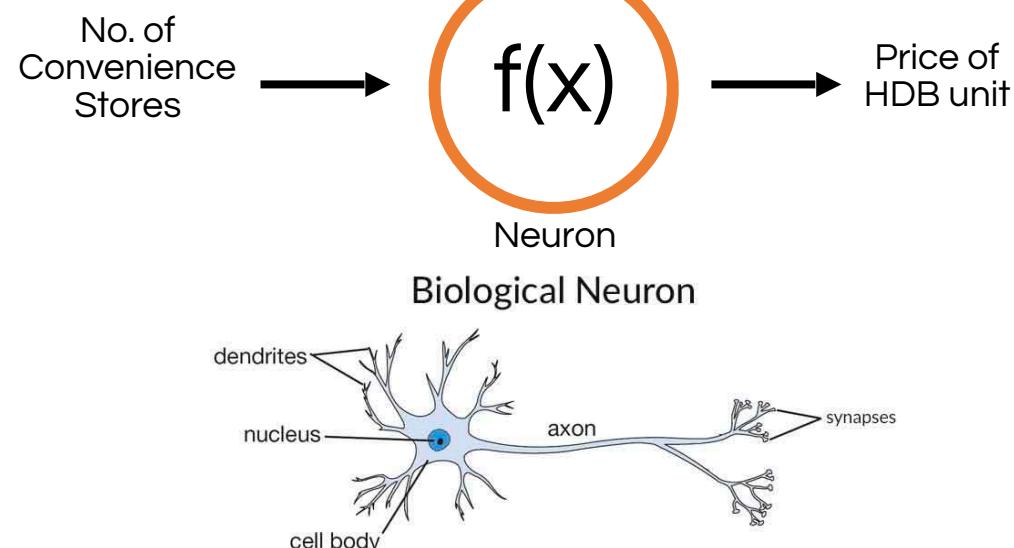
$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon$$



$$y = mx + c$$

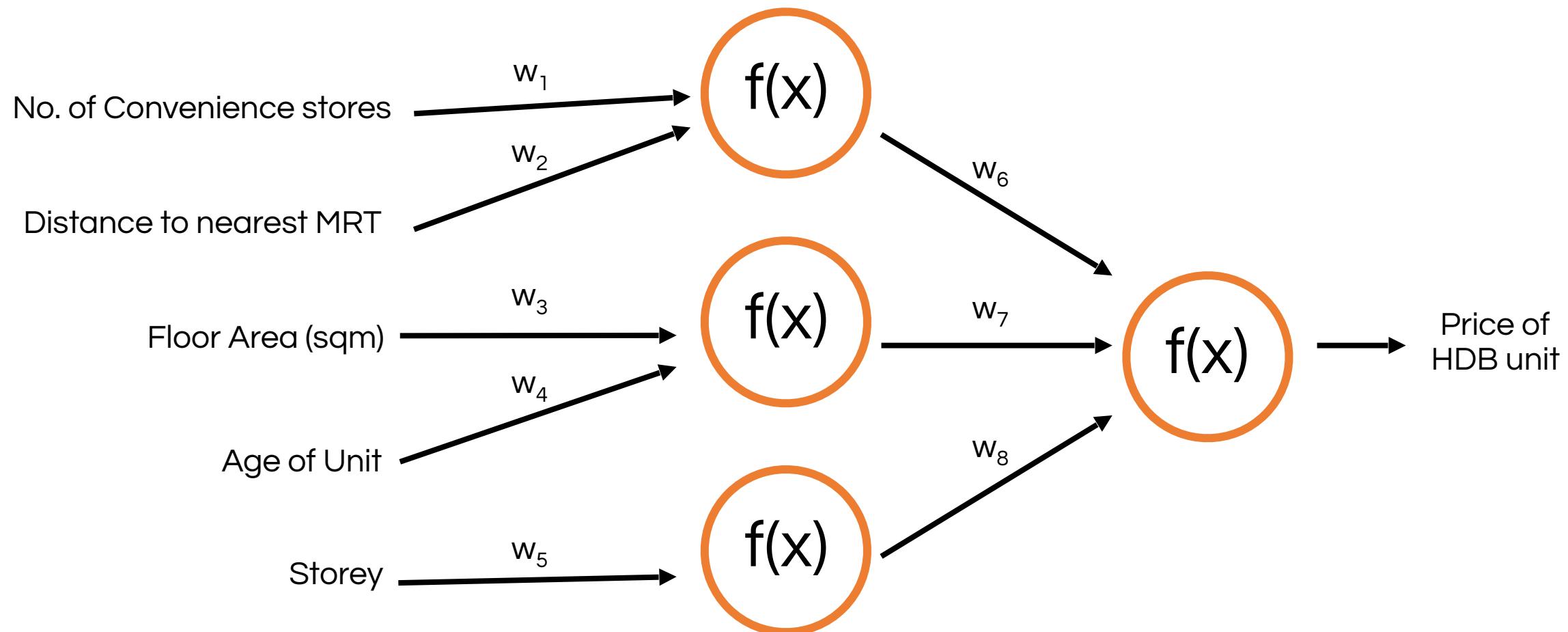
Diagram illustrating the components of a linear regression equation:

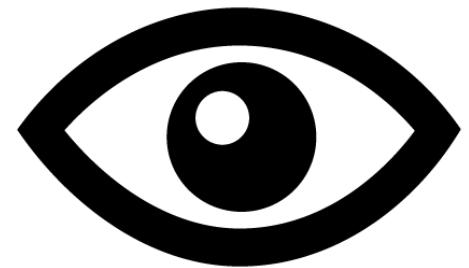
- y -intercept: The point where the line intersects the vertical axis.
- Gradient: The slope of the line, representing the coefficient m .



DEEP LEARNING & NEURAL NETWORKS

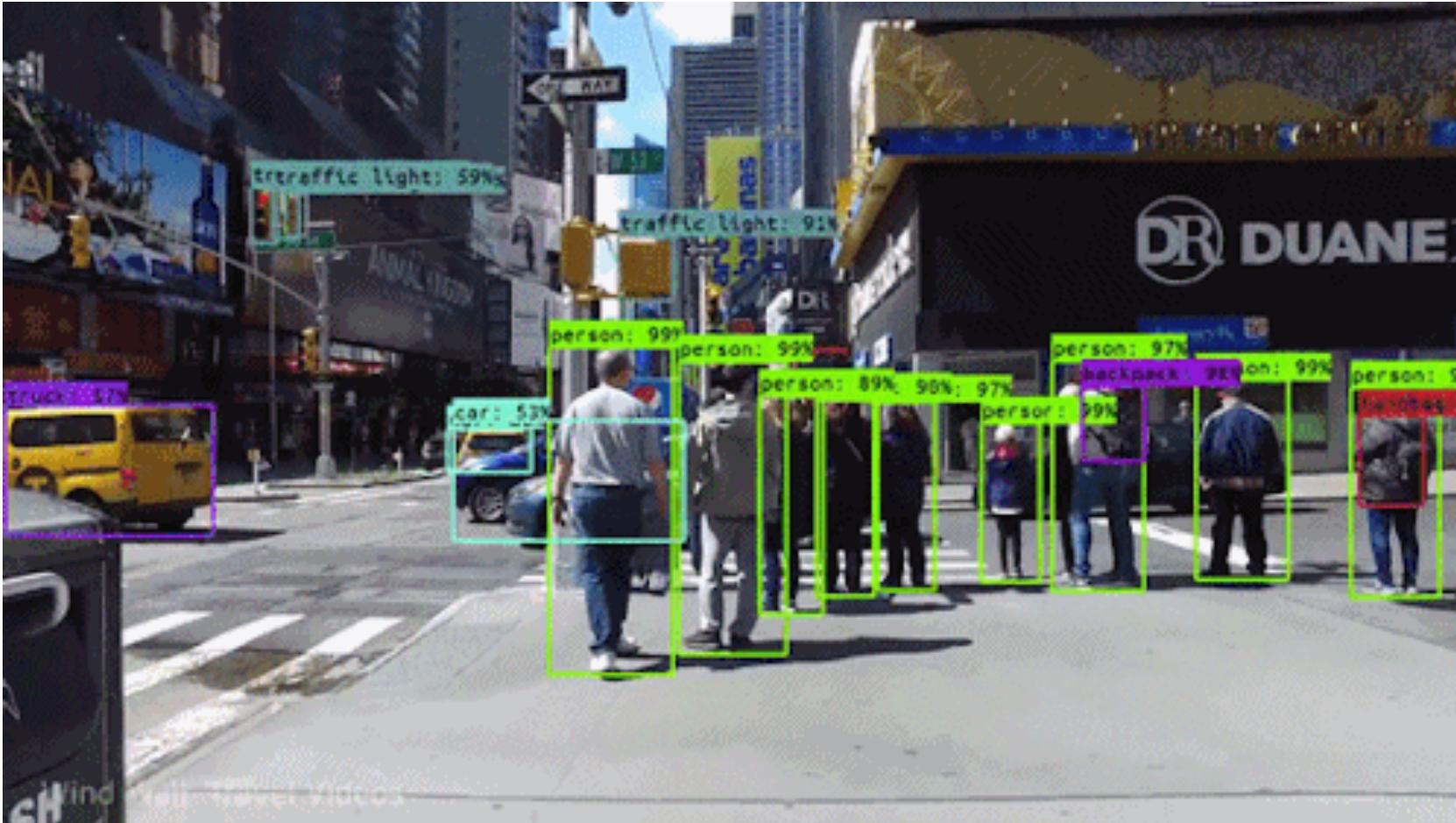
Artificial Neural Network



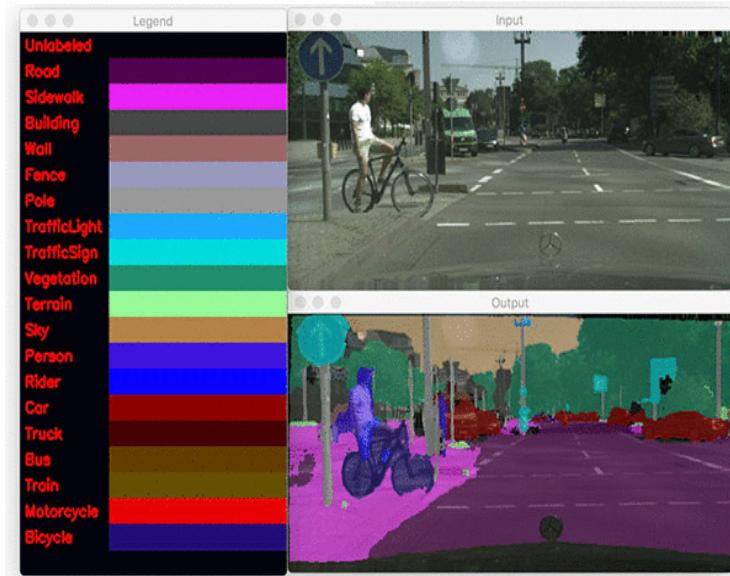


COMPUTER VISION

COMPUTER VISION

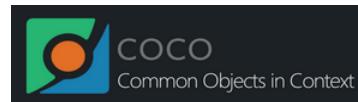


COMPUTER VISION – IMAGE SEGMENTATION



[Semantic segmentation with OpenCV and deep learning](#)

