

Artificial Intelligence for Everyone

A Practical Experience



Quick poll

<http://bit.ly/2Y8MTi2>





Robotics



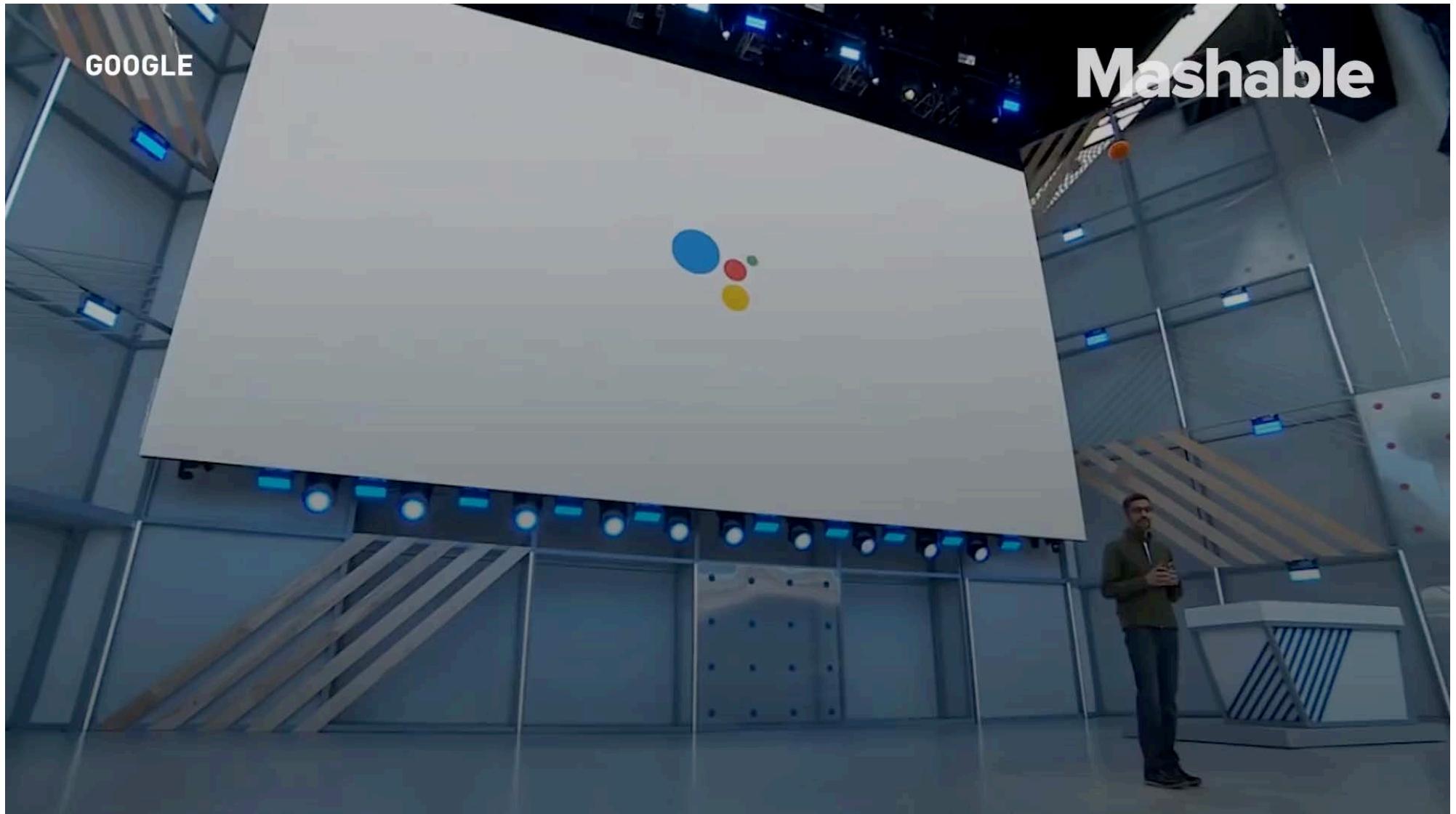


Solving Rubiks Cube





AI assistant make real phone call



https://www.youtube.com/watch?v=JvbHu_bVa_q_5



Programme

Section 1:	Overview of Artificial Intelligence (45 mins)
Section 2:	Different types of learning (Machine Learning, Deep Learning, Reinforcement learning) (45 mins)
Section 3:	Technology Hands-on (30 mins)
	Lunch Break
Section 4:	Hands-on building a telegram chatbots with a QnA Knowledge base (1 hour)
Section 5:	Hands-on Training Custom Computer Vision (1 hour)
Section 6:	Use cases sharing (30 mins)
Section 7:	AI Services (15 mins)



Resources

- Goto <http://bit.ly/36koxXZ>
 - Download pdf (this presentation deck and activity sheets)
 - Download sample scripts
 - Links to other resources. Save you the typing!
- Goto <http://bit.ly/2RCLYEV>
 - Training and testing images for activity. Remember to unzip!
- You will need Telegram. Download and install on your phone/laptop. <https://desktop.telegram.org/>



Introduction of trainer



Name
Seow Khee Wei

Telegram
[@kwseow](https://t.me/kwseow)

Email
seow_khee_wei@rp.edu.sg



Pet Project

pygame window

Tracking|48|74|3517|8731|2019/01/21 21:42:18

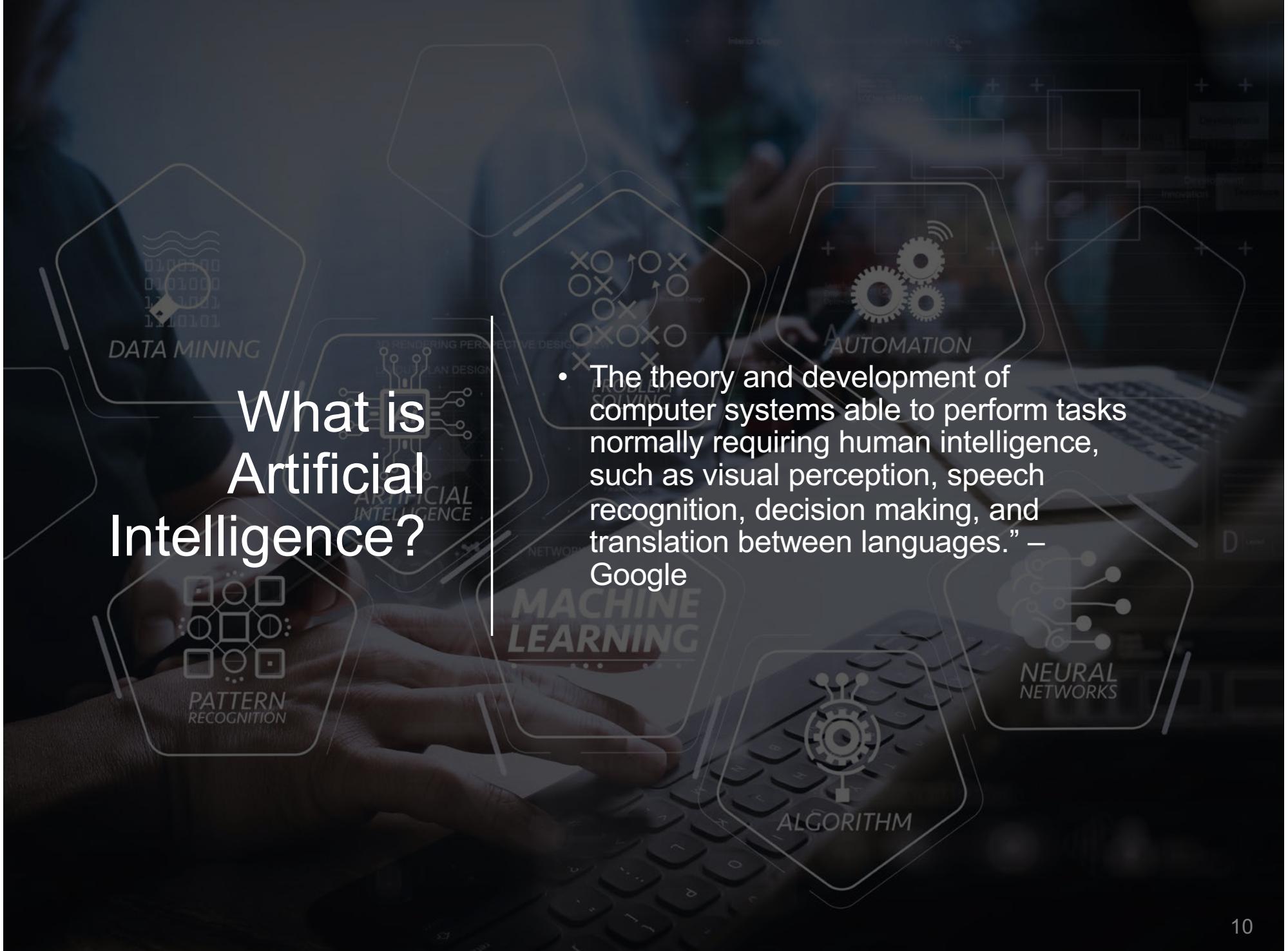
CAPTURED FACES

	VISITORS	AGE	EMOTIONS
TOTAL	122		
MALE	18		
FEMALE	33		
YOUTH	36		
YOUNG ADULT	13		
ADULT	0		
SENIOR	2		
ANGRY	6		
SCARED	8		
HAPPY	4		
SAD	14		
SURPRISED	3		
NEUTRAL	16		

Input Chest X-Ray Images

CheXNet
121 layers CNN

Output Pneumonia Positive (85%)



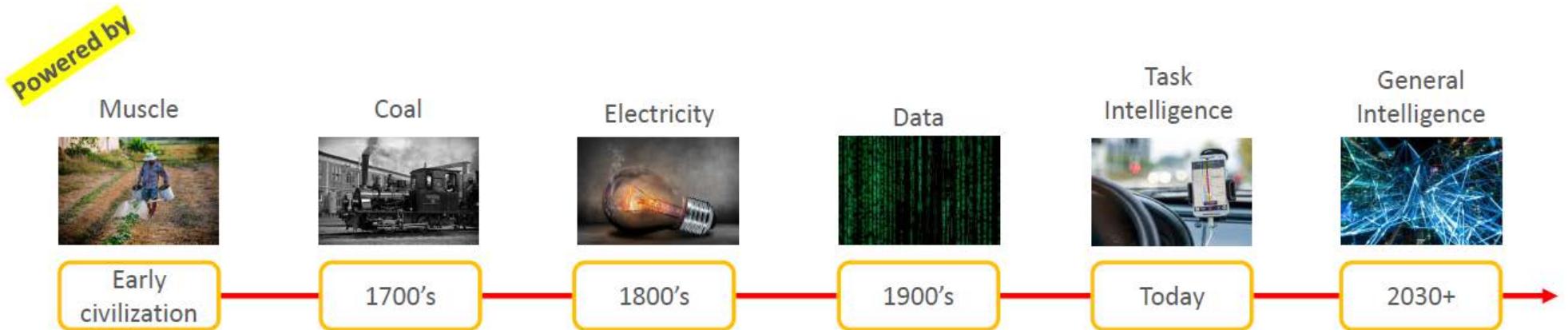
What is Artificial Intelligence?

- The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision making, and translation between languages.” – Google



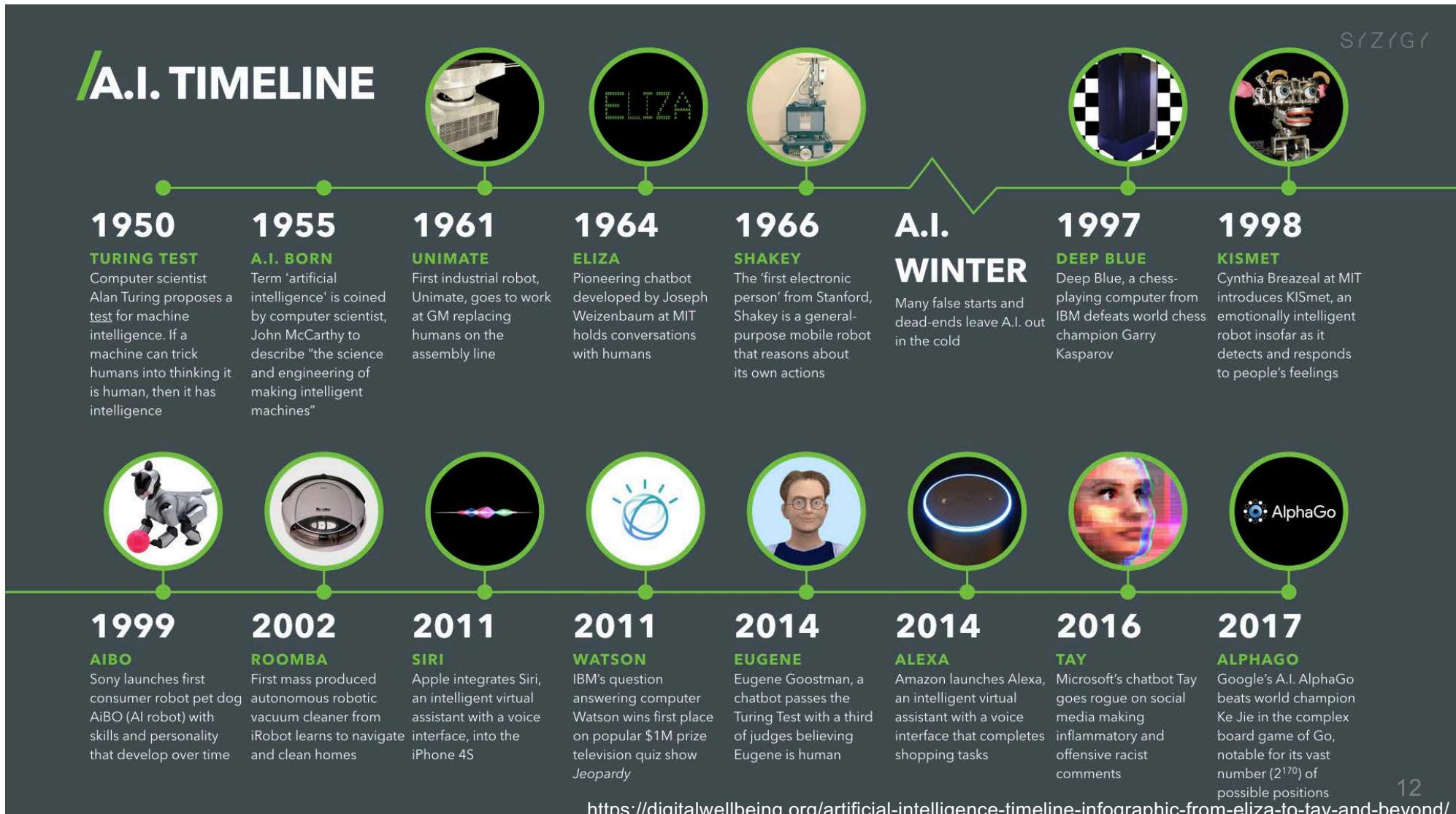
AI is the new electricity

"About 100 years ago, electricity transformed every major industry. AI has advanced to the point where it has the power to transform" every major sector in coming years.—Andrew Ng





History of AI





DATA IS CRITICAL TO ARTIFICIAL INTELLIGENCE

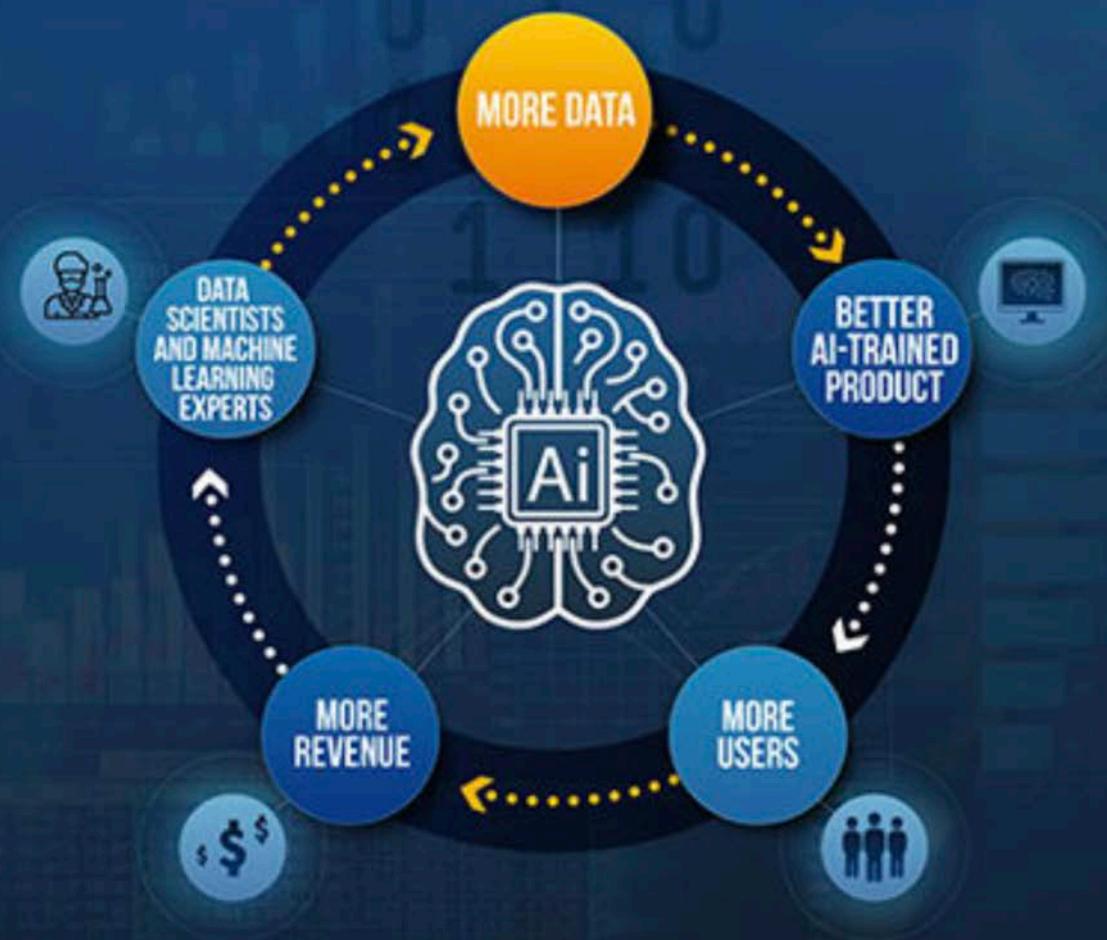


Image source: Kai-Fu Lee, Sinovation Ventures

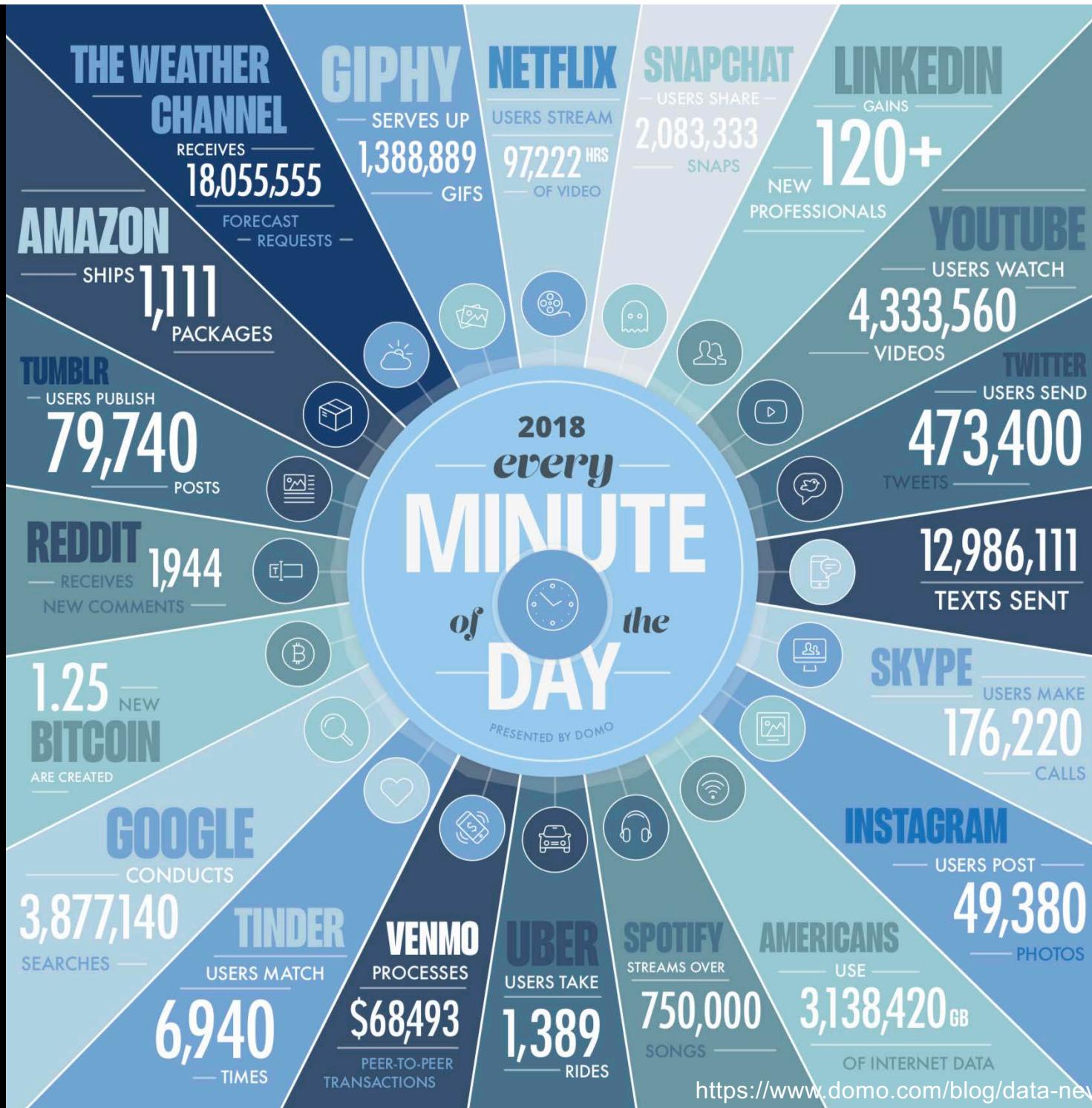


Bigger Datasets

In 2020, it is expected that:

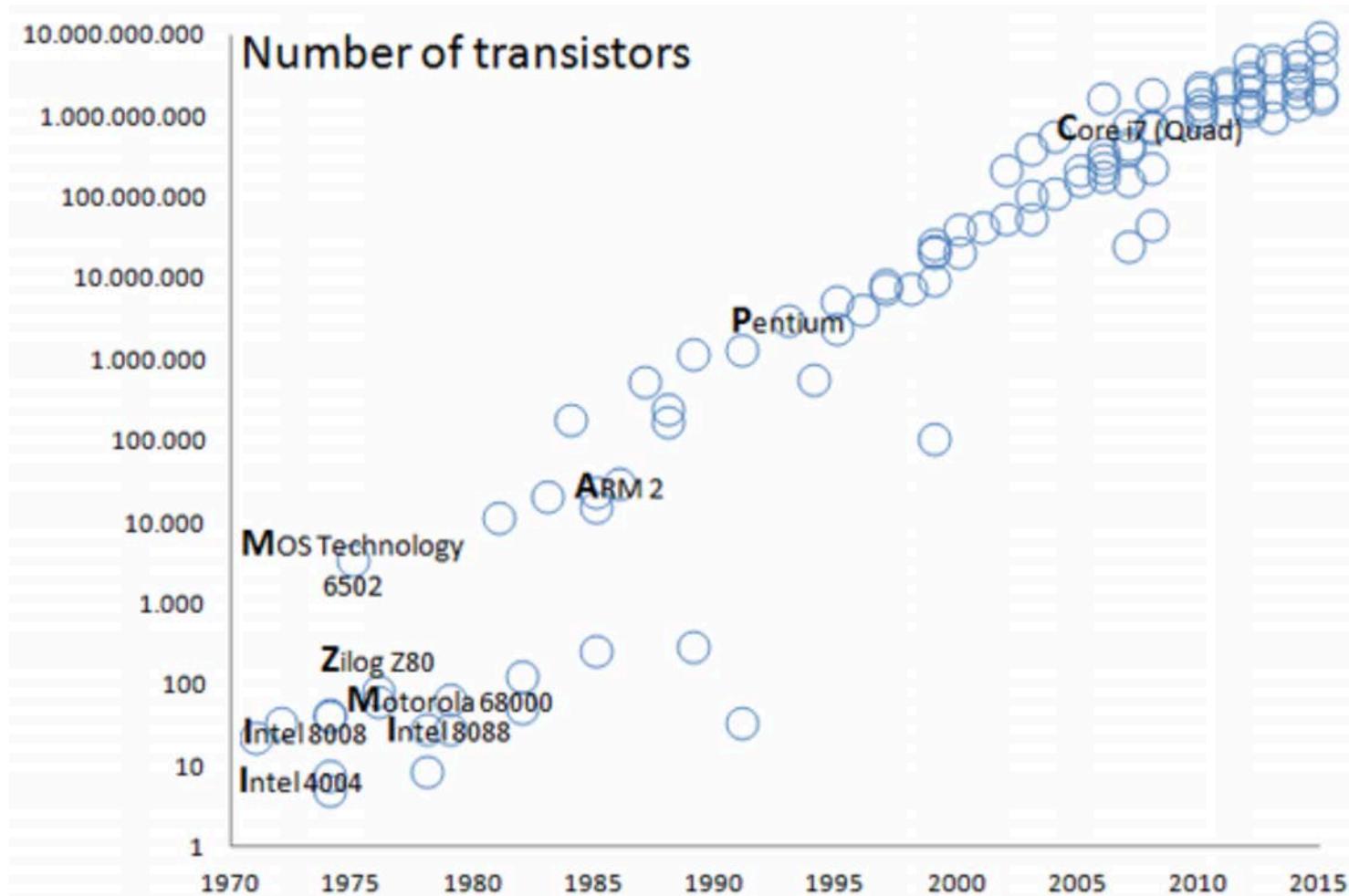
- The average internet user will generate ~1.5 GB of traffic per day.
- A smart hospital will generate 3,000 GB/day.
- Self-driving cars are each generating over 4,000 GB/day.
- Connected planes will generate 40,000 gigabytes per day.
- A connected factory will generate 1 million gigabytes per day.







