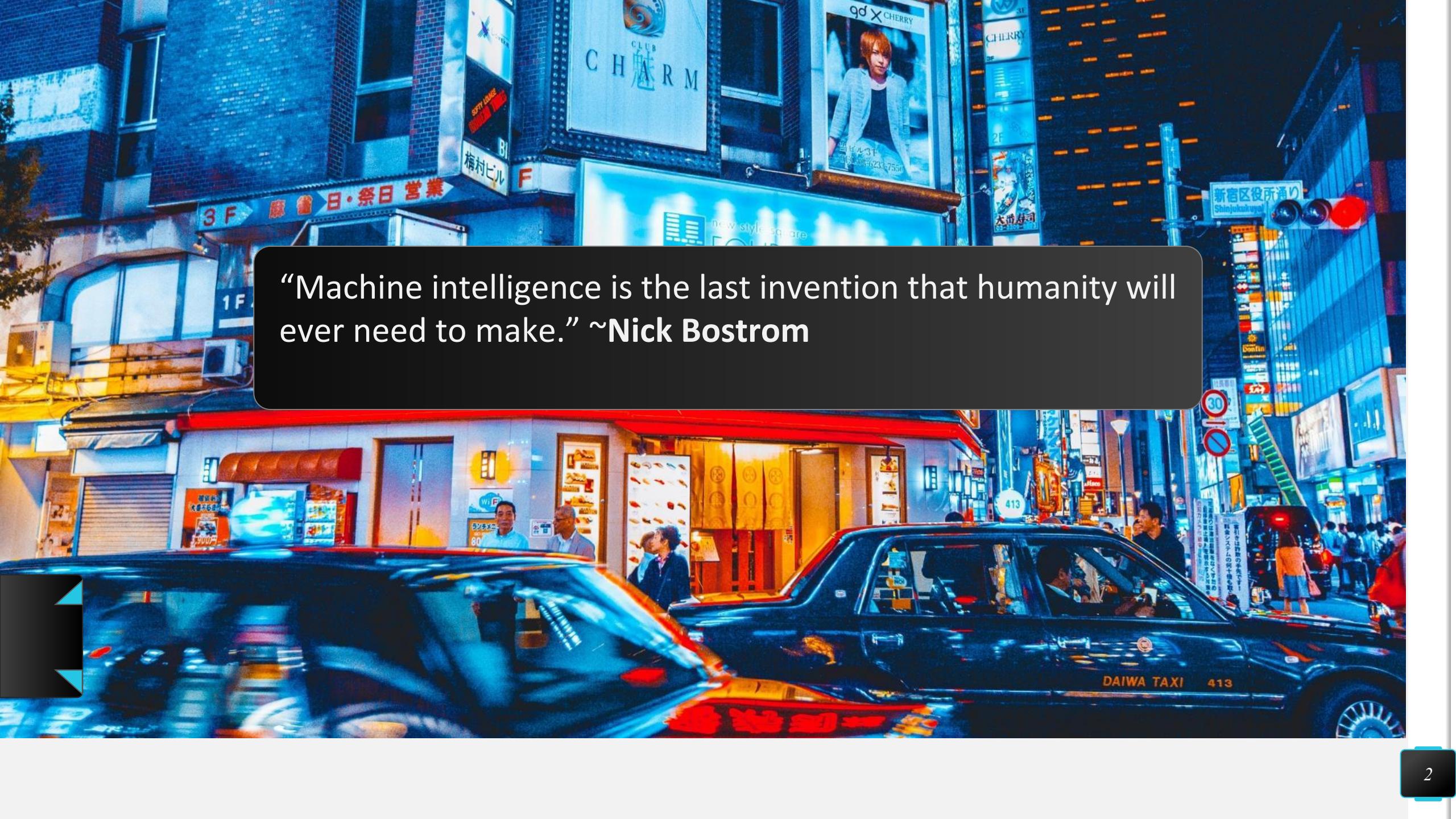


Artificial Intelligence and Machine Learning

An Industry overview: Jayanth Rasamsetti





“Machine intelligence is the last invention that humanity will ever need to make.” ~**Nick Bostrom**

Books

FROM THE BESTSELLING AUTHOR OF *SAPIENS*

Yuval Noah
Harari



Homo Deus

A Brief History
of Tomorrow

CALUM CHACE

SURVIVING AI

The promise and perils
of artificial intelligence



NICK BOSTROM

SUPERINTELLIGENCE

Paths, Dangers, Strategies





Agenda
Introduction
Market
Understanding genesis of AI
Deeplearning
Computer vision
NLP
Machine Learning

About Me

- Co-founder & Chief AI Scientist, Sigmoid, Inc
- Deep Learning + Health Sciences Startup
- Over a decade of overall experience
- Lead a team of 10 Data Scientists
- Deployed scalable in Machine learning covering Deep Learning, Computer Vision, Natural Language Processing
- Trained hundreds on Machine learning
- Collaborating with several AI companies worldwide on new implementations
- American Express, KPMG
- Columbia University (MS)
- IIT - Madras (B.Tech & M.Tech)



Demographics

Note : 58% of the batch has no coding/programming experience.

Experience Cohort for Batch: PGP AIML FEB 20 batch					
Total working Exp. (In Yrs)	#Count of Candidates	% of batch	Total 'Programming' Exp. range (In Yrs)	#Count of Candidates	% of batch
15+	11	35%	15+	5	16%
10-14	7	23%	10-14	2	6%
6-9	7	23%	6-9	3	10%
3-5	1	3%	3-5	3	10%
0-2	5	16%	0-2	18	58%



Artificial Intelligence

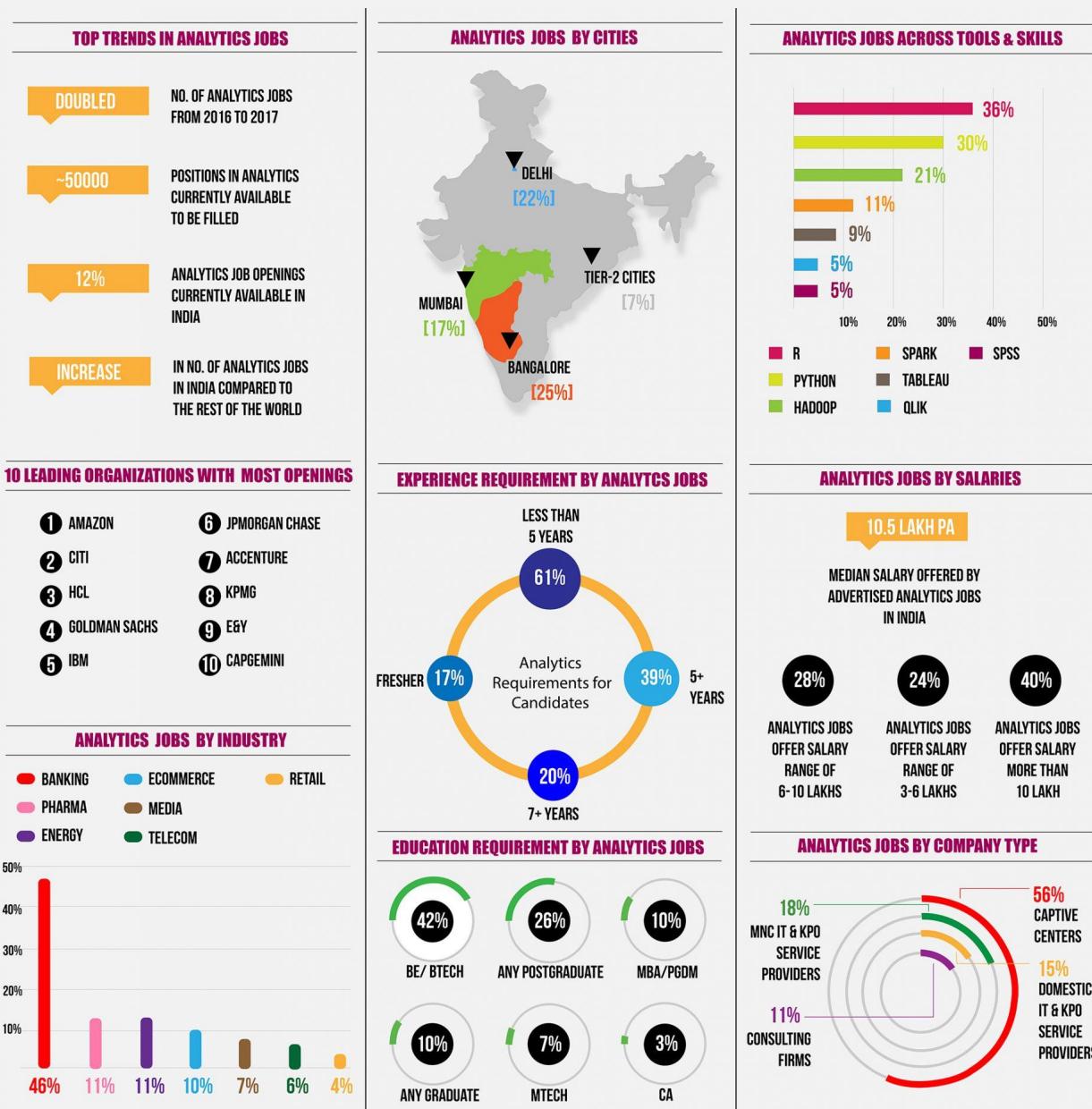
Why are we here?

Why learn AI?



Job Statistics

In India



ANALYTICS & DATA SCIENCE JOBS STUDY- 2017

Data is the new oil!



What exactly does that mean?