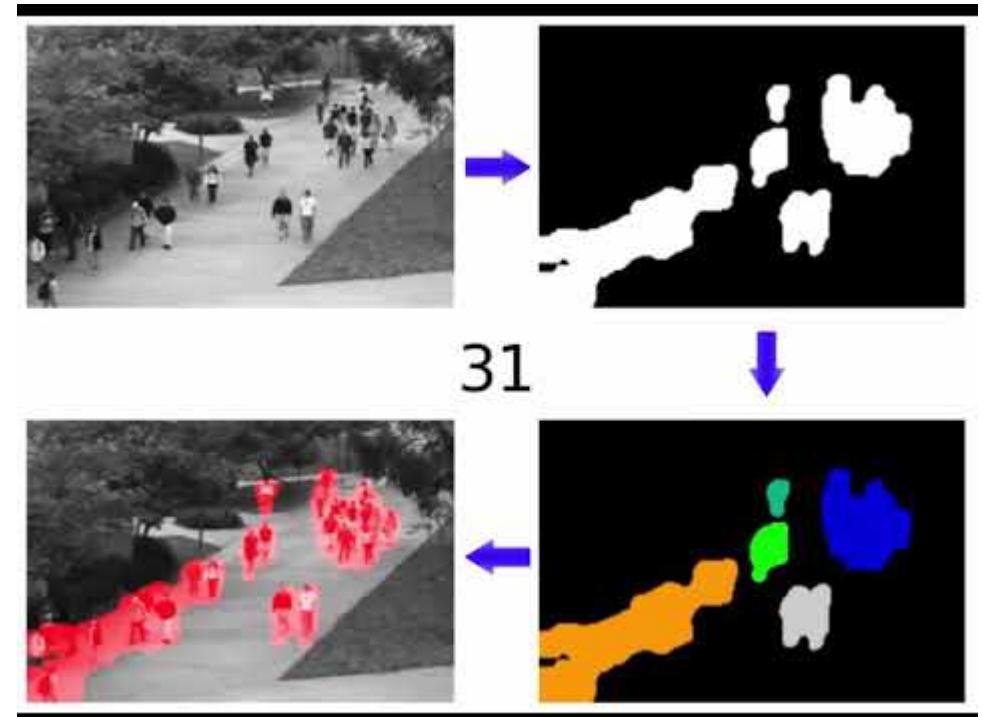
Adrian Rosebrock on September 3, 2018 in [Deep Learning](#), [Semantic Segmentation](#), [Tutorials](#)



a man with racket and ball playing in the court
a man is playing a game of tennis.
a man that is on a court with a racket
a man holding a racquet on top of a tennis court.
a man is hitting the ball at a tennis tournament.



[Crowd Density Estimation Method - UCSD Crowd Counting Dataset](#)



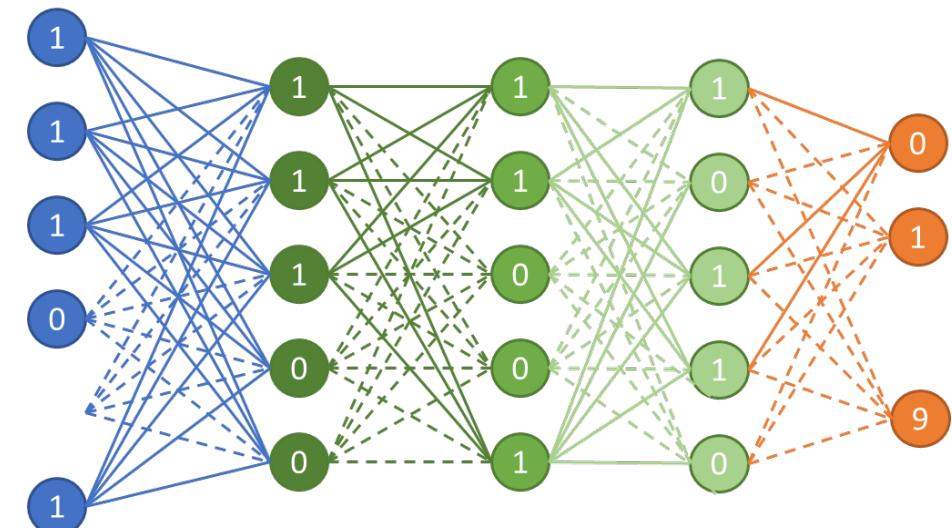
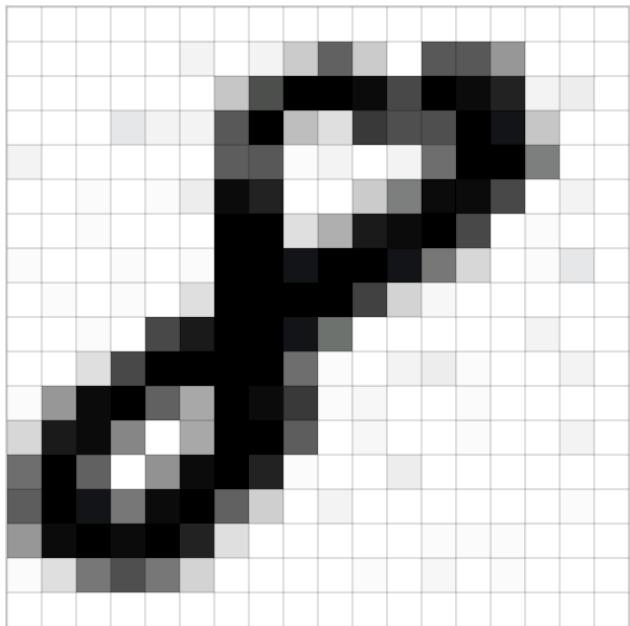
AI SINGAPORE

COMPUTER VISION



IMAGES AND DEEP LEARNING

Images are just arrays of numbers that encode the intensity of each pixel

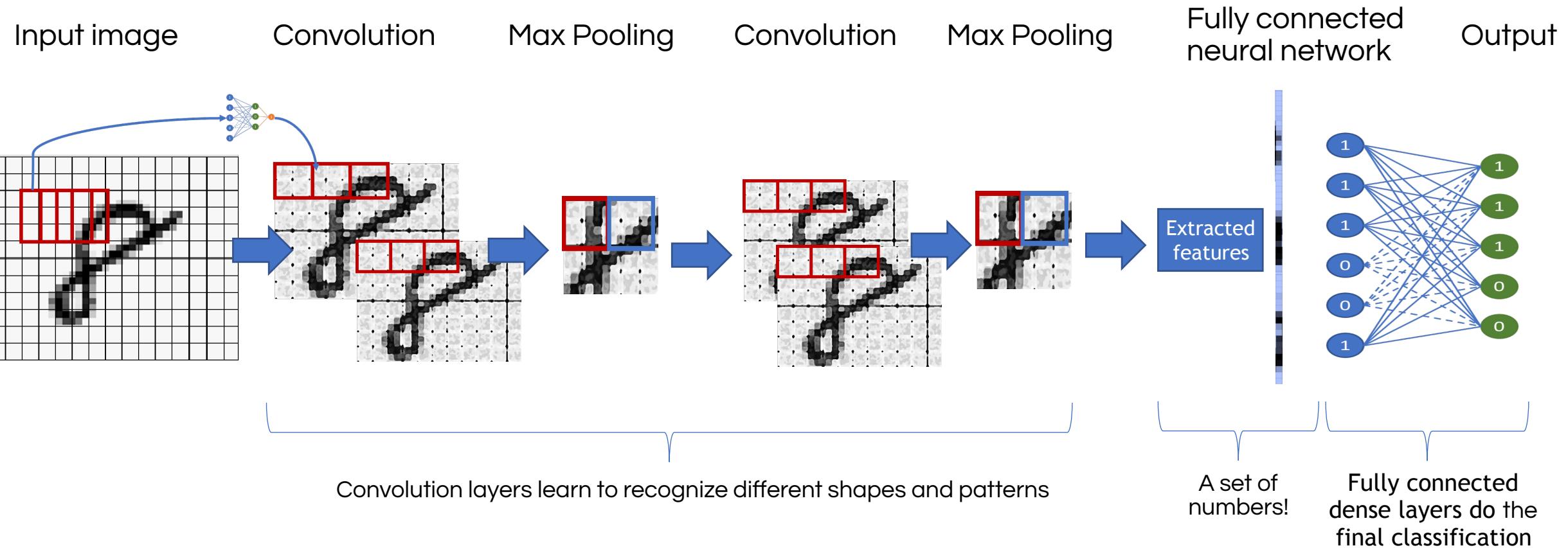


COMPUTER VISION



IMAGES AND DEEP LEARNING

Images are just arrays of numbers that encode the intensity of each pixel



Source: <https://medium.com/@ageitgey/machine-learning-is-fun-part-3-deep-learning-and-convolutional-neural-networks-f40359318721>

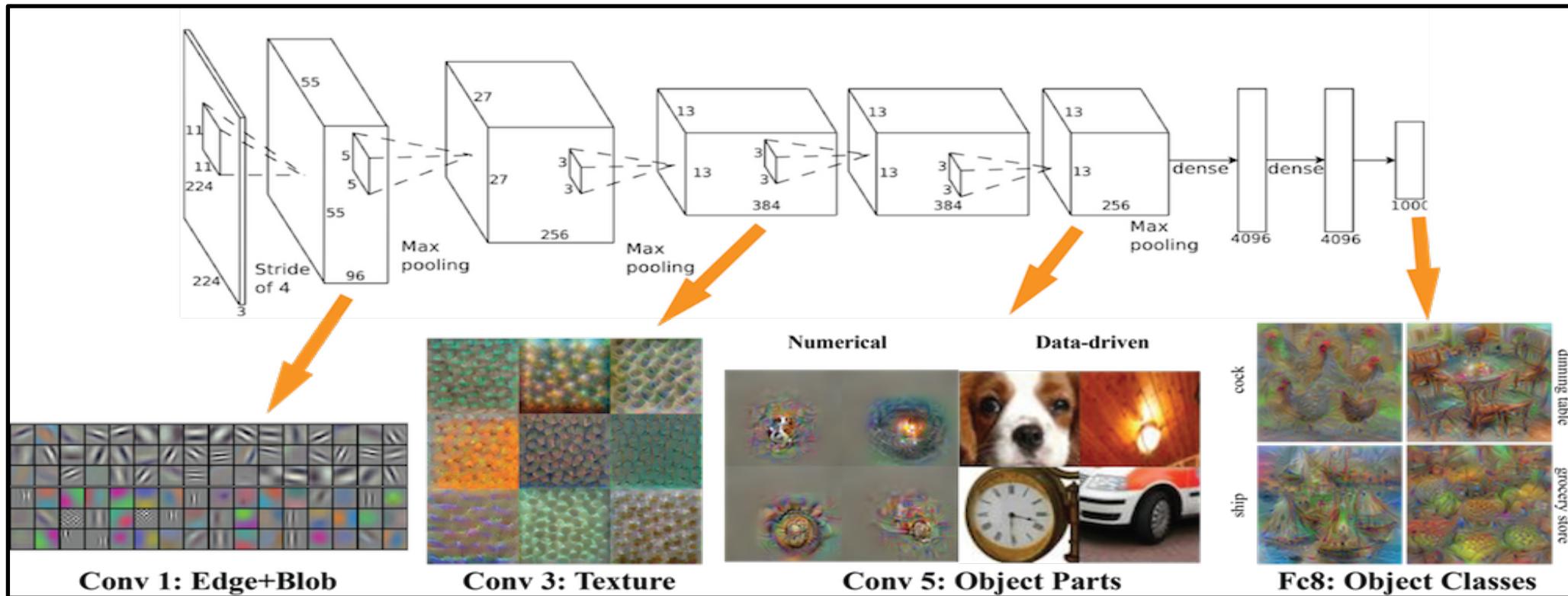
COMPUTER VISION



IMAGES AND DEEP LEARNING

Images are just arrays of numbers that encode the intensity of each pixel

Convolution Networks (CNN) 2012





NATURAL LANGUAGE PROCESSING & SPEECH RECOGNITION

NATURAL LANGUAGE PROCESSING & SPEECH RECOGNITION



Eliza

ELIZA: Please tell me what's been bothering you.