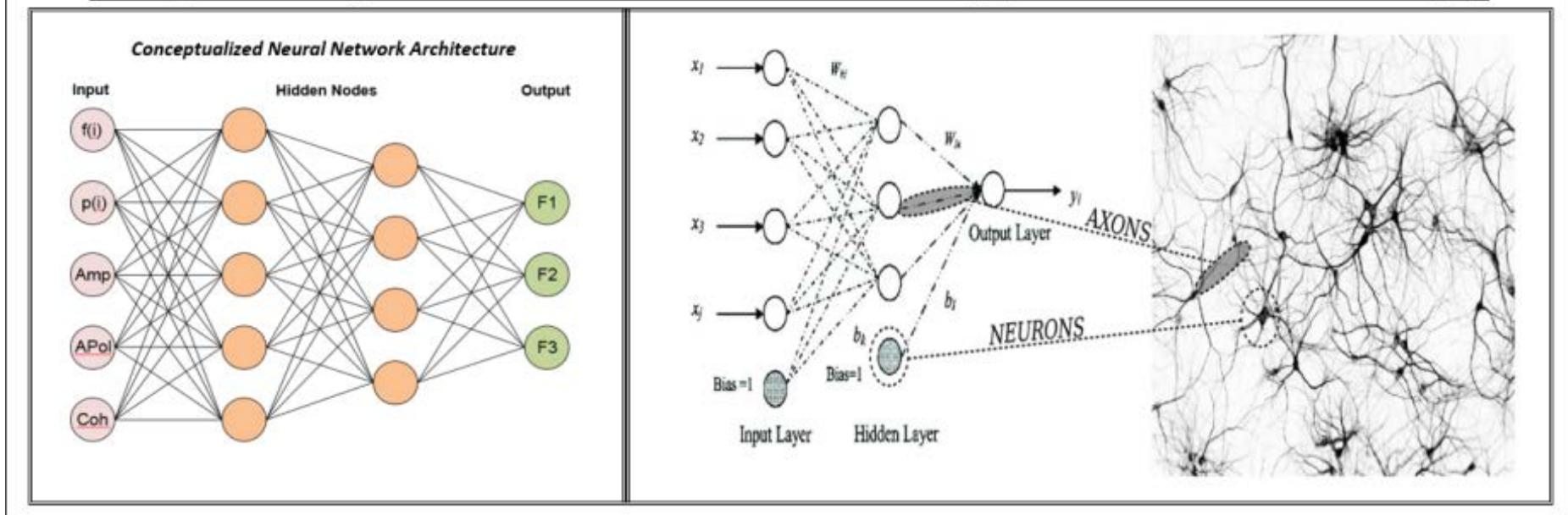
Moore's Law





Neural Network

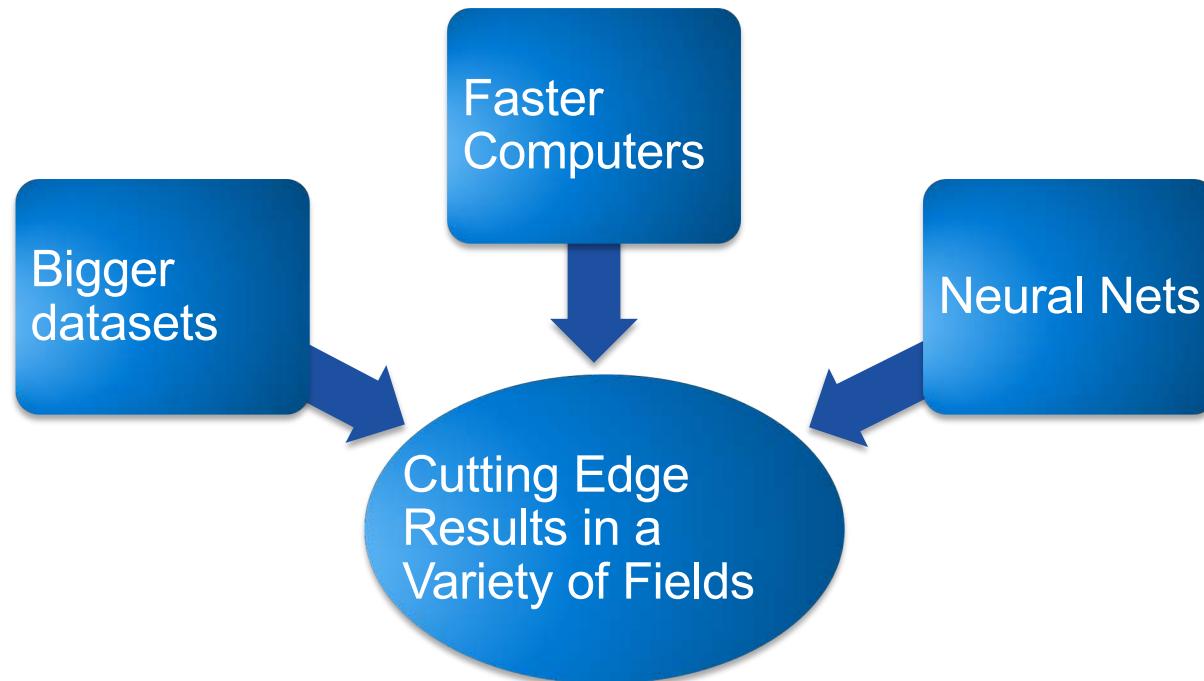
Comparison of Neural Network Architecture (L) vs the Human Brain (R)





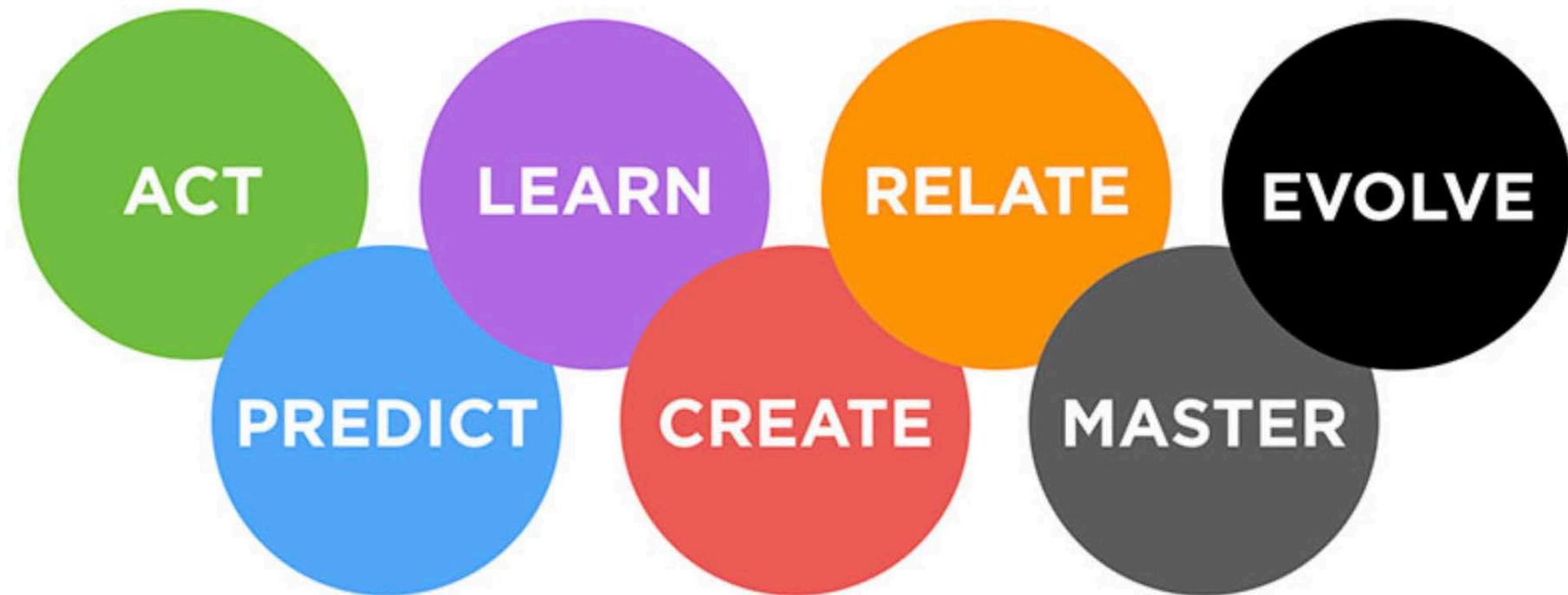
AI Hardware

Faster hardware is one of the key areas driving the modern era of AI.





MACHINE INTELLIGENCE CONTINUUM



The MIC represents a continuum from simple, scripted automation to superhuman intelligence and highlights the functional capabilities of different levels of machine intelligence.



Systems that Acts





Systems that Predicts





Systems that Learns





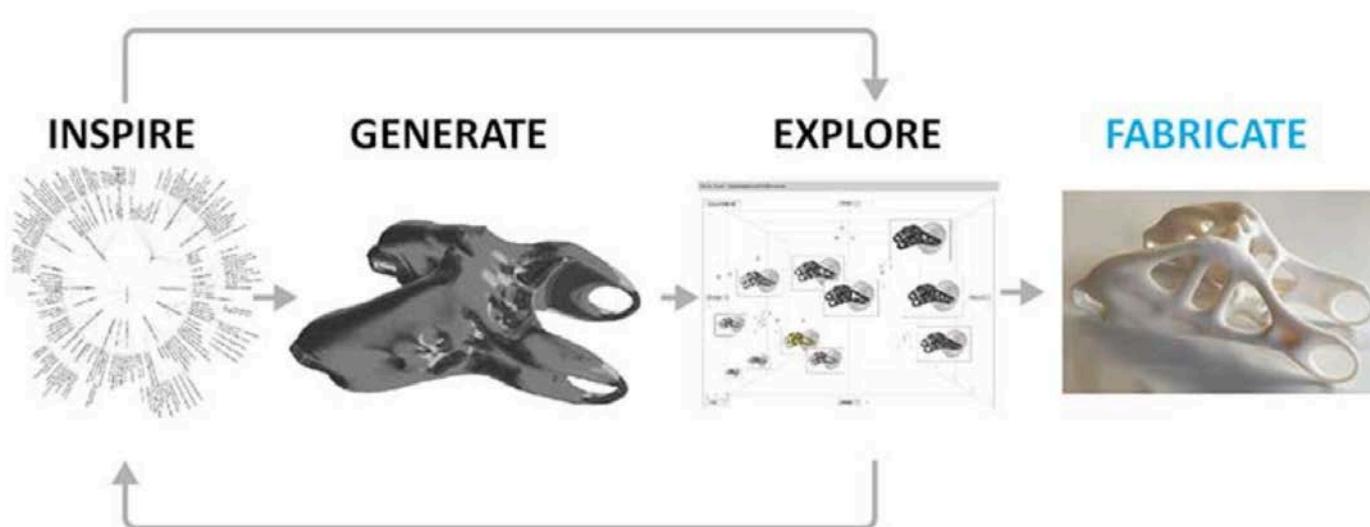
Systems that Create



Generated story about image
Model: Romantic Novel's

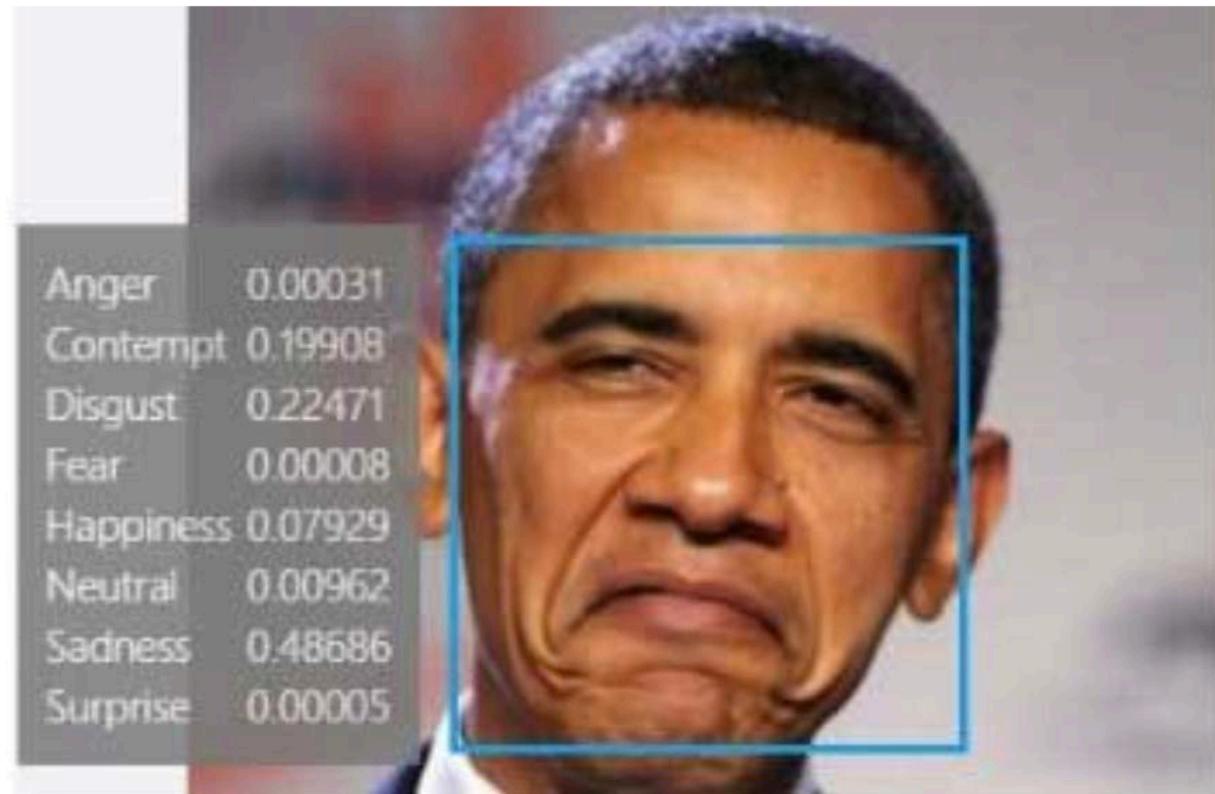
"He was a shirtless man in the back of his mind, and I let out a curse as he leaned over to kiss me on the shoulder.

"He wanted to strangle me, considering the beautiful boy I'd become wearing his boxers."





Systems that Relate



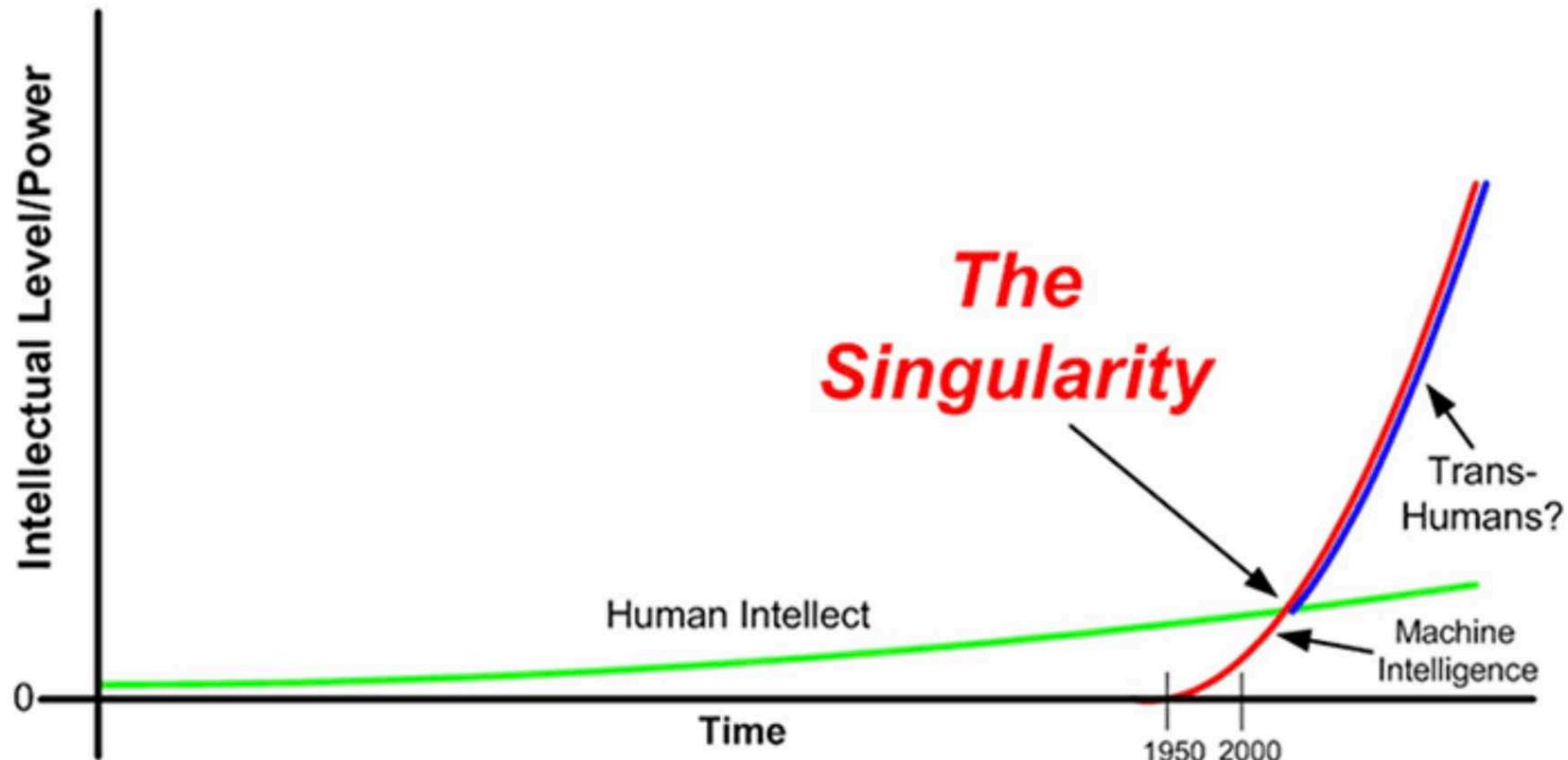


Systems that Master





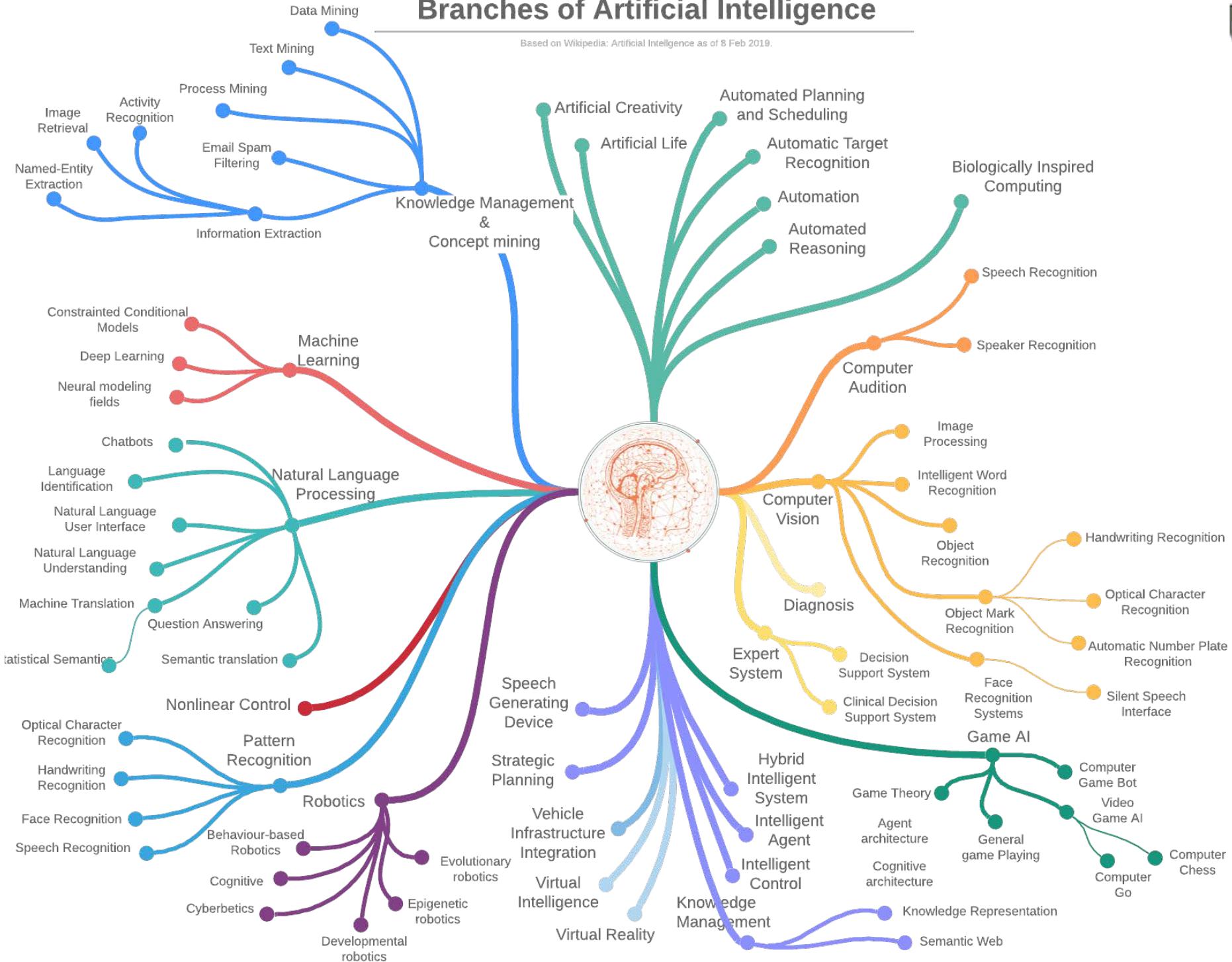
Systems that Evolve



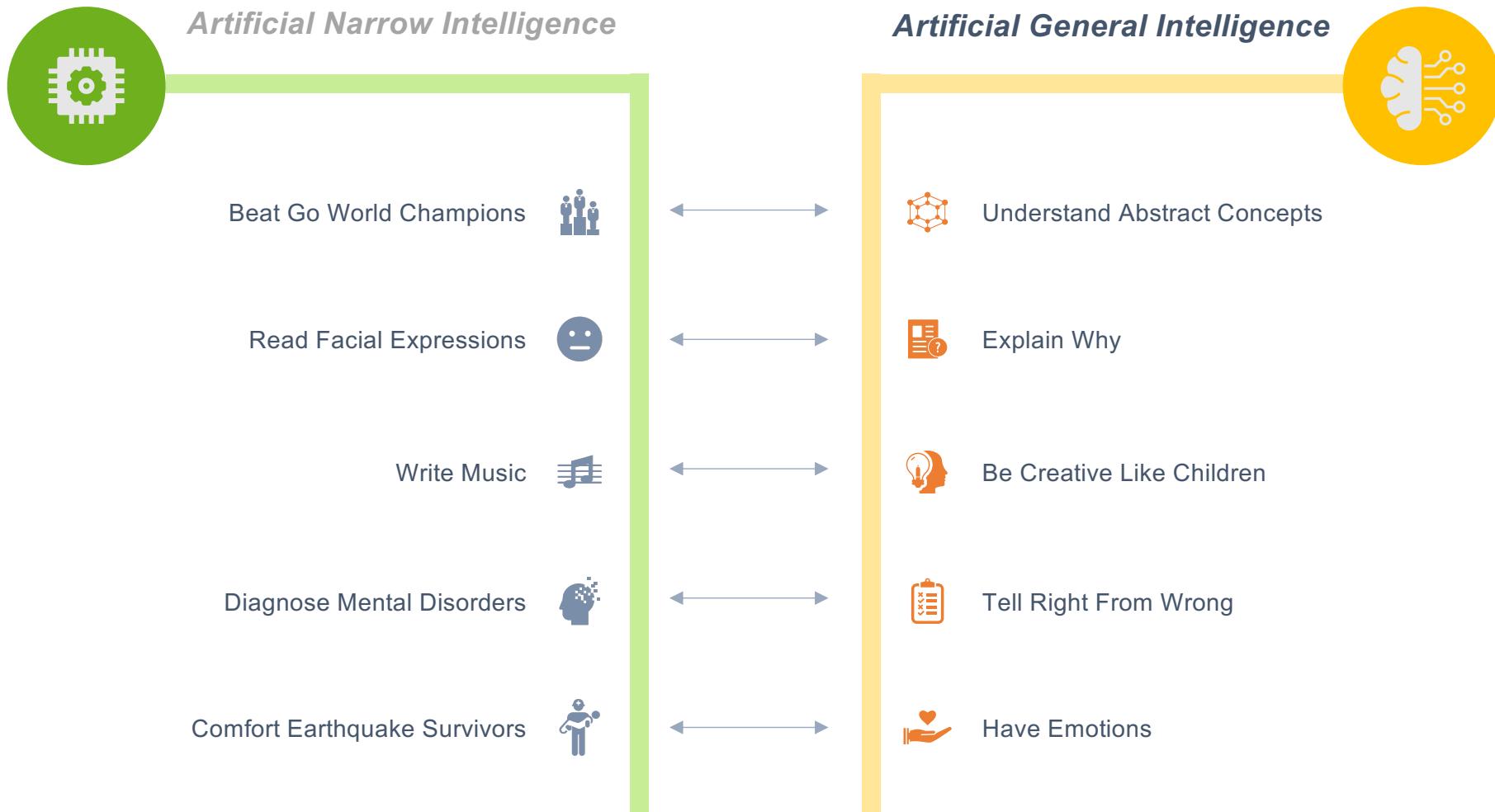


Branches of Artificial Intelligence

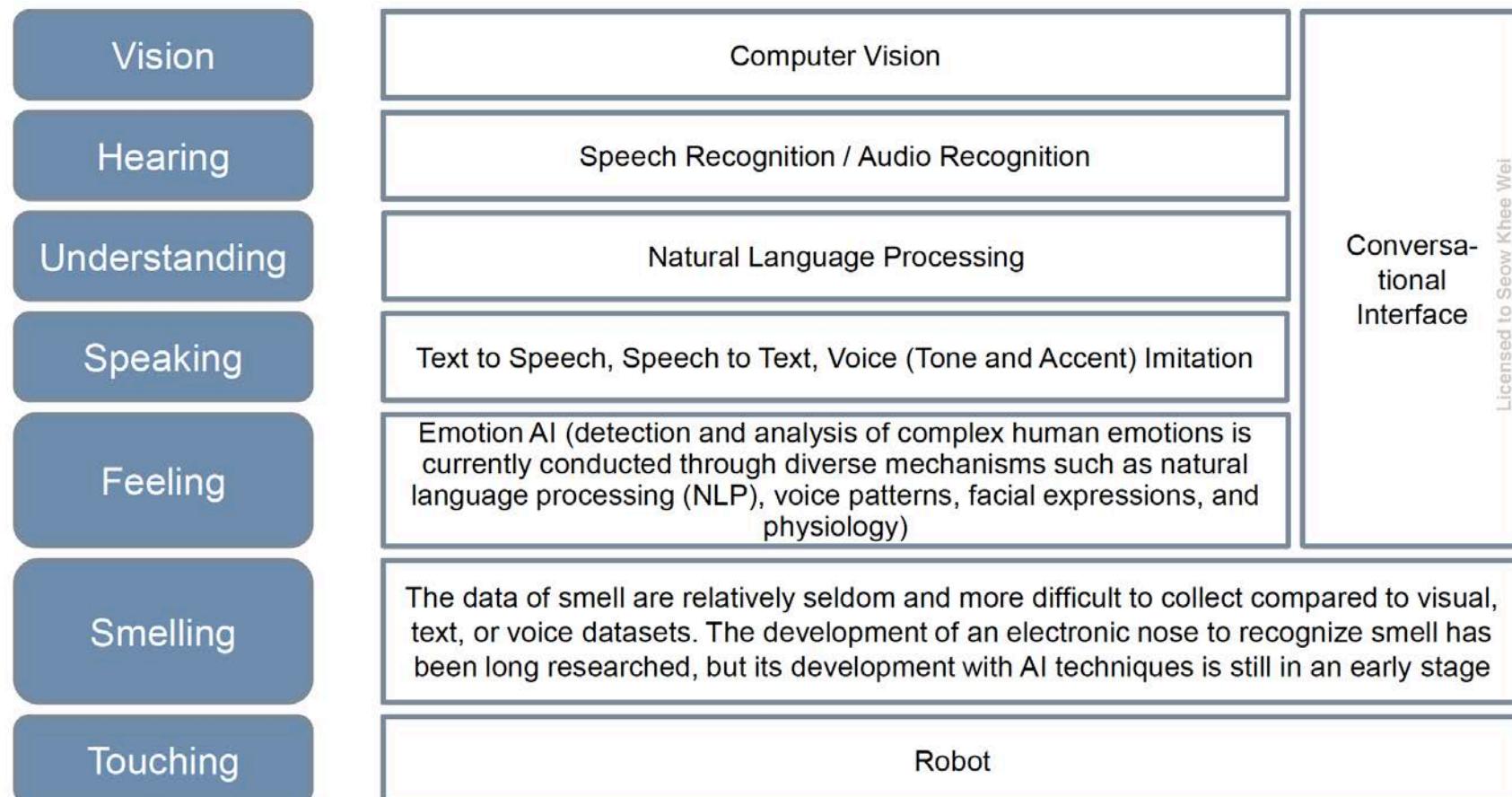
Based on Wikipedia: Artificial Intelligence as of 8 Feb 2019.



Artificial Narrow Intelligence vs Artificial General Intelligence



Mapping Human Perceptions to AI-enabled Capabilities



Licensed to Seow Khee Wei
Hemimil: PnMPerclinic



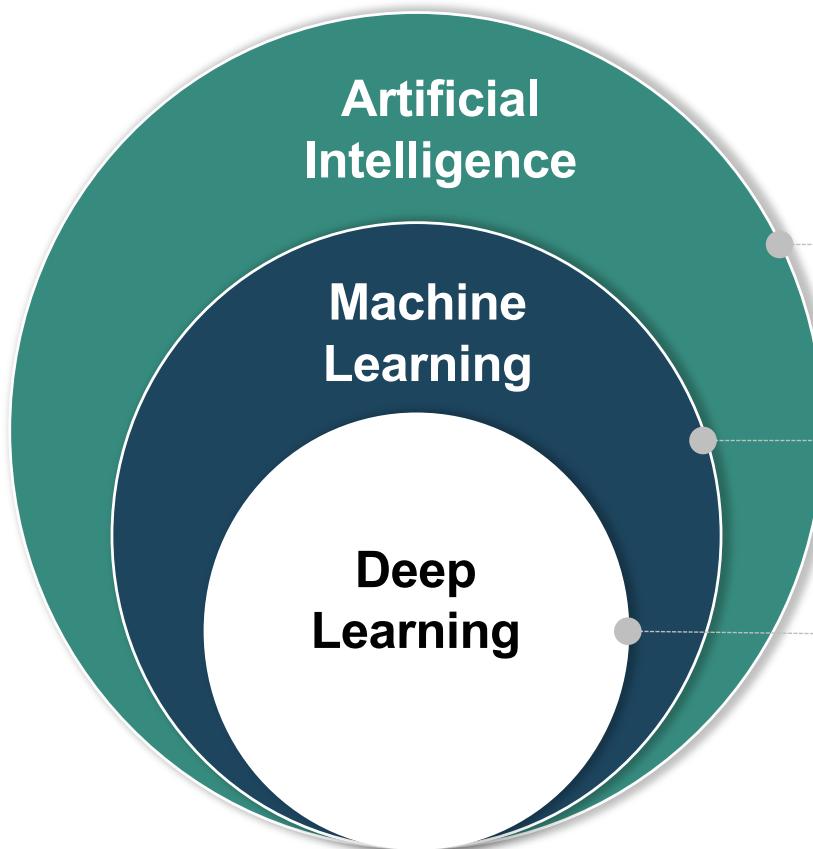
Quiz I



SCAN ME



Definitions



Artificial Intelligence

Any technique which enables computers to sense, reason, act and adapt



Machine Learning

Subset of AI techniques which use statistical methods to enable machines to improve with experiences.