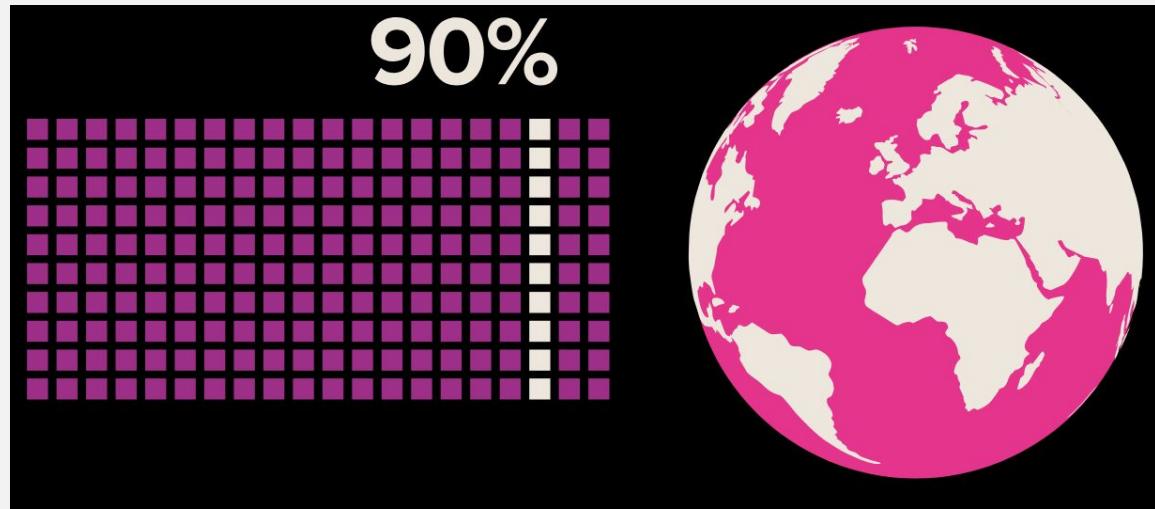
'AI IS THE NEW ELECTRICITY'



"Just as electricity transformed almost everything 100 years ago, today I actually have a hard time thinking of an industry that I don't think AI will transform in the next several years."

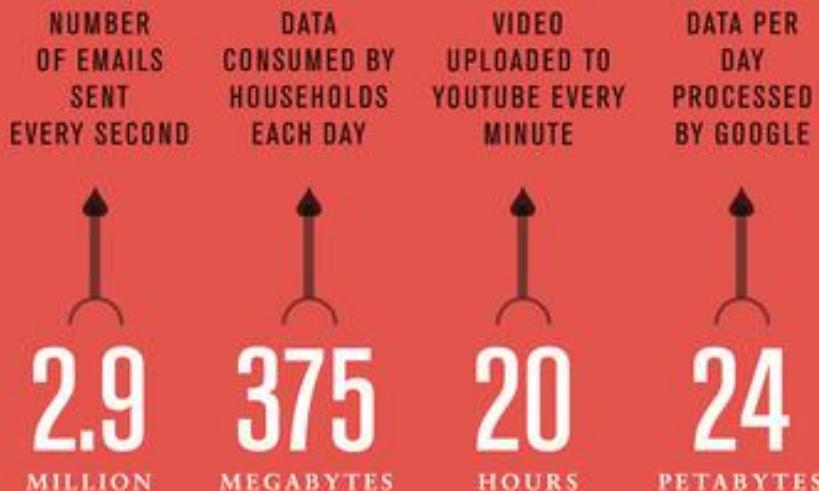
Andrew Ng

Former chief scientist at Baidu, Co-founder at Coursera



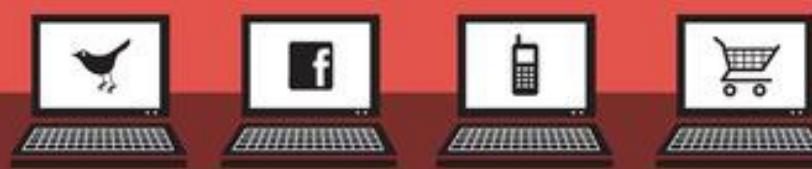
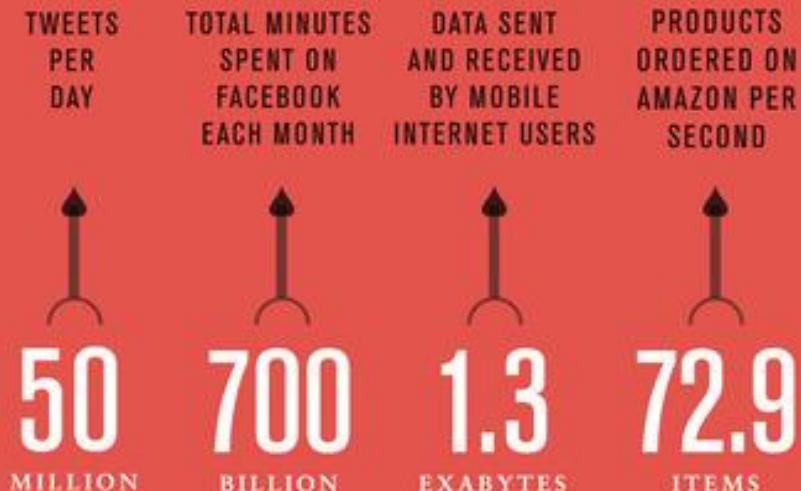
90% of data in
the world

<https://www.youtube.com/watch?v=R2mC-NUAmMk>



Data

THE WORLD OF DATA



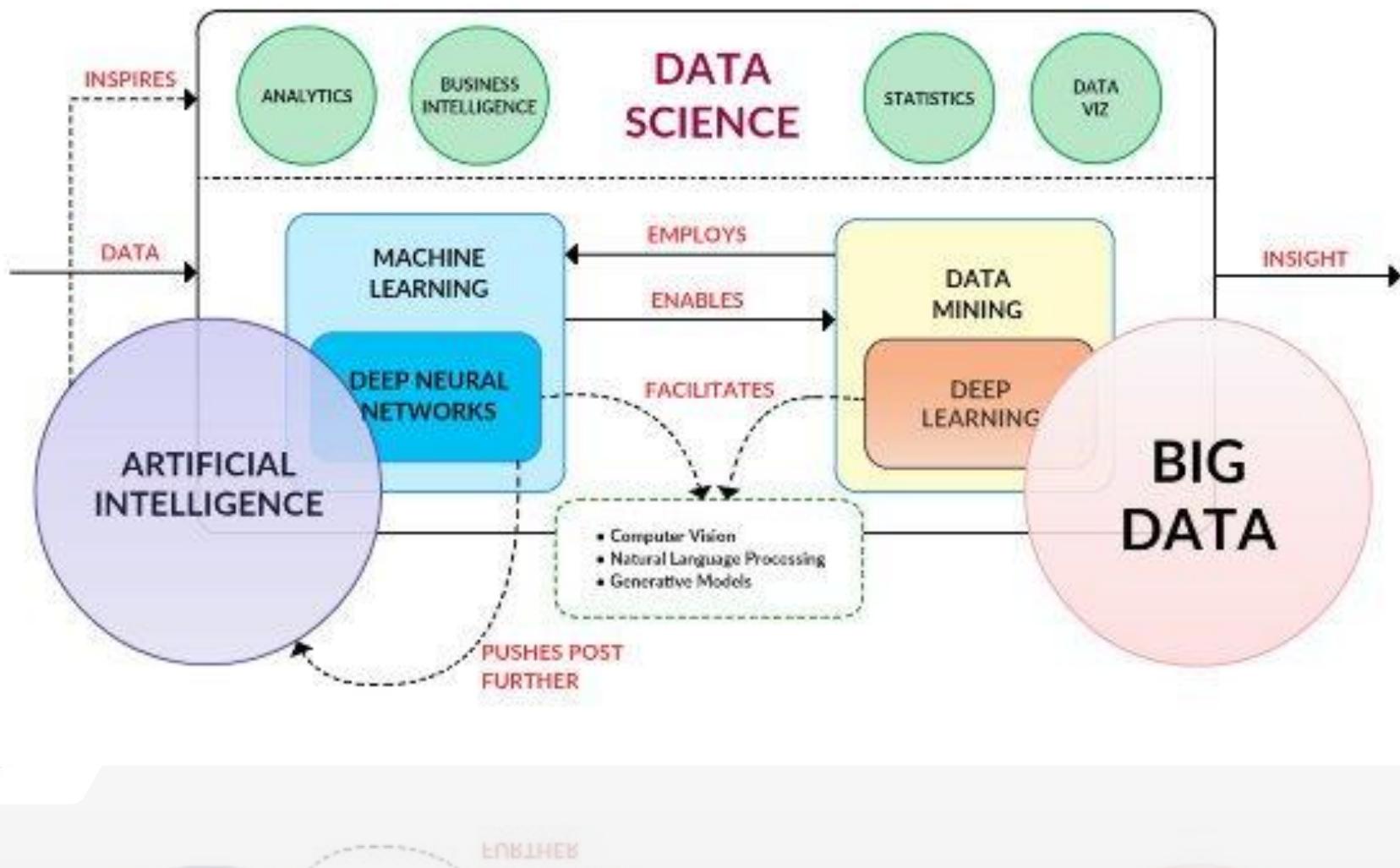
SOURCES: Cisco; comScore; MapRadius; Radicati Group; Twitter; YouTube

IN THE 21ST CENTURY, we live a large part of our lives online. Almost everything we do is reduced to bits and sent through cables around the world at light speed. But just how much data are we generating? This is a look at just some of the massive amounts of information that human beings create every single day.

How will my resume be different?