I

Talk Reset

ELIZA is a natural language conversation program described by Joseph Weizenbaum in January 1966 [1].

It features the dialog between a human user and a computer program representing a mock Rogerian psychotherapist.

The original program was implemented on the IBM 7094 of the Project MAC time-sharing system at MIT and was written in MAD-SLIP.

<https://www.masswerk.at/elizabot/>

NATURAL LANGUAGE PROCESSING & SPEECH RECOGNITION



- <https://www.youtube.com/watch?v=D5VN56jQMWM>



NLP AND ITS COMPLEXITY



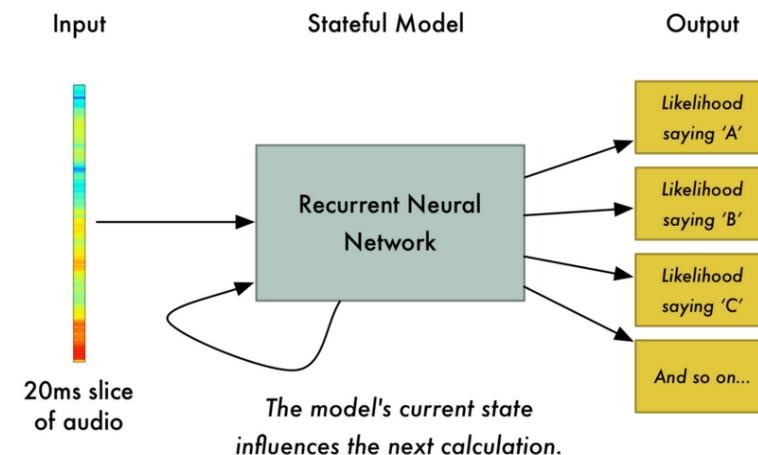
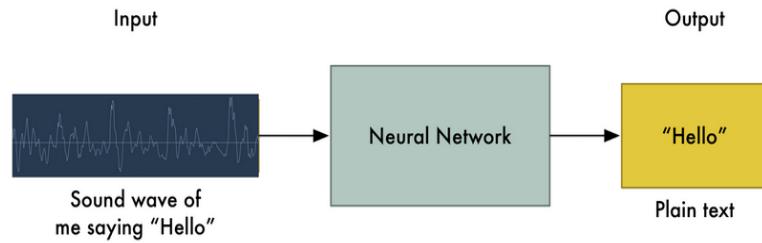
You can come from all walks of life and despite your race and mother tongue, as long as you're Singaporean, you will totally get this.

Source: <https://towardsdatascience.com/generating-singlish-text-messages-with-a-lstm-network-7d0fdc4593b6>

NATURAL LANGUAGE PROCESSING & SPEECH RECOGNITION



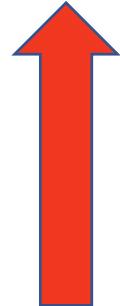
Transform the raw signals (Waveforms) into features which the neural network can easily learn



HELLO

Best guess from dictionary

Clean up



- HHHEE_LL_LLLOOO becomes HE_L_LO
- HHHUUU_LL_LLLOOO becomes HU_L_LO
- AAAUUU_LL_LLLOOO becomes AU_L_LO

Source: <https://medium.com/@ageitgey/machine-learning-is-fun-part-2-a26a10b68df3>

NATURAL LANGUAGE PROCESSING & SPEECH RECOGNITION

“Hainanese Chicken Rice is the favorite and most popular hawker dish in Singapore. It is by far the most ordered dish when we eat out. We love our hawker food.”

NLP pipeline

Unstructured text

Sentence segmentation

1. Hainanese Chicken Rice is the favorite and most popular hawker dish in Singapore.
2. It is by far the most ordered dish when we eat out.
3. We love our hawker food.

Word tokenization

“Hainanese” “Chicken” “Rice” “is” “the” “favorite” “and”
“most” “popular”

Proper Noun Proper Noun Proper Noun Verb Determiner Adjective Conjunction Adverb Adjective

Lemmatization

“Hainan” “Chicken” “Rice” “is” “the” “favorite” “and” “most”
“popular”

Stop words

“Hainan” “Chicken” “Rice” “is” “the” “favorite” “and” “most”
“popular”

Noun phrases

“Hainan Chicken Rice” “is” “the” “favorite” “and” “most popular”
“hawker dish”^{hawker dish} Adjective Noun

Name Entity Recognition

“Hainan Chicken Rice” “is” “the” “favorite” “and” “most popular hawker”
“dish” in ^{Singapore} Geographic entity

Structured data which we can analyze with code

Coreference resolution

Hainanese Chicken Rice is the favorite and most popular hawker dish in Singapore.
It is by far the most ordered dish when we eat out. We love our hawker food.



AVAILABILITY OF DATA

DO I NEED THOUSANDS OF IMAGES TO USE DEEP LEARNING?

- When you go from primary school to secondary school, or after NS, you go from NS to University... do you have to learn everything all over again?
- What if instead of starting from scratch, we could bootstrap a DLNN?

TRANSFER LEARNING

WHERE TO FIND THEM?

- Many labs have released pre-trained models
- Trick is to use one with images like what you are trying to classify
- Other transfer learning techniques
 - Retrain some or all of the convolution layers
 - Start with an existing network (instead of random start) - faster
- So...
 - Always start with a pre-trained model to see if it works for you
 - Unless you have 100,000s of images

WHERE TO FIND THEM?



<https://github.com/onnx/models>

Watch 99 ★ Star 938 Fork 180

Code Issues 40 Pull requests 3 Insights

Branch: master models / README.md

vinitra TOC reorganization and additional descriptions for model zoo README (#... 89190ff on 2 Feb

9 contributors

218 lines (171 sloc) 14.5 KB

Raw Blame History

Open Neural Network eXchange (ONNX) Model Zoo

Contributions Welcome

<https://paperswithcode.com/>

Trending Research

Trending Latest Greatest

Subscribe

DSFD: Dual Shot Face Detector

24 Oct 2018 • TencentYoutuResearch/FaceDetection-DSFD • torch

★ 899

4.74 stars / hour



In this paper, we propose a novel face detection network with three novel contributions that address three key aspects of face detection, including better feature learning, progressive loss design and anchor assign based data augmentation, respectively.

🏆 SOTA for Face Detection on WIDER Face (Easy)

FACE DETECTION

Paper

Code

Reconstructing Video from Interferometric Measurements of Time-Varying Sources

3 Nov 2017 • achael/eht-imaging

★ 730

1.84 stars / hour



Most recently, the Event Horizon Telescope (EHT) has extended VLBI to short millimeter wavelengths with a goal of achieving angular resolution sufficient for imaging the event horizons of nearby supermassive black holes.

IMAGE IMPUTATION RADIO INTERFEROMETRY

Paper

Code

FUN WITH TRANSFER LEARNING

<https://www.youtube.com/watch?v=-i7HMPpxB-Y>

THERE'S WALDO

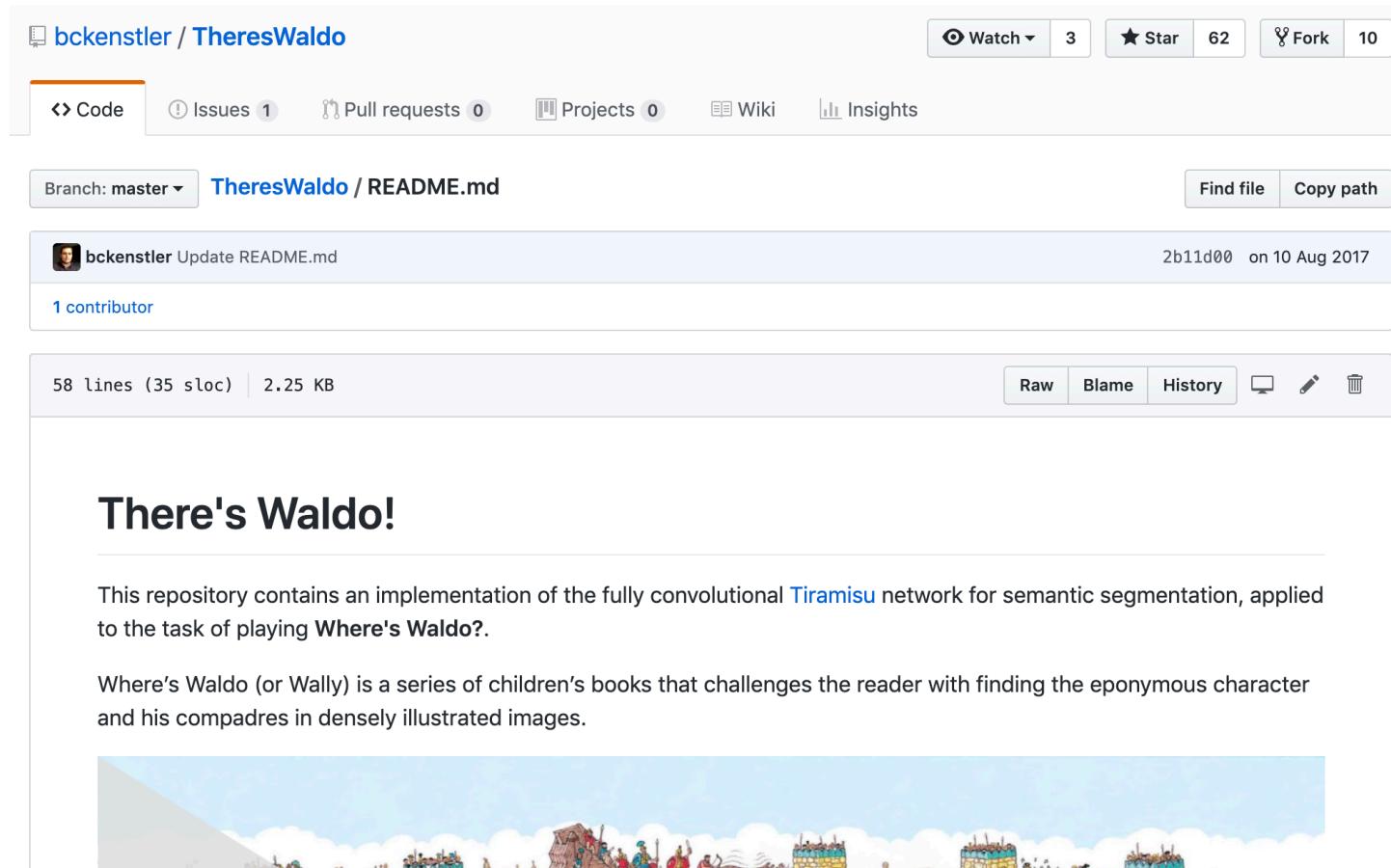
FINDING WALDOS WITH GOOGLE AUTOML VISION