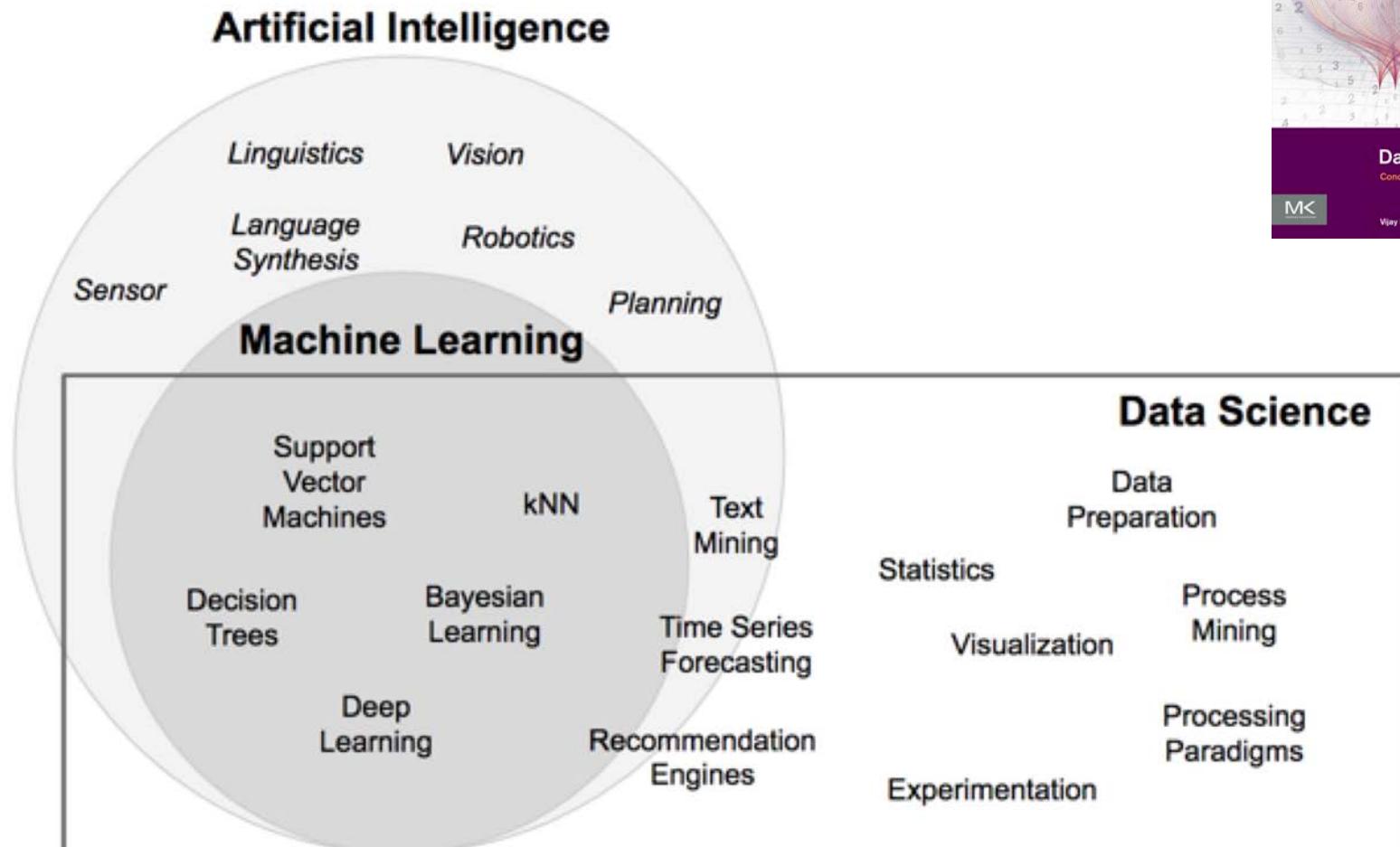


Deep Learning

A subset of machine learning in which multilayered neural networks learn from vast amount of data.

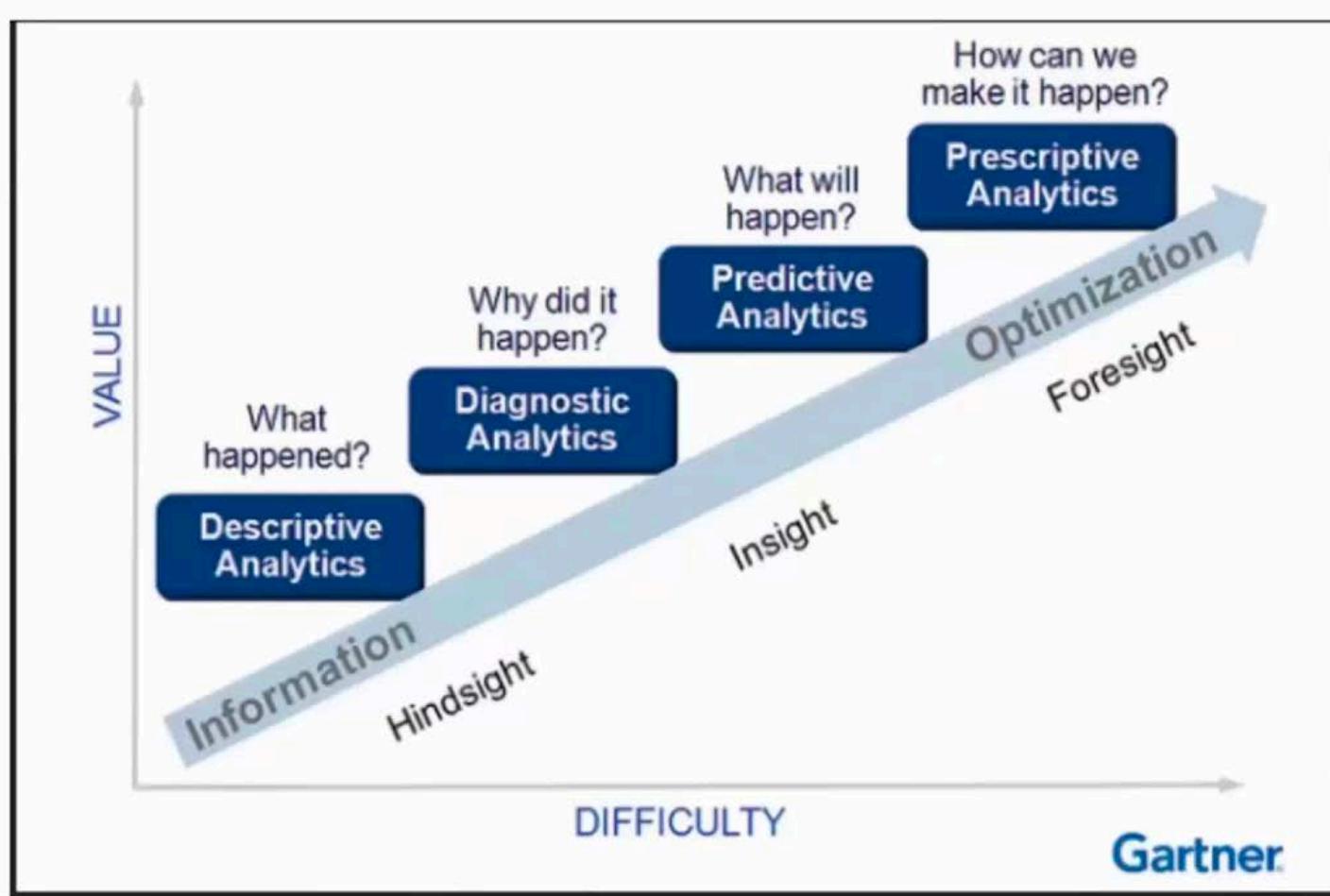


AI vs ML vs DS





Gartner Analytic Continuum



5 questions data science answers



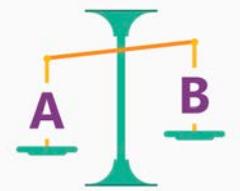
**Is this weird?
(Anomaly detection)**



Is this pressure
gauge reading
normal?

Is this message
from the internet
typical?

**Is this A or B?
(Classification)**



Will this tire fail
in the next 1,000
miles: Yes or
no?

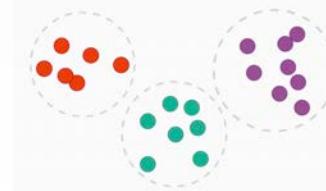
Which brings in
more
customers: a \$5
coupon or a
25% discount?

**How many?
How Much?
(Regression)**



What will the
temperature be
next Tuesday?
What will my
fourth quarter
sales be?

**How is this
organized?
(Clustering)**



Which viewers
like the same
types of
movies?
Which printer
models fail the
same way?

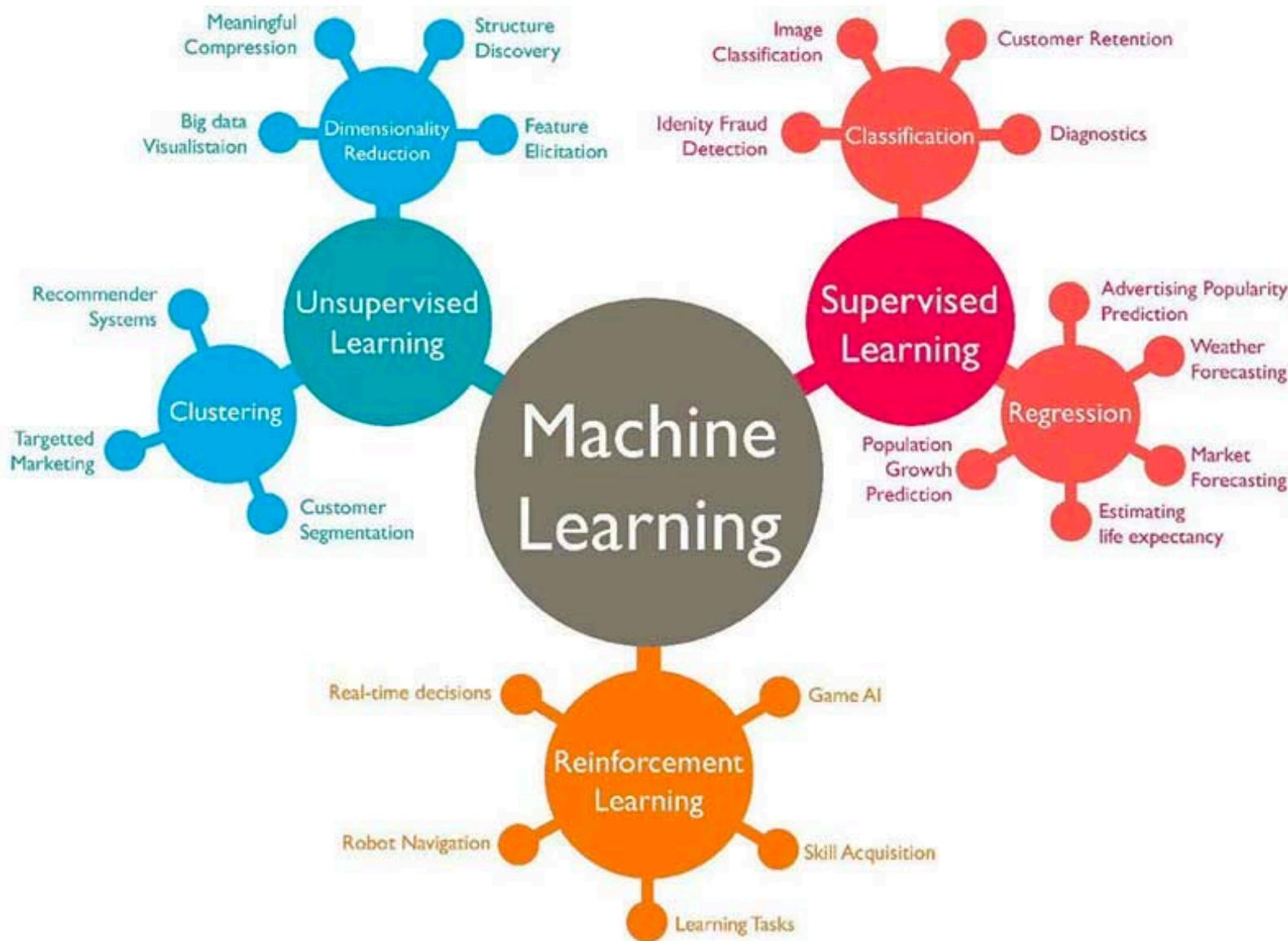
**What should I
do?
(Reinforce
Learning)**



If I'm a self-
driving car: At a
yellow light,
brake or
accelerate?
For a robot
vacuum: Keep
vacuuming, or
go back to the
charging
station?

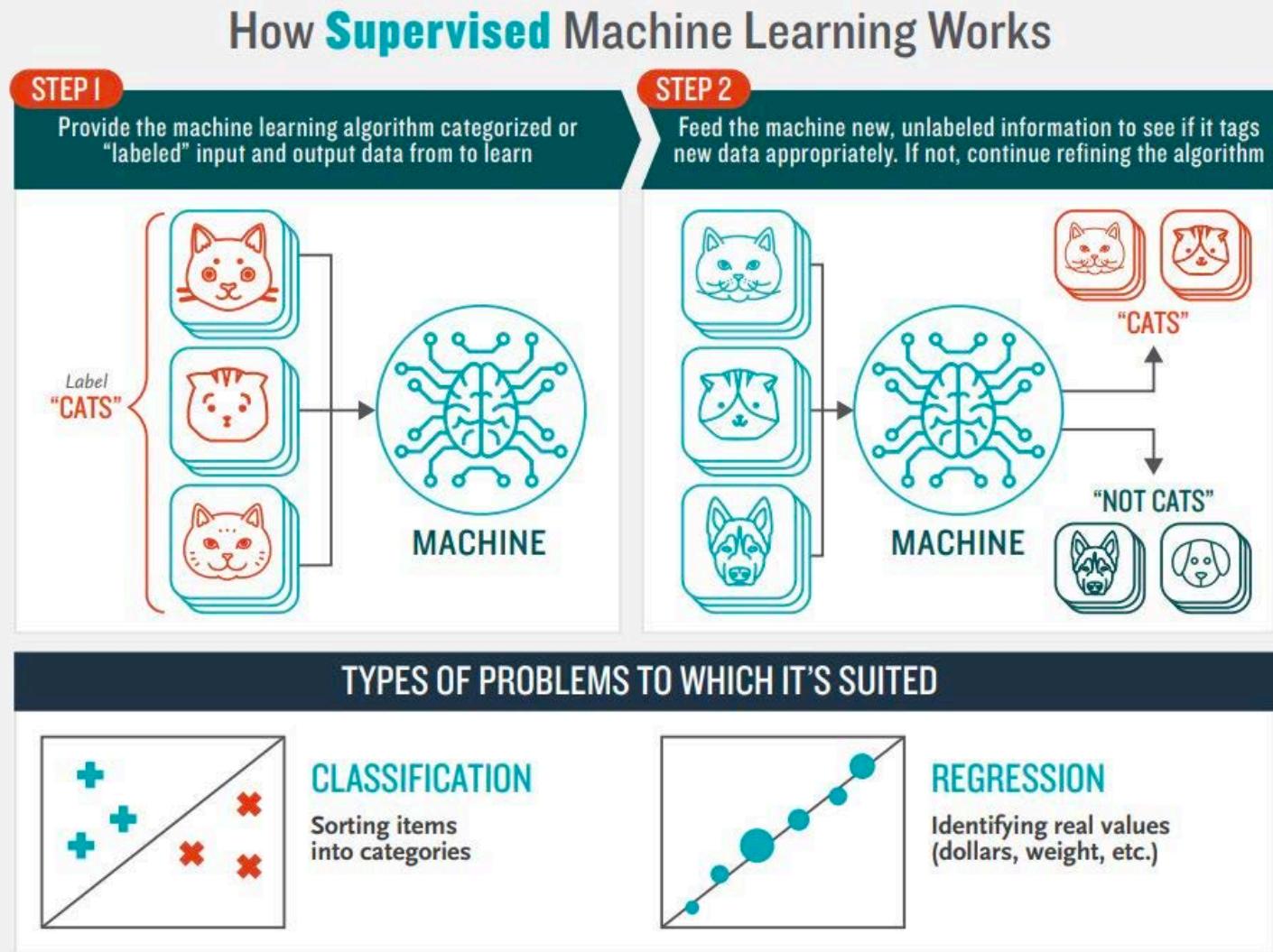


Types of Machine Learning





Supervised Learning



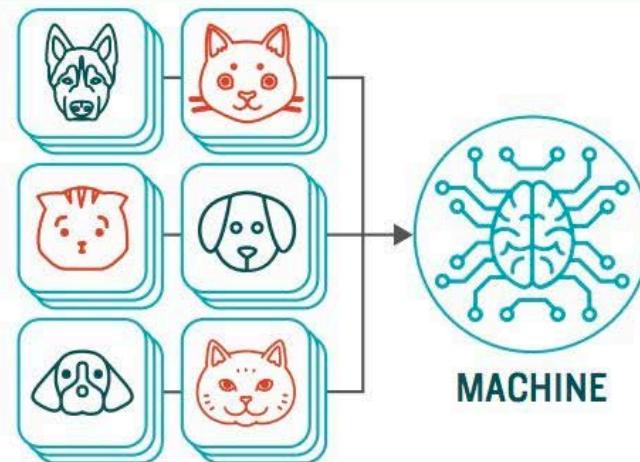


Unsupervised Learning

How **Unsupervised** Machine Learning Works

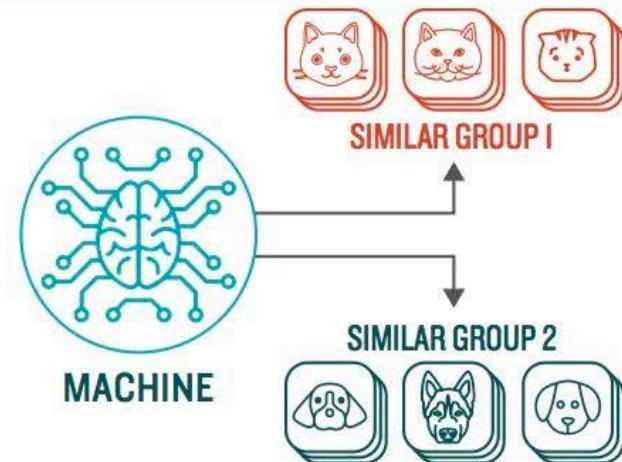
STEP 1

Provide the machine learning algorithm uncategorized, unlabeled input data to see what patterns it finds



STEP 2

Observe and learn from the patterns the machine identifies

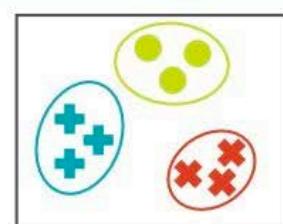


TYPES OF PROBLEMS TO WHICH IT'S SUITED

CLUSTERING

Identifying similarities in groups

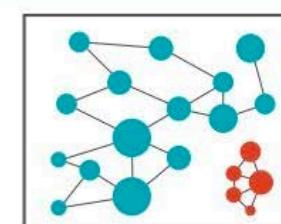
For Example: Are there patterns in the data to indicate certain patients will respond better to this treatment than others?



ANOMALY DETECTION

Identifying abnormalities in data

For Example: Is a hacker intruding in our network?





Machine Learning Example

- Suppose you wanted to identify fraudulent credit card transactions.
- You could define features to be:
 - Transaction time
 - Transaction amount
 - Transaction location
 - Category of purchase
- The algorithm could learn what feature combinations suggest unusual activity.





Machine Learning Limitations

- Suppose you wanted to determine if an image is of a cat or a dog.
- What features would you use?
- This is where **Deep Learning** can come in.



Dog and cat recognition

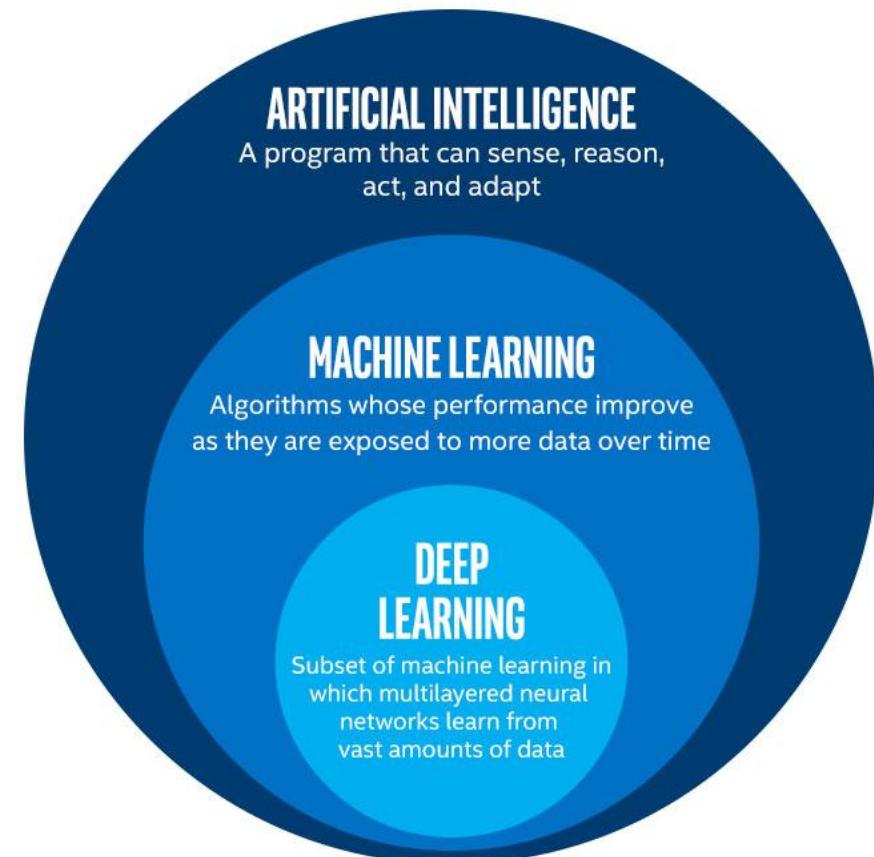


What is deep learning?

Deep Learning

“Machine learning that involves using very complicated models called “deep neural networks”.”
(Intel)

Models determine best representation of original data; in classic machine learning, humans must do this.

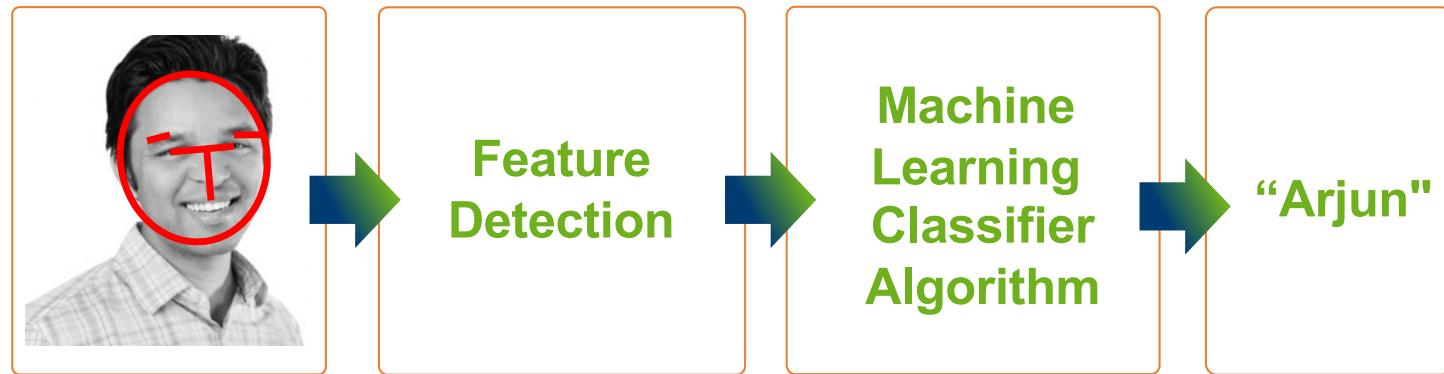




Deep Learning Example

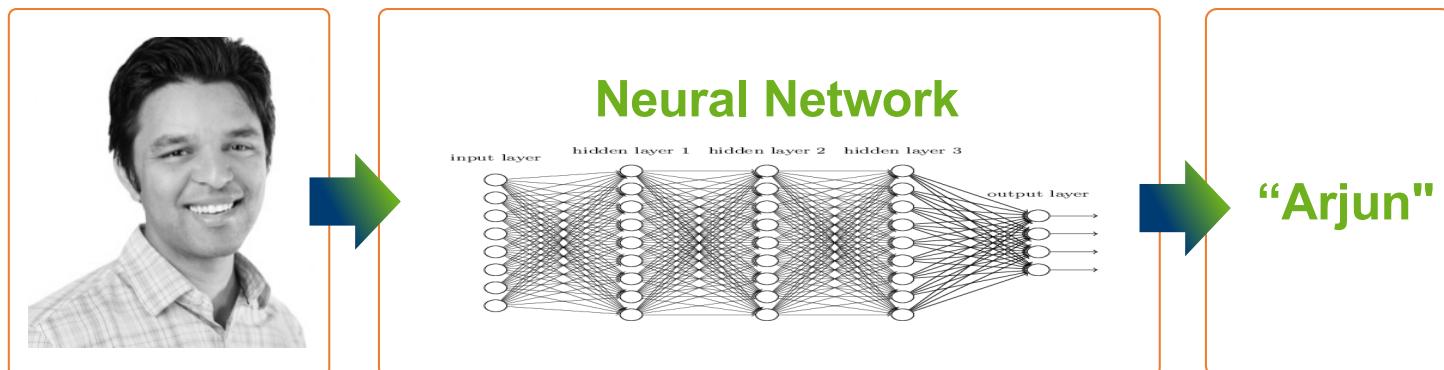
Classic Machine Learning

Step 1: Determine features.
Step 2: Feed them through model.



Deep Learning

Steps 1 and 2 are combined into 1 step.



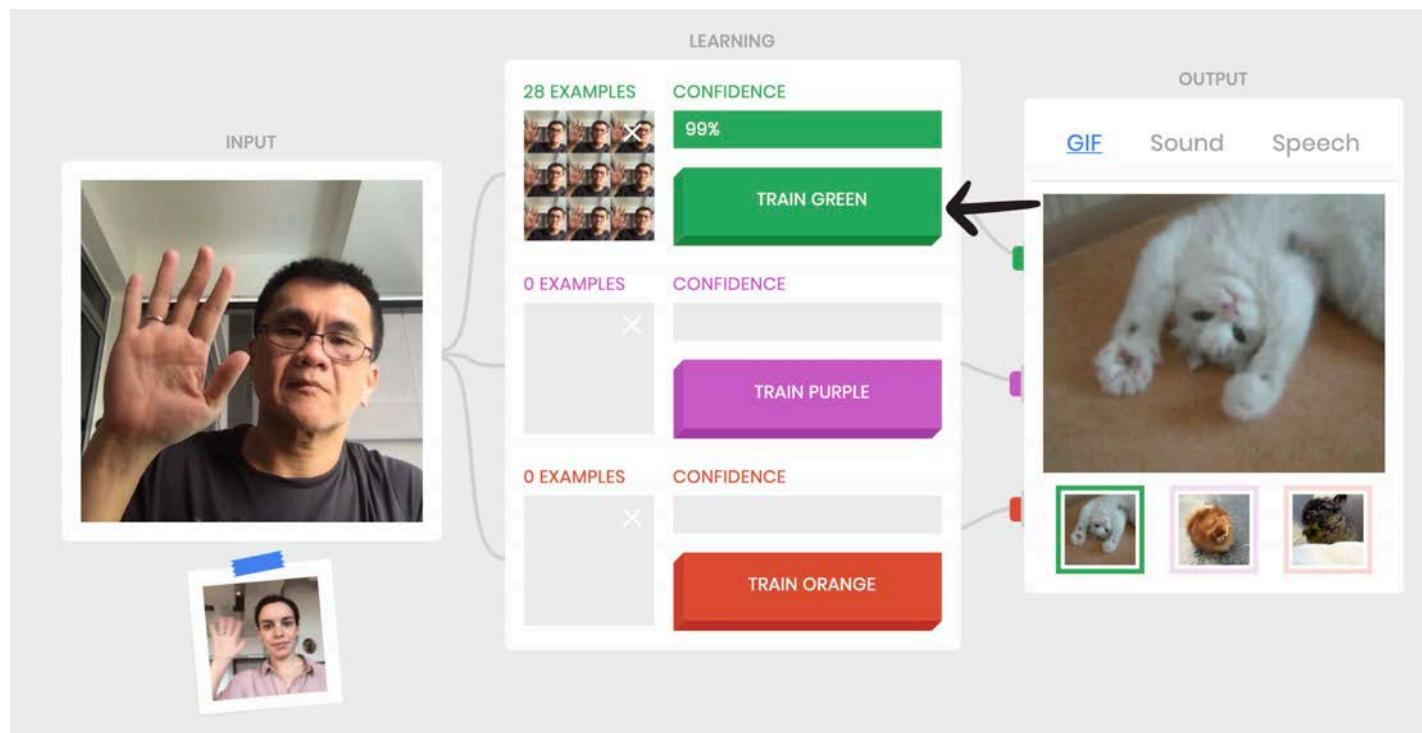


What is neural network?