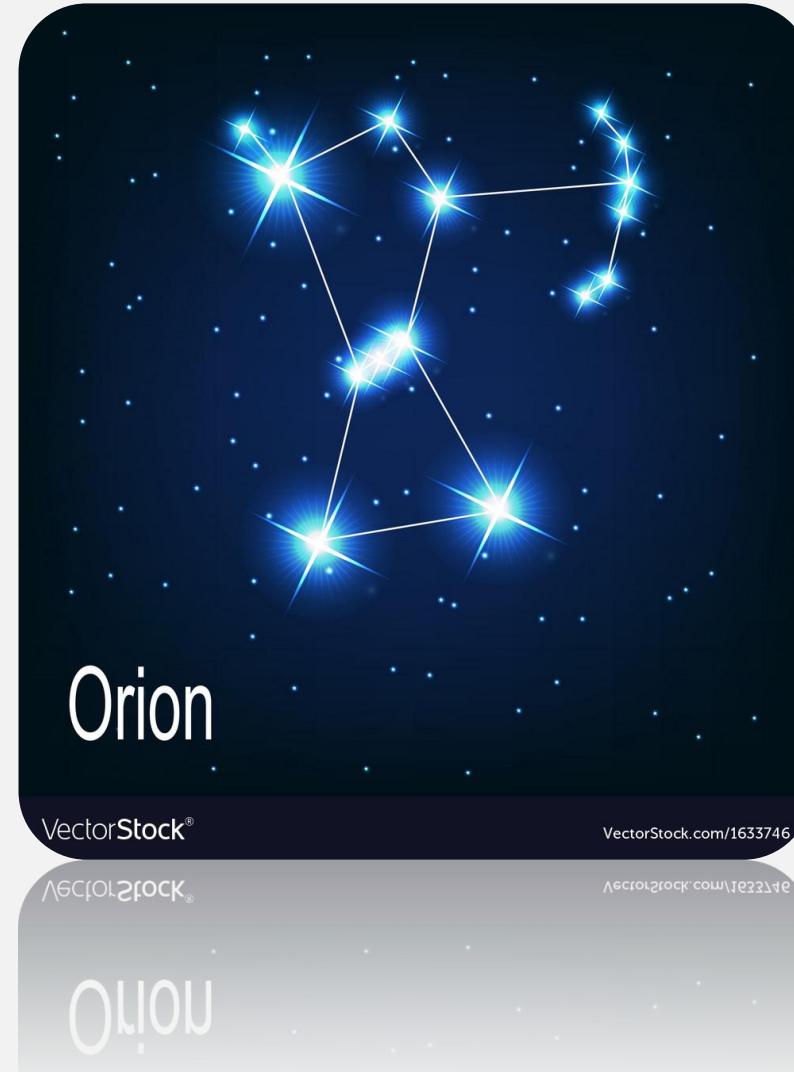
So what is Data science , machine learning and AI?



Humans vs Animals



What is AI?



Pattern Matching.

The stars allowed farmers to plan ahead and form agriculture, and **constellations** made it easier to recognize and interpret the patterns in the sky. The **constellations** also helped with navigation

The Gamut of AI

Understanding Career options and
the kind of problems Industries
solve.

Where do I go?

DataScience is too huge to learn it all. Choose where you belong.