PROTOTYPE v0.1
redpepper.land/innovation



AI SINGAPORE

FUN WITH TRANSFER LEARNING

A screenshot of a GitHub repository page for 'bckenstler / TheresWaldo'. The repository has 3 watches, 62 stars, and 10 forks. It contains 1 issue, 0 pull requests, 0 projects, and a wiki. The README.md file is the current branch. A commit by 'bckenstler' (2b11d00) updated the README.md on 10 Aug 2017, with 1 contributor. The README.md file has 58 lines (35 sloc) and is 2.25 KB. There are links for Raw, Blame, History, and a download icon. The main content of the README.md is:
There's Waldo!
This repository contains an implementation of the fully convolutional [Tiramisu](#) network for semantic segmentation, applied to the task of playing **Where's Waldo?**.
Where's Waldo (or Wally) is a series of children's books that challenges the reader with finding the eponymous character and his compadres in densely illustrated images.


Source: <https://github.com/bckenstler/TheresWaldo>



USE CASES

USE CASE - FINANCE

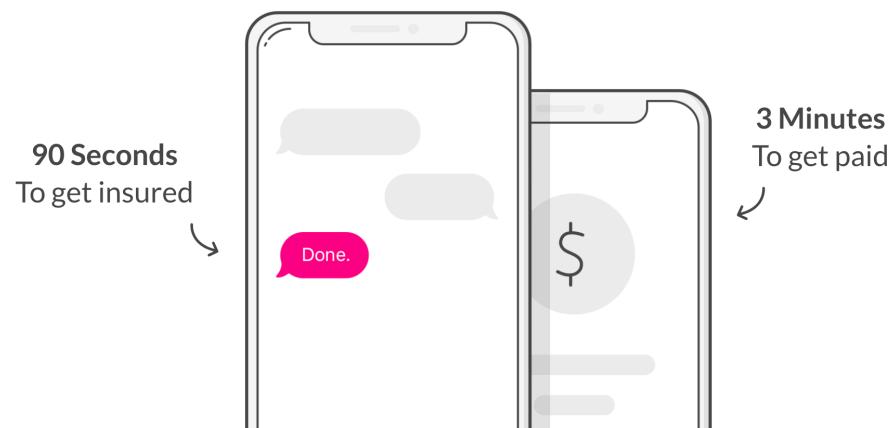
Lemonade

Lemonade raises \$120 million from SoftBank, others to take its chatbot-based insurance service global

Instant Everything

Maya, our charming artificial intelligence bot, will craft the perfect insurance for you.
It couldn't be easier, or faster.

↻ See the Lemonade App in action



Source: <https://venturebeat.com/2017/12/19/lemonade-raises-120-million-from-softbank-others-to-take-its-chatbot-based-insurance-service-global/>

USE CASE - FINANCE



Manulife announces \$400,000 Artificial Intelligence partnership with UWaterloo

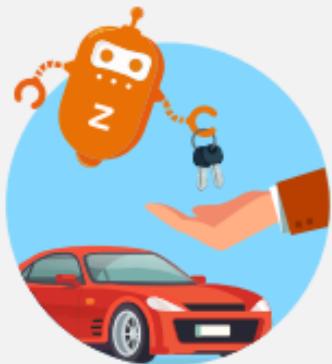
TORONTO – Today, Manulife announced a four-year, \$400,000 partnership with the Waterloo Artificial Intelligence Institute at the University of Waterloo. This investment will support Artificial Intelligence (AI) research in disability claim prediction as well as fraud detection and natural language comprehension in customer service.

"Customer expectations are evolving and are increasingly driven by the power of technology," said Cindy Forbes, Executive Vice President and Chief Analytics Officer, Manulife. "This partnership with Canada's top university in computer science and engineering is well matched with Manulife as we transform into a digital, customer-centric leader."

In addition to funding research, this Manulife and UWaterloo partnership will help build the next generation of intelligent systems through the Institute's partnership program. It will also fund two AI prizes – for each year of the partnership – to undergraduate students who have excelled in either their studies, research or leadership in AI fields.

Source: http://manulife.force.com/Master-Article-Detail?content_id=a0Qf200000JTVOTEA5&ocmsLang=en_US

USE CASE - FINANCE



Machine Learning Can Increase Approvals, Cut Losses for Auto Lenders

ZestFinance enables auto lenders to acquire more borrowers at lower cost and with lower risk. You can capture the benefits of machine learning-based underwriting quickly and safely while also satisfying compliance needs.

Several major auto lenders are using machine learning to achieve game-changing business results:



A top U.S. auto lender cut its losses by **23% annually**



Ford Motor Credit found machine learning could **more accurately predict risk** for thin-file borrowers



A U.S. subprime auto lender **reduced losses by over 25%**

Source: <https://www.zestfinance.com/hubfs/Underwriting/Auto-Machine-Learning.pdf?hsLang=en>

USE CASE – URBAN SOLUTIONS

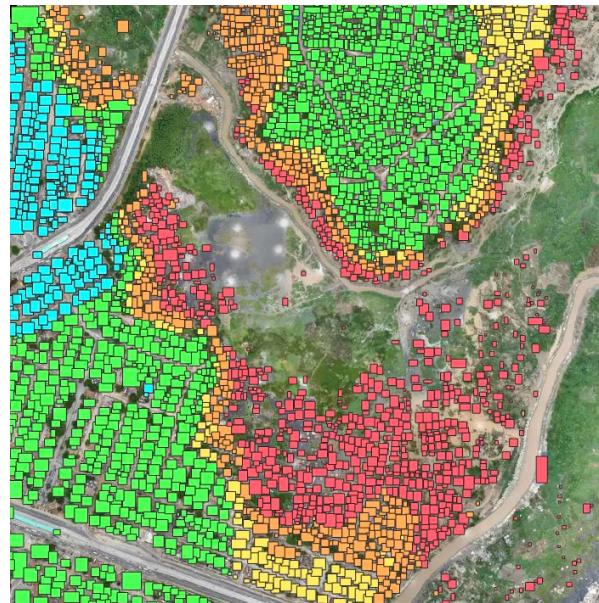


BOSTON
DYNAMICS



Source: <https://www.hothardware.com/news/robots-at-gtc-2019-tegra-tx1-powered-snakes-quadruped-bots>

USE CASE - HEALTHCARE



"The GLOBHE drones carry a specially designed HemoCue drone kit"

Evan Herbst, HemoCue Regional Director SSA



"GLOBHE helps the United Nations strengthen efforts in emergency preparedness"

UN Innovation Office New York



"These drones are saving lives"

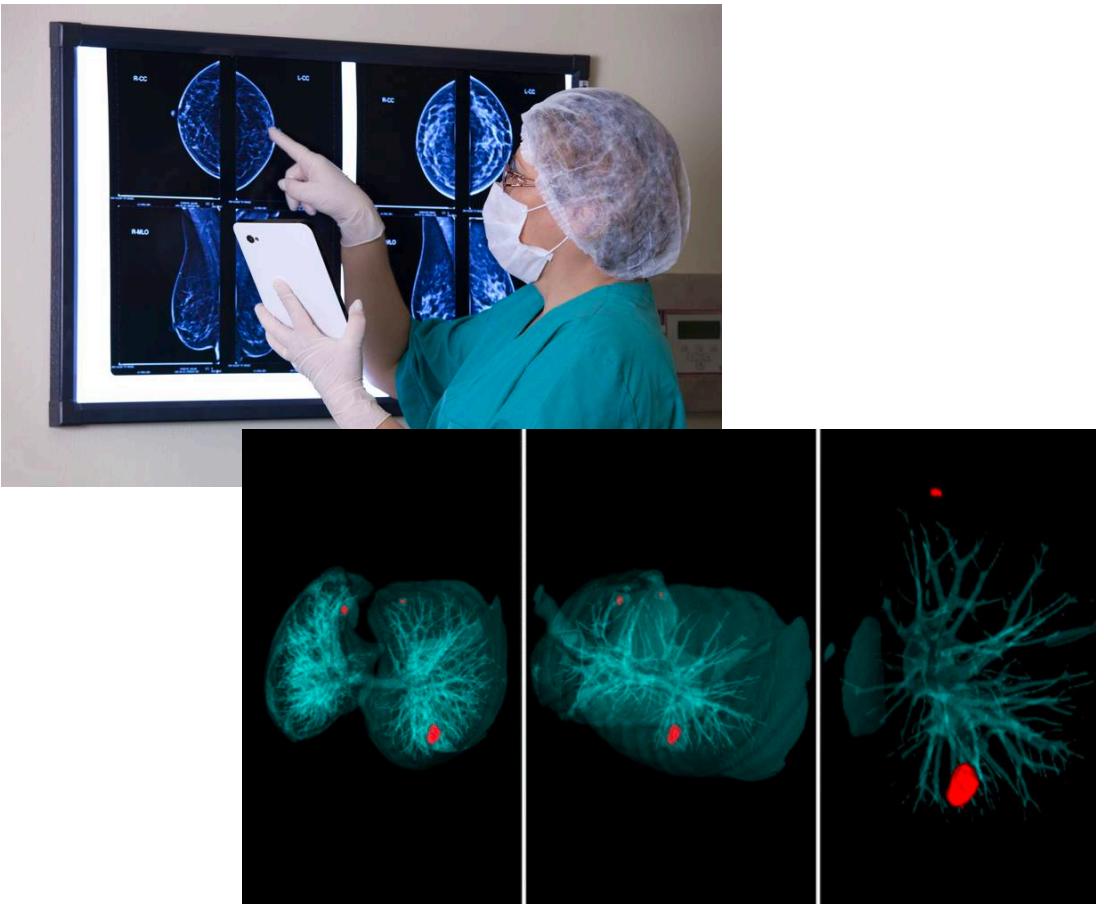
BBC World Hacks

Source: <https://globalhealth.usc.edu/education-training/online-global-health-courses/drones/>