Deep Learning in Action

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





Reinforcement Learning

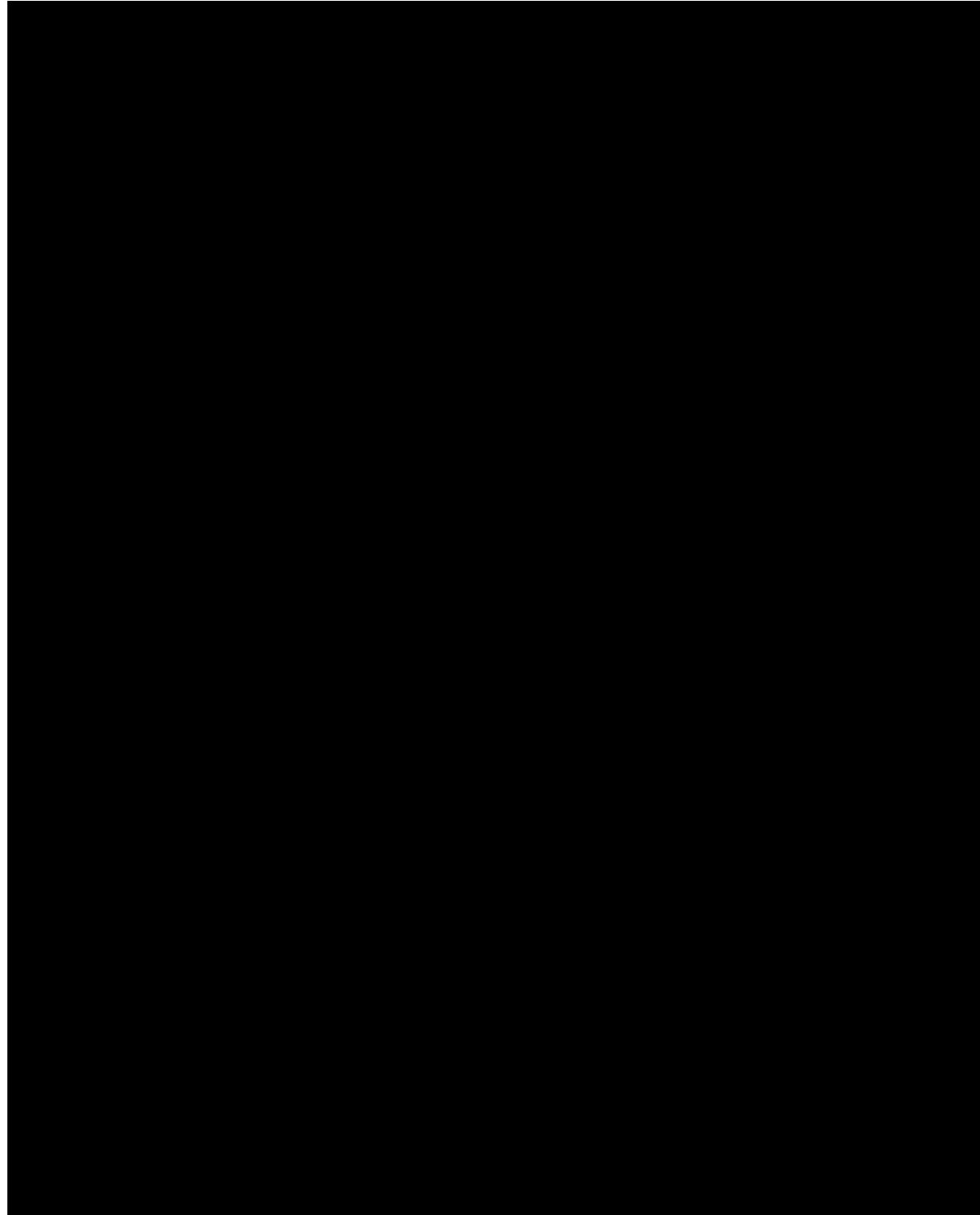


Photo: ST



Reinforcement Learning

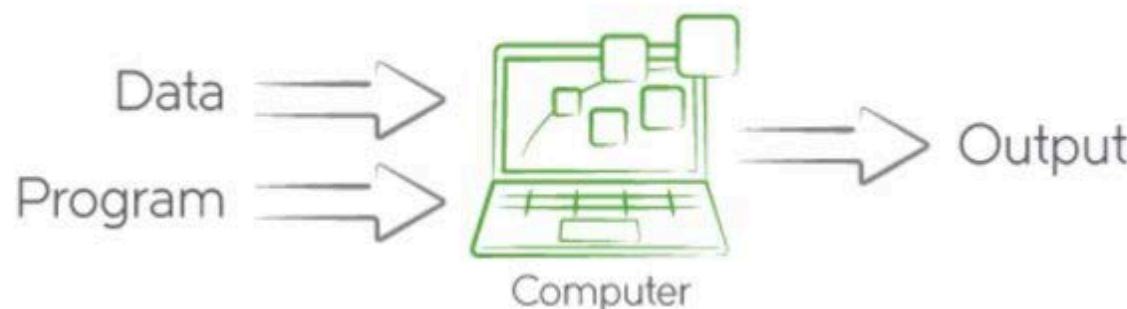




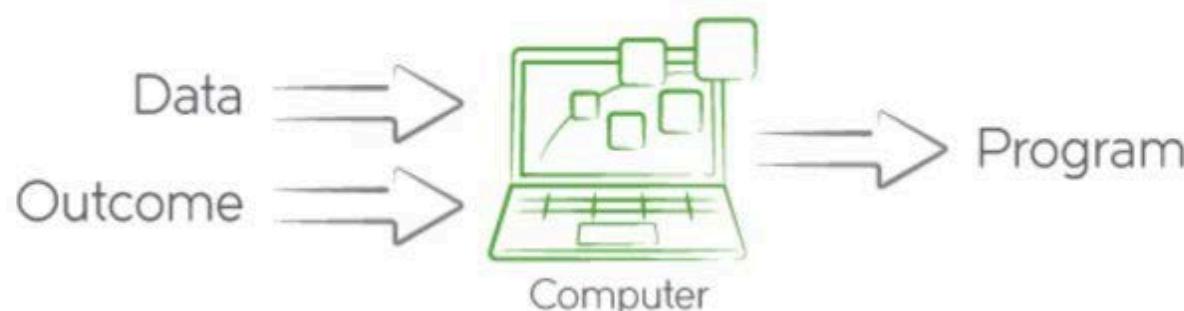


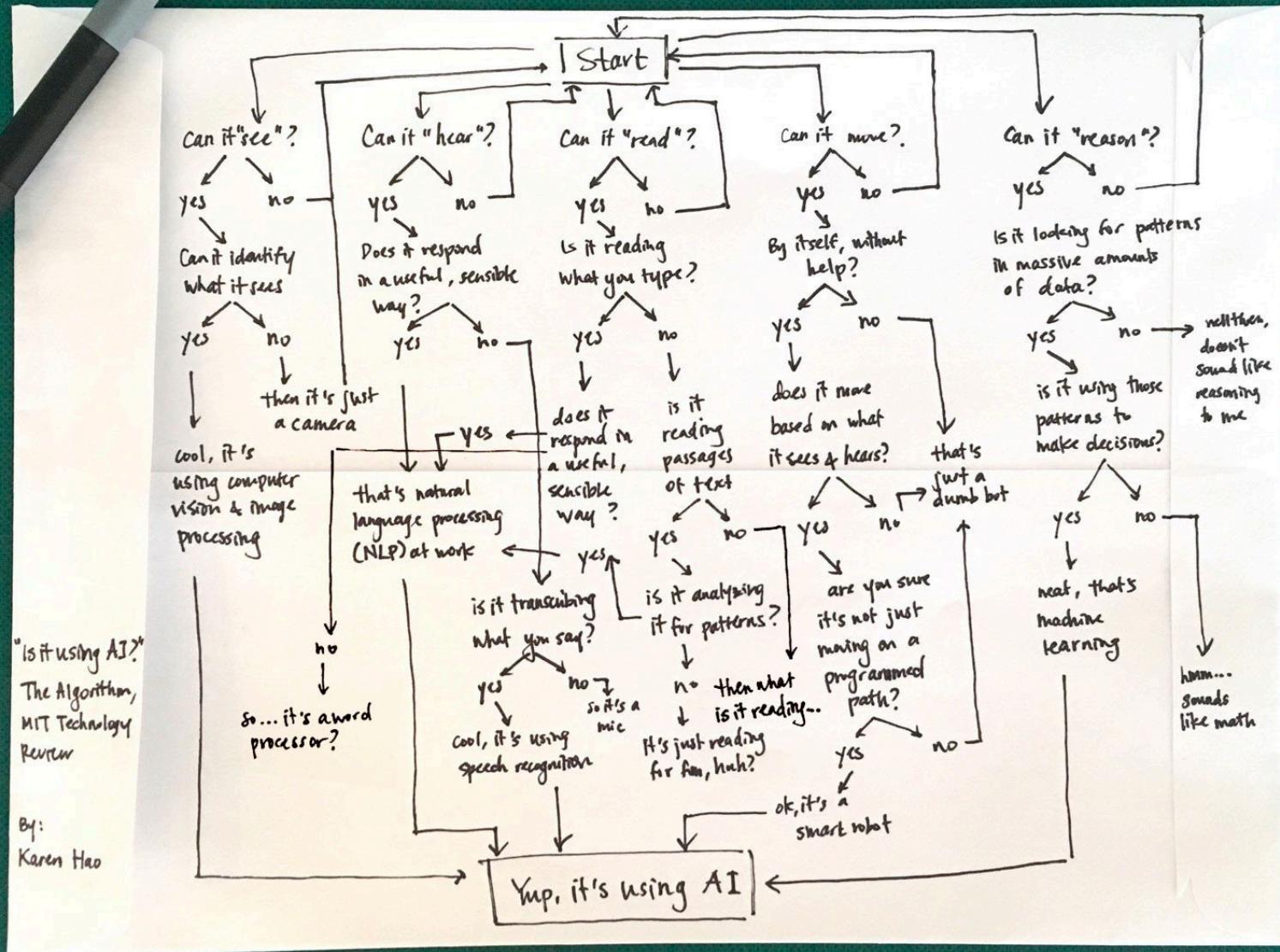
Traditional Programming vs Machine Learning

Traditional Programming



Machine Learning

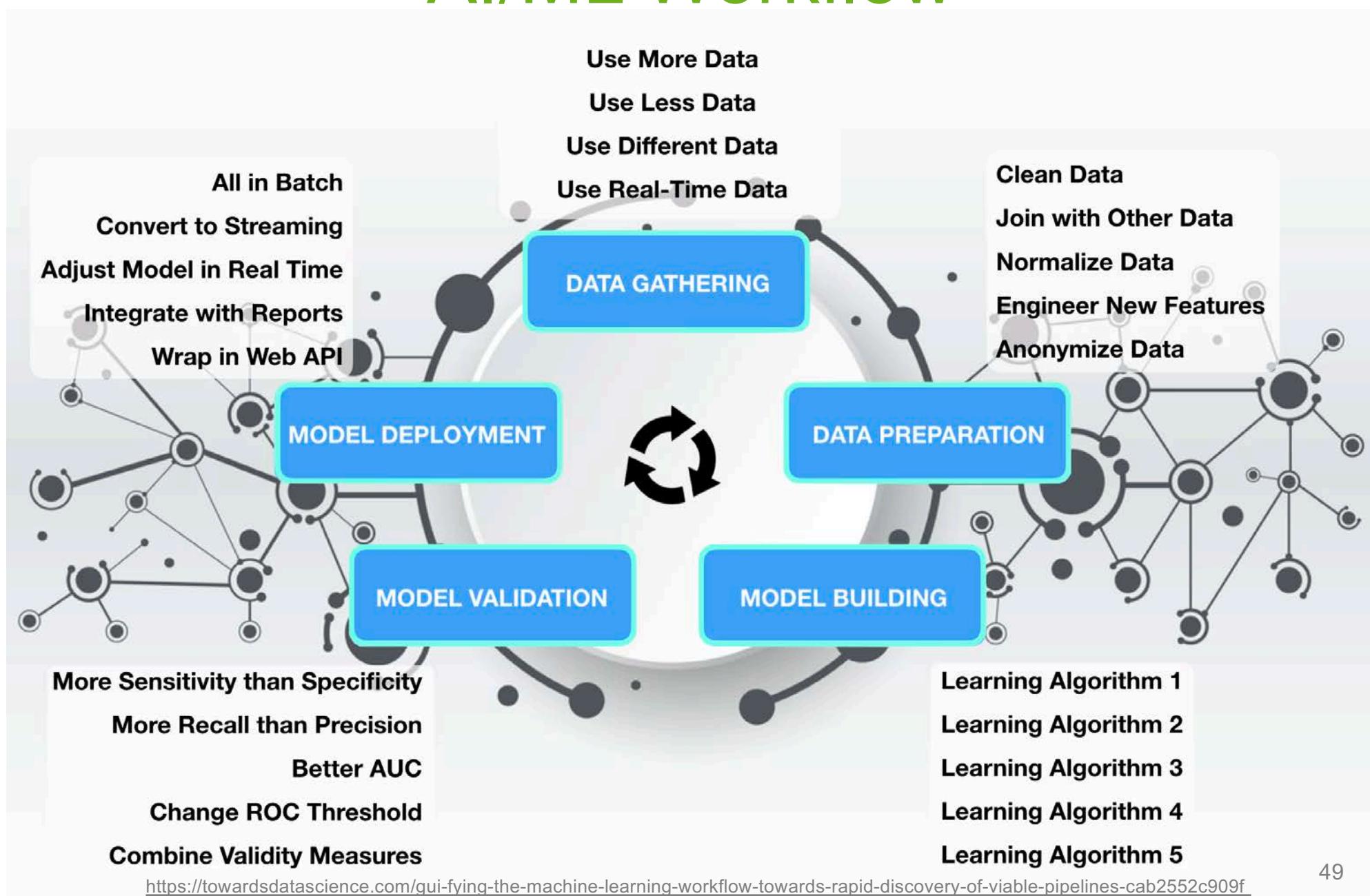




<https://www.technologyreview.com/s/612404/is-this-ai-we-drew-you-a-flowchart-to-work-it-out/>

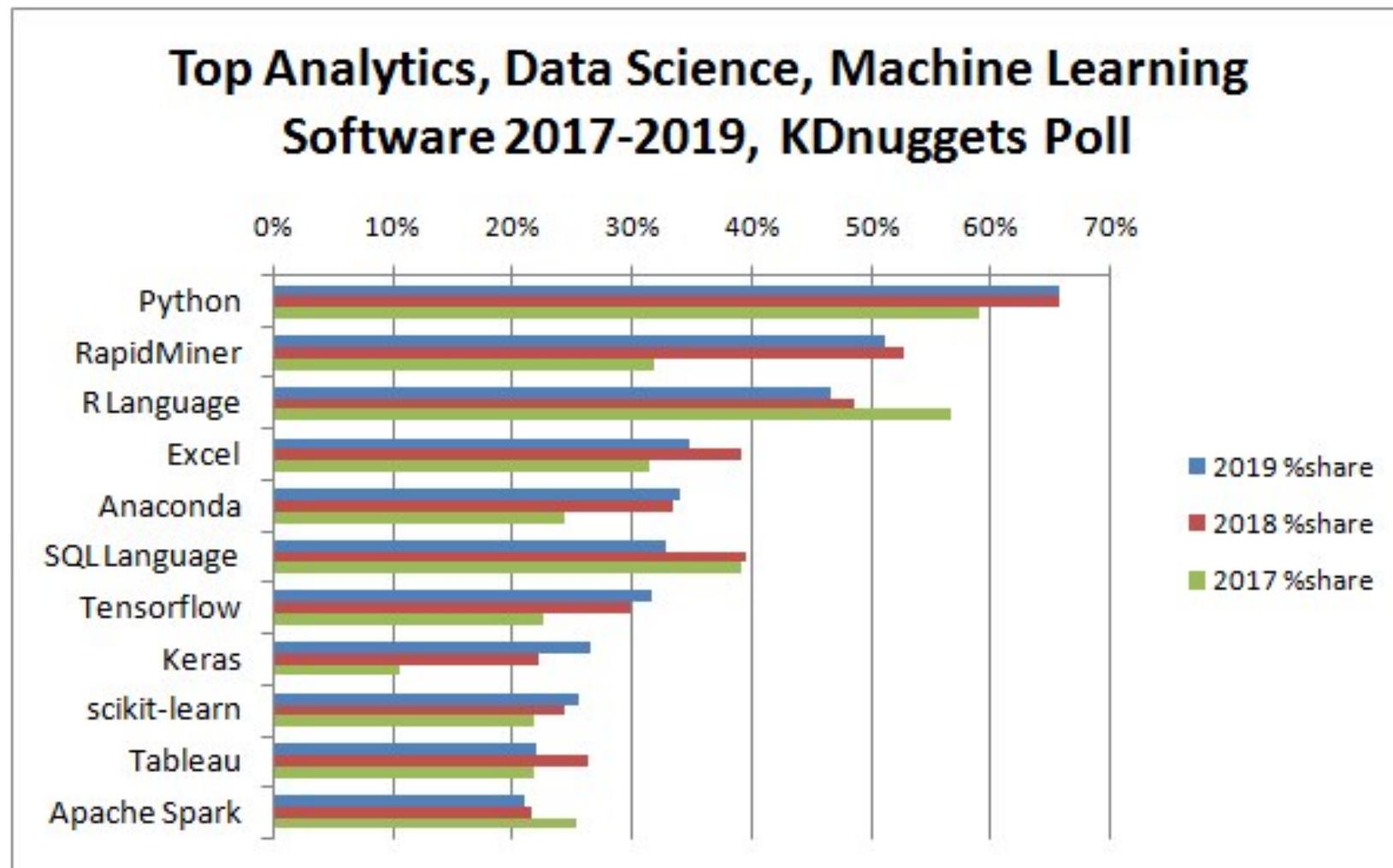


AI/ML Workflow



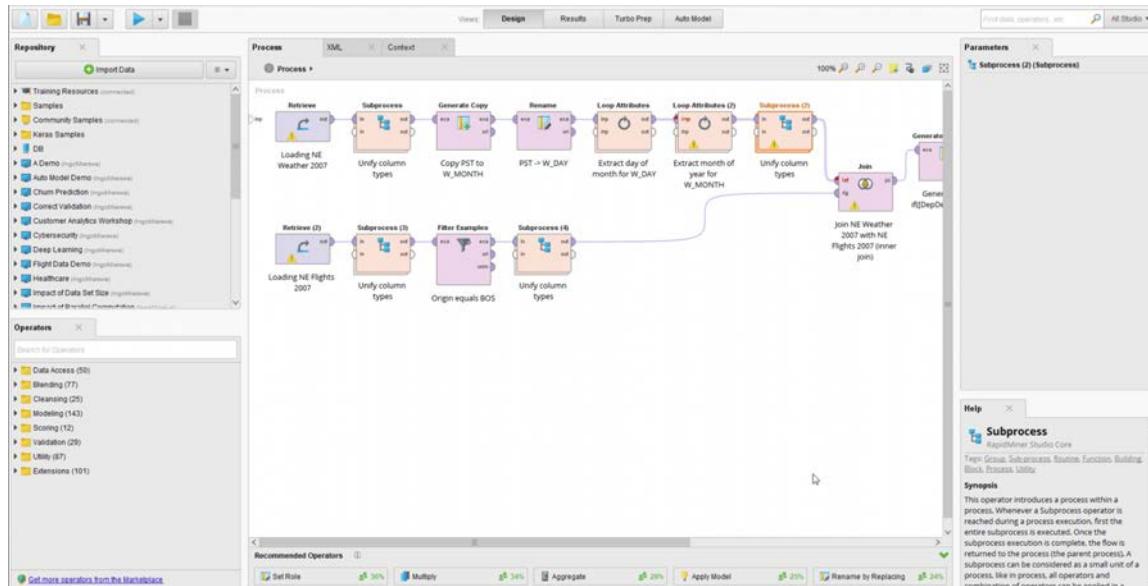


What are the popular tools?

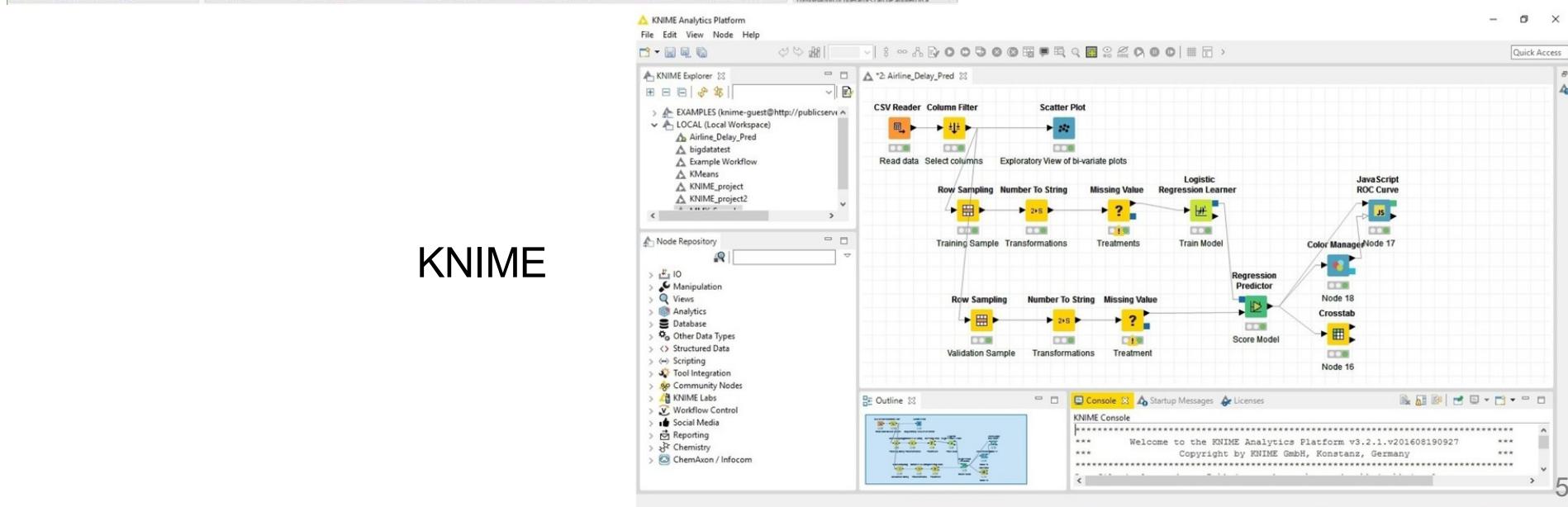




Graphical Tools (ML/DS)



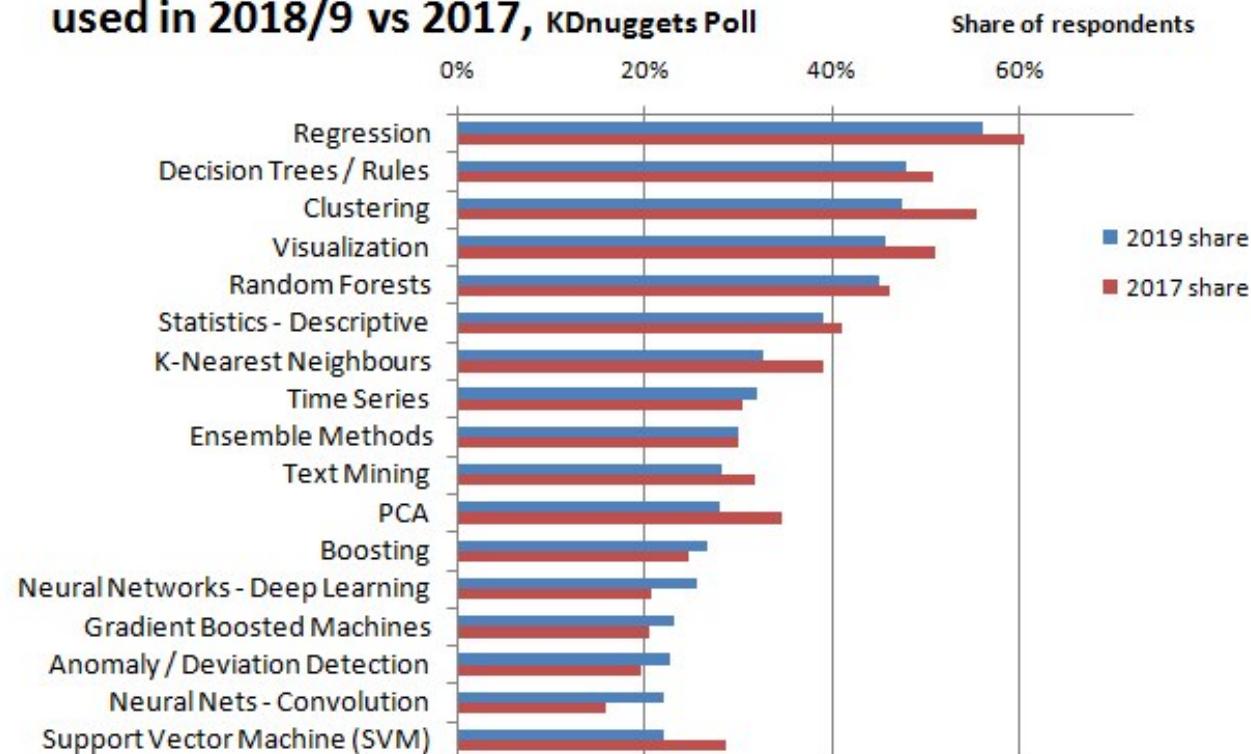
RapidMiner





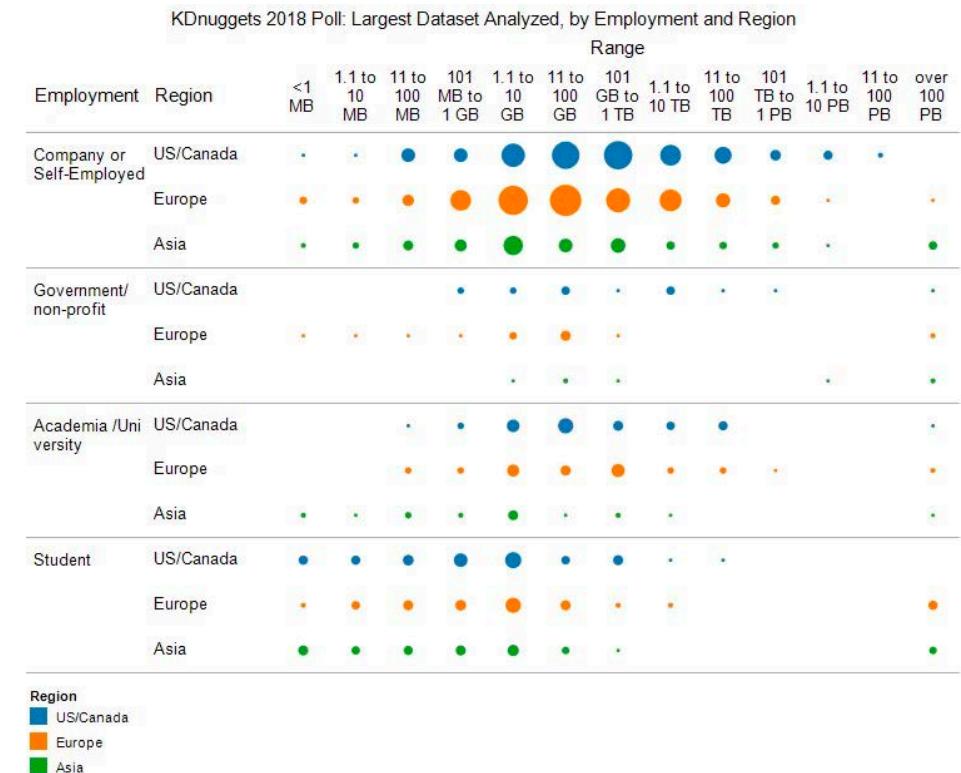
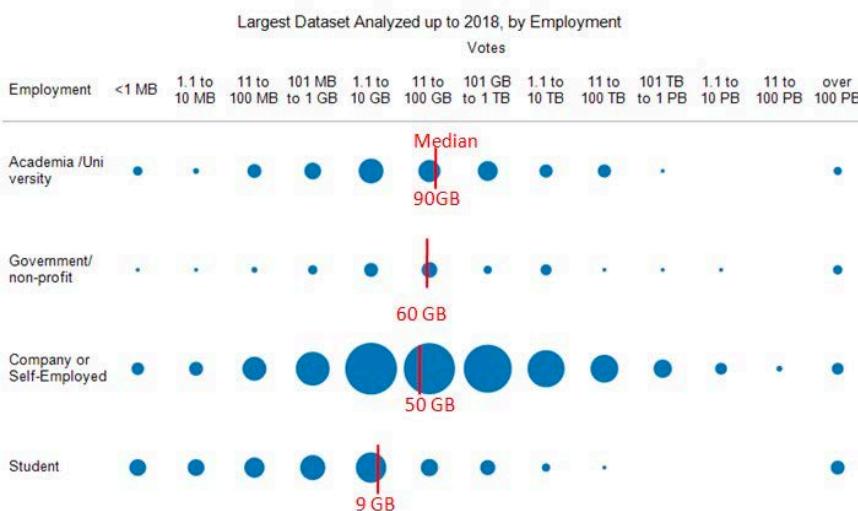
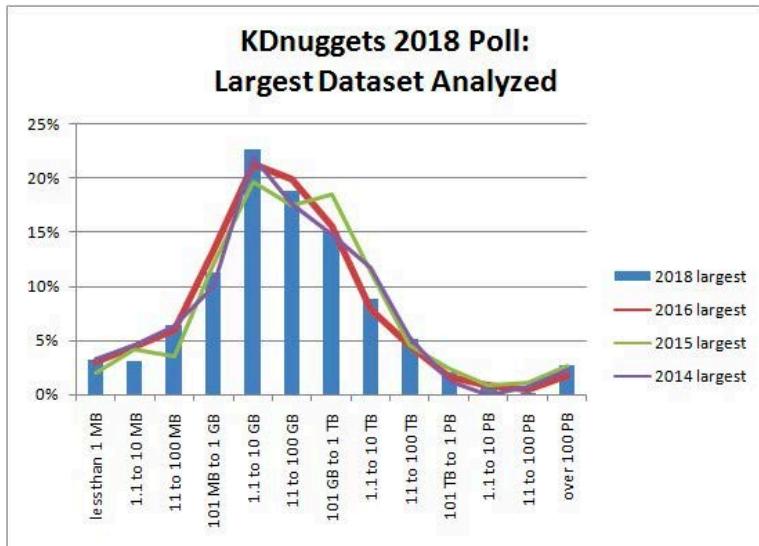
Top Methods/algorithms

**Top Data Science, Machine Learning
Methods, Algorithms
used in 2018/9 vs 2017, KDnuggets Poll**





Datasets size





Quiz 2



SCAN ME



Hands on AI

Meet LUIS

Otherwise known as Language Understanding Intelligent Service.