DataScience

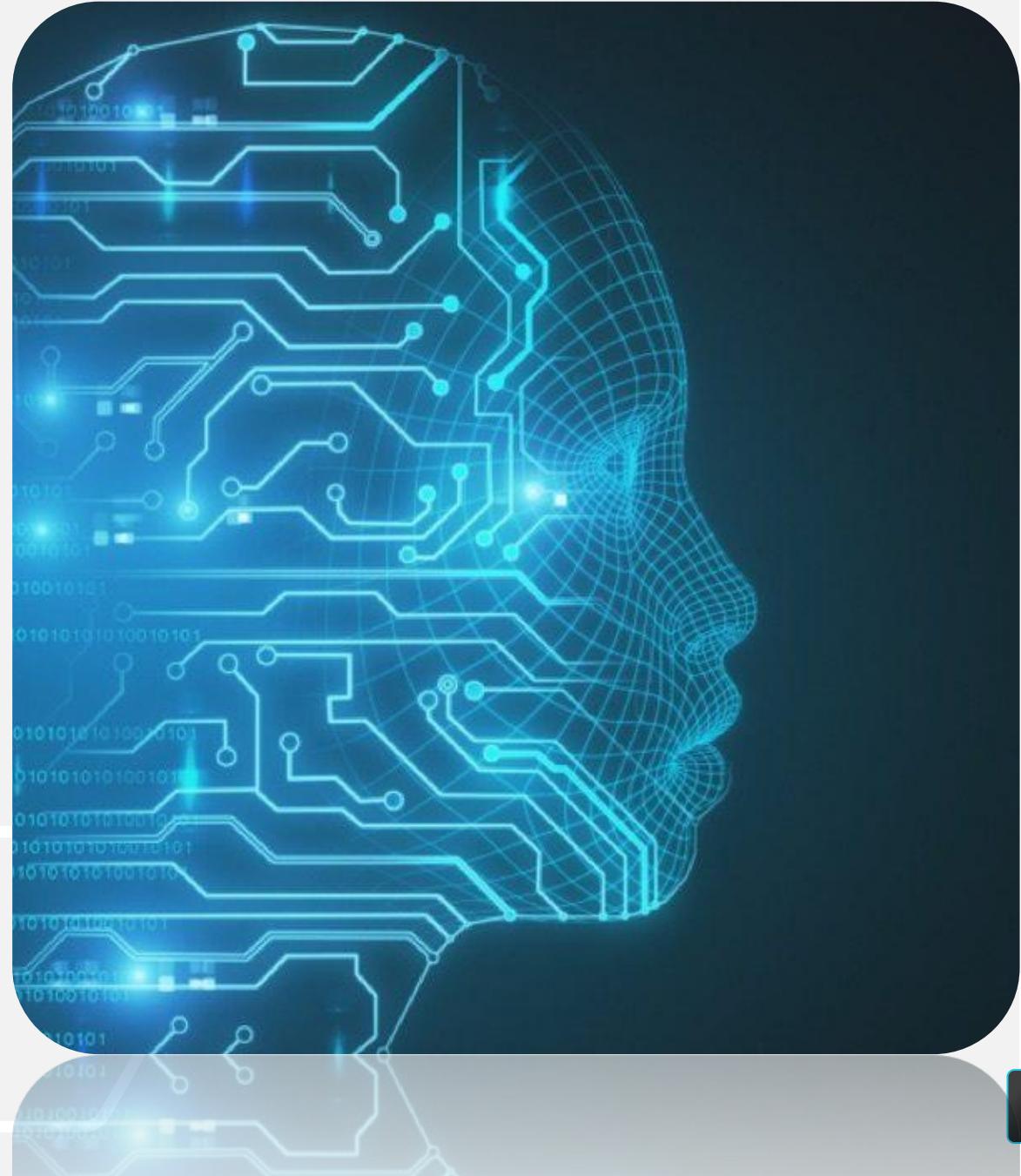
Machine learning

Deep
learning

NLP

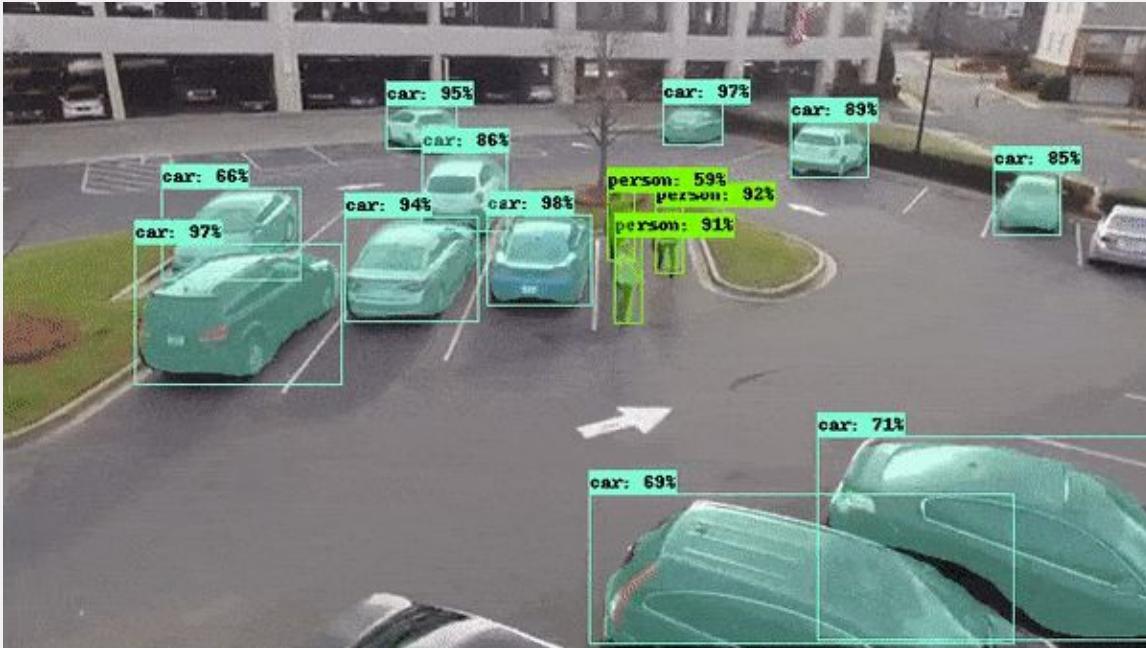
Data
Analytics

Computer
Vision



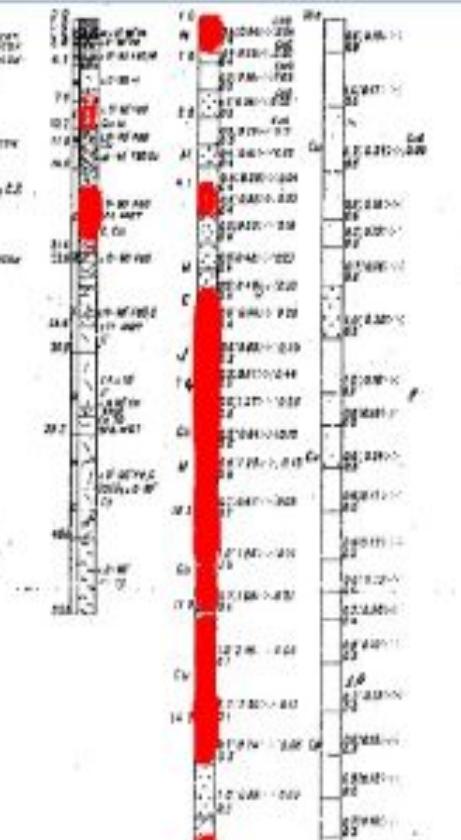
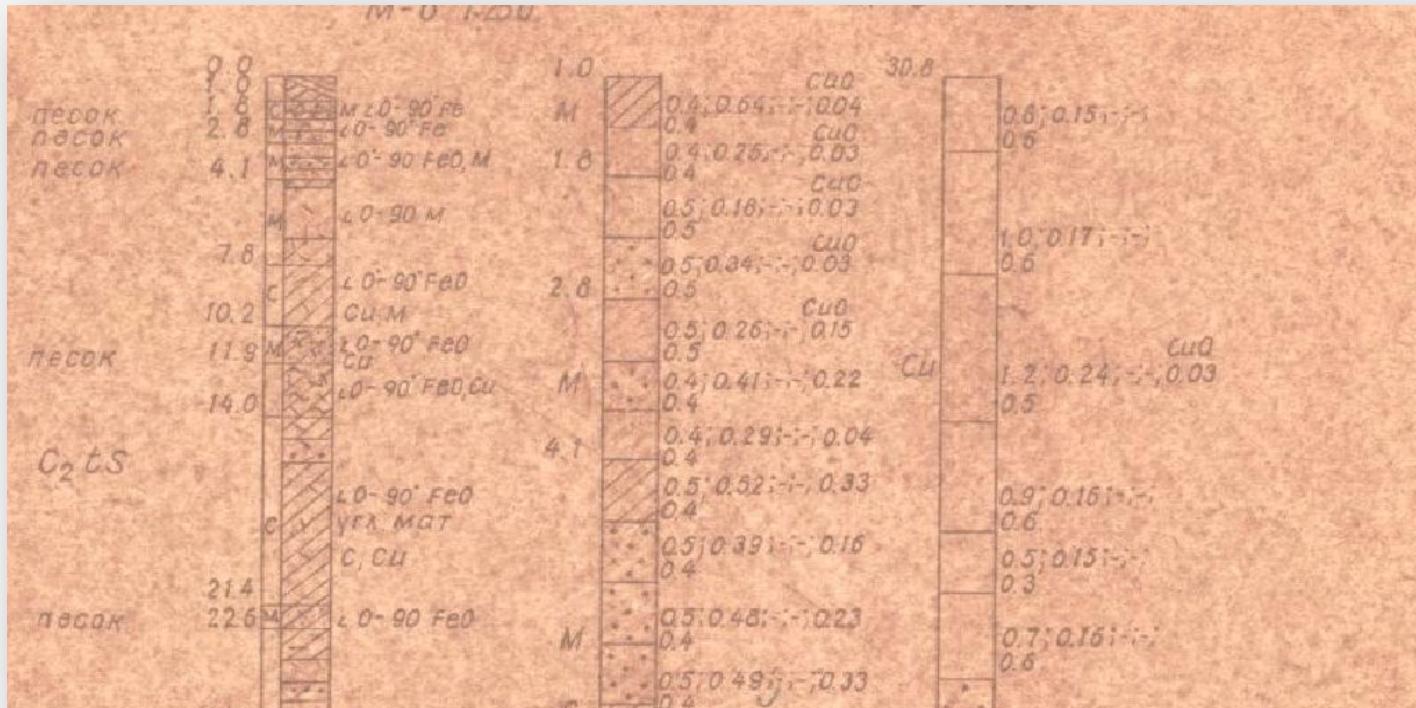
Computer Vision

Computer vision is an interdisciplinary scientific field that deals with how **computers** can be made to gain high-level understanding from digital images or videos.



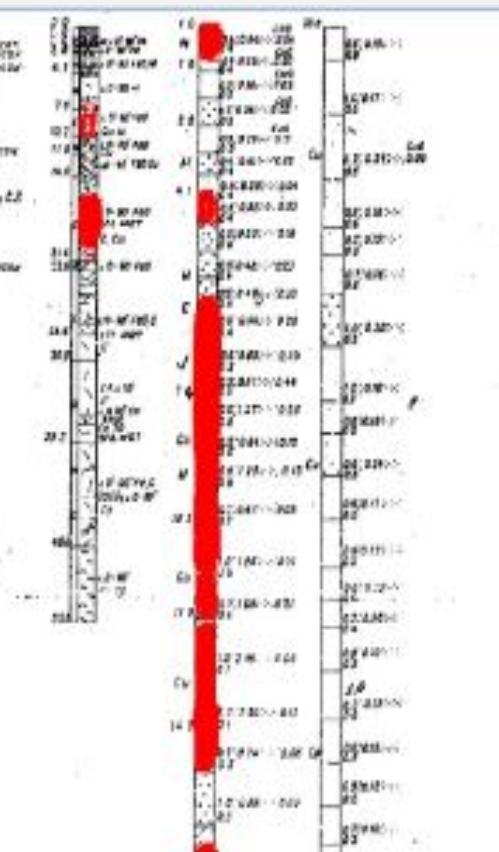
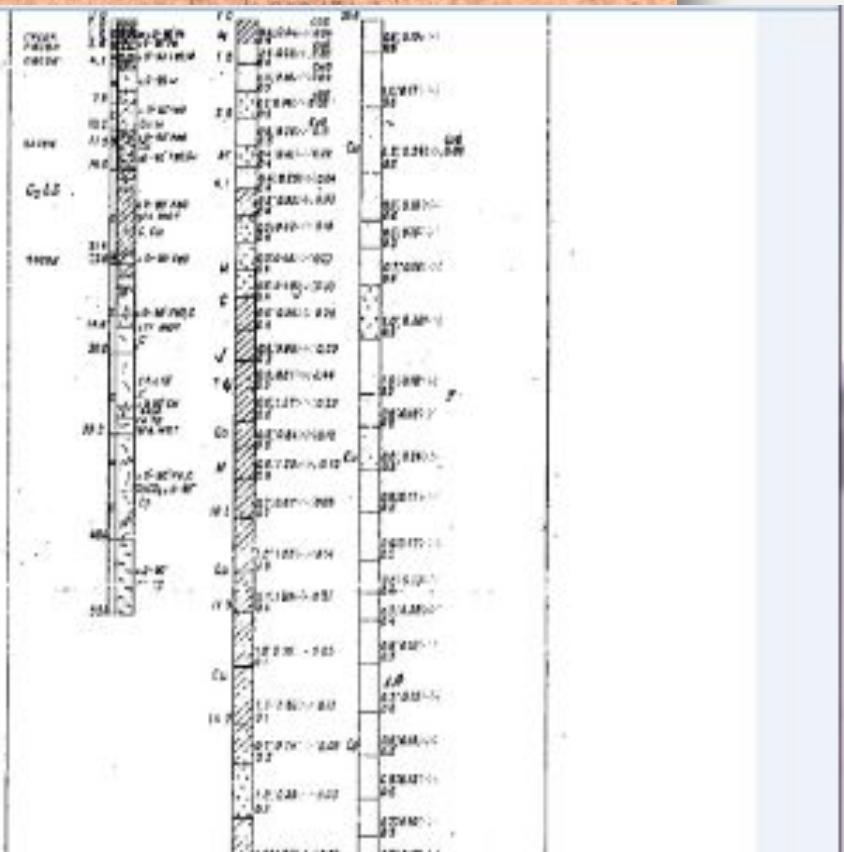
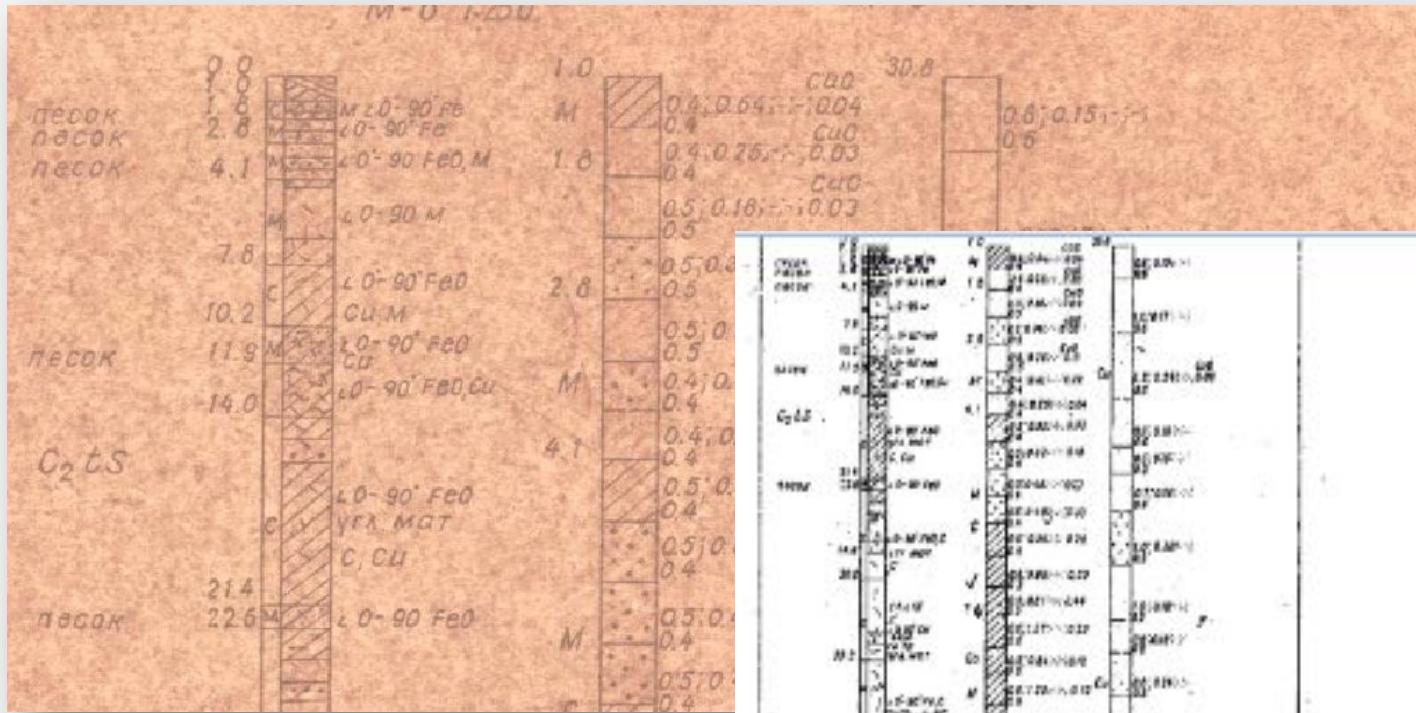
Detecting Minerals in a Drawing