USE CASE – HEALTHCARE

HOUSTON
Methodist[®]

This AI software can tell if you're
at risk from cancer before
symptoms appear



Source: <https://www.wired.co.uk/article/cancer-risk-ai-mammograms>

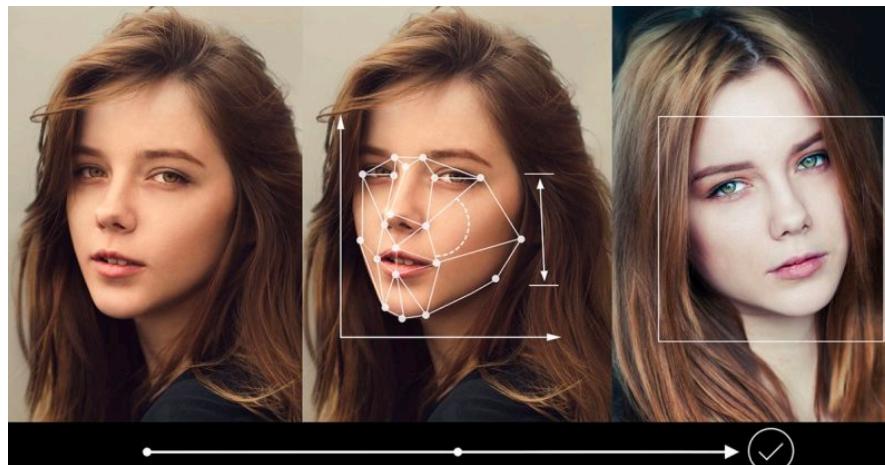
<https://www.pwc.com/gx/en/industries/healthcare/publications/ai-robotics-new-health/transforming-healthcare.html>

USE CASE – HUMANITARIAN



The Young Woman Who Created A New Way to Bust Sex Trafficking Rings

When she was still an undergrad, Emily Kennedy created Traffic Jam, a program that helps authorities track prostitution rings by using publicly available data.



Source: https://broadly.vice.com/en_us/article/8qwj75/the-young-woman-who-created-a-new-way-to-bust-sex-trafficking-rings

POLYFINTECH WORKSHOP

APIs for AI

Date: 14th May 2019

Brief/Instructions:

bit.ly/aisgpolyfin140519brief



COMPUTER VISION API

WHAT IS CLARIFAI?



- Clarifai is a platform that provides solutions pertaining to image and video recognition. Its solutions and models are made accessible through an API, device SDK, as well as on-premise deployment.
- Users and clients can utilise pretrained algorithms and models or train their own.
- Pricings wise, they range from 'Community' to 'Enterprise' scale.
- For 'Community' users first 5000 API calls are free.

CLARIFAI PRICINGS



	Community Add Machine Learning to your app or service, no credit card needed Free for the first 5,000 operations per month <a href="#">GET FREE API KEY		Essential Pay for what you use, without long-term commitments. Flexibility and value in one package. Month to month <a href="#">GET STARTED		Business This plan scales alongside your business needs. Ask us about volume discounts. Starting at \$2,000/month <a href="#">CONTACT US		Enterprise Our most customizable plan. For advanced infrastructure needs and unmatched service. Let's chat <a href="#">CONTACT US		Public Sector Government grade platform. For government specific use cases. Let's chat <a href="#">CONTACT US
---	--	---	---	---	---	---	--	---	--

MACHINE LEARNING OPERATIONS - PRE-BUILT & CUSTOM MODELS

Predict	5,000 free operations	Pre-Built Models: \$1.20 / 1,000 operations Custom Models: \$3.20 / 1,000 operations
Search <small>?</small>	5,000 free operations	\$1.20 / 1,000 operations
Custom Model Training	5,000 free operations	\$1.20 / 1,000 model versions
Add or Edit Input Images	5,000 free operations	\$1.20 / 1,000 operations

CLARIFAI OFFERINGS

PRE-TRAINED OR CUSTOM MODELS



Models

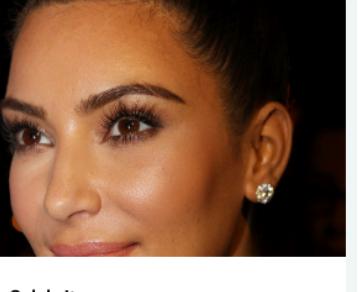
Explore all our ready-to-use image recognition models to suit your specific needs



Custom
Create your own model and teach it with your own images and concepts



Apparel
Recognize clothing, accessories, and other fashion-related items



Celebrity
Identify celebrities that closely resemble detected faces



Color
Identify the dominant colors present in your media in hex or W3C form

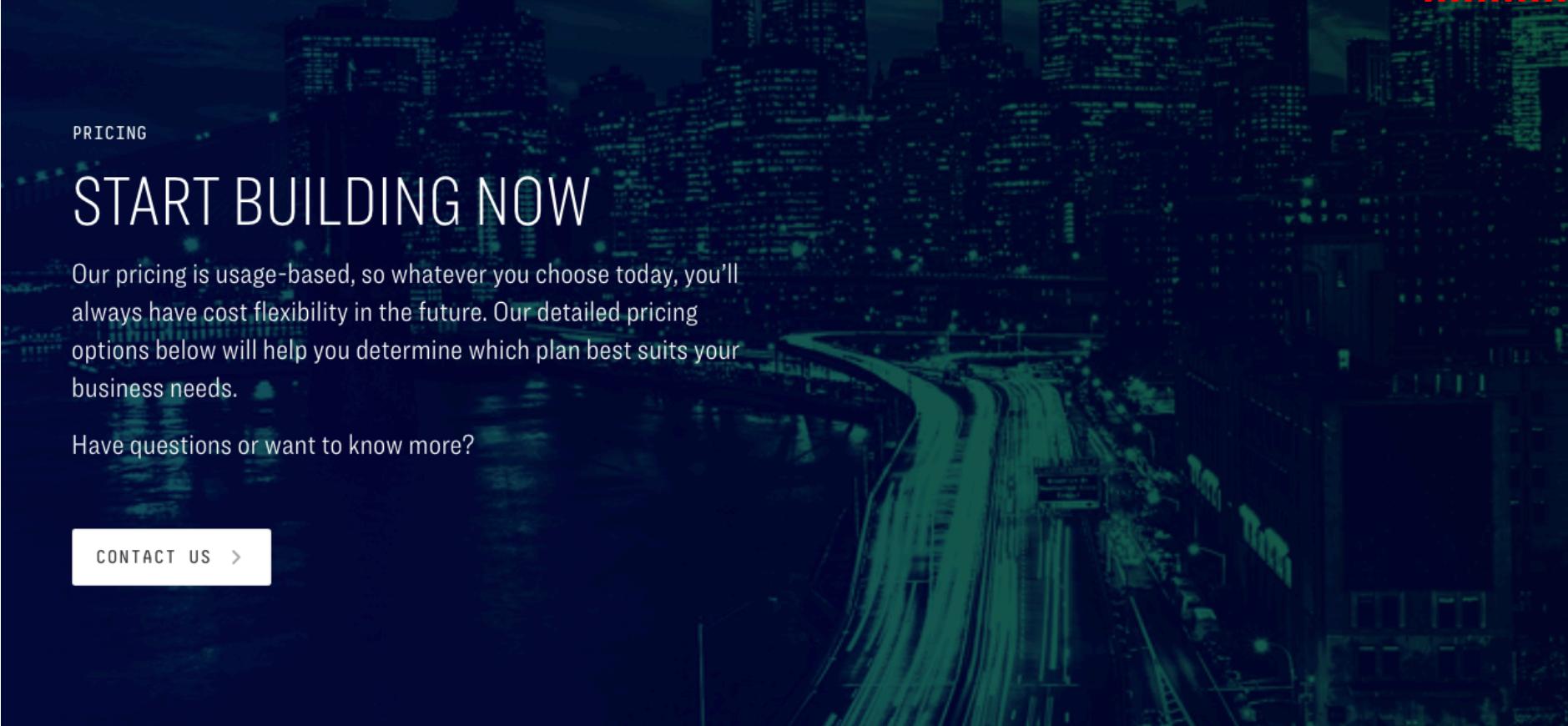


Demographics
Predict the age, gender, and cultural appearance of detected faces



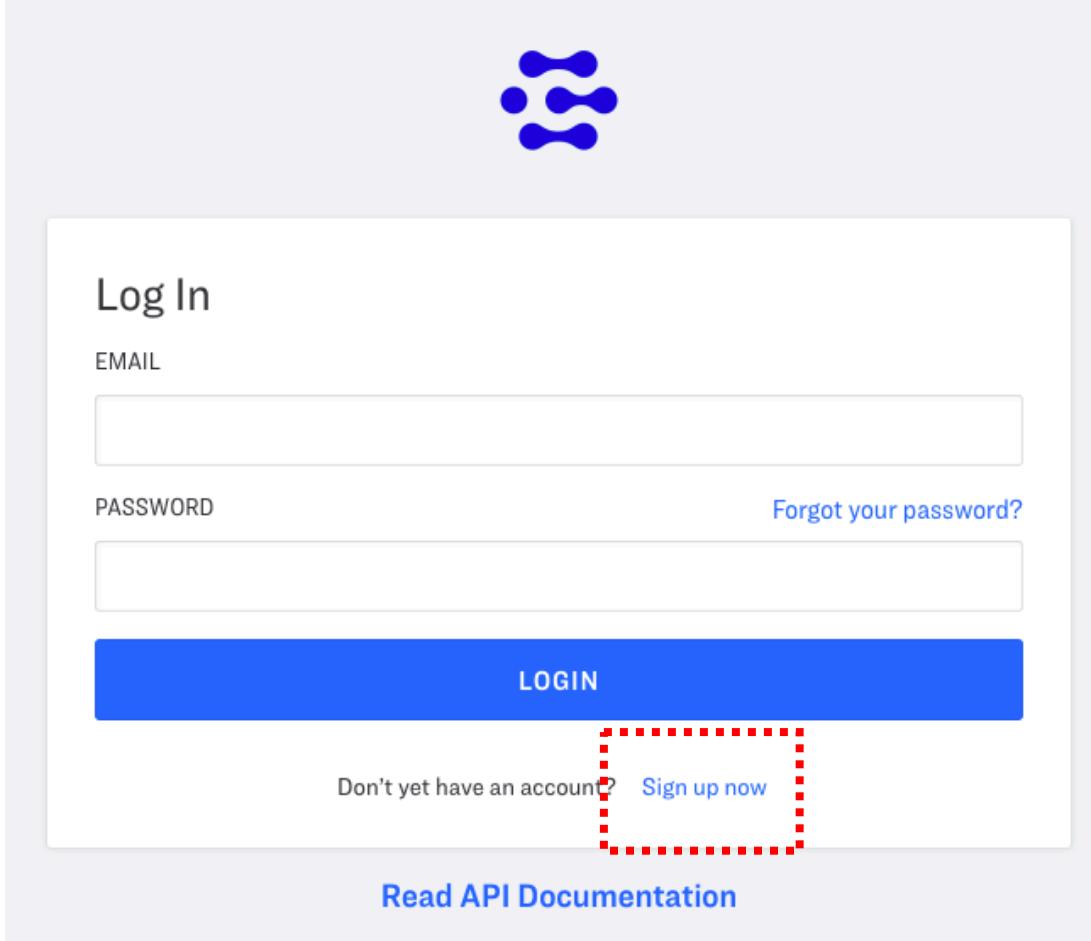
Face Detection
Detect the presence and location of human faces with a bounding box