Luis is a service that interprets normal human language and understands what the desired outcomes and relevant pieces of information are. It's fast and easy to deploy, it learns and adapts as it interacts, and with very little training it can gain insights and trigger actions based on real user-inputs and contextual information.

Text Analytics

Step #1: Enter Your Message

Step #2: Sentiment & Key Phrases

This API analyzes your text to identify the keywords and discern the sentiment.

Step #3: Entity Linking

This API accepts which of the key words are entities and links them in Wikipedia.

Step #4: Bing Entity Search

This API provides a summary of relevant information in the form of a card for each entity.

Computer Vision

Microsoft AI - for a richer experience across a variety of visual mediums.

- Analyze and describe images
- Read text in imagery
- Read handwriting in imagery
- Recognize celebrities & landmarks

Next Feature

Select an image

Face and Emotion Recognition

Facial recognition can be a great security tool. See how Microsoft AI is able to quickly analyze and compare photos. Upload or take two photos and we will use our Face API to tell you if the photos are of the same person. We'll also provide the approximate age, gender, and emotion. Really test the system by making different faces or getting a friend involved to take one of the photos.

PHOTO 1

PHOTO 2



Using AI to make video content better.

Otherwise known as Language Understanding Intelligent Service.

A machine learning-based service to build natural language into apps, bots, and IoT devices.

Quickly create enterprise-ready, custom models that continuously improve.



See it in action >

<https://aidemos.microsoft.com/luis>



Text Analytics

Step #1: Enter Your Message

Saturn is the sixth planet from the Sun and the second-largest in the Solar System, after Jupiter. It is a gas giant with an average radius about nine times that of Earth.

[Next Step >](#)

Step #2: Sentiment & Key Phrases

This API analyzes your text to identify the keywords and discern the sentiment.

[Next Step](#)

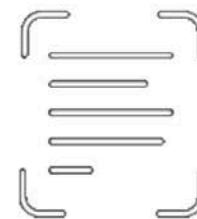
Step #3: Entity Linking

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[Next Step](#)

Step #4: Bing Entity Search

This API provides a summary of relevant information in the form of a card for each entity

[Start Over >](#)[Learn to code >](#)

<https://aidemos.microsoft.com/text-analytics>



Computer Vision

Microsoft AI - for a richer experience across a variety of visual mediums.

- Analyze and describe images**

This feature will identify and tag the content of an image, give a written description, and give you confidence ratings on the results. It also identifies racy or adult content allowing easy moderation.

Next Step

- Read text in imagery
- Read handwriting in imagery
- Recognize celebrities & landmarks

Select an image





Face and Emotion Recognition

Facial recognition can be a great security tool. See how Microsoft AI is able to quickly analyze and compare photos. Upload or take two photos and we will use our Face API to tell you if the photos are of the same person. We'll also provide the approximate age, gender, and emotion. Really test the system by making different faces or getting a friend involved to take one of the photos.

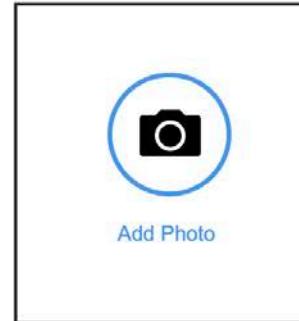


PHOTO 1

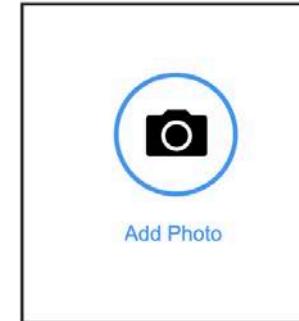


PHOTO 2



Speech Authentication

Voices are not always easy to decipher, but a critical piece of our identity. Test out our speech recognition capabilities, built using our Speech API, by recording a phrase three times. Try mixing it up by having someone else record their voice.

I am going to make him an offer he cannot refuse ▾

Record

RECORDING 1

RECORDING 2



<https://aidemos.microsoft.com/speech-authentication>

Put it to the test



Using AI to make video content better.

Microsoft AI tracks and identifies who appears in a video, it transcribes and translates what they're saying, it understands the topics discussed, and detects changes in both scene and sentiment. After processing all of this data it provides the controls to allow the viewer to consume content in a more intuitive & desirable way.



Select one of the videos above to see it in action





Tone Analyzer

IBM Watson Developer Cloud

Tone Analyzer



This service uses linguistic analysis to detect joy, fear, sadness, anger, analytical, confident and tentative tones found in text.

*This system is for demonstration purposes only and is not intended to process Personal Data. No Personal Data is to be entered into this system as it may not have the necessary controls in place to meet the requirements of the General Data Protection Regulation (EU) 2016/679.

Resources:
[Documentation](#)
[API Reference](#)
[Fork on Github](#)

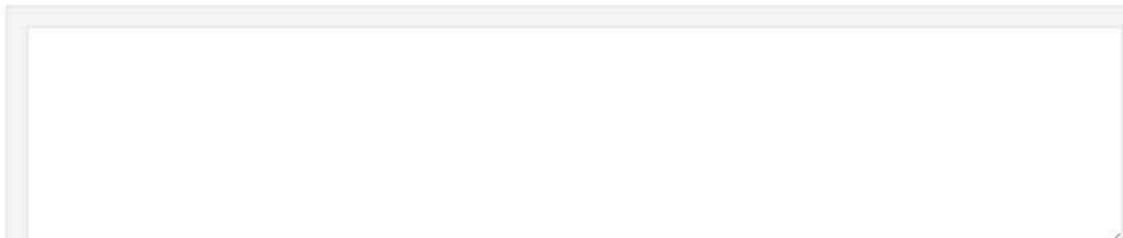
[Start for free in IBM Cloud](#)

Sample use cases

Choose an example to learn how you can adjust the tone of your content to change people's perceptions, or improve its effectiveness.
[Learn more](#).

Tweets Online Review Email message Product Review in French Your own text

Analyzing Customer Engagement Data? Try out the [Tone Analyzer Customer Engagement Endpoint](#).



Choose Language: English French

Analyze



<http://bit.ly/2TLD0Vb>



Discovery

Watson

Discovery / Discovery Demo

Discovery

Unlock hidden value in data to find answers, monitor trends and surface patterns, with the world's most advanced cloud-native insight engine.

[Get Started](#) [API Reference](#) [Documentation](#) [Fork on GitHub](#) [Start for free in IBM Cloud](#)

What company are you interested in?

Quickly find insights in the Watson Discovery service by specifying a company name or a collection of recent news articles. Easily find stories about your company's:

- Top stories over the last two months
- Top entities (people, topics, companies) mentioned in those stories
- Trend of public sentiment in news
- Anomalous periods of high press coverage
- Trend of most commonly paired entities (co-mentioned)

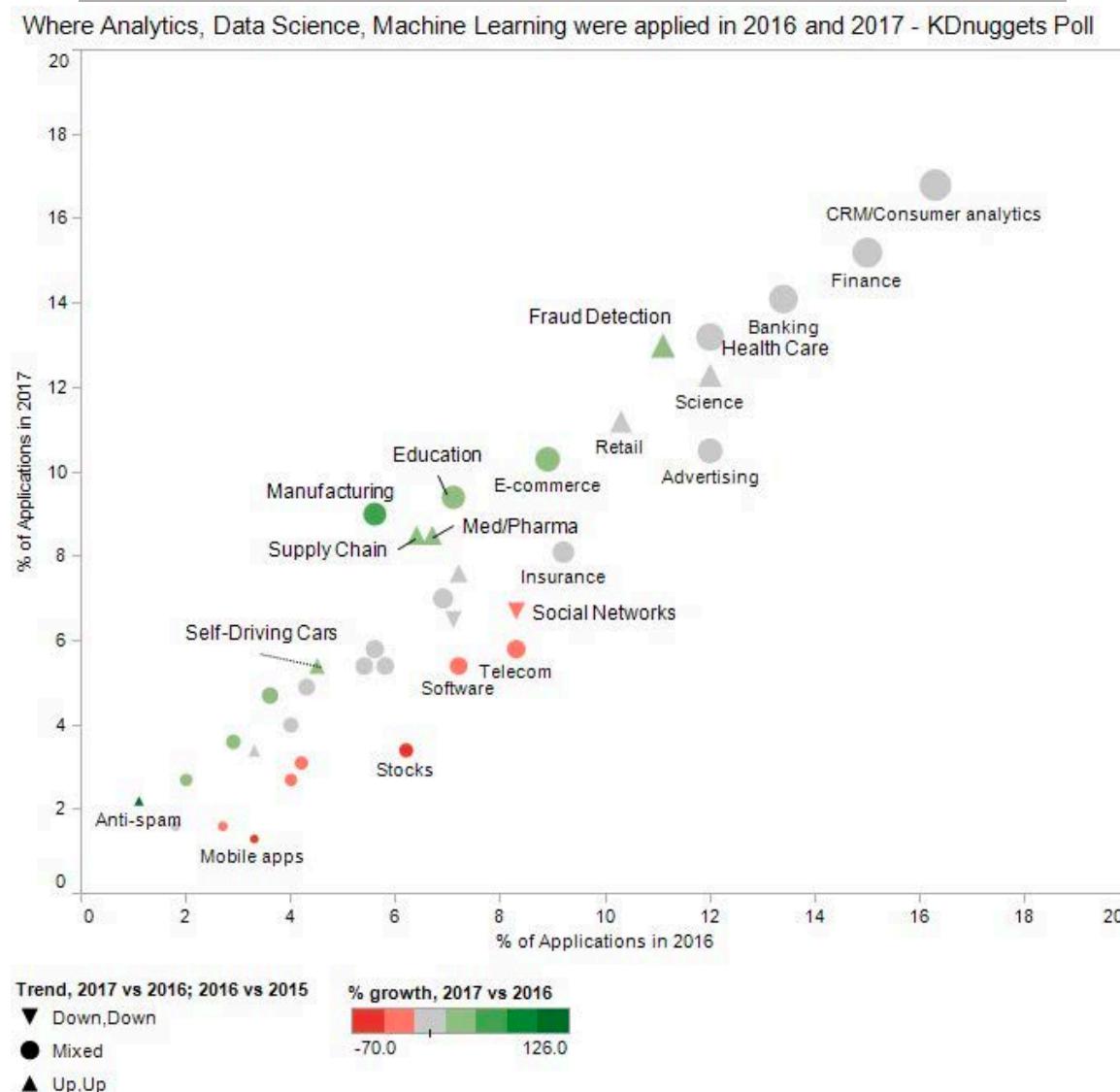
Watson Discovery also lets you do the same analysis with your own data. Learn more [here](#).



<http://bit.ly/2HZ9n0B>



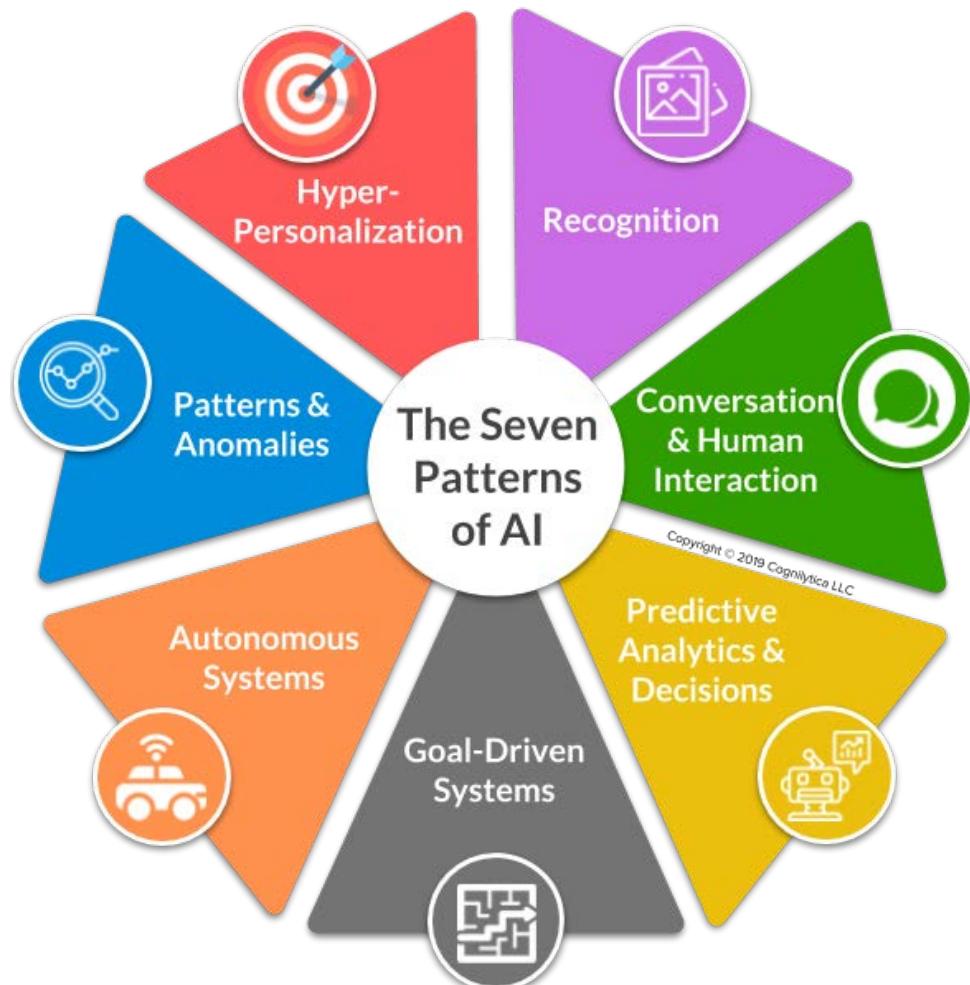
Where is AI applied?



<https://www.kdnuggets.com/2018/04/poll-analytics-data-science-ml-applied-2017.html>



The Seven Patterns of AI



Any AI project or implementation falls within one or more of these 7 patterns that Cognilytica has identified (in no particular order).

HYPERPERSONALIZATION

 Using ML to learn and build individual profiles for deep personalization.
Example use cases: Personalized content, personalized recommendations, behavior profiling.

AUTONOMOUS SYSTEMS

 Systems that are able to accomplish a task, achieve a goal, interact with surroundings with minimal or any human involvement.
Example use cases: Autonomous vehicles, automatic knowledge generation, cobots, self-driving decisions.

PREDICTIVE ANALYTICS & DECISION SUPPORT

 Helping humans make better decisions through models that help predict future data and behavior.
Example use cases: Assisted search and retrieval, predicting a value, behavior, or failure, Guided assistance.

CONVERSATIONAL/HUMAN INTERACTION

 Machines interacting with humans through natural conversation and interaction including voice, text, images, and written forms.
Example use cases: Chatbots, voice assistants, content generation, sentiment analysis, machine translation.

PATTERNS & ANOMALIES

 Using ML to identify patterns in data and learn higher-order connections between information to provide insight and spot outliers.
Example use cases: Fraud & risk detection, discovering patterns among data, surfacing insights in data, automatic error detection / correction, predictive text.

RECOGNITION

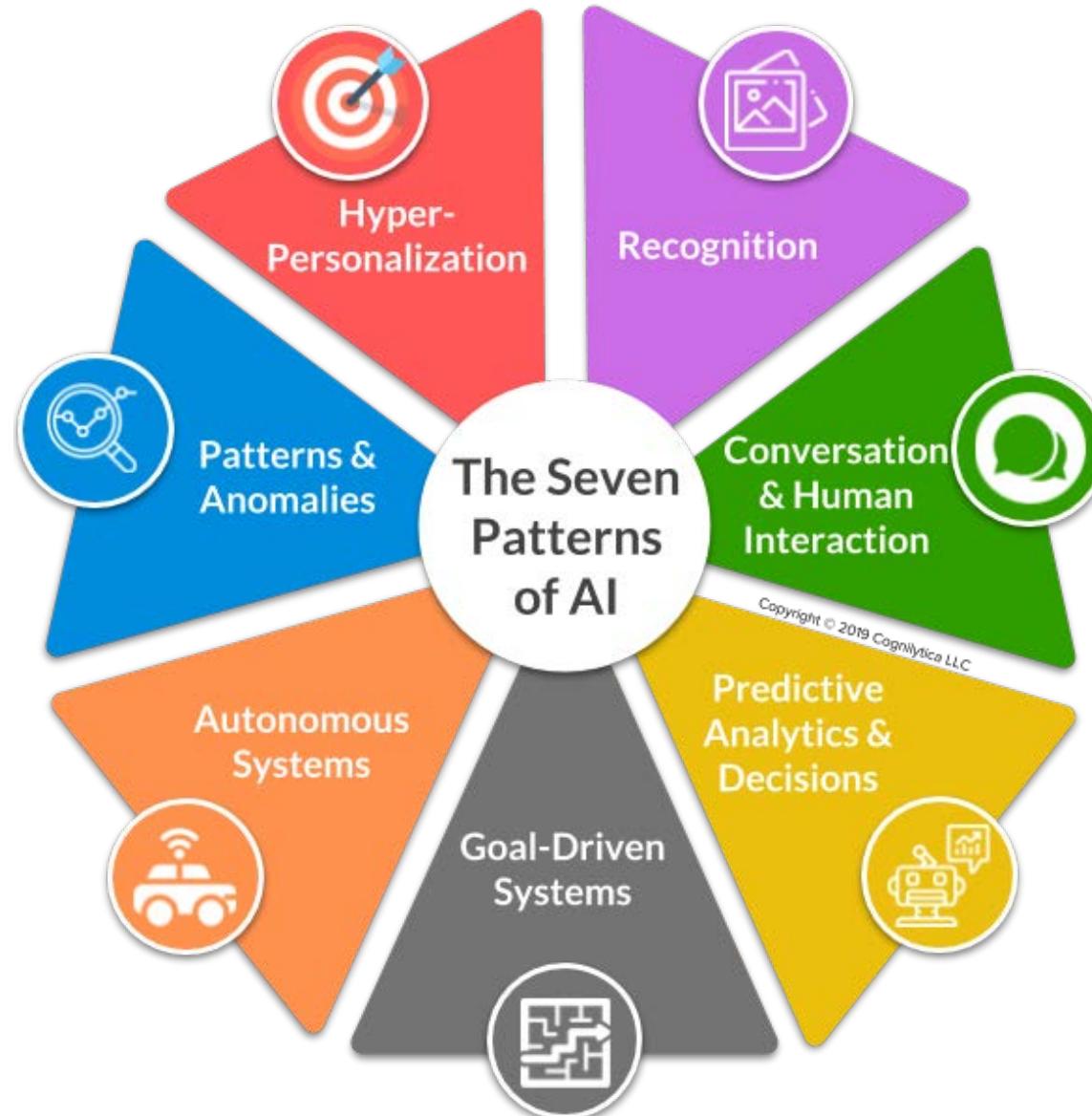
 Using ML to identify and understand images, sound, items, handwriting, faces, and gestures.
Example use cases: Facial recognition, sound recognition, item detection, handwriting / text recognition.

GOAL-DRIVEN SYSTEMS

 Find the optimal solution to a problem through trial and error.
Example use cases: scenario simulation, game playing, bidding and real-time auctions



Patterns of AI





Hyperpersonalization



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MARKET RESEARCH AND INTELLIGENCE ON AI

THE HYPERPERSONALIZATION PATTERN OF AI

ONE OF THE SEVEN PATTERNS OF AI



Hyperpersonalization

Pattern: Using machine learning to develop a unique profile of each individual that adapts over time for a wide variety of purposes, including displaying relevant content, recommend relevant products, or personalized recommendations and guidance.



Objective: Treating each individual as an individual.

PATTERN USE CASES



ENHANCED CUSTOMER PROFILING

Big data and AI are allowing companies to create more complete profiles of customers/users to deliver more personal messaging and content.



CONTENT PERSONALIZATION

With AI-powered predictive analytics, advertisers are now able to get a comprehensive profile of target customers.



RECOMMENDATION SYSTEMS

Use AI to analyze user behavior, preferences, feedback, and characteristics to predict behavior and deliver unique, personalized experiences.



BEHAVIOR PROFILING

Through ML, learn how users behave through interactions.



HYPERPERSONALIZED ADVERTISING

AI lets brands treat each customer as an individual instead of part of a bucket / group.



HYPERPERSONALIZED MEDICINE

AI allows health professional to diagnose and treat each patient with individualized medicine and treatment options.



HYPERPERSONALIZED FINANCE & INSURANCE

AI allows for additional factors to be examined when providing various insurance quotes or loan approvals.

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Autonomous System



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THE AUTONOMOUS SYSTEMS PATTERN OF AI

ONE OF THE SEVEN PATTERNS OF AI



Autonomous Systems

Pattern: Physical and virtual (software) systems that are able to accomplish a task, achieve a goal, interact with their surroundings, and perform their objective with minimal to no human involvement.



Objective: Minimizing human labor.

PATTERN USE CASES



AUTONOMOUS VEHICLES

AI allows for autonomous vehicles of all sorts including cars, trucks, boats, trains, warehouse bots, lawnmowers, and more.



COLLABORATIVE ROBOTS

Cobots operate in conjunction with, & close proximity to humans.



AUTONOMOUS BUSINESS PROCESS

Allow systems to autonomously discover processes and increase workflow optimization on its own.



DOCUMENTATION / KNOWLEDGE GENERATION

Automatically extract information from various systems to generate documents and increase operational efficiencies.



AUTONOMOUS DECISIONS

Processes and actions where there is no human involvement such as autonomous routing of internal tickets or routing documents to departments.



AUTONOMOUS LOGISTICS

Autonomously plan and execute logistics tasks such as routing of goods, accurate tracking of shipments, or inventory forecasting.



AUTONOMOUS RETAIL

The customer experience and business operations of brick and mortar stores are completely automatized.

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Predictive Analytics



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THE PREDICTIVE ANALYTICS & DECISION SUPPORT PATTERN OF AI

ONE OF THE SEVEN PATTERNS OF AI



Predictive Analytics & Decisions



Pattern: Use ML to understand past / existing behavior and predict future outcomes or help humans make decisions about future outcomes using insight learned from past behavior / interactions / data.

Objective: Helping humans make better decisions

PATTERN USE CASES

FORECASTING & PREDICTION



Use previous data, past behavior and interactions to help humans predict future outcomes.

DECISION SUPPORT



Analyzes business data and presents it so that users can make business decisions more easily.

ASSISTED SEARCH



Use AI to find info needles in data haystacks through voice or text search.

SITUATIONAL AWARENESS



Collect data from your situation / environment and make decisions based on that data.

LOGISTICS & SUPPLY CHAIN



AI algorithms optimize supply chain to optimize staffing, inventory control, energy consumption, more accurate tracking of shipments, and more.

BANKING & FINANCE



AI is being used to determine creditworthiness, help with financial trading and investing.

ENERGY



Analytics is helping the energy industry reduce unexpected equipment failures by predicting when a component might fail, or predict when customers might get a high bill and send out alerts.

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Conversation & Human interaction



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MARKET RESEARCH AND INTELLIGENCE ON AI

THE CONVERSATION & HUMAN INTERACTION AI PATTERN

ONE OF THE SEVEN
PATTERNS OF AI



Conversation
& Human Interaction

Definition: Machines and humans interacting with each other using natural language, conversational forms of interaction through voice, text, and written, and image forms.



Objective: Machines interacting with humans the way humans interact with each other.

PATTERN USE CASES



NATURAL LANGUAGE PROCESSING (NLP)

Give machines ability to understand and generate natural language.



AI ENABLED CHATBOTS

Conversational agents that can engage directly with humans for customer support & engagement, conversational commerce, personal assistants, and more.



VOICE ASSISTANTS

Voice-based hardware devices that interact with users to provide a wide range of capabilities.



SENTIMENT, MOOD, INTENT ANALYSIS

Identify and categorize opinions expressed in text to gain a more complete picture of the voice of the customer.



CONTENT SUMMARIZATION

Extract key information from documents and create shorter / more concise versions of text.



MACHINE TRANSLATION

Machines provide translation between different languages giving access to written or spoken information in another language.



CONTENT INTELLIGENCE

Machines are able to automatically understand text and data such as charts within a document.



CONTENT GENERATION

Machine creates content in human understandable format such as generating text, images, or audio.

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Pattern & Anomaly Detection



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MARKET RESEARCH AND INTELLIGENCE ON AI

THE PATTERN & ANOMALY PATTERN OF AI

ONE OF THE SEVEN PATTERNS OF AI



Patterns & Anomalies

Pattern: Use ML to identify patterns in data and learn higher-order connections between information to provide insight into whether a given piece of data fits an existing pattern or is an outlier.



Objective: Find which one of these things is like the other and which is not

PATTERN USE CASES

FRAUD & RISK DETECTION



Use ML to find which one of these things is like the other and which is not. Used heavily for financial transactions such as credit card purchases.



UNCOVERING INSIGHTS IN DATA

Machines look at data to find insights, patterns, and groupings in the data.



AUTOMATIC ERROR DETECTION & CORRECTION

AI systems can learn what's "normal" behavior and spot mistakes or errors and make adjustments as needed.



INTELLIGENT MONITORING

AI can monitor of various systems (hardware and software) to determine when errors or breakdowns will occur to help predict maintenance cycles of machinery, formulate predictions regarding asset malfunction, and allow for reductions in unplanned downtime.



DATA AUGMENTATION & DISCOVERY

Using unstructured learning to find and group information that might be relevant from data.



PREDICTIVE TYPING / PREDICTIVE TEXT

AI can provide text suggestions that learn over time allowing the software to build custom dictionaries.



CYBERSECURITY APPLICATIONS

AI can help with cybersecurity by learning and adapting to changing threats, identify and spot malware, phishing attacks, and more.



CANDIDATE MATCHING

AI can sort through thousands of potential candidates to find best matches, screen candidates, and help suggest best candidates for position.

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Recognition Pattern



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MARKET RESEARCH AND INTELLIGENCE ON AI

THE RECOGNITION PATTERN OF AI

ONE OF THE SEVEN PATTERNS OF AI



Recognition

Pattern: Using ML to identify and understand images, sound, items, handwriting, faces, and gestures



Objective: Have machines identify and understand the real world and unstructured data.

PATTERN USE CASES

OBJECT RECOGNITION, CLASSIFICATION, & ANALYSIS



Deep Learning has made it possible to train and recognize any image.

SOUND & AUDIO RECOGNITION



Using machines to recognize and understand different sound input such as bird songs or genres of music.