Using OpenCV for image processing



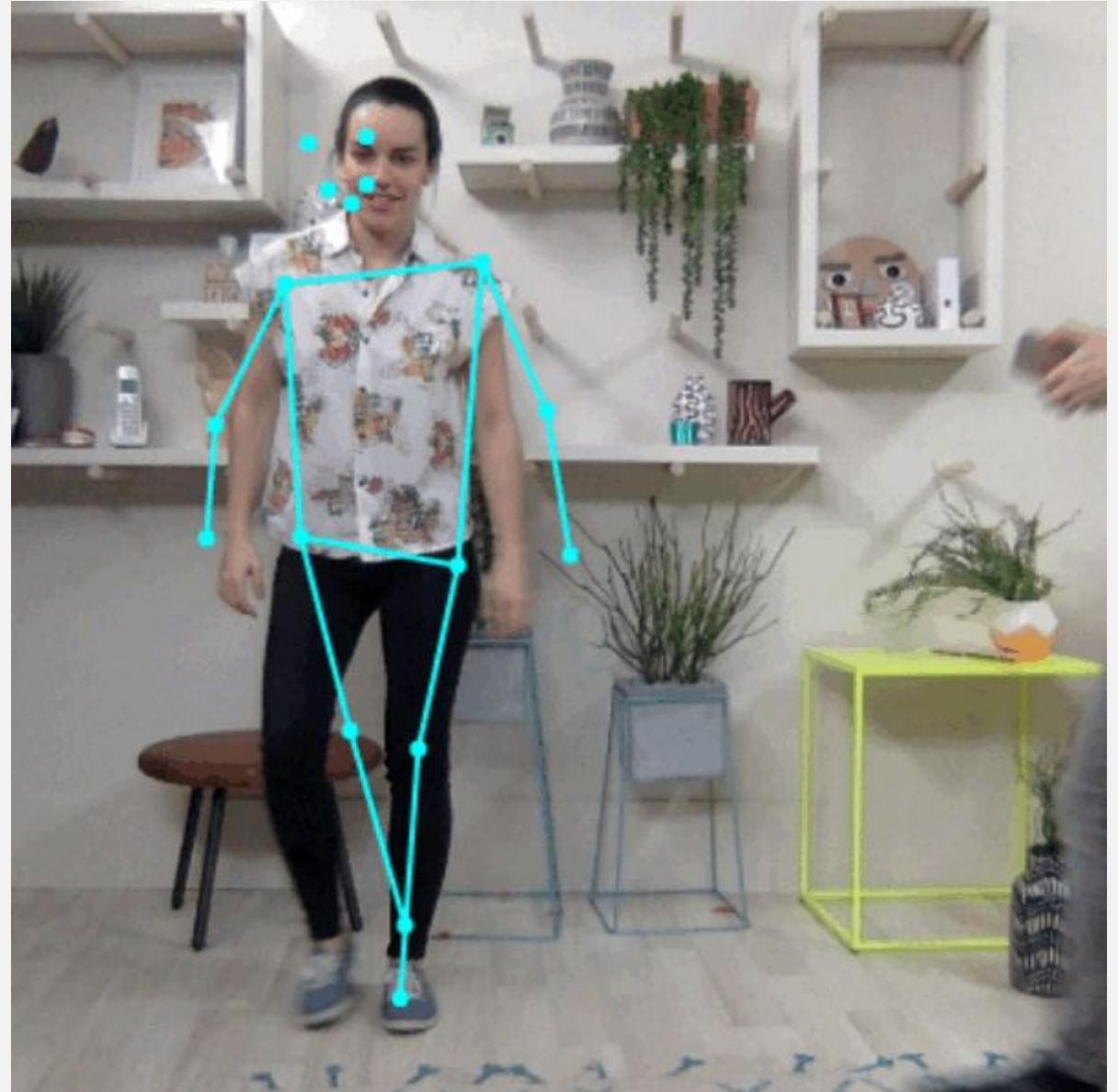
Detecting Minerals in a Drawing

Using OpenCV for image processing



Tracking the Human movement

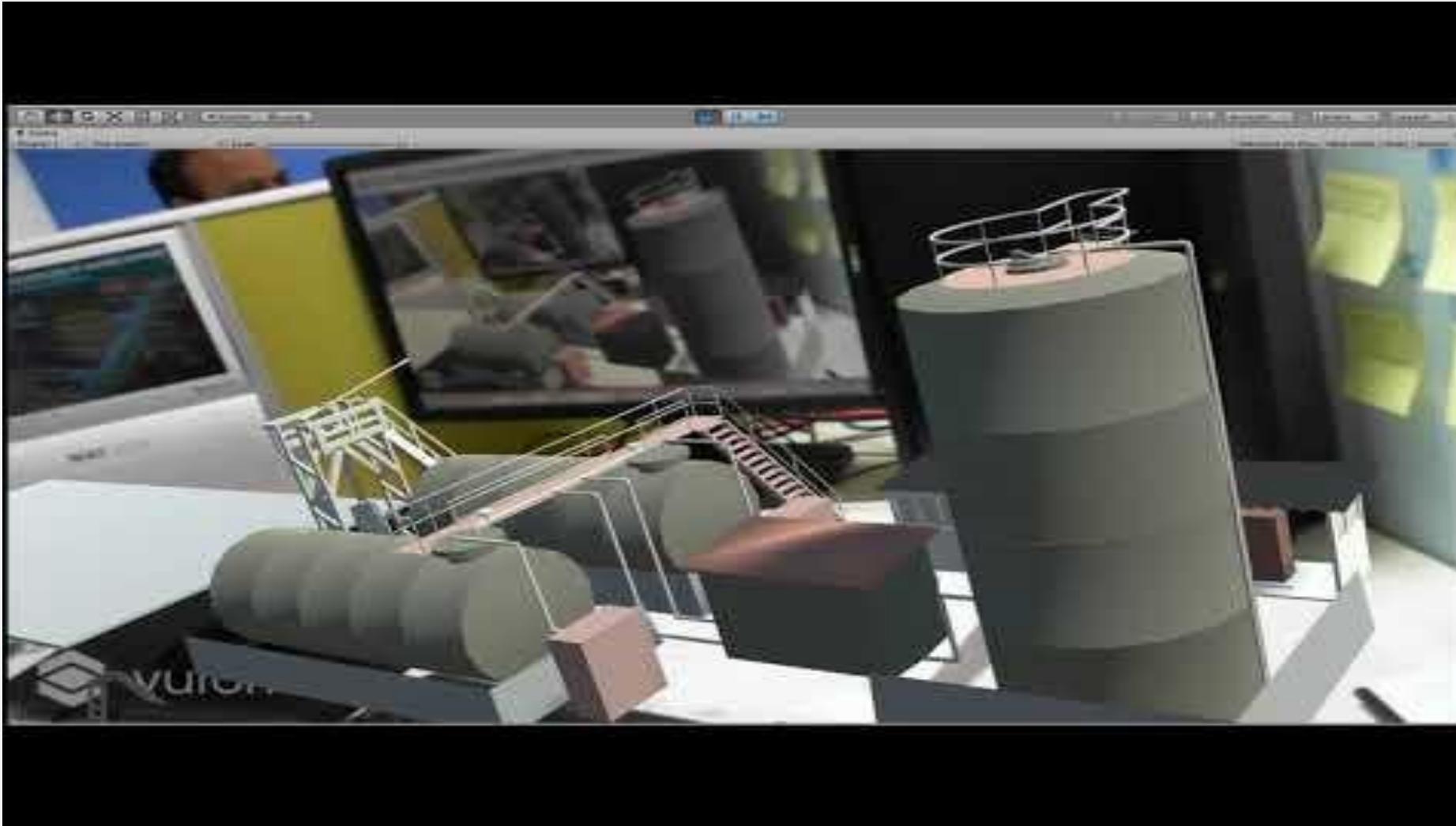
Using TensorFlow Pose Estimation for tracking people



<https://storage.googleapis.com/tfjs-models/demos/posenet/camera.html>

Using Computer Vision with Augmented Reality

Using Computer vision methods to recognize components in a paper drawing for augmented reality

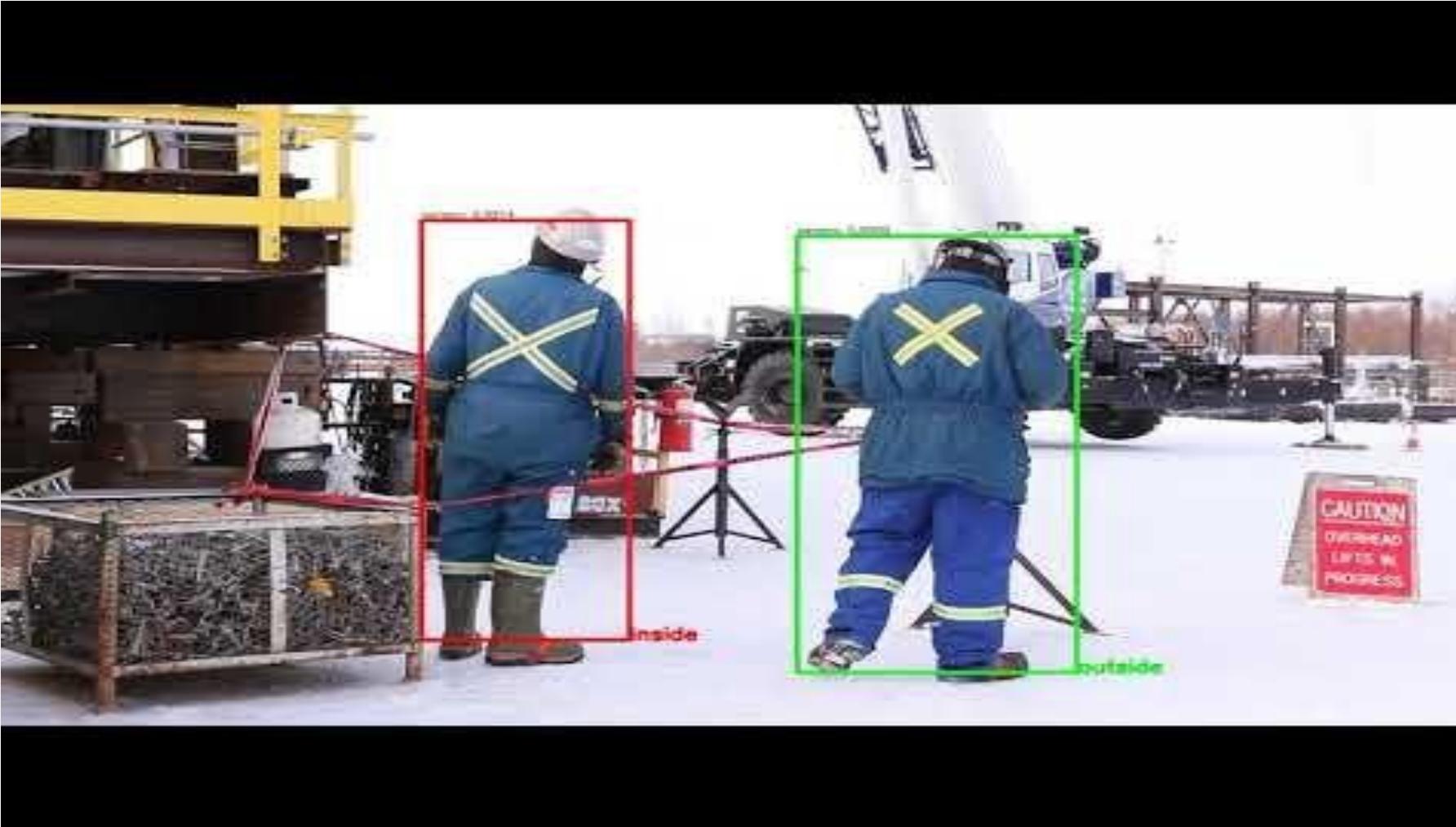


Deep learning

Deep learning is part of a broader family of **machine learning** methods based on artificial neural networks