CLARIFAI SET-UP



A screenshot of the Clarifai Pricing page. The page has a dark background with a blurred image of a road and buildings. At the top, there is a navigation bar with the Clarifai logo and links for PRODUCTS, ENTERPRISE, DEVELOPERS, COMPANY, DEMO, PRICING (which is highlighted with a red dashed box), and LOG IN (which is also highlighted with a red dashed box). Below the navigation bar, the word "PRICING" is displayed in white. The main heading "START BUILDING NOW" is in large white capital letters. Below it, a paragraph of text reads: "Our pricing is usage-based, so whatever you choose today, you'll always have cost flexibility in the future. Our detailed pricing options below will help you determine which plan best suits your business needs." At the bottom left, there is a white button with the text "CONTACT US >".

CLARIFAI SET-UP



The image shows the Clarifai login page. At the top center is the Clarifai logo. Below it is a white rectangular form with the title "Log In" in bold black font. There are two input fields: "EMAIL" and "PASSWORD", each with a corresponding input box. To the right of the "PASSWORD" input box is a blue link "Forgot your password?". Below the input boxes is a large blue "LOGIN" button with white text. At the bottom left, there is a link "Don't yet have an account?". To its right is a blue link "Sign up now" enclosed in a red dashed rectangle. At the very bottom of the form is a blue link "Read API Documentation".

Log In

EMAIL

PASSWORD

Forgot your password?

LOGIN

Don't yet have an account? [Sign up now](#)

[Read API Documentation](#)

CLARIFAI SET-UP



A screenshot of the Clarifai application dashboard. On the left is a dark sidebar with icons for file management, a search bar, help, and user profile (RK). The main area shows "My Applications 1" with a card for "aisg-test1". The card displays a thumbnail image of a hawk perched on a branch, with counts of 2 images and 1 label. A red dashed box highlights the "CREATE APPLICATION" button in the top right corner of the application card.

CLARIFAI SET-UP



Create an application

A Clarifai Application is a workspace in which you can manage data and models. You will need an application to use any of our products.

Create your application here!

APP NAME

DEFAULT LANGUAGE

BASE WORKFLOW ?

Note: an API Key will be created automatically for this application.

CANCEL CREATE

CLARIFAI SET-UP



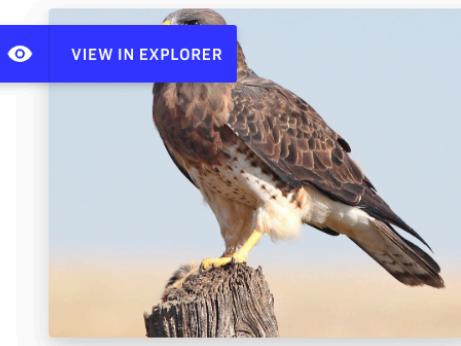
APP ID:fc264822b6cb4e86ab62827edc3673fa

aisg-test1

DEFAULT LANGUAGE English BASE WORKFLOW General CREATED May 13, 2019

INPUTS 2 CONCEPTS 1 CUSTOM MODELS 1

[VIEW IN EXPLORER](#)



API Keys [DETAILS](#)

aисg-test1-all-scopes
b0b5d May 13, 2019

[CREATE NEW API KEY](#)

App Workflows [?](#)

You do not have any App Workflows in this App.

[CREATE NEW WORKFLOW](#)

Concepts [DETAILS](#)

NAME rabbit INPUTS 2

Custom Models [DETAILS](#)

NAME rabbit_mod LAST TRAINED May 13, 2019

CLIENTS (GITHUB)

<https://github.com/clarifai>



A screenshot of the Clarifai GitHub profile page. At the top, there's a large blue icon, the company name "Clarifai", and links for location (New York, NY), website (https://clarifai.com), and email (info@clarifai.com). Below this, there are tabs for "Repositories" (28), "People" (5), and "Projects" (0). A "Report abuse" link is also present. The main section is titled "Pinned repositories" and contains three cards: "clarifai-python" (Clarifai API Python Client, Python, 322 stars, 100 forks), "clarifai-java" (Clarifai API Java Client, Java, 90 stars, 50 forks), and "clarifai-javascript" (Official Clarifai JavaScript client for browsers and node.js, JavaScript, 201 stars, 49 forks).

Clarifai API Python Client

This is the official Python client for interacting with our powerful recognition [API](#). The Clarifai API offers image and video recognition as a service. Whether you have one image or billions, you are only steps away from using artificial intelligence to recognize your visual content.

- Try the Clarifai demo at: <https://clarifai.com/demo>
- Sign up for a free account at: <https://clarifai.com/developer/account/signup/>
- Read the developer guide at: <https://clarifai.com/developer/guide/>



HANDS-ON

- [Azure Notebooks](#) is a free service for anyone to utilise the power of Jupyter to develop and run their code in their browser, without any local installation.
- [Jupyter](#) is an open-source project that enables markdown formatting, executable code, and embedded visualisations/graphics on a single canvas.
- Free for anyone to use; all that is needed is a Microsoft account to sign up.



Azure Notebooks

The screenshot shows a Jupyter notebook running on Azure Notebooks. The code cell contains:

```
def newman_watts_strogatz(n, m, k, p):
    return nx.newman_watts_strogatz_graph(n, k, p)

def plot_random_graph(n, m, k, p, generator):
    g = generator(n, m, k, p)
    nx.draw(g)
    plt.show()
```

The interact function automatically creates user interface (UI) controls for exploring code and data interactively:

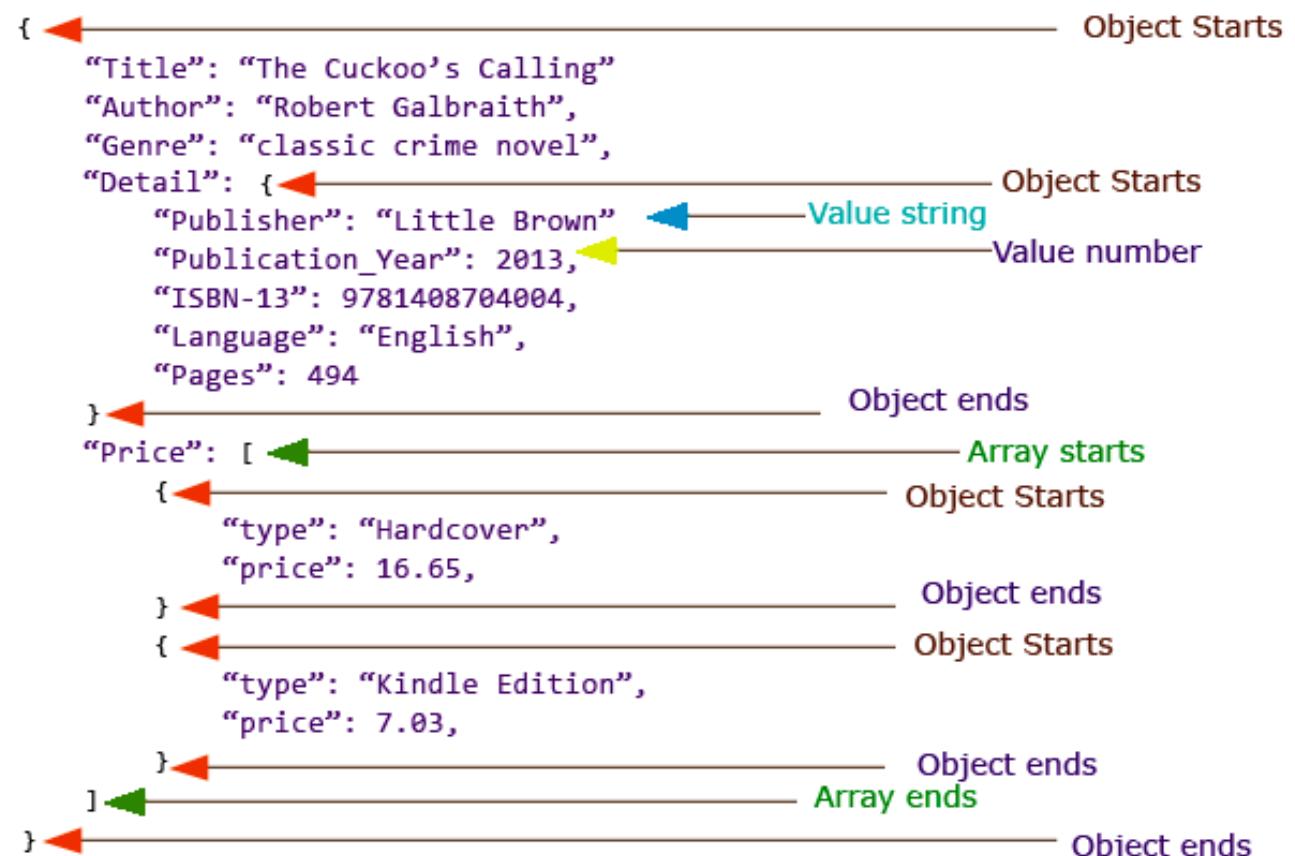
```
In [8]: interact(plot_random_graph, n=(2,30), m=(1,10), k=(1,10), p=(0.0, 1.0, 0.001),
                 generator={'lobster': random_lobster, 'power law': powerlaw_cluster,
                            'Newman-Watts-Strogatz': newman_watts_strogatz,
                            'Erdős-Rényi': erdos_renyi, })
```

UI controls include sliders for n (16), m (5), k (5), and p (0.50), and a dropdown menu for generator (set to Newman-Watts-Strogatz). A network graph visualization is shown at the bottom.