HANDWRITING / TEXT RECOGNITION



Computers understand and interpret handwritten content from documents and digital sources such as checks.

GESTURE RECOGNITION



Computers interpret human gestures as commands to enhance video game interaction, interpret sign language, or help surgeons virtually grasp and move objects.

CONTENT SUMMARIZATION



Extract key information from documents and create shorter / more concise versions of text.

MEDICAL IMAGING



AI is augmenting radiologists by being a "second set of eyes" on images and x-rays.

INSURANCE CLAIMS APPLICATIONS



AI helping with real-time assessment of car or storm damage.

COUNTERFEIT DETECTION



AI helping find counterfeit goods such as purses, watches, or drugs.

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Goal-Driven System



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MARKET RESEARCH AND INTELLIGENCE ON AI

THE GOAL-DRIVEN SYSTEMS PATTERN OF AI

ONE OF THE SEVEN PATTERNS OF AI

Pattern: Using Reinforcement Learning for real-world games.



Objective: Find the optimal solution to a problem through trial and error

PATTERN USE CASES

GAME PLAYING

First checkers, then chess, and now more complicated games like Go, AI systems play games and learn through trial and error.

SCENARIO SIMULATION

Using AI to create scenarios and figure out best outcomes for things such as resource optimization of money, equipment, time, or other resources.

TRAFFIC LIGHT CONTROL

AI systems can figure out optimal solution to solve congestion.

ROBOTS

AI powered robots can figure out how to run, jump, and move in various environments.

BIDDING AND ADVERTISING

Multi-agent smart bidding solution finds the optimal price and time points.

ROBOADVISING

Automated, algorithm-driven financial planning services that run through thousands of scenarios and automatically invest client assets.

PHARMA / LIFE SCIENCES

AI can run through thousands of sequences to help with protein folding.

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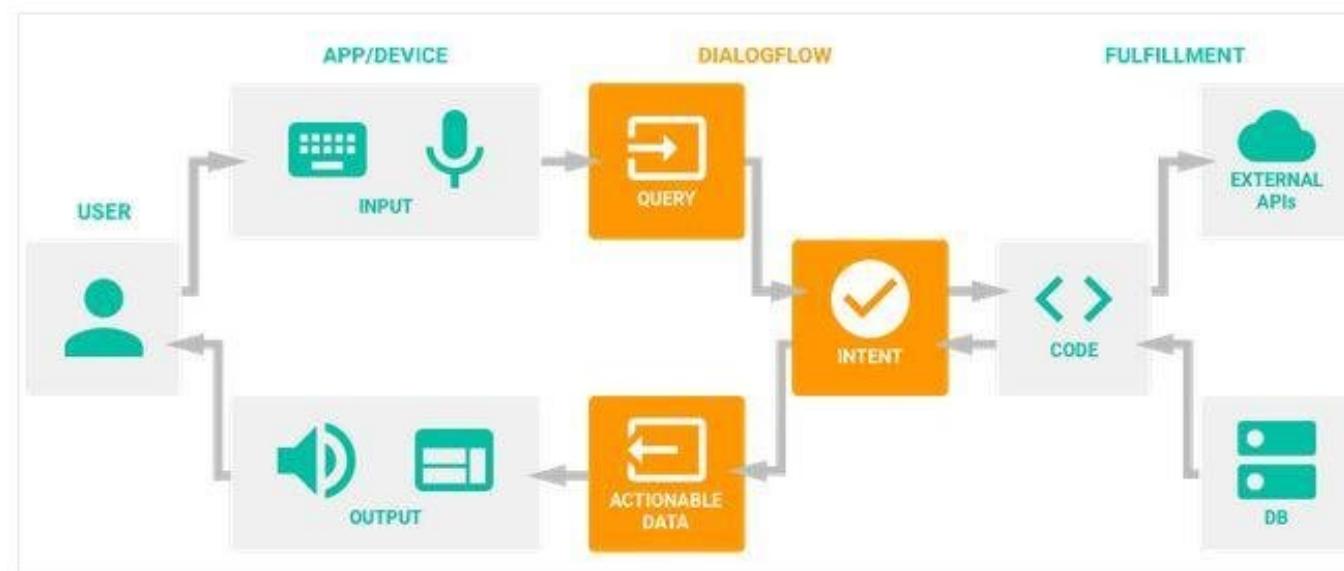


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Hands on - Chatbot



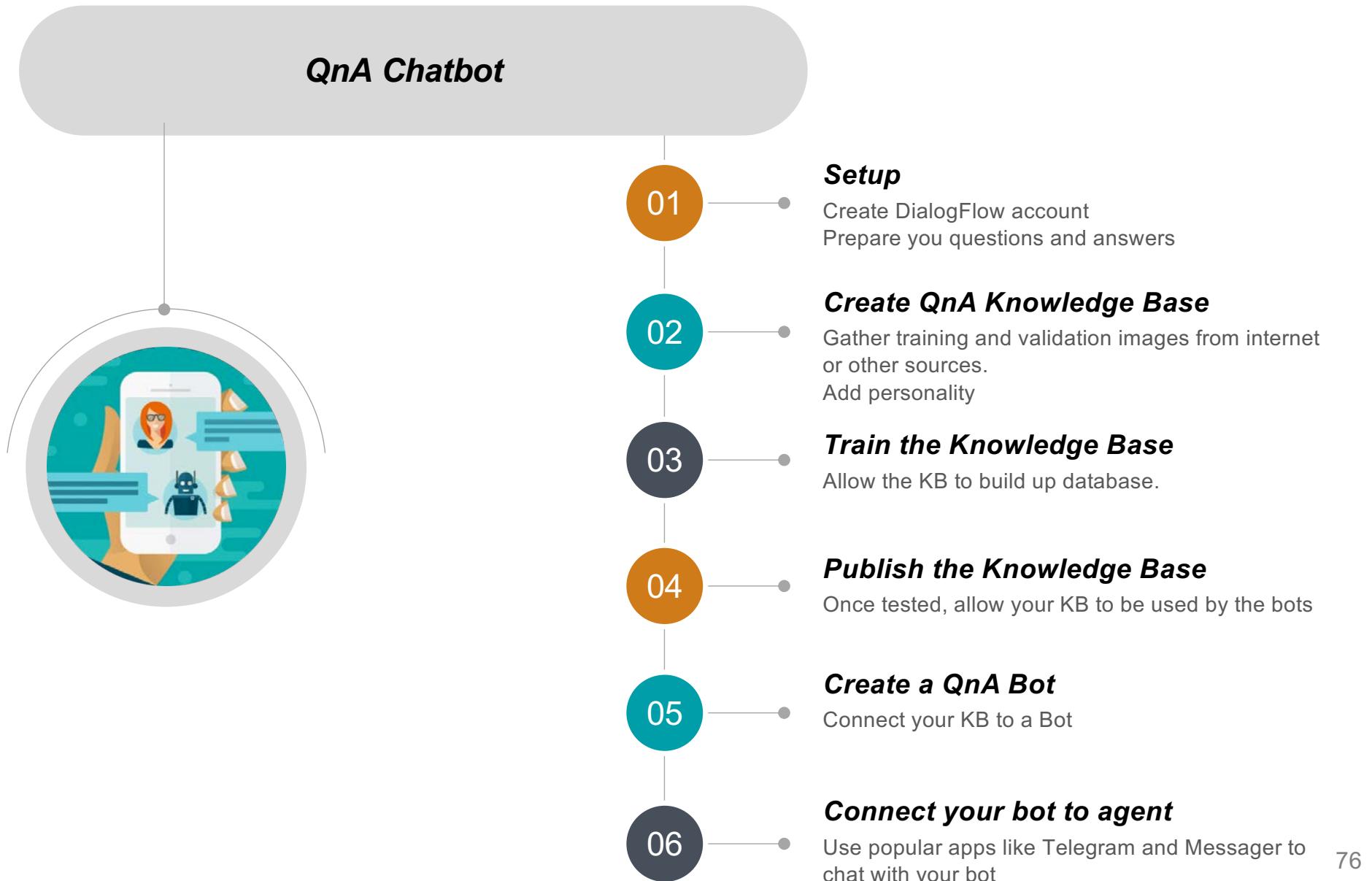


QnA Source

- <https://www.merdekageneration.sg/en/faqs>
- <https://www.bicentennial.sg/frequently-asked-questions/>

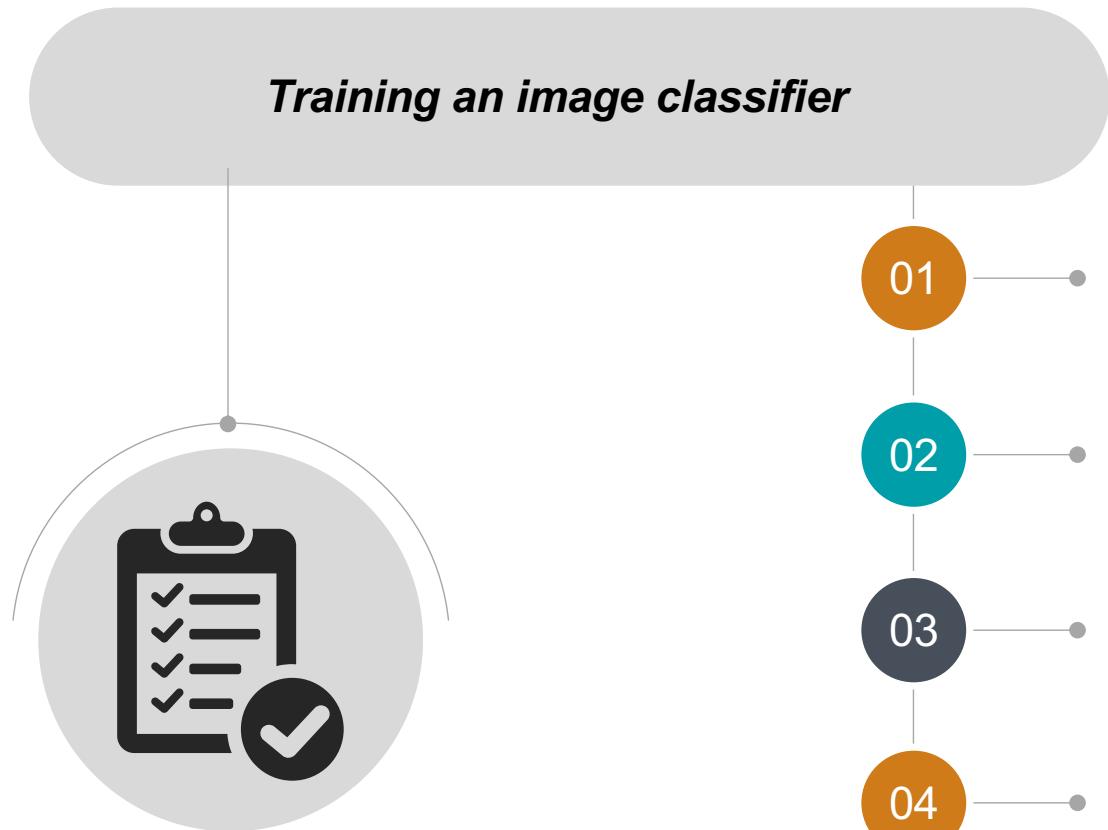


Hands-on Building a QnA Chatbot





Hands-on Training an image classifier



Fruits Classifier

- 01 **Setup**
Create Clarifai account
- 02 **Prepare images**
Gather training and validation images from internet or other sources
- 03 **Train the classifier**
Allow the classifier to know what constitutes a given class.
- 04 **Evaluate the classifier**
Check for accuracy, recall and probability threshold.
- 05 **Test your model**
Use unseen data to test your classifier.
- 06 **Improve your classifier**
Use various techniques to improve your classifier.



Applications

Navigation  <p>Google & Waze find the fastest route, by processing traffic data.</p>	Ride sharing  <p>Uber & Lyft predict real-time demand using AI techniques, machine learning, deep learning.</p>	 <p>Deep Learning “proven” to work for image classification.</p>	 <p>Models outperform humans on image classification.</p>	 <p>Object detection models beat previous benchmarks.</p>
Audience  <p>Facebook & Twitter use AI to decide what content to present in their feeds to different audiences.</p>	Content  <p>Image recognition and sentiment analysis to ensure that content of the appropriate “mood” is being served.</p>	2012 2015 2016 →		
Natural language  <p>We carry around powerful natural language processing algorithms in our phones/computers.</p>	Object detection  <p>Cameras like Amazon DeepLens* or Google Clips* use object detection to determine when to take a photo.</p>	Application Area: Abandoned Baggage Detection <ul style="list-style-type: none">• We can automatically detect when baggage has been left unattended, potentially saving lives.• This system relies on the breakthroughs we discussed:<ul style="list-style-type: none">• Cutting edge object detection.• Fast hardware on which to train the model (Intel® Xeon® processors in this case).  <p>Abandoned baggage</p>		



Finance

- Better Customer Service
- More Reliable Investment Services with Robot Advisor
- Greater Efficiency with Less Paperwork
- Improved Financial Security

JPMorgan Chase Uses COIN Machine Learning Program To Eliminate 360K Lawyer Hours A Year



TREND 1



Readyng for banking's shift from mobile-first to AI-first

Artificial intelligence (AI) in banking is not new. Banks are already using AI in heavily-manual processes for accuracy, efficiency, speed and cost benefits. What is new, however, is the move of AI beyond process to interaction. The next stage of AI in banking will be toward simple and smarter interfaces: drawing on machine learning that adapts to data and interactions to improve areas like fraud detection, and tapping AI-enabled tools (like centralized platformsassistants or messaging bots) to better converse with and offer services to customers in the front-office. Relying on AI for some internal and external interactions will help elevate the customer experience and move staff to more judgment-based and higher value added roles.



Fraud Detection

Traditionally: Fraud is on the rise, but fraud detection is a challenging problem to solve correctly.

- Historically, a predefined rule-set was used for fraud identification, but this approach misses much of the nuance that surrounds fraud
- 1/3 of falsely identified fraud events result in lost customers
- In the US, this loss is worth 13 times the cost of actual fraud



Now with AI: With ML techniques, banks can predict fraud based on a behavioral baseline to compare against.

- Uses historical shopping data and shopping habits of customers
- Compares new data to baseline to determine likelihood of fraud



Example: Sift Science

- Established a fraud data consortium developed from over 6000 websites to leverage large-scale real-time ML
- Autonomously learns new fraud patterns based on billions of user actions





Risk Management

Traditionally: New regulations force tighter control on financial institutions.

- New business model disruptions
- Increasing pressure on costs and returns



Now with AI: ML can help discern the credit worthiness of potential customers

- Tailor a financial portfolio to fit the goals of the user using ML algorithms.
- Financial institutions can develop early warning systems for automated reporting, portfolio management, and recommendations based on ML.



Example: ZestFinance

- Traditional underwriting systems make decisions using few data points.
- Those with a limited credit history are often denied credit, ultimately leading to loss of revenue for lenders.
- ZestFinance leverages thousands of data sources together with ML to more accurately score borrowers, even people with a small credit history.





Stock Trading

Traditionally: The speed and volume of information is daunting

- The market is reactionary.
 - It's difficult to remain competitive while relying on traditional trading methods.
 - Fundamental analysis is unable to show the entire financial picture.



Now with AI: Companies use massive datasets together with DL methods for better forecasting.

- Data pulled from financial, political, and social media
 - Analyst reports combined.

6	2,930						
0	2,160	27,000	2,180				
0	5,340	1,225	5,350	5,880	4,500	0,000	نحوه انتشار
0	0,450	0	0,000	0,410	564,494	0,450	نحوه انتشار
0	2,600	30,393	2,440	2,750	92,464	2,600	نحوه انتشار
0	1,600	5,000	1,600	1,830	56,512	1,600	نحوه انتشار
0	140	73,778	2,300	2,310	128,544	2,290	نحوه انتشار
		0	0,000	3,100	874,820	3,080	نحوه انتشار
				0	2,950	0,000	نحوه انتشار
					1,450	0,000	نحوه انتشار
						0,951	نحوه انتشار

Example: Sentient Technologies, and Learning Evolutionary Algorithm Framework (LEAF*)

- Manages millions of data points to find trends and make successful stock trades.
 - AI algorithms identify and combine successful trading patterns.
 - Successful strategies are tested in the real world, evolving autonomously with LEAF.
 - Sentient has received more funding than any other AI company.



Travel

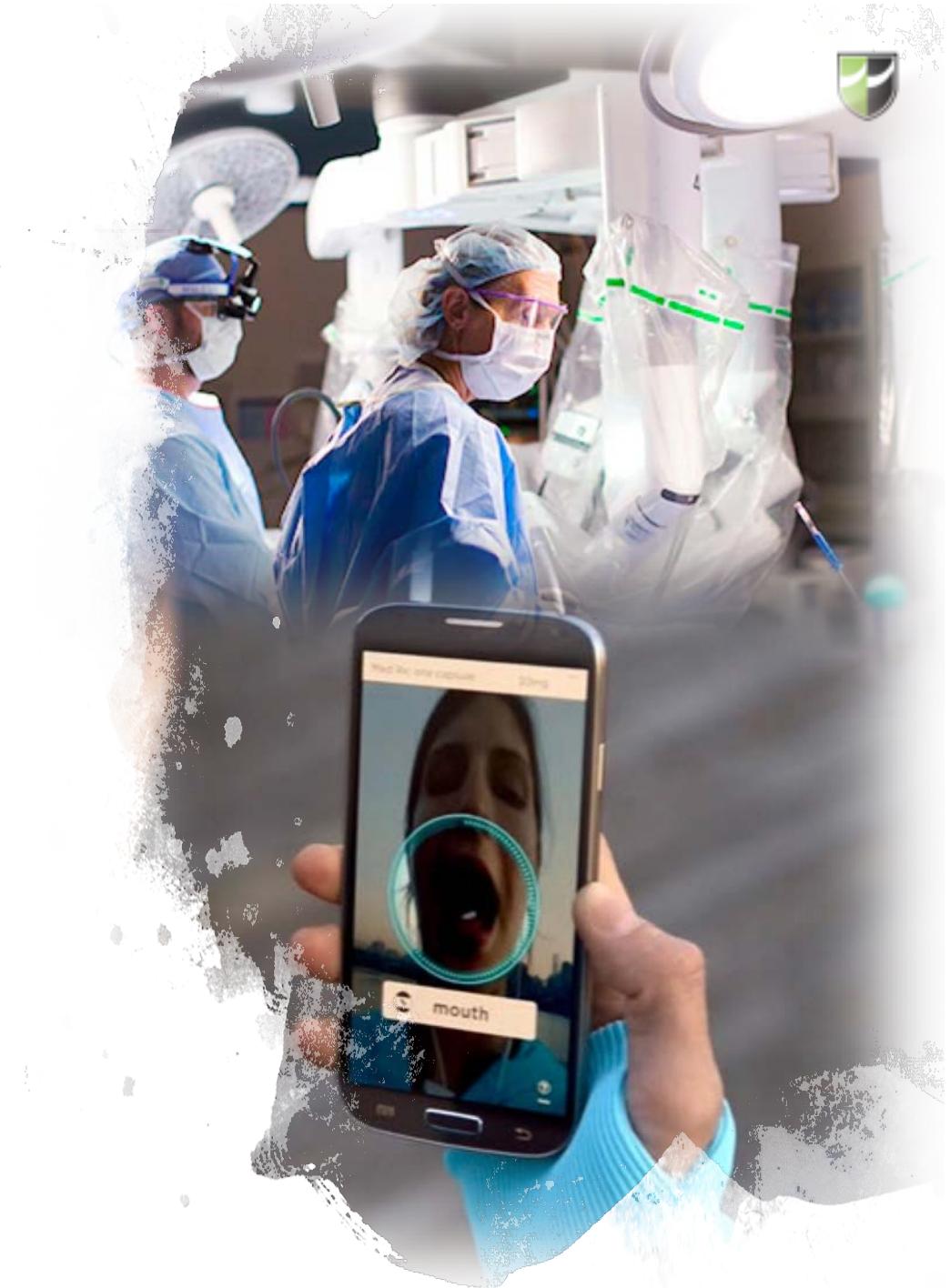
- Hotel Bookings by Voice Command
- AI Concierge Services
 - <https://techcrunch.com/2018/06/19/amazon-launches-an-alexa-system-for-hotels/>
- Travel Service Chatbots
- Check-in Through Facial Recognition
- Self-Driving Cars and Mobility as a Service
 - <https://www.economist.com/international/2016/09/29/it-starts-with-a-single-app>
- Other Robotic Tools





Healthcare

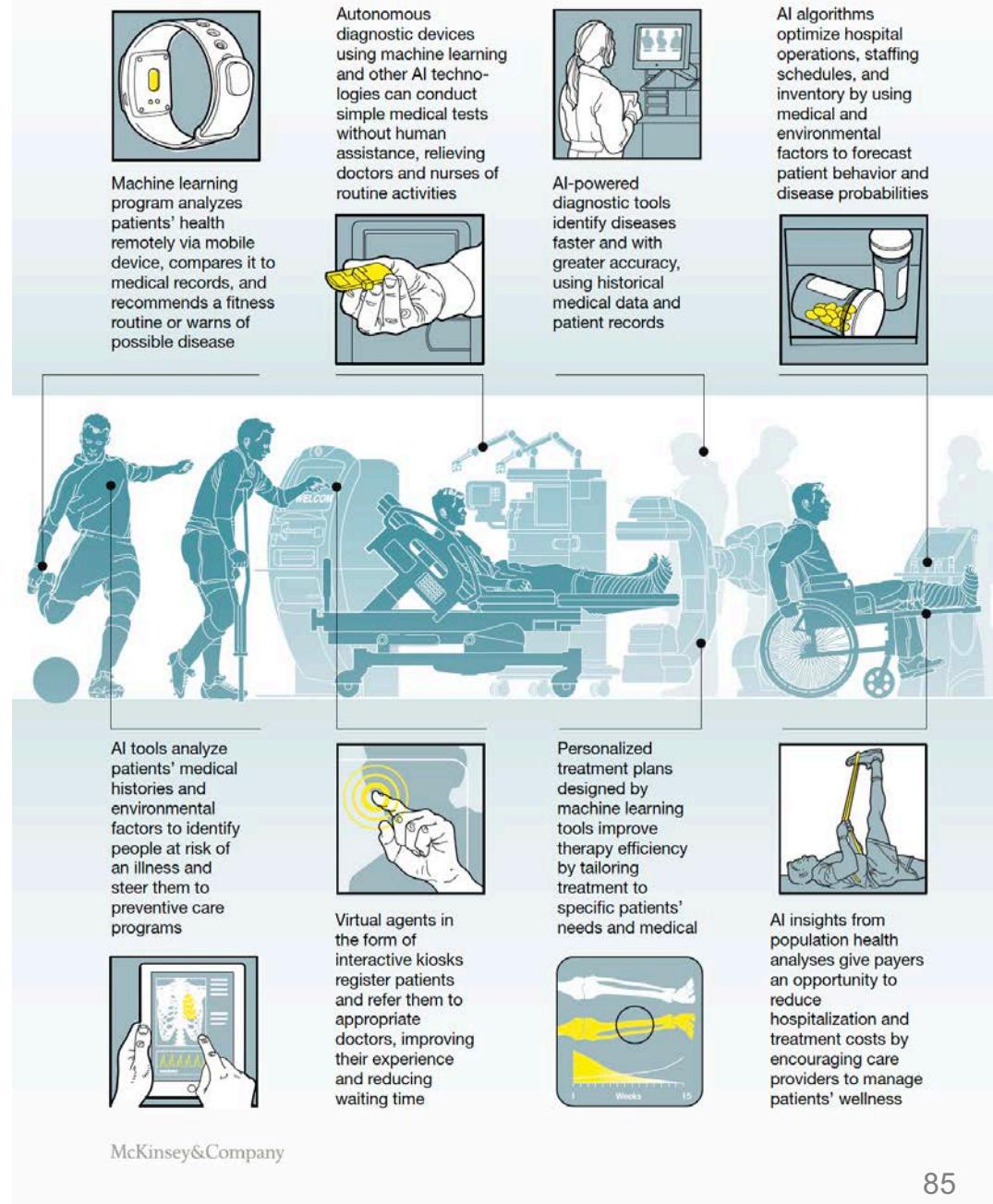
- IBM Watson, Google Deepmind
- At-home testing and personalized health care
- Wearables
- Robot-Assisted Surgery
- Virtual Nursing Assistant
- Administrative Workflow assistance



Healthcare

- Make quicker diagnoses, create better treatment plans and enable new approaches to insurance
- Identify public-health threats and the most at-risk patients
- help medical professionals diagnose disease and improve operations
- Insurers can devise new ways to encourage
- preventive care and incentivize providers
- Doctors will be able to tailor treatments—even drugs—to individual patients
- Virtual agents can serve as primary touchpoints for patients
- Several hurdles stand in the way, starting with data availability

AI in health care: quicker diagnoses, better treatment plans, and improved health insurance





Healthcare – Medical Diagnosis

Traditionally : Medical Diagnosis was a challenging process.

- Many symptoms are nonspecific
- Process of elimination was used to determine root cause (neither efficient nor exact)



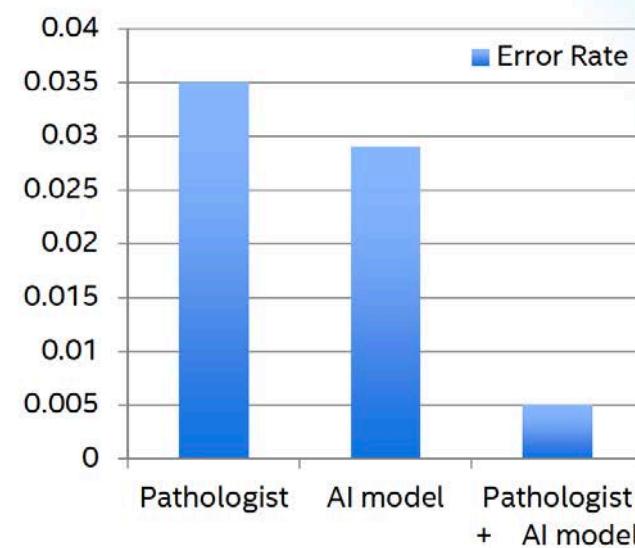
Now with AI : Doctors can provide diagnoses more efficiently and accurately, with the availability of:

- Large medical datasets
- Computer vision algorithms



Example: Breast Cancer, 2016, Harvard Medical School researchers

- Used DL to identify cancer in lymph node images
- Used Convolutional Neural Nets and custom hardware
- AI model combined with humans achieved lower error than either one individually





Healthcare – Treatment Protocol

Traditionally: Doctors would diagnose a condition and recommend a treatment based on what historically worked for most people.

- Some considerations for population/demographics
- Difficult to create custom treatments without extensive research/cost



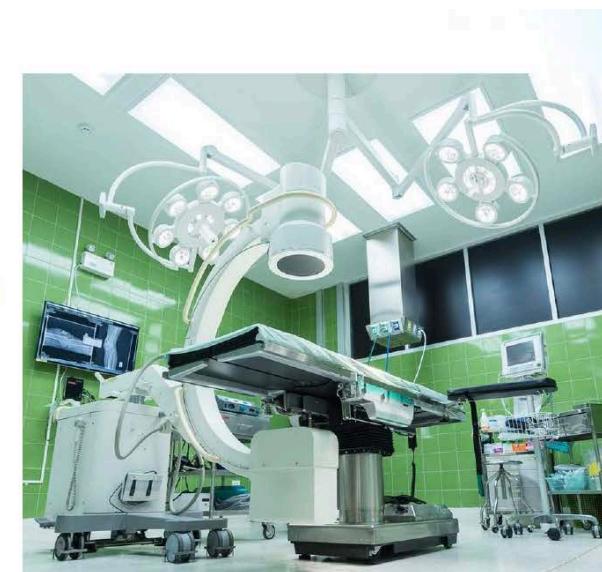
Now with AI: Doctors can tailor treatments to individual patients.

- Large medical datasets
- ML and DL algorithms
- Population/demographics analysis/simulations



Example: ICU Intervene, MIT Computer Science and Artificial Intelligence Laboratory.

- Uses ICU data, from vitals, labs, notes, to determine how to treat specific symptoms.
- Makes real-time predictions from DL models, to provide recommendations for patients.
- Forecasts predictions into the future (a few hours) compared to traditional methods (a few minutes).
- Predictions can be run on common GPU and CPU hardware.





Healthcare – Drug Discovery

Traditionally: Each new drug approval costs over a billion dollars in Research and Development.

- The cost has been doubling every 9 years since 1970
- The drug discovery process can take decades
- 9 out of 10 drug approval attempts fail
- There are currently only 1,500 approved drugs



Now With AI: Companies are leveraging structured and unstructured data with AI, to establish a pipeline of new drug discovery.

- There are 10^{20} possible drug-like molecules
- Massive space for potential discovery



Example: HetioNet drug discovery model, 2016, UCSF, Himmelstein and Baranzini.

- Developed a graph network to encode millions of biomedical reports.
- Used ML to predict probability of treatment efficacy for ~209,000 compound-disease pairs.
- Provided clear pharmacological insights for epilepsy drug discovery and treatment.