Deep learning for video analytics

Processing video footage using deeplearning to take actions



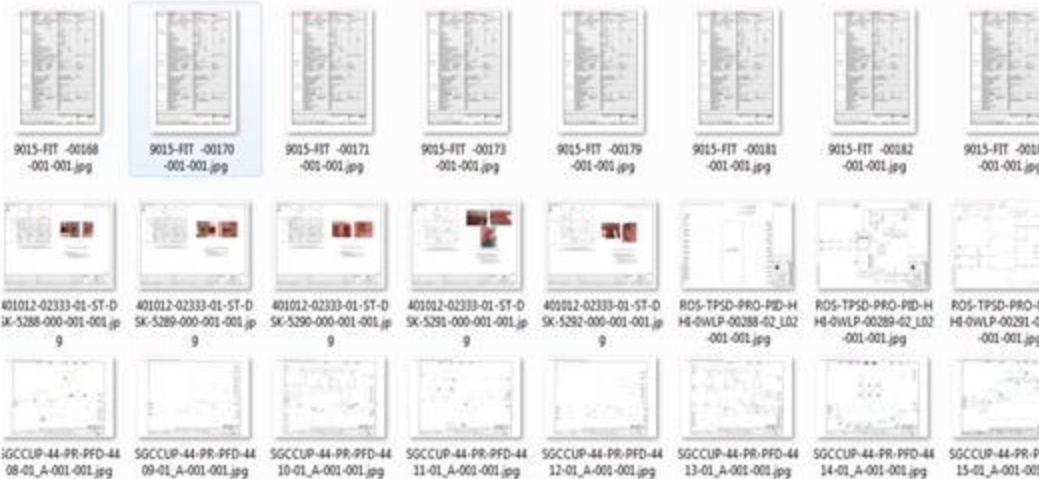
Deep learning - NVIDIA examples



<https://www.youtube.com/watch?v=GiZ7kyrwZGQ>



Automate Document Classification



Name	Date modified	Type	Size
DSK	11/1/2017 4:39 PM	File folder	
Instrument Index	10/30/2017 2:36 PM	File folder	
P&ID	10/30/2017 2:36 PM	File folder	
Processflowdiagram	10/30/2017 2:36 PM	File folder	

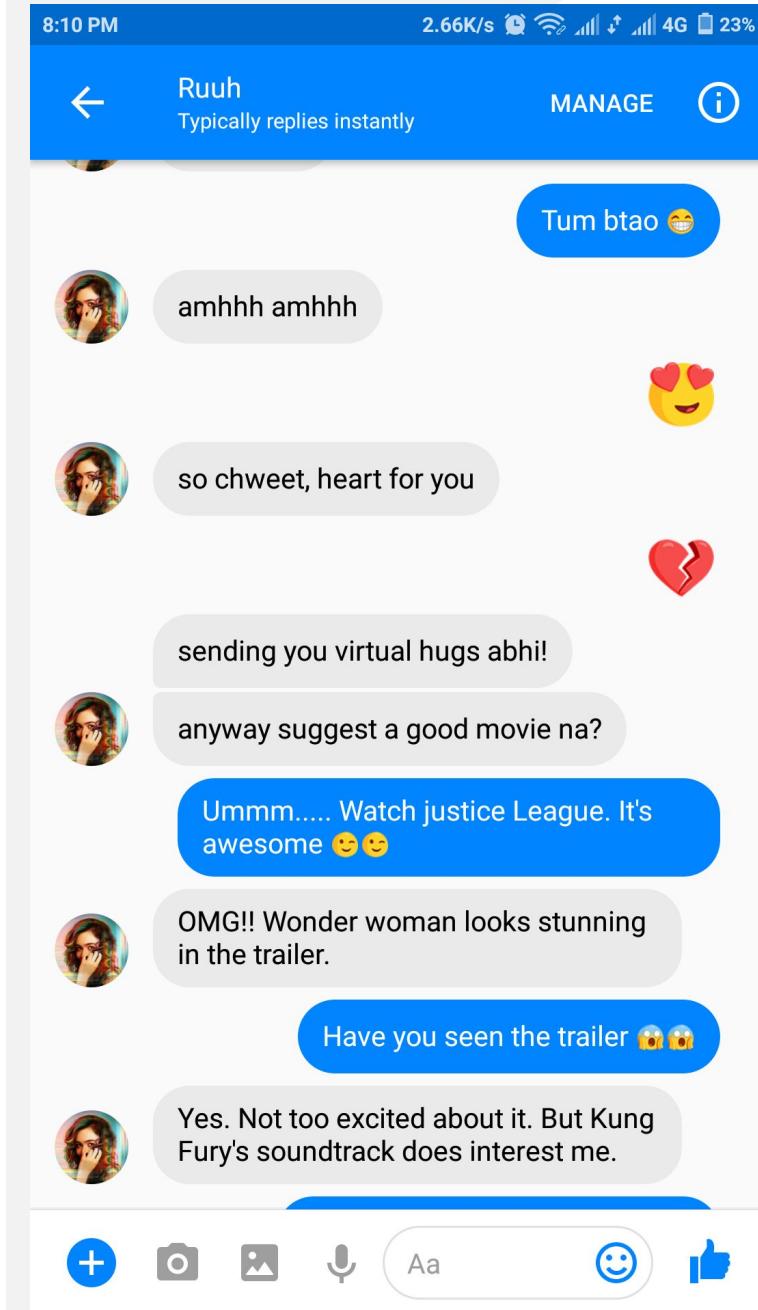
Natural Language Processing

Natural language processing is a subfield of computer science, information engineering, and artificial intelligence concerned with the interactions between computers and human languages

Who is Ruuh?