PYTHON

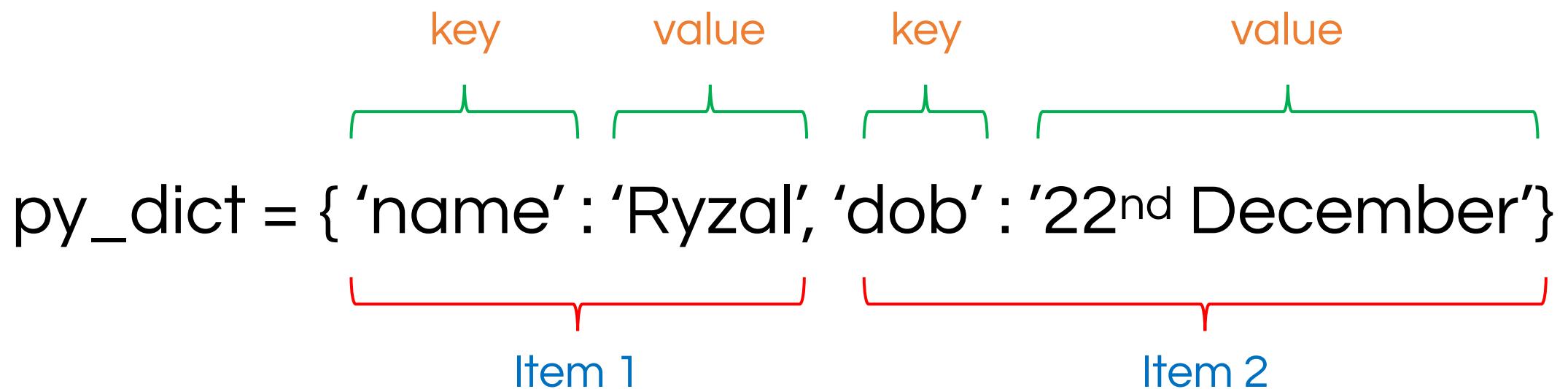
JSON, DICTIONARIES AND INDEXING

```
1 {  
2     "Title": "The Cuckoo's Calling",  
3     "Author": "Robert Galbraith",  
4     "Genre": "classic crime novel",  
5     "Detail": {  
6         "Publisher": "Little Brown",  
7         "Publication_Year": 2013,  
8         "ISBN-13": 9781408704004,  
9         "Language": "English",  
10        "Pages": 494  
11    },  
12    "Price": [  
13        {  
14            "type": "Hardcover",  
15            "price": 16.65  
16        },  
17        {  
18            "type": "Kindle Edition",  
19            "price": 7.03  
20        }  
21    ]  
22 }  
23 }
```



PYTHON

JSON, DICTIONARIES AND INDEXING



PYTHON

JSON, DICTIONARIES AND INDEXING

```
cryptocurrency_data = { 'BTC':{ 'Ticker': 'BTC',
                                'Price': 7154.05,
                                'Changes': 5.45,
                                'name': 'Bitcoin',
                                'market_cap_usd': 126597000000},
                        'ETH':{ 'Ticker': 'ETH',
                                'Price': 189.619,
                                'Changes': 0.2,
                                'name': 'Ethereum',
                                'market_cap_usd': 20106500000}}}
```

```
cryptocurrency_data['BTC'] = { 'Ticker': 'BTC',
                                'Price': 7154.05,
                                'Changes': 5.45,
                                'name': 'Bitcoin',
                                'market_cap_usd': 126597000000}
```



COMPUTER VISION API (HANDS-ON)



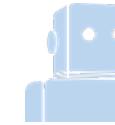
NATURAL LANGUAGE API

WHAT IS WIT.AI?



- [Wit.ai](#) allows developers or engineers to tap on to an open and extensible natural language platform.
- Wit.ai learns human language from interactions collected through it and is shared with the community.
- Pricings wise, it is completely free, be it for personal or commercial use. However, usage is subjected to their terms and conditions.
- While they don't have a strict rate limit for their API usage, it is of course imperative that API users do not hit the API heavily.

WIT.AI SET-UP



wit.ai

wit.ai



GETTING STARTED

DOCS

FAQ

BLOG

JOBS

Natural Language for Developers



Bots



Mobile apps



Home automation



Wearable devices



Hardware

Users enjoy a hands-free mobile experience while driving, working out, cooking. Developers use Wit to easily build a voice interface for their app.

Log in with GitHub

Log in with Facebook

or see how it works



AI SINGAPORE

WIT.AI SET-UP



wit.ai

 ryzalk

Enter a bio—[Edit](#)
Enter a site—[Edit](#)
 <https://github.com/ryzalk>

My Apps

 [ryzalk / MyFirstApp](#)

 [ryzalk / ryz-celebrities](#)

WIT.AI SET-UP



Create a new App

ryzalk /

Language

 Open
Your data will be open to the community

 Private
Your data will be private and accessible only by you and the developers you decide to share your app with.

Import your app from a backup

WIT.AI SET-UP



Hello, ryzalk!

Welcome to your new Wit app!

Wit allows you to extract relevant pieces of information — or **entities** — from what your users might say to your app.

To get started and create a new entity, you can start teaching your app with the input below, or refer to our [documentation](#).

Test how your app understands a sentence

You can train your app by adding more examples

User says...

+ Add a new entity

✓ Validate

Your app uses 1 entity

Entity	Description	Values
intent →	User-defined entity	
LOOKUP STRATEGIES trait		

WIT.AI TERMINOLOGIES



- **Expressions (Commands)**

Inputs provided by end user for the application to infer from and execute identified actions.

- **Intents**

Expressions are to be translated into intents for the app to provide the application with outputs.

- **Entities**

Elements or features identifiable from the user-submitted inputs.

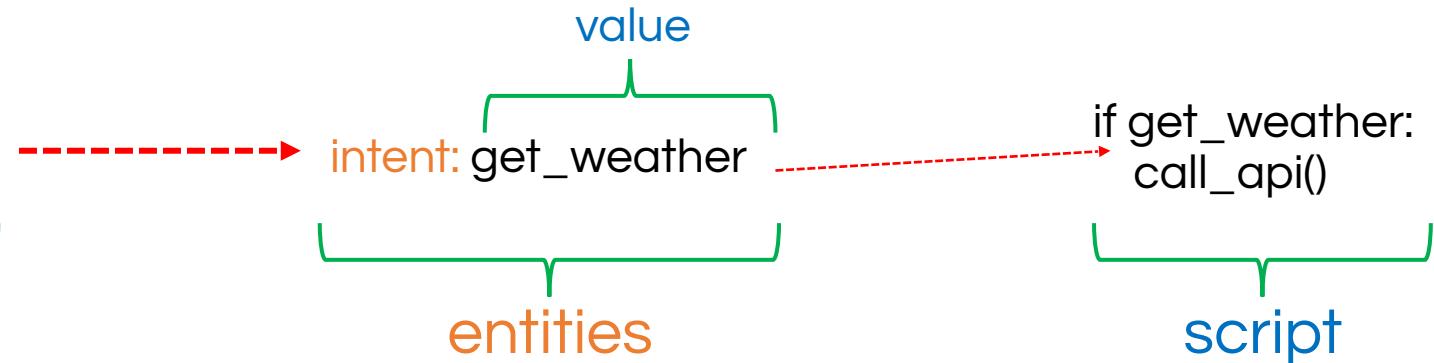
WIT.AI TERMINOLOGIES



Objective: Get information about the weather

- "Tell me about the weather"
- "What's the weather like"
- "Is it going to be rainy"

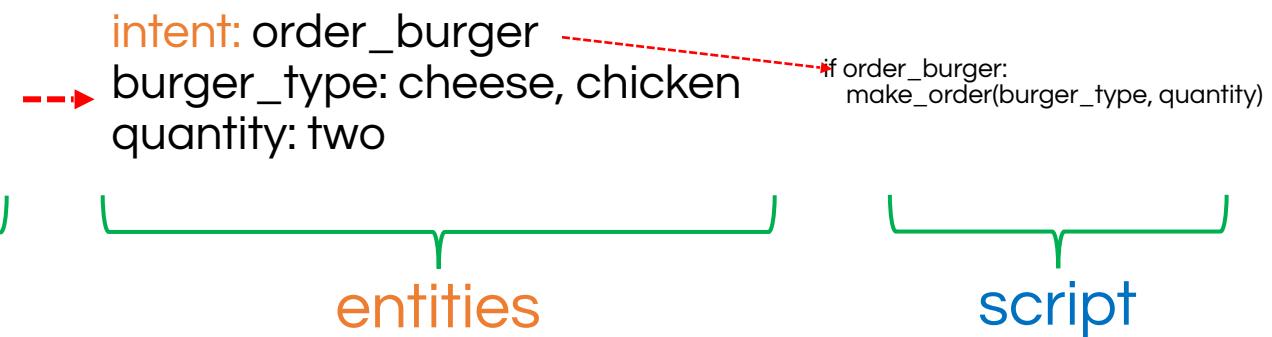
expressions



Objective: Order burger

- "Get me a chicken and cheese burger"
- "I'd like to order two cheese burger"

expressions



WIT.AI TERMINOLOGIES

TYPES OF ENTITIES

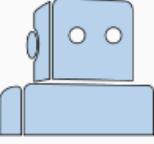


Lookup Strategy	Use Case	Examples
Trait	<ul style="list-style-type: none">- Entity value not inferred from keyword or specific phrase within sentence	"What's the weather like"
Free Text	<ul style="list-style-type: none">- When a substring of the message needs to be extracted and substring doesn't belong to a predefined list of possible values	"Set status to <u>out of office to fetch my kid</u> "
Keywords	<ul style="list-style-type: none">- When entity value belongs to a predefined list, and substring matching is needed to be looked up	"Buy flight tickets to <u>Phuket</u> on <u>10th October</u> "

CLIENTS (GITHUB)

<https://github.com/wit-ai>



 **Wit.ai**
Natural Language for everyone
Palo Alto, CA <https://wit.ai> help@wit.ai Verified

Repositories 10 People 3 Projects 0

Find a repository... Type: All ▾ Language: All ▾

wit-go
Go client for wit.ai HTTP API

go nlu wit
Go ★ 39 4 MIT Updated 9 days ago

wit-api-only-tutorial
JavaScript ★ 106 48 Updated 14 days ago


Report abuse

pywit
pywit is the Python SDK for Wit.ai.

Install

Using pip:

```
pip install wit
```

Top languages

- JavaScript
- Python
- Clojure
- Go
- CoffeeScript

People 3 >

 **jtiao** Jason Liao



NATURAL LANGUAGE API (HANDS-ON)

Financial Modeling Prep

FINANCE DATA API

WHAT IS FINANCIAL MODELING PREP?

Financial Modeling Prep

- Financial Modeling Prep is a platform that provides users with stock market information be it news, currencies or prices. They also provide free financial modeling methodology.
- They provide an [API](#) designed for developers and engineers to obtain financial data in a seamless way. The API is free for everyone to use and no keys are required. Data can be obtained in JSON, CSV, or XLS format for convenience.

FINANCIAL MODELING PREP API SET-UP

Financial Modeling Prep

Getting Started

The FinancialModelingprep API is a set of services designed for developers and engineers. It can be used to build high-quality apps and services.

We're always working to improve the FinancialModelingPrep API. Please check back for enhancements and improvements.

Terms

By using the FinancialModelingprep API, you agree to our terms.

Companies Financial Statements

Annual Income Statement

This API returns companies income statements.

```
https://financialmodelingprep.com/api/v2/financials/income-statement/AAPL
```

```
https://financialmodelingprep.com/api/v2/financials/income-statement/AAPL?datatype=json
```

```
https://financialmodelingprep.com/api/v2/financials/income-statement/AAPL?datatype=csv
```

```
https://financialmodelingprep.com/api/v2/financials/income-statement/AAPL?datatype=xls
```

TABLES OF CONTENTS

Financial Statements

Companies profile

Financial Ratios

Realtime Stock Price

Stock Historical Price

Stock Symbols List

Companies Rating

Stock DCF

Batch Request

Most Active

Most Gainer

Most Loser

CryptoCurrencies

Forex (FX)

Majors Indexes

Sectors Performance

NYSE Trading Hours

FINANCIAL MODELING PREP API SET-UP

Financial Modeling Prep

```
#!/usr/bin/env python

try:
    # For Python 3.0 and later
    from urllib.request import urlopen
except ImportError:
    # Fall back to Python 2's urllib2
    from urllib2 import urlopen

import json

def get_jsonparsed_data(url):
    """
    Receive the content of ``url`` , parse it as JSON and return the object.

    Parameters
    ------
    url : str

    Returns
    ------
    dict
    """
    response = urlopen(url)
    data = response.read().decode("utf-8")
    return json.loads(data)

url = ("https://financialmodelingprep.com/api/financials/income-statement/FB?datatype=json")
print(get_jsonparsed_data(url))
```

INTEGRATION

Javascript

Jquery

VueJs

Angular

JAVA

PHP

NodeJS

Python

Go

Ruby

C#

R

Strest

Rust

Swift

Scala

< back

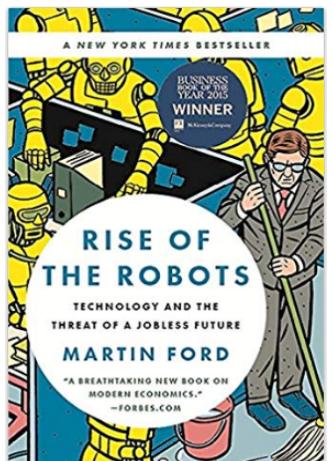
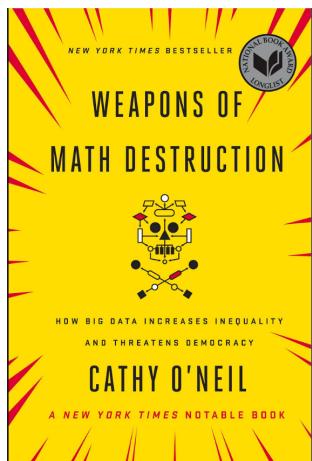
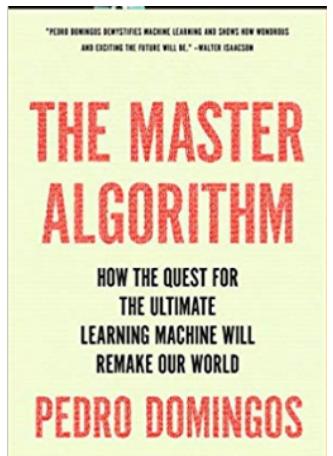
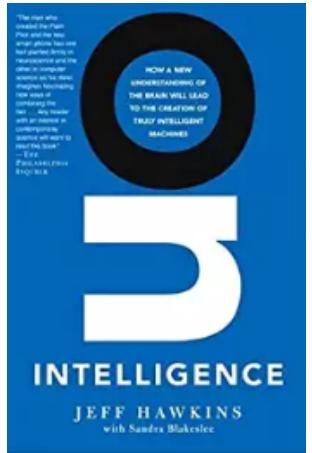
Financial Modeling Prep

FINANCE DATA API (HANDS-ON)

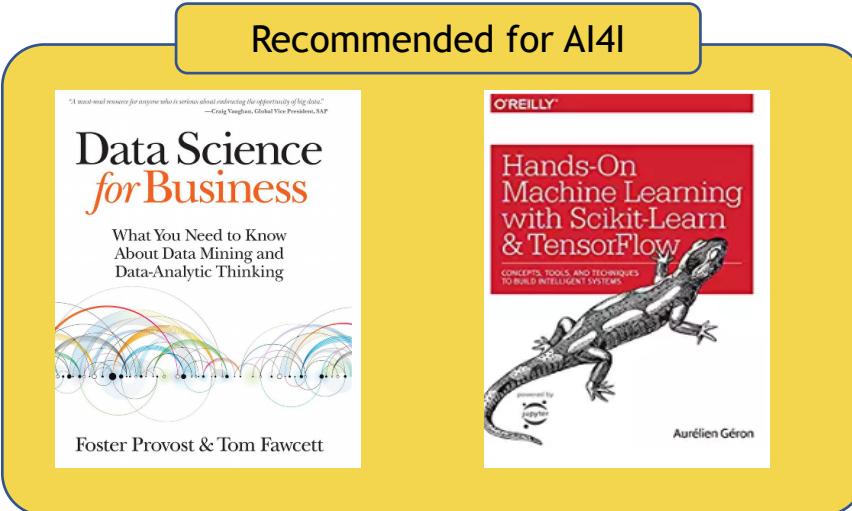
OTHER RESOURCES

RECOMMENDED BOOKS

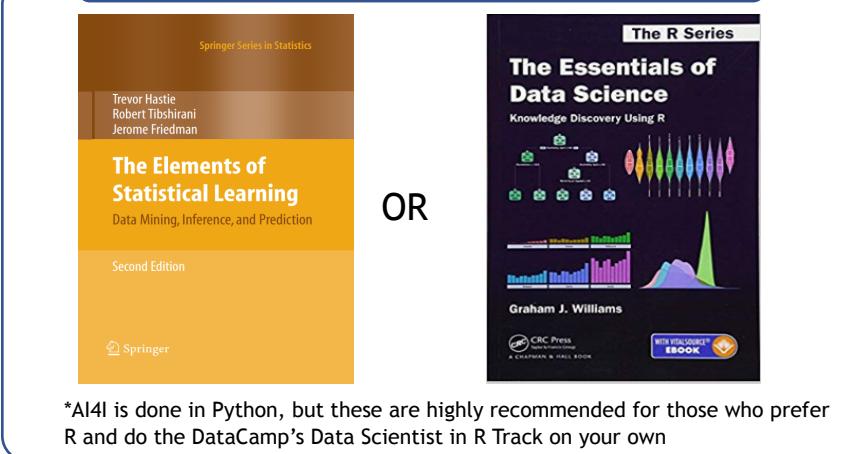
Optional but recommended



Recommended for AI4I



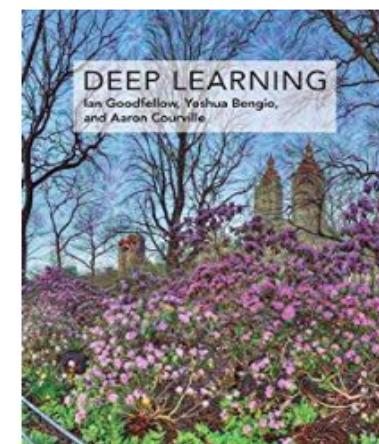
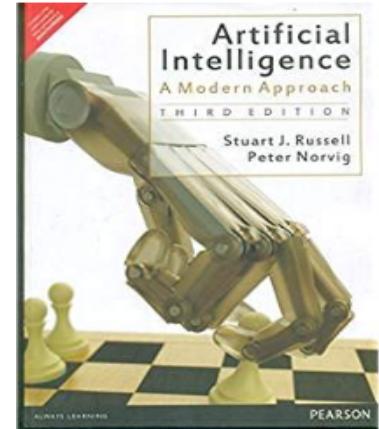
Optional but recommended for AI4I*:



OR

*AI4I is done in Python, but these are highly recommended for those who prefer R and do the DataCamp's Data Scientist in R Track on your own

Optional:
Math/Theory

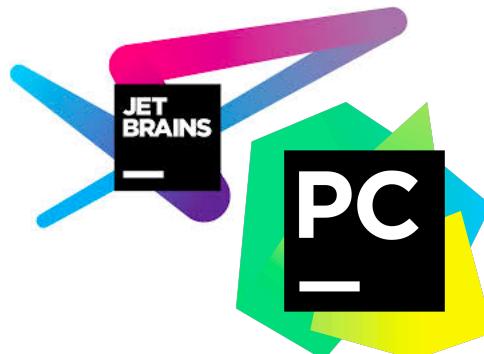


ENTERPRISE TOOLS FOR STUDENTS

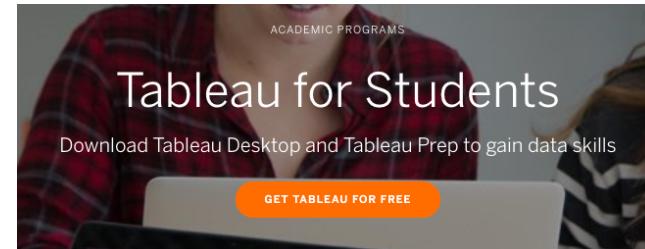


GitHub Education

<https://education.github.com/pack>



<https://www.jetbrains.com/student/>



<https://www.tableau.com/academic/students>

alteryx

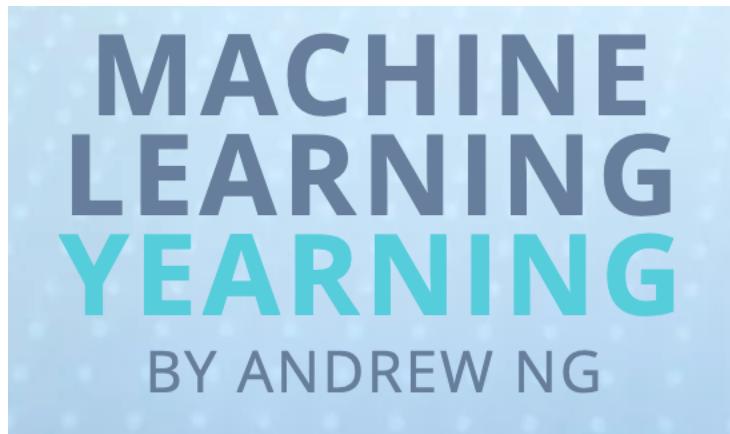


<https://www.alteryx.com/why-alteryx/alteryx-for-good/stude>



AI SINGAPORE

MISCELLANEOUS



<https://www.mlyearning.org>



<http://dataskeptic.com>

Get the O'Reilly
Artificial Intelligence
Newsletter

[https://www.oreilly.com/ai/
newsletter.html](https://www.oreilly.com/ai/newsletter.html)

Towards Data Science
Sharing concepts, ideas, and codes

<https://towardsdatascience.com/>

THANK YOU

WWW.AISINGAPORE.ORG