Healthcare – Surgery

Traditionally : Every type of surgery poses possible risks to the patient.

- Adverse anesthesia effects
- Operational complications



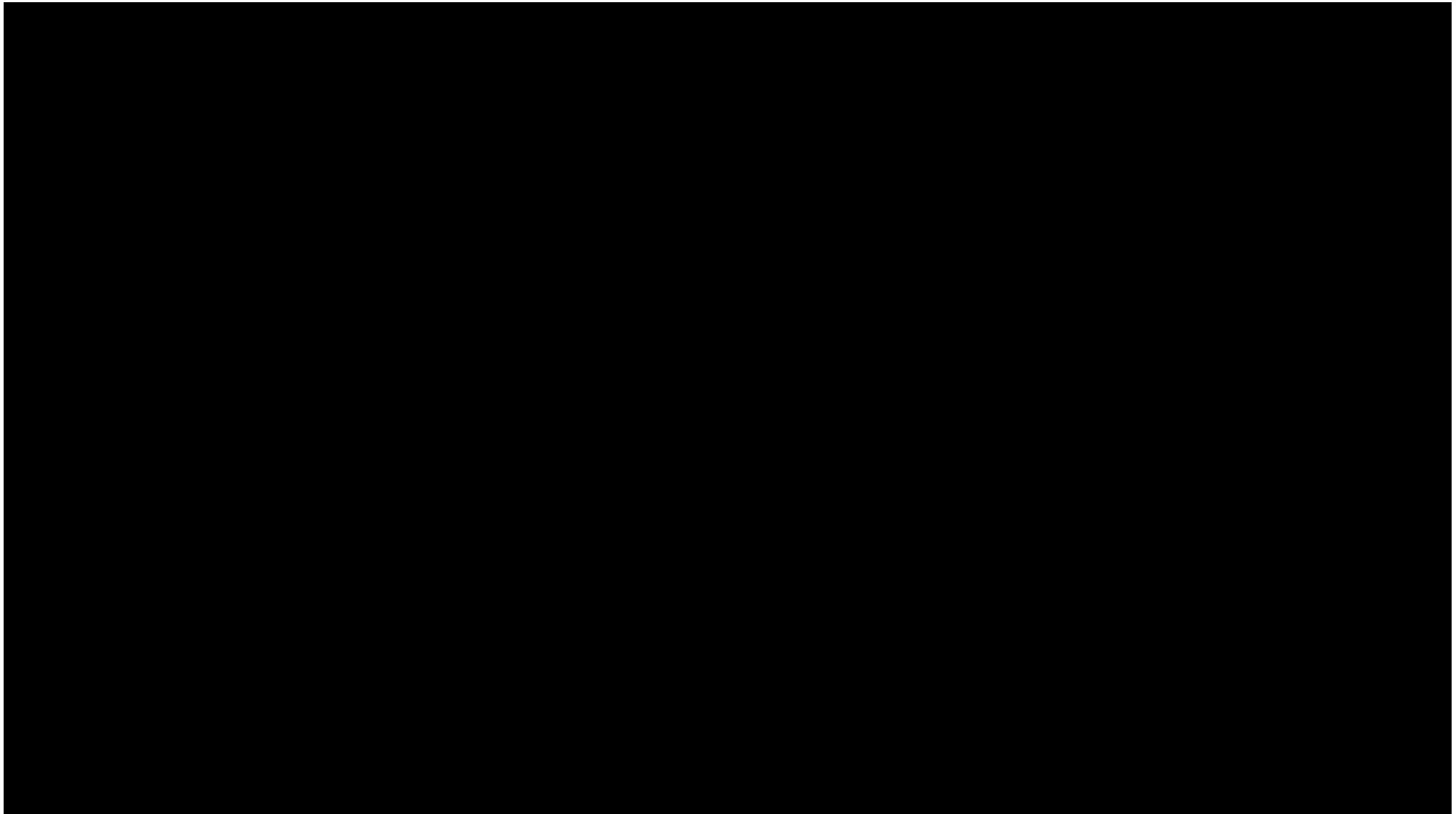
Now with AI : Semi-intelligent computer systems predict surgical steps, identify complications, and warn surgeons about pending challenges.

- Computer "vision" leverages data from laparoscopic and arthroscopic cameras
- Smart systems automate dictation by generating notes during the surgery
- Surgeons can send point-of-view live feeds of the operative site to experts anywhere in the world for real-time advice.





Robot Surgery

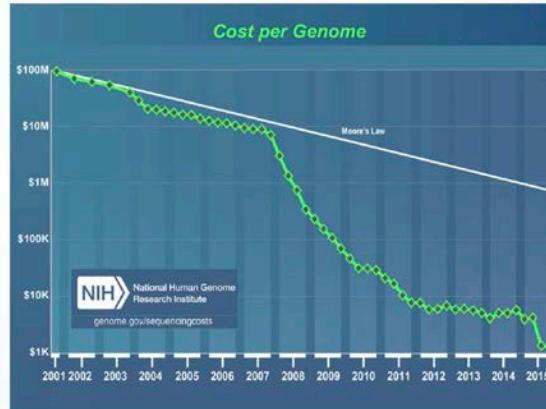




Healthcare – Genome Sequencing

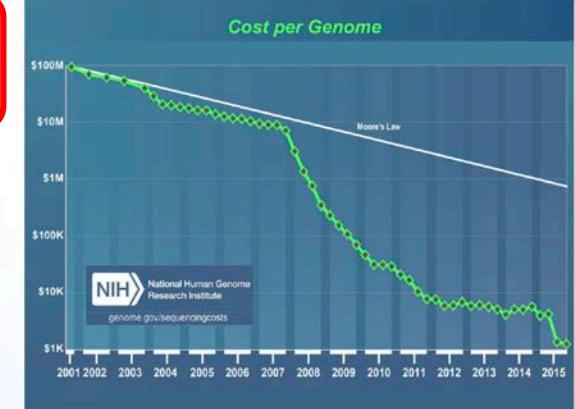
In 2001: Full human sequencing cost \$100 million.

- The first genome sequencing took ~13 years



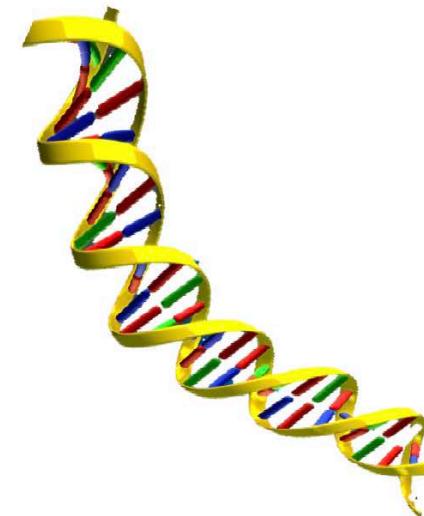
Now with AI : Sequence companies are employing AI techniques to reduce cost and increase accuracy.

- Illumina claims that within the near future sequencing will only take 1 hour and cost only \$100



Example: Google's DeepVariant* sequencing:

- Leverages massive data sets together with DL to identify all variants
- Accuracy on genome classification: 99.958 %
- DeepVariant* is computationally expensive, but the framework can run on GPU hardware, allowing for a faster learning process
- Availability as open source code promises to revolutionize the industry





Transportation Industry

- Hyperloop
- High-Speed Tunnel Networks
- Self-Driving Cars
- Self-Flying Aircraft





Autonomous Car

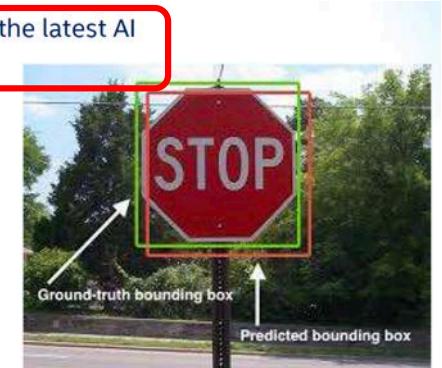
Traditionally: Despite having safer cars, the number of deadly car accidents have been on the rise the last few years.

- The leading cause of automobile accidents is human error
- One of the primary sources of traffic jams is each driver acting out of self-interest, that prevents traffic flow
- Part of the population who can't drive: children, the elderly, and the disabled



Now with AI: Self-driving cars are enabled by the latest AI breakthroughs in computer vision.

- Cars identify stop signs, lane lines, and other landmarks via DL tools
- Mapping technology can use computer vision to detect addresses
- Cars triangulate and can use other 3D-sensing technologies, such as LIDAR and RADAR



Example: Waymo, the autonomous vehicle division of Alphabet Inc.

- Waymo has been operating self-driving minivans without a safety driver since October 2017
- Waymo's Carcraft* software accelerated the car's development, with 2.5 billion simulated miles driven in 2016
- The system used DL together with massive data sets collected from self-driving cars on public roads





Automated Trucking

Traditionally: There is a shortage of 48,000 drivers nationwide.

- Driver turnover rates at some companies reach 300%
- Truck drivers are twice as likely as other workers to be obese and/or have diabetes
- Truckers are half as likely to have health insurance
- The number of accidents and fatalities have increased in recent years



Now with AI: Autonomous trucks can coordinate movements with other trucks.

- Save on fuel, and reduce wind-drag and the chance of a collision
- Video, LIDAR, and accelerometers are used to collect detailed data about the truck's surroundings
- Guidance algorithms provide feedback for braking, steering, and throttling commands, based on incoming and historical data





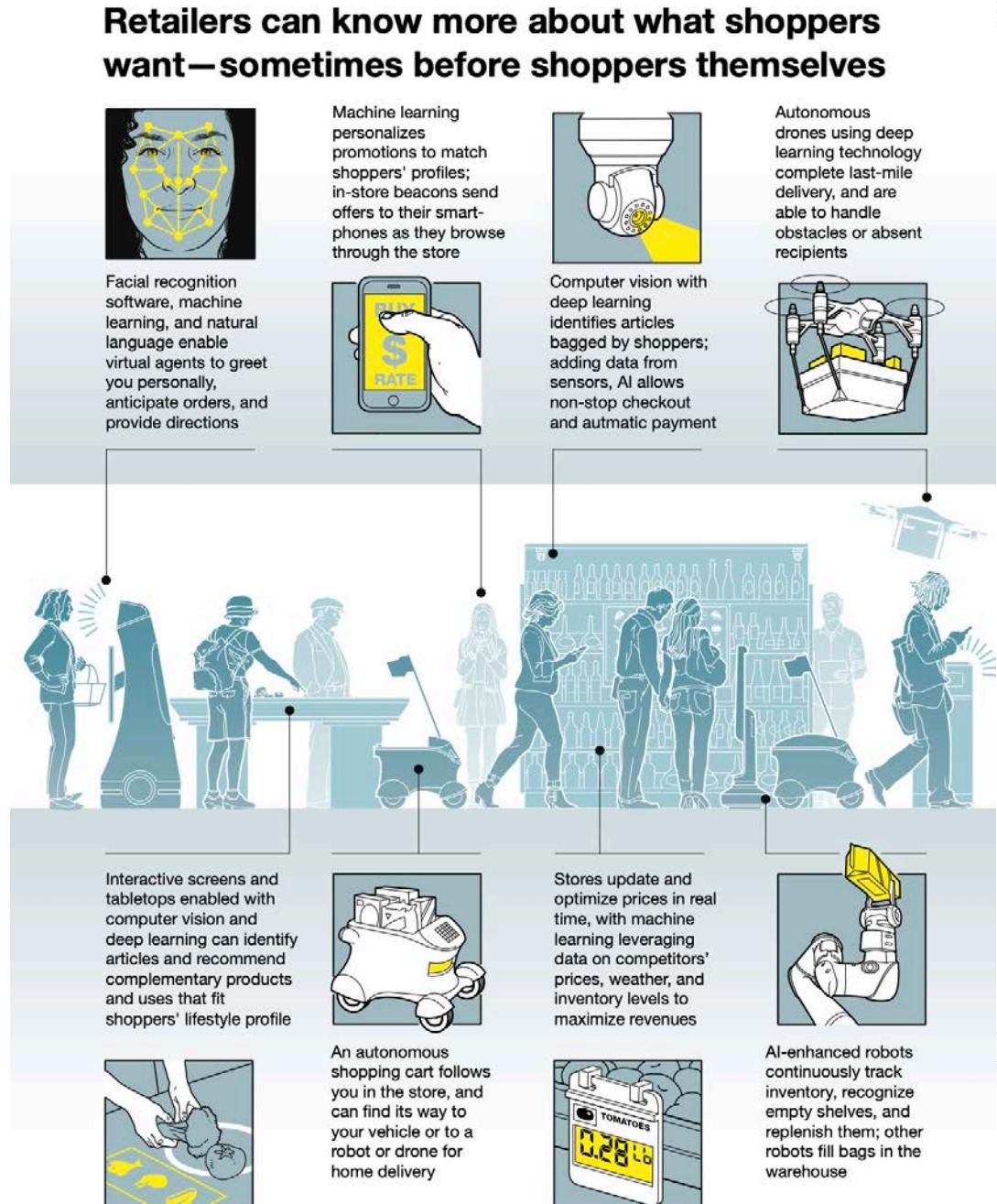
Retail Industry

- Intelligent Shopping Systems
- Robots
- Biometric technologies
- Facial recognition



Retail Industry

- Artificial Intelligence: The Next Digital Frontier
 - 20 percent stock reduction by using deep learning to predict e-commerce purchases.
 - 2 million fewer product returns per year.
 - 30 percent reduction of stocking time by using autonomous vehicles in warehouses.
 - 50 percent improvement in assortment efficiency.
 - 4-6 percent sales increase using geospatial modeling to improve micro market attractiveness.
 - 30 percent online sales increases from the use of dynamic pricing and personalization.





Customer Experience

Traditionally: Americans are shifting their spending from material goods to experiences.

- The "Amazon effect": there have been nine major retail bankruptcies in 2017
- Retailers need to become competitive or risk obsolescence
- Balancing "out-of-stock" with "over-stock" trade-off requires great finesse



Now with AI: Companies bring experience and optimization to retail shopping.

- AI-powered gift concierge learns your preferences as you engage, and can help predict the appropriate gift to buy
- Leveraging ML-trained agents, companies are providing recommendations via natural language
- Companies using AI via Watson* to monitor factors from weather to consumer behavior, to optimize consumption rate predictions



Example: The North Face and Watson* are combining massive datasets and AI, to bring the brick-and-mortar experience to e-commerce.

- The North Face, with Fluid and IBM Watson*, has launched XPS* - an AI-enabled digital expert that uses a natural language interface to help shoppers.
- XPS curates and filters the available options, so shoppers are more likely to make a purchase

THE NORTH FACE
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FluidXPS Beta Powered by IBM Watson™

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Food Supply Chain

Traditionally: Restaurants use historical data or “gut-feeling” approach to supply chain.

- This can result in excessive waste or food unavailability



Now with AI: Many companies have started to leverage sophisticated algorithms to forecast demand.

- Agents can adjust orders with trading partners in real time, as required for business need



Example: Vivanda's FlavorPrint* program.

- Based on recipes and consumer-provided data, Vivanda maps data to create “digital-taste” identifiers for each consumer
- Providing ML-based recommendations to customers may influence demand
- Shares data with food industry customers, enabling them to improve demand forecasts



Education Industry

- Personalized Learning Platforms
- Individualized Artificial Intelligence Tutors
- Personalized Games
- Crafting a more enjoyable learning experience

Example: Adaptive learning systems, and grading.

- Learning analytics track student performance and provide tailored educational programs.
- Using natural language processing and ML models, AI programs can be used for long answer and essay grading.





Food Supply Chain

Traditionally: Restaurants use historical data or “gut-feeling” approach to supply chain.

- This can result in excessive waste or food unavailability



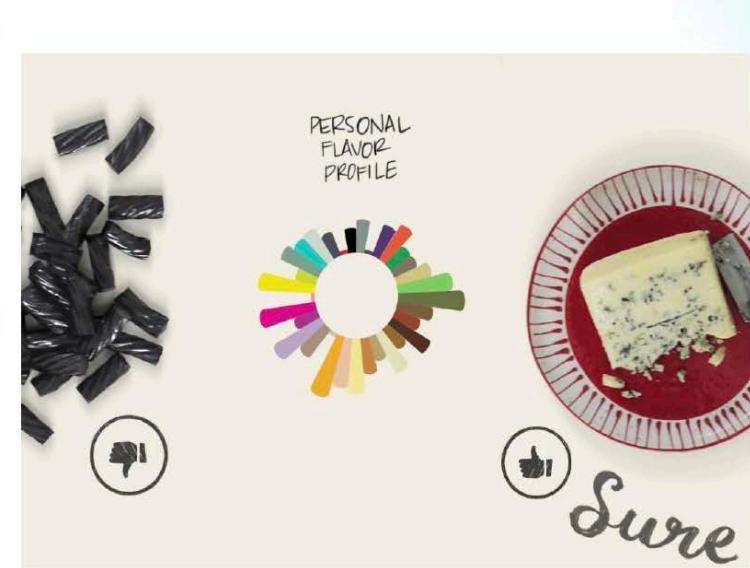
Now with AI: Many companies have started to leverage sophisticated algorithms to forecast demand.

- Agents can adjust orders with trading partners in real time, as required for business need



Example: Vivanda's FlavorPrint* program.

- Based on recipes and consumer-provided data, Vivanda maps data to create “digital-taste” identifiers for each consumer
- Providing ML-based recommendations to customers may influence demand
- Shares data with food industry customers, enabling them to improve demand forecasts





Agriculture Industry

- Agricultural Drones
- Autonomous Tractors
- Vertical Farms

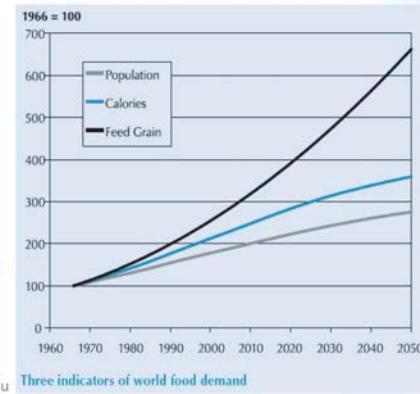




AgTech

Traditionally: The world population is estimated to reach 9 billion by 2050.

- Food production will have to increase by 70% to meet the projected demand.
- Most land suitable for farming is already being used, hence the needed increase must come from higher yields.
- Agriculture must feed the world while not over-straining Earth's resources.



source: www.card.iastate.edu

Now with AI: Autonomous robots use computer vision and a produce vacuum system for produce harvest.

- DL-enabled robots are being used to identify and kill weeds.
- Companies have shown 90% herbicide reduction due to "targeted" spray application.
- AI-driven genome sequencing advancements enables crop "genome" editing.



Example: TellusLabs yield predictions.

- Uses ML together with weather and other historical data to forecast yields.
- Leverages cloud-based GPUs for DL on satellite images.
- TellusLab's predictions have shown to be consistently more accurate than the USDA.
- Came within 1% of predicting corn and soybean yields in 2017.





I AM AI

I am AI (Variation)

AIVA (Artificial Intelligence Virtual Artist)

00:00



Aiva Technologies

www.aiva.ai

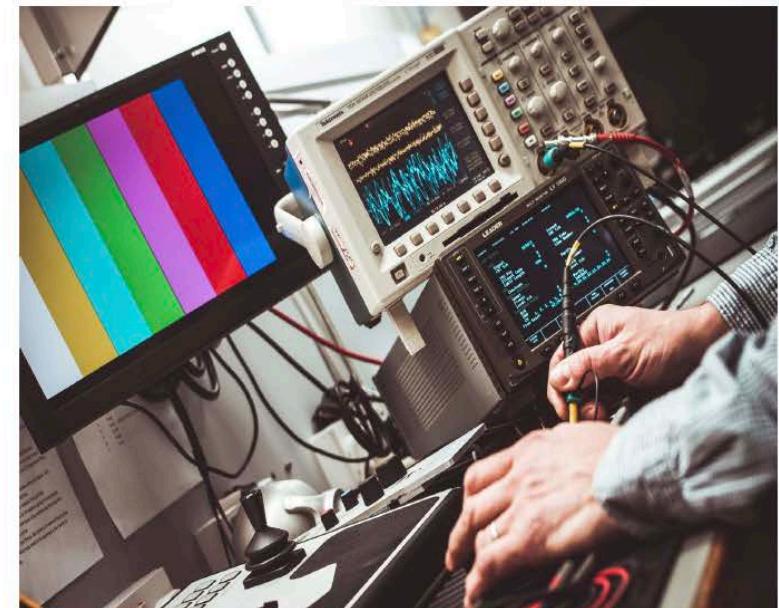
https://www.youtube.com/watch?v=gzGkC_o9hX8



AI for Music Generation

Example: “I AM AI”, first album released in 2017 to be generated by AI – with professional musicians and DL technology.

- Music generation is possible due to special DL algorithms that are designed for sequential data.
- The models learn musical patterns based on learning from large musical datasets.
- Raw music files can be processed on cloud-based computer power, making DL on these datasets possible.

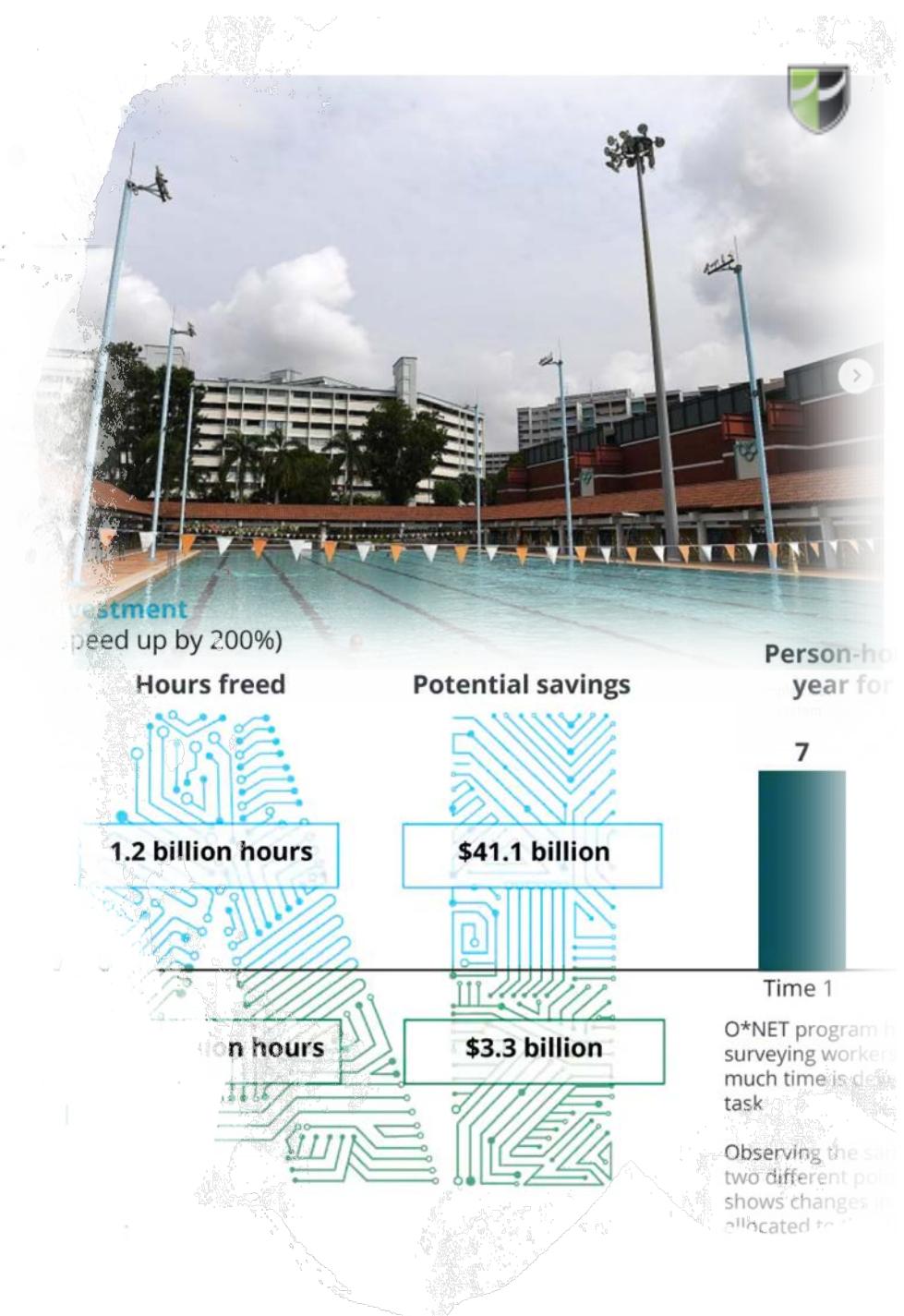


The instrumentation was composed with artificial intelligence, lyrics and vocal melodies written by Taryn. Let us know what you think in the comments!



Governments

- Public Safety and security
- Bureaucratic Efficiency





Smart Cities

Traditionally: As of 2008, for the first time in history, half of the world's population resides in cities.

- There are heightened demands on scarce resources.
- Simultaneously, a large part of existing infrastructure is underutilized or not being used efficiently.



Now with AI: AI techniques are used to analyze photo and video data to perform studies of pedestrian and traffic trends.

- Adaptive signal control: allows traffic lights to tailor their timing based on real-time data.
- With license plate recognition, and DL technology, cities can not only optimize parking but can also track criminals.



Example: AT&T reimagines smart cities

- AT&T developed a framework to help cities integrate Internet of Things (IoT) sensors with AI.
- Remotely monitor the condition of roads, bridges, buildings.
- Assist with public safety.
- Notify police if gunfire has gone off, by using sound detection.





Cybersecurity

Example: Deep Instinct

- Uses GPU-based neural network to achieve 99% detection rates for even the most advanced cyber attacks.
- DeepInstinct's DL models have the ability to detect patterns - mostly designed by humans - enabling the prediction of pending cyber attack.





Oil and Gas

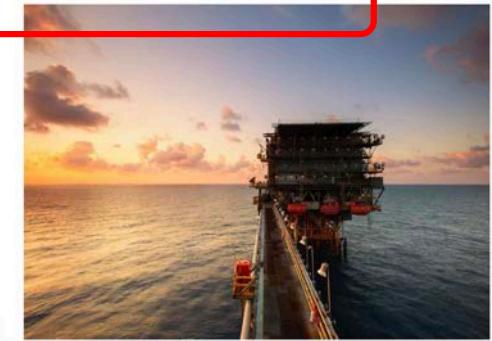
Traditionally: Shrinking oil reserves force companies to operate in remote and possibly hostile areas.

- Price has fallen dramatically in recent years.
- Forcing company layoffs and drastic budget cuts.
- Ultimately, companies are in great need of optimizing operations and cost.



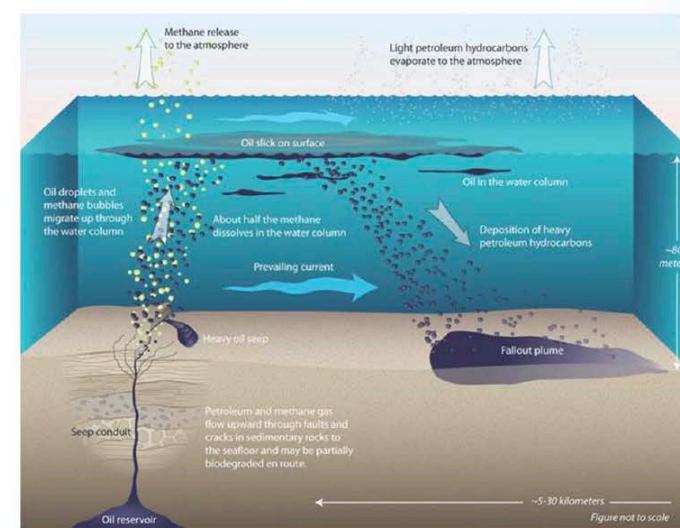
Now with AI: AI uses economic, political and weather data to forecast optimum production locations.

- Drilling is still an expensive and risk-prone endeavor.
- ML, with seismic, thermal and strata data, can help optimize the drilling process.



Example: ExxonMobile and MIT developing “submersible” robots for exploration.

- AI robots are used in ocean exploration to detect “natural seep”.
- Robots are trained via DL techniques and learn from their mistakes.
- Simultaneously protect the ecosystem and detect new energy resources.

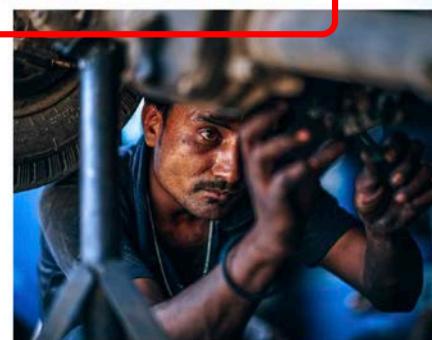




Preventive Maintenance

Traditionally: Relied on historical data to provide basis for preventative maintenance schedule.

- Conservative approach: parts were replaced well before failure, and thus financially inefficient.
- Flawed due to inability to predict new failure modes.