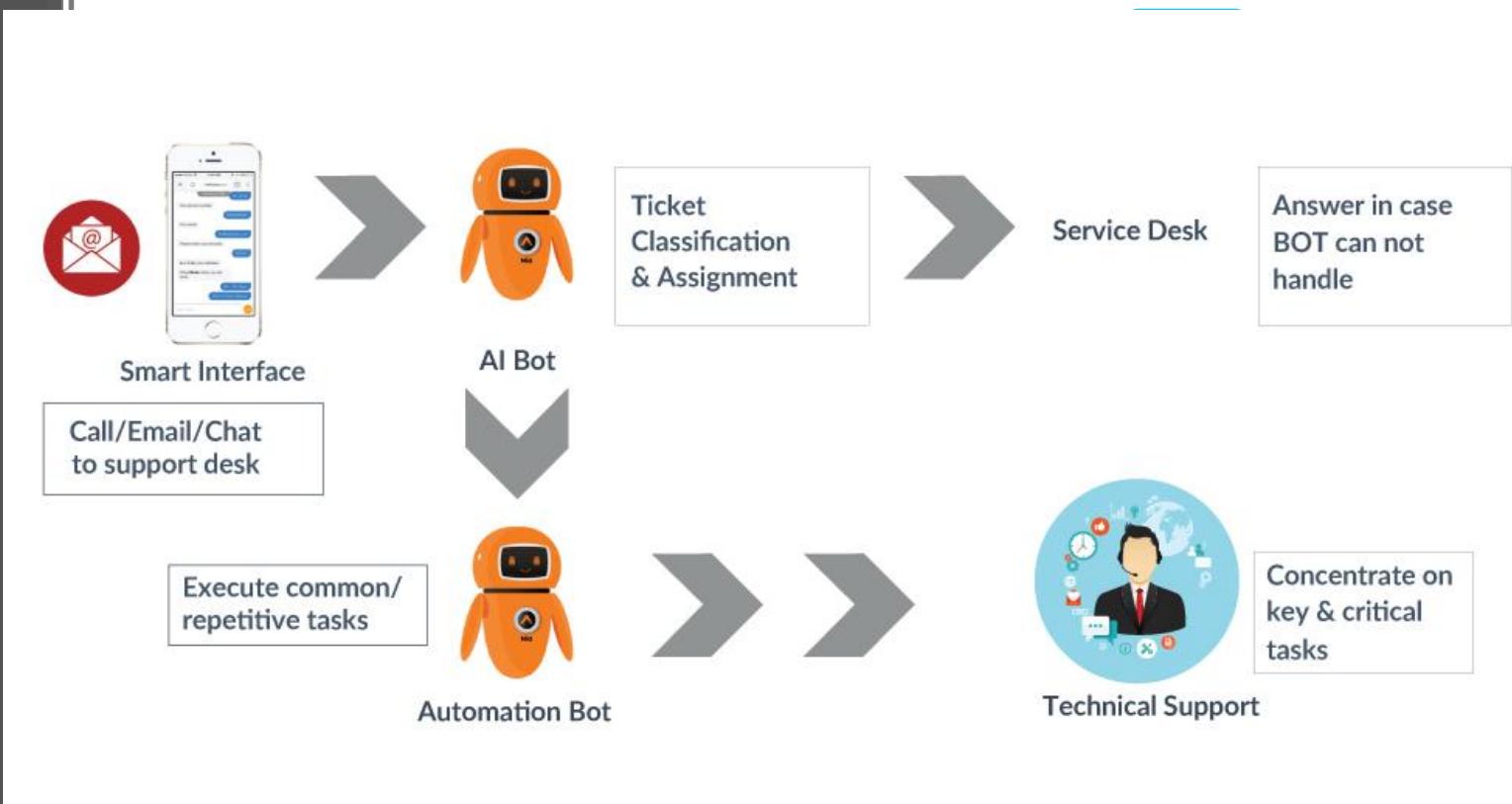
Microsoft created AI Chatbot





NLP for Service Desk Automation

Using Natural language to allocate ticket que



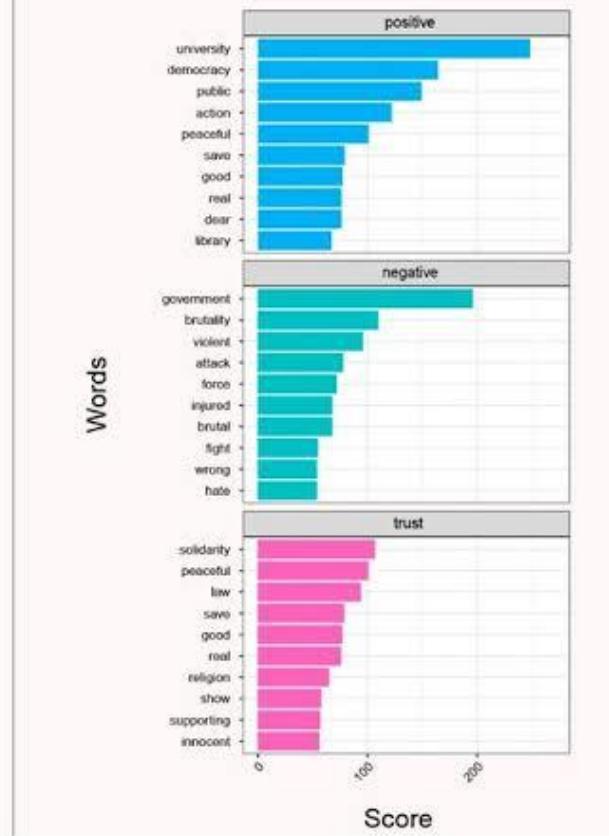
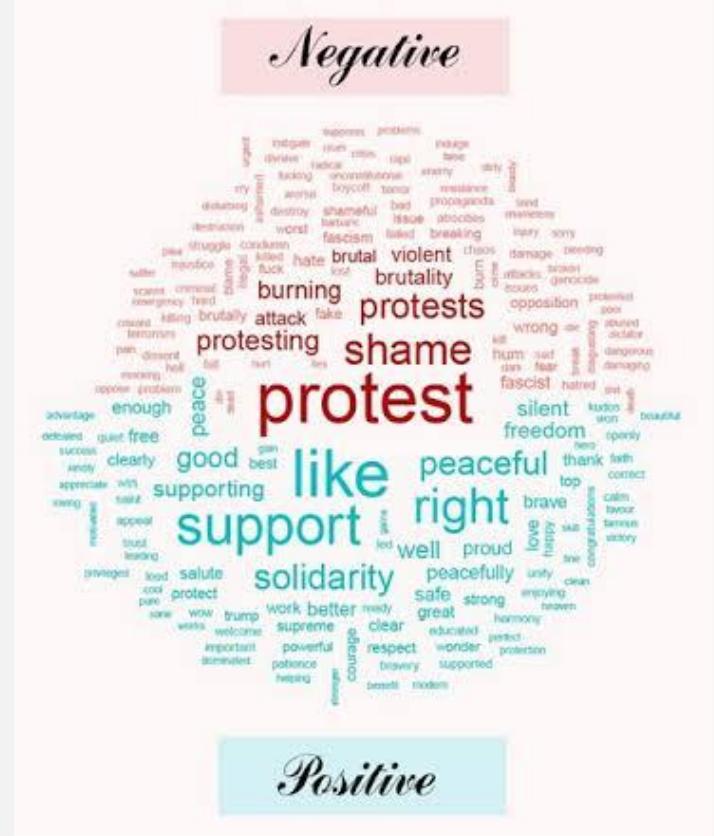
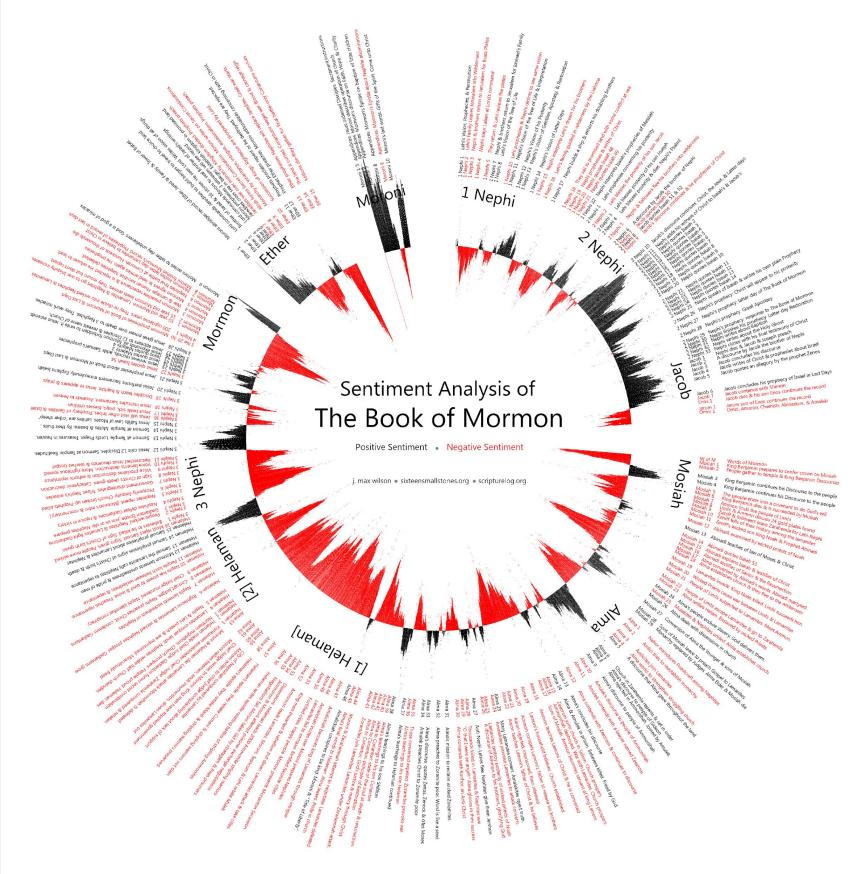
Machine Learning

Traditional Machine learning opportunities using Linear regressions, classification problems

Predicting the Wind direction for turbines

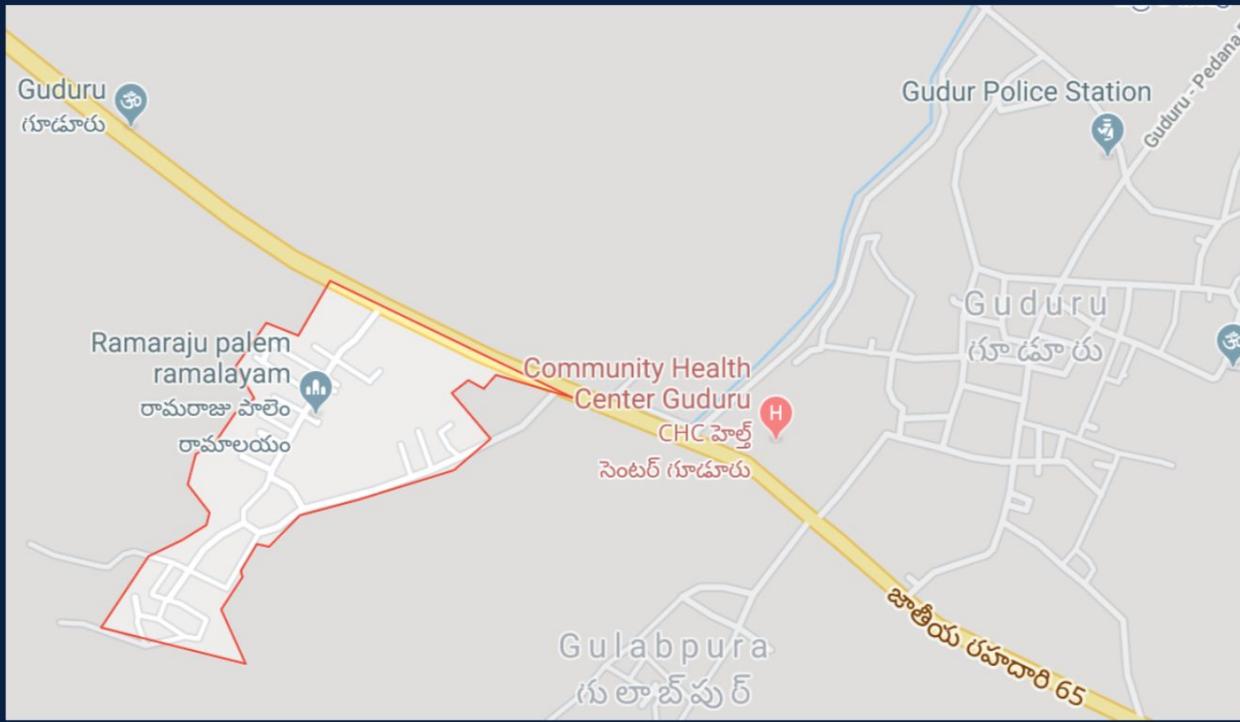
Applying XGBoost to predict the direction

Sentiment Analysis of email data



This Photo by Unknown Author is licensed under [CC BY-NC](#)

Tale of 2 villages over 30 years



Gudur:

2 IAS officers, several doctors,
several engineers, HNI NRIs

Chitti Gudur:
1 engineer

Agenda

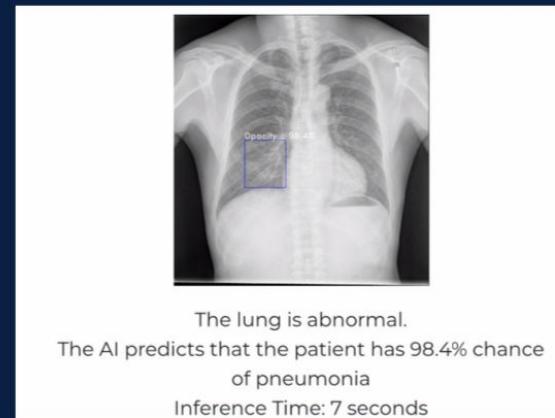
Eye related morbidities (e.g. blindness) are the largest cause of work unproductivity (over 70%) in about 40 cr people.

A lot in hinged on the screening camps (Vision Technician) in these settings



Classification of Medical Data

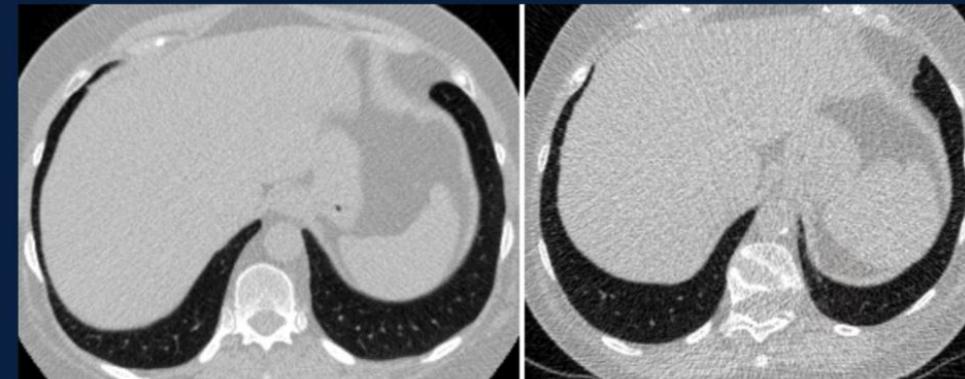
Chest Xrays



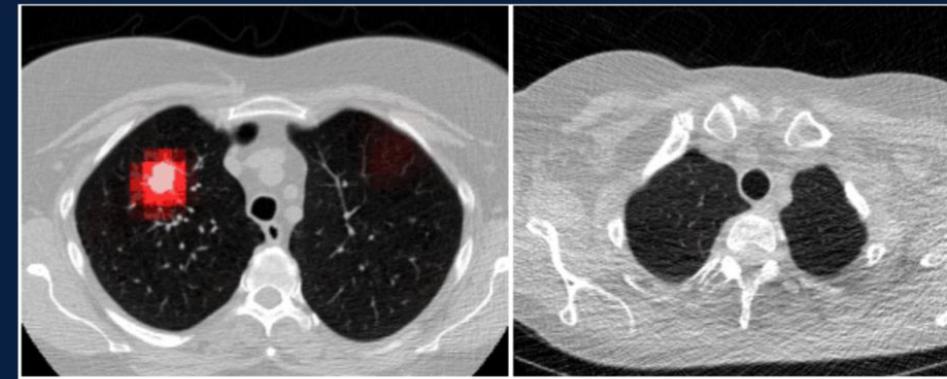
Musculoskeletal Radiographs



Naked Dicom



Cancer = Red



The Reinforcement Learning



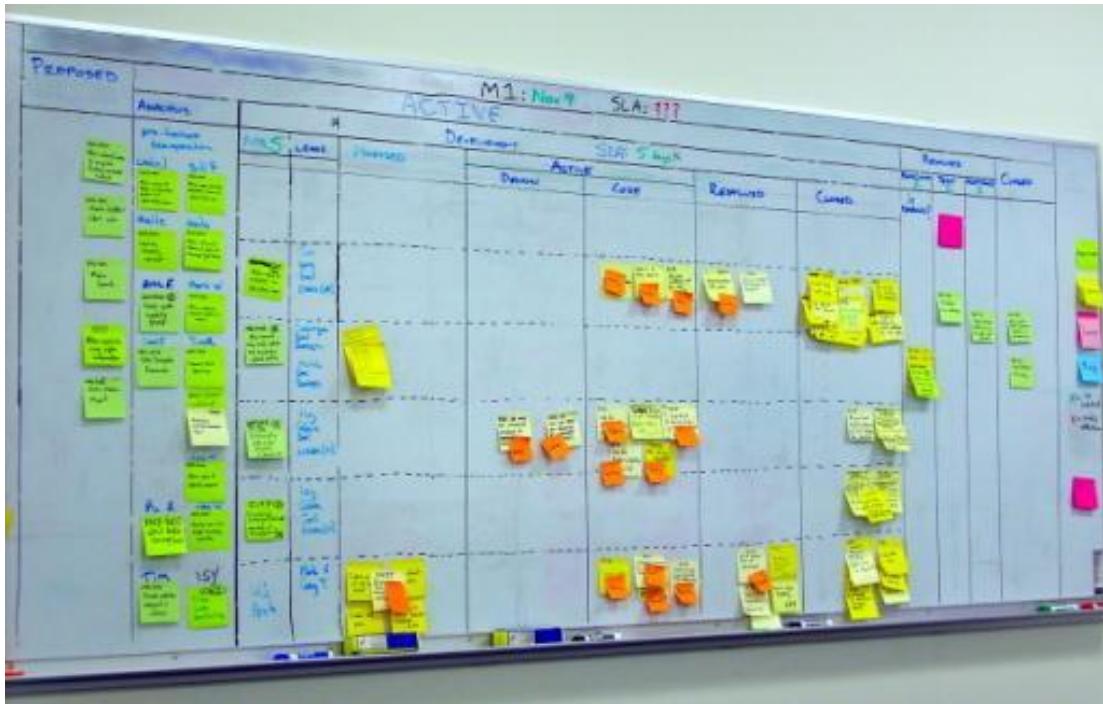
The good puppy, badpuppy method

Training an NPC using reinforcement learning is quite similar to how we train a puppy to play fetch. We present the puppy with a treat and then throw the stick. At first, the puppy wanders around not sure what to do, until it eventually picks up the stick and brings it back, promptly getting a treat. After a few sessions, the puppy learns that retrieving a stick is the best way to get a treat and continues to do so.

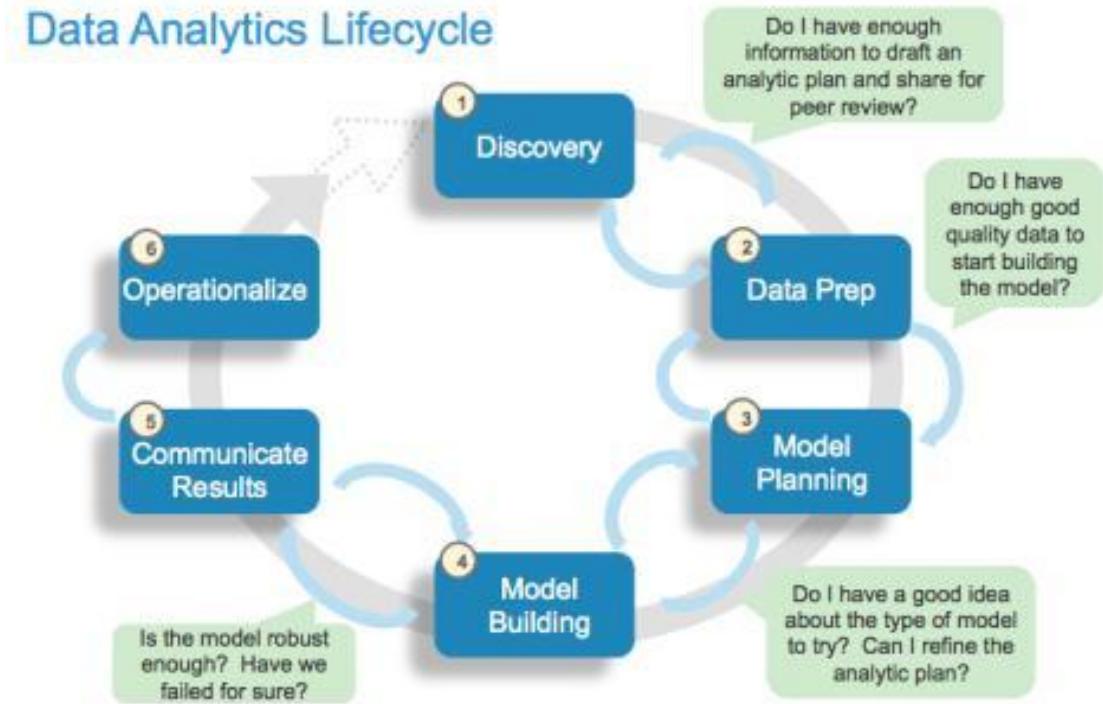
https://www.youtube.com/watch?v=8tq1C8spV_g



Data Science the Agile Scrum way



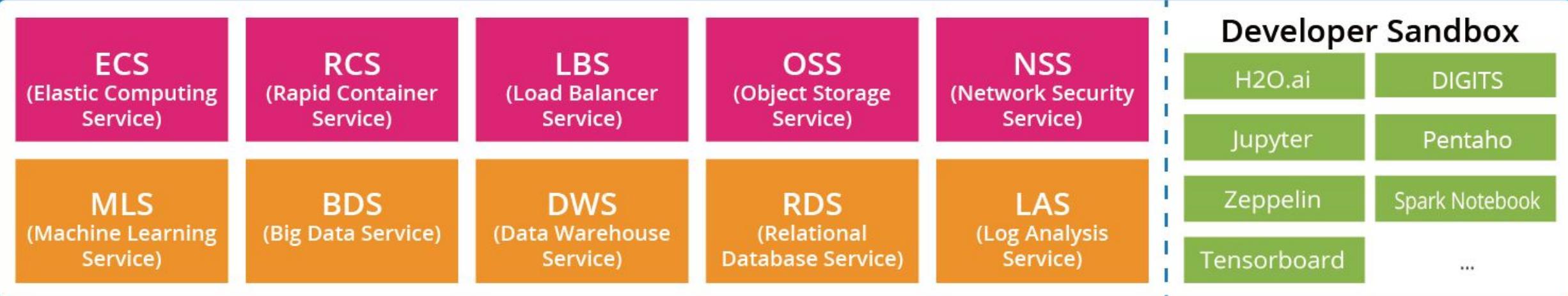
Data Analytics Lifecycle



ISRAEL'S ARTIFICIAL INTELLIGENCE STARTUPS



AI / Data Science Hybrid Cloud Platform



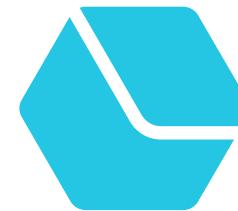