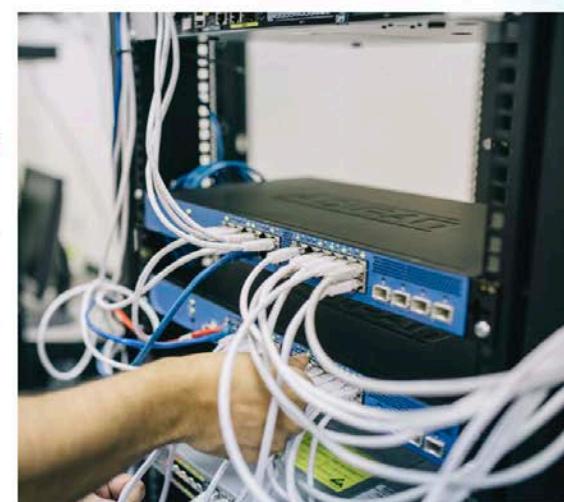
Now with AI: Internet of Things (IoT) sensors help to optimize maintenance scheduling.

- Part replacement schedule is optimized by assessing anomalies and failure patterns.
- Safety and productivity can increase exponentially.



Example: AI with General Electric.

- GE is the industry leader for Internet of Things (IoT) sensor installations on engines and turbines, and plans to have 60,000 engines connected to the internet by 2020.
- Computer vision cameras and reinforcement learning algorithms find tiny cracks or damage.
- Sensor data and AI allows GE to track performance and optimize part replacement.





Fault Detection

Example: Computer vision for fault detection on solar panels.

- DL algorithm trained on labelled data of correctly manufactured vs. flawed panels
- Reduced the need for human inspection by 66% compared to historical need





Automate Garment Industry

Example: SoftWear Automation's "sewbots".

- Computer vision is used to track fabric at the thread level.
- Eliminates need for human seamstress / seamster.
- Allows designers to create garments that were previously thought to be too complicated or specialized to construct.





AI and Customer Service

Example: Bot assistants and customer service agents

- AI Augmented messaging.
- AI for sorting and routing inquiries.
- AI enhanced customer phone calls.
- Some companies have used AI to fully automate customer service.





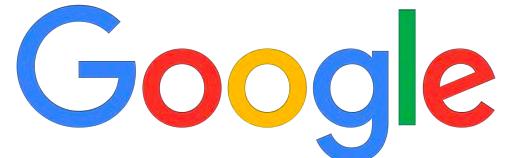
AI and Next Gen Gaming

Now with AI: Forza 5 Motorsport* uses its “Drivatar” AI system to learn how to drive in the style of other players in the game.

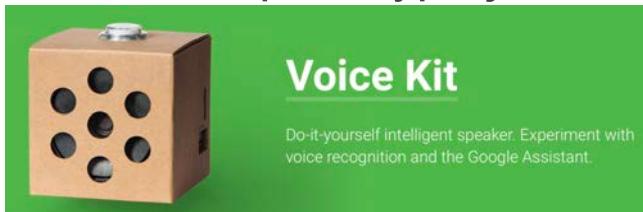
- Neural networks are used to train characters to walk and run realistically.
- Reinforcement Learning (RL) is a technique used throughout gaming.



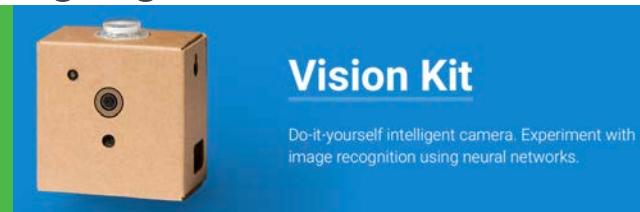
AI Services



- Google Search
 - Google Assistant ([hands on](#))
 - Google Photo (image recognition)
 - Speech Recognition
-
- Google's AI Services for Companies
 - <https://experiments.withgoogle.com/collection/ai>
 - Google's cloud-based AI Tools
 - <https://ai.google>
 - Google's AI Experiments:
 - <https://experiments.withgoogle.com/ai>
 - Do-it-Yourself AI:
 - <https://aiyprojects.withgoogle.com/voice/>



Voice Kit
Do-it-yourself intelligent speaker. Experiment with voice recognition and the Google Assistant.



Vision Kit
Do-it-yourself intelligent camera. Experiment with image recognition using neural networks.

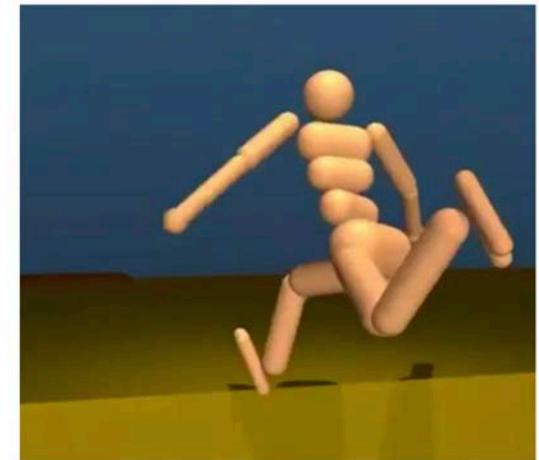


Meet your Google Assistant.

Ask it questions. Tell it to do things. It's your own personal Google, always ready to help.

Beware – Google's AI is so smart it just taught itself to walk without any human help

 Jimmy Nsubuga Monday 17 Jul 2017 6:31 pm



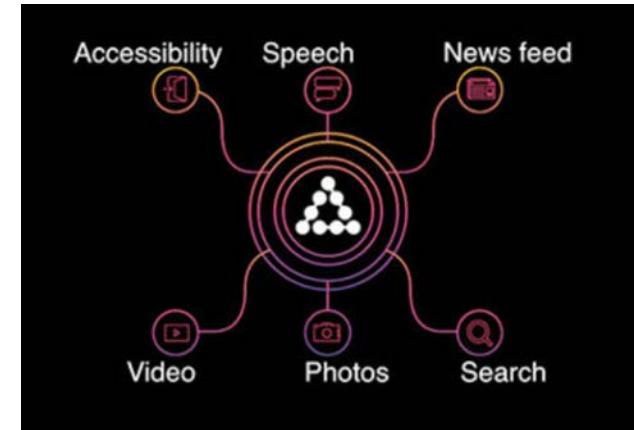


AI Services

- Facebook Photo search
- FB Learner Flow (<https://code.fb.com/ml-applications/introducing-fblearner-flow-facebook-s-ai-backbone/>)
- Text Analytics (Deep Text)
- Pattern Recognition to Prevent Suicides
- Improving 360 Degree Photos
- Computer Vision
- Facebook Personal Assistant M (experiment)
- Facebook Messenger Platform Chatbot
- Facebook's AI research Activities
 - <https://research.fb.com/category/facebook-ai-research/>

Facebook will use AI to help correct skewed 360-degree photos

The company has a technique for dealing with big file sizes, too.



TECHNOLOGY NEWS NOVEMBER 28, 2017 / 12:05 AM / A YEAR AGO

Facebook to expand artificial intelligence to help prevent suicide

David Ingram

3 MIN READ





AI Services

- Amazon Recommended Products
- Alexa Personal Assistant
- Cloud Storage
- Amazon's AI platform:
 - Amazon Lex
 - Amazon Polly
 - Amazon Recognition

LEARNING TOOLS

Get deep with machine learning

AWS DeepRacer

AWS DeepRacer is a fully autonomous 1/18th-scale race car designed to help you learn about reinforcement learning through autonomous driving.

- Experience the thrill of the race in the real world when you deploy your RL model onto AWS DeepRacer
- Build models in Amazon SageMaker and then train, test, and iterate on the track using the AWS DeepRacer 3D racing simulator
- Starting in 2019, compete in the world's first global autonomous racing league, race for prizes and a chance to advance to win the coveted AWS DeepRacer Cup

[Learn more »](#)

AWS DeepLens

AWS DeepLens is the world's first deep learning-enabled video camera for developers. Integrated with Amazon SageMaker and many other AWS services, it allows you to get started with deep learning in less than 10 minutes through sample projects with practical, hands-on examples.

- Choose your deep learning model from the AWS DeepLens pre-trained model library, or your own models trained with Amazon SageMaker.
- Deploy your model to the device with a single click.
- Watch the results in real time in the AWS Management Console.

[Learn more »](#)







Recommendations

Personalize experiences for your customers with the same recommendation technology used at Amazon.com.

[AMAZON PERSONALIZE »](#)



Forecasting

Build accurate forecasting models based on the same machine learning forecasting technology used by Amazon.com.

[AMAZON FORECAST »](#)



Image and Video Analysis

Add image and video analysis to your applications to catalog assets, automate media workflows, and extract meaning.

[AMAZON REKOGNITION »](#)



Advanced Text Analytics

Use natural language processing to extract insights and relationships from unstructured text.

[AMAZON COMPREHEND »](#)



Document Analysis

Automatically extract text and data from millions of documents in just hours, reducing manual efforts.

[AMAZON TTEXTRACT »](#)



Voice

Turn text into lifelike speech to give voice to your applications.

[AMAZON POLLY »](#)



Conversational Agents

Easily build conversational agents to improve customer service and increase contact center efficiency.

[AMAZON LEX »](#)



Translation

Expand your reach through efficient and cost-effective translation to reach audiences in multiple languages.

[AMAZON TRANSLATE »](#)



Transcription

Easily add high-quality speech-to-text capabilities to your applications and workflows.

[AMAZON TRANSCRIBE »](#)



Amazon Rekognition

Amazon Rekognition Video をご紹介します。



AI Services

- Cortana - <https://www.microsoft.com/en-us/windows/cortana>
- Presentation Translator –
<https://translator.microsoft.com/help/presentation-translator>
- HoloLens
- InnerEye - <https://www.microsoft.com/en-us/research/project/medical-image-analysis/>
- Azure Microsoft Cloud Service –
- AI for Earth –
<https://www.microsoft.com/en-us/ai/ai-for-earth>
- AI Language Translator –
<https://www.microsoft.com/en-us/translator/>
<https://www.bing.com/translator> (demo)



Microsoft | AI Products & Services Approach More All Microsoft Sign in

AI for Earth

AI for Earth puts Microsoft cloud and AI tools in the hands of those working to solve global environmental challenges.

▷ Play AI for Earth video

Areas of focus

AI for Earth awards grants to projects that use artificial intelligence to address four critical areas that are vital for building a sustainable future.

[Learn about AI for Earth grants >](#)

AI Services



- Cognos Analytice - <https://www.ibm.com/us-en/products/cognos-analytics>
- Tone Analyzer - <https://tone-analyzer-demo.ng.bluemix.net> (demo)
- Discovery - <https://discovery-news-demo.ng.bluemix.net>
- Visual Recognition -
<https://www.ibm.com/watson/services/visual-recognition/demo/#demo>
- Text to Speech - <https://text-to-speech-demo.ng.bluemix.net/> (audio streaming does not work on mobile browser)

The screenshot shows the IBM Watson Tone Analyzer interface. At the top, there's a purple icon of a speech bubble with a brain inside. Below it, the title "Tone Analyzer" is displayed. A sub-section titled "Sample use cases" asks users to choose an example to learn how to adjust the tone of their content. There are five options: "Tweets" (selected), "Online Review", "Email message", "Product Review in French", and "Your own text". Below this, a text input area contains a tweet about a new phone update. At the bottom right, a large blue button labeled "Analyze" is visible.

The screenshot shows the IBM Watson Visual Recognition interface for insurance claims. On the left, there's a large image of a van covered in colorful graffiti. To the right, a sidebar lists categories and their confidence scores: "vandalism" (0.64), "flat_tire" (0.53), "broken_windshield" (0.11), and "motorcycle_accident" (0.06). Below the sidebar, a text block explains that Belron is an international vehicle glass repair company that uses Custom Models to automatically generate estimates of repair costs based on customer-submitted images of car damage. At the bottom, there's a note to select an image on the left to evaluate how the Custom Model analyzes different images.



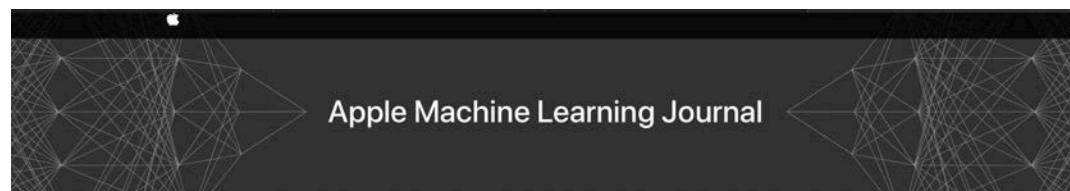
AI Services

- Speech Recognition on Siri
- QuickType
- A11 Bionic Chip – Core ML
- Apple Music
- Apple HomePod
- Apple Photos

Apple has new self-driving car hardware covered with iPod-style white plastic

Kif Leswing, Business Insider US

October 18, 2017



Apple acquires AI tech that seeks to understand your photos

Regaind can tell good pics from bad ones, and interpret what's going on.

71,188 views | Dec 26, 2016, 07:05am

Apple Publishes Its First Artificial Intelligence Paper



Aaron Tilley Forbes Staff

Optimizing Siri on HomePod in Far-Field Settings

Vol. 1, Issue 12 • December 2018
by Audio Software Engineering and Siri Speech Team



AI Services

Robots Run the Warehouses ([link](#))

Innovation

Alibaba lets AI, robots and drones do the heavy lifting on Singles' Day

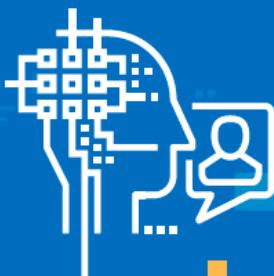
This year's November 11 shopping ritual will engage a recommendation algorithm, robots, and chatbots capable of understanding human emotion

Topic | Singles' Day (11.11)

SMART CUSTOMER SERVICE

Ali Assistant is a chatbot that handles both spoken and written queries, acting as customer-service rep and personal shopping assistant. It is capable of handling up to

95%



of customer service enquiries



Intelligent Machines

Alibaba's AI Fashion Consultant Helps Achieve Record-Setting Sales

AI will blur the line between online and offline retail.

COMPUTING POWER

Alibaba has built up one of the world's largest networks of interconnected computer servers to run its e-commerce empire, backed by an operating system that can process more than

175,000 transactions per second.

BIG DATA

With nearly
500 million

active users across its websites and apps, Alibaba has a vast repository of consumer data that can be processed and analyzed by AI programs continuously in real time, leading to increasingly accurate predictions and a better shopping experience.



Function specific AI services

Sales	Outreach.io
Virtual Human	https://www.quantumcapture.com/ctrl-human
HR Services	https://leena.ai/HR-FAQ
Scheduling	https://x.ai/how-it-works/
Enterprise support functions	https://www.soapbox.ai/
Sales Bots	https://octaneai.com/
AI-Powered Transcription	http://capiro.ai/index.html
Hiring	https://hiringsolved.com/product
Programming	https://www.codota.com/enterprise https://kite.com/



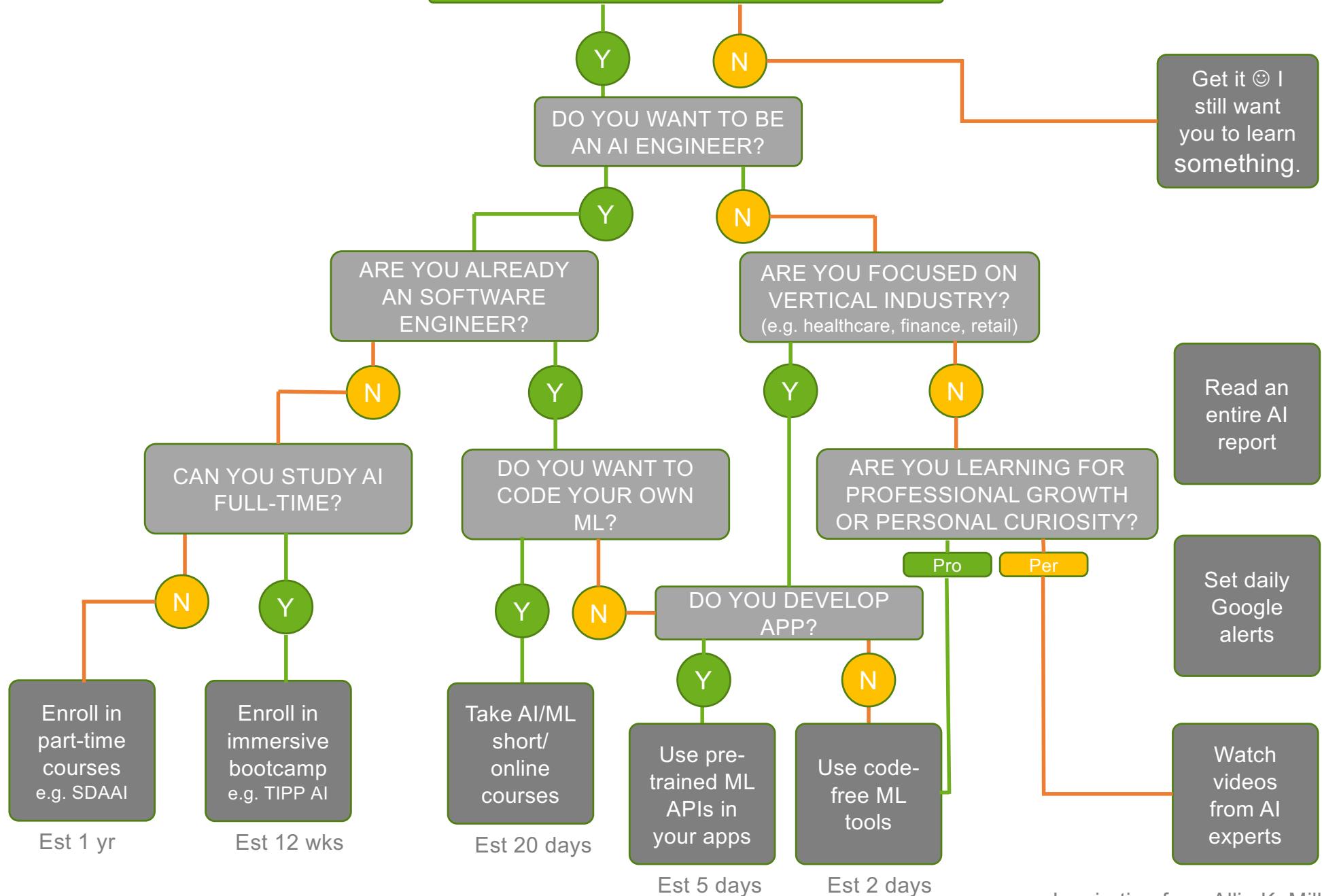
Quiz 3



SCAN ME



DO YOU WANT TO LEARN AI?



Inspiration from Allie K. Miller



Where to go from here?

MOOC:
DataCamp
<https://www.datacamp.com/>

The screenshot shows the DataCamp website with a search bar for "python". Below it, a banner says "Subscribe now. Save 50% on DataCamp and skill up. Offer ends in 04 days 04 hrs 56 mins 51 secs". The main heading is "57 results for \"python\"". Below are six course cards:

- Intro to Python for Data Science**: Master the basics of data analysis in Python. Expands your skill set by learning scientific computing with numpy. 4 hours. Instructor: FILIP SCHOUVENAARS.
- Intermediate Python for Data Science**: Level up your data science skills by creating visualizations using matplotlibs and manipulating data frames with Pandas. 4 hours. Instructor: FILIP SCHOUVENAARS.
- Python Data Science Toolbox (Part 1)**: Learn the art of writing your own functions in Python as well as key concepts like looping and error handling. 3 hours. Instructor: HUGO BOWNE-ANDERSON.
- Deep Learning in Python**: Learn the fundamentals of neural networks and how to build deep learning models using Keras 2.0. 4 hours. Instructor: FILIP SCHOUVENAARS.
- Supervised Learning with scikit-learn**: Learn how to build and tune predictive models and evaluate how well they will perform on unseen data. 4 hours.
- pandas Foundations**: Learn how to use the industry-standard pandas library to import, build, and manipulate DataFrames. 4 hours.

Edx
<https://www.edx.org/>

Udemy (freemium course)
<https://t.me/freecourse>

RP/SOI AI4E Telegram Channel
<http://bit.ly/2FFWsPI>

The screenshot shows the edX homepage. At the top, there's a banner with a woman using a tablet and the text "Accelerate your future. Learn anytime, anywhere." Below it is a search bar and a "Find courses" button. A "What do you want to learn?" section follows. At the bottom, there's a "THE COUNTDOWN IS ON! Get 15% off your purchase." section with a "Start Exploring" button and a large "CYBER MONDAY" graphic. Logos for MIT, Harvard, Berkeley, and other partner universities are at the very bottom.



\$5000 ELP SIGN-ON INCENTIVE

REPUBLIC POLYTECHNIC SINGAPORE TRANSITION ACADEMY

Specialist Diploma in APPLIED ARTIFICIAL INTELLIGENCE

ARTIFICIAL Intelligence (AI) is a frontier technology that has been identified in Singapore's Industry Transformation Map (ITM) as an enabler of growth and jobs in Singapore. To achieve this objective, manpower skilled with AI knowledge and abilities is required to contribute and develop the AI ecosystem in Singapore.

The Specialist Diploma in Applied Artificial Intelligence (SDAAI) at Republic Polytechnic will equip participants with the requisite concepts and theories that underpin AI and to develop in participants, the fundamental practical skills and knowledge for developing AI solutions. Participants will undertake practical hands-on case studies and projects in clearly identified areas in which AI is applied today, namely the application of recommender systems, virtual assistants and pattern recognition and anomaly detection.

REGISTER NOW
<http://bit.ly/2IArFXw>

COMMENCEMENT DATE:
OCT 2018

SkillsFuture Earn and Learn Programme (ELP) information:
<http://bit.ly/2IArFXw>

SOI
SINGAPORE
For more info:
Email: ACE-help@rp.edu.sg
Tel: 6510 3000

Specialist Diploma in Applied Artificial Intelligence

Total Hours = 270 hours

Time to Complete = 12 months

PDC in Fundamentals of Artificial Intelligence (120 hours)	PDC in Applications of Artificial Intelligence (150 hours)
Math for Machine Learning (30 hours)	Pattern Recognition and Anomaly Detection (30 hours)
Introduction to Programming (30 hours)	Recommender Systems (30 hours)
Introduction to Data Management for Machine Learning (30 hours)	Virtual Assistants (30 hours)
Machine Learning Fundamentals (30 hours)	Capstone Project* (60 hours)



REPUBLIC POLYTECHNIC **Academy for Continuing Education**

Tech Immersion and Placement Programme in

Applied Artificial Intelligence

In Collaboration With

AI SINGAPORE Microsoft

Programme Overview



THIS programme is designed to equip participants with practical, industry-relevant skills and knowledge to undertake the role of an AI Application Developer or System Integrator or as an AI or Machine Learning Engineer.

It is structured as a 3-month / 12-week programme where participants complete 10 modules. The first 9 modules will be conducted during an 8-week facilitation and e-learning training phase before leading up to the final 4-week Industry Capstone Project.

Participants who successfully complete the programme will be awarded a Professional Certificate of Completion in Applied Artificial Intelligence from Republic Polytechnic (in collaboration with AI Singapore and Microsoft).

Programme Structure

- 8 WEEKS TRAINING:**
- 1 Foundations to Artificial Intelligence
 - 2 Python for Data Science
 - 3 Mathematics for Machine Learning
 - 4 Ethics and Law in Data and Analytics
 - 5 Research Methods for Data Science
 - 6 Machine Learning Fundamentals
 - 7 Deep Learning Fundamentals
 - 8 Reinforcement Learning Fundamentals
 - 9 Applied AI Solutions Development

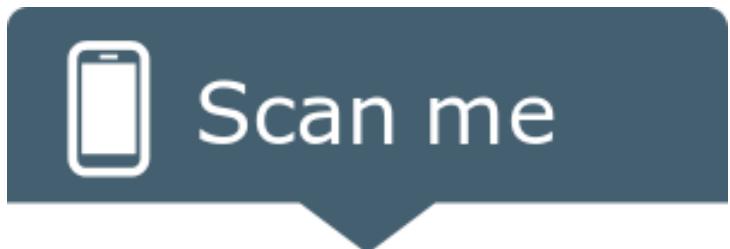
- 4 WEEKS PROJECT:**
- 10 Applied AI Industry Capstone Project

Key Features

- Collaborative programme between Republic Polytechnic, AI Singapore and Microsoft Singapore
- Industry-relevant programme outcomes based on the Skills Framework for Infocomm Technology (ICT) professionals for AI
- Practical and innovative pedagogy that infuses classroom learning with real-world applications
- Real-world and industry-sourced Capstone Projects
- Guest talks and seminars from industry experts and practitioners
- Bundled Microsoft's Professional Program in Artificial Intelligence certification vouchers
- Jobs placement opportunities and facilitation upon completion of programme
- Subsidy support under IMDA's Tech Immersion and Placement Programme (TIPP)



Lifelong Learning



- <https://www.rp.edu.sg/soi/lifelong-learning>

Short Courses



SOI offers an extensive variety of short, industry-relevant courses for ICT skills upgrading and skills acquisition. Our courses are categorized under different areas, ranging from Artificial Intelligence (AI), Business Intelligence/Business Analytics (BI/BA), Business Processes (BP), Unmanned Aerial Vehicle (UAV), IT Security, New/Digital Media, Software Development to the Internet of Things (IoT). To view our short course offerings, click on the relevant tab below.



- + Artificial Intelligence for Everyone - A Practical Experience (1 day Beginner)
- + Artificial Intelligence for Techies - A Hands-On Approach (1 day Beginner)
- + An Introduction to Code-Free Machine Learning (1 day Beginner)



**Applied Artificial
Intelligence with
Python
(2 days)**



**Intro Code-Free
Machine Learning
(1 day)**



**AI for Everyone –
A Practical
Experience
(1 day)**



**Mining Data for
Insights @ Work
(2 days)**



**Fundamentals of
Data Visualisation
(2 days)**



**Deep Learning
with Python
(2 days)**





**Developing
your first
Chatbot
(1 day)**



**AI-based Recommender
Systems using Python
and TensorFlow
(3 days)**



**Data Science
with Python
(2 days)**



**AWS Academy
Cloud
Foundations
(3 days)**



**An Introduction to
DevOps
(2 days)**

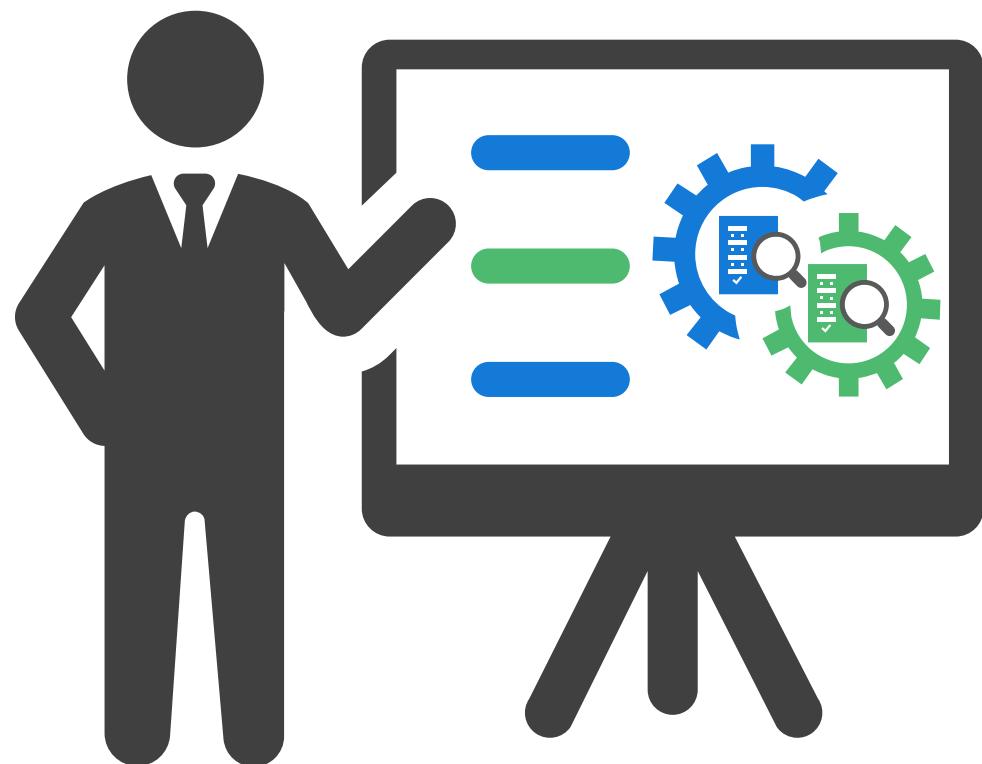


**Computer Vision
with Deep
Learning (4 days)**





Summary



Email
seow_khee_wei@rp.edu.sg

Telegram
[@kwseow](https://t.me/kwseow)

Source code:

131



Thank you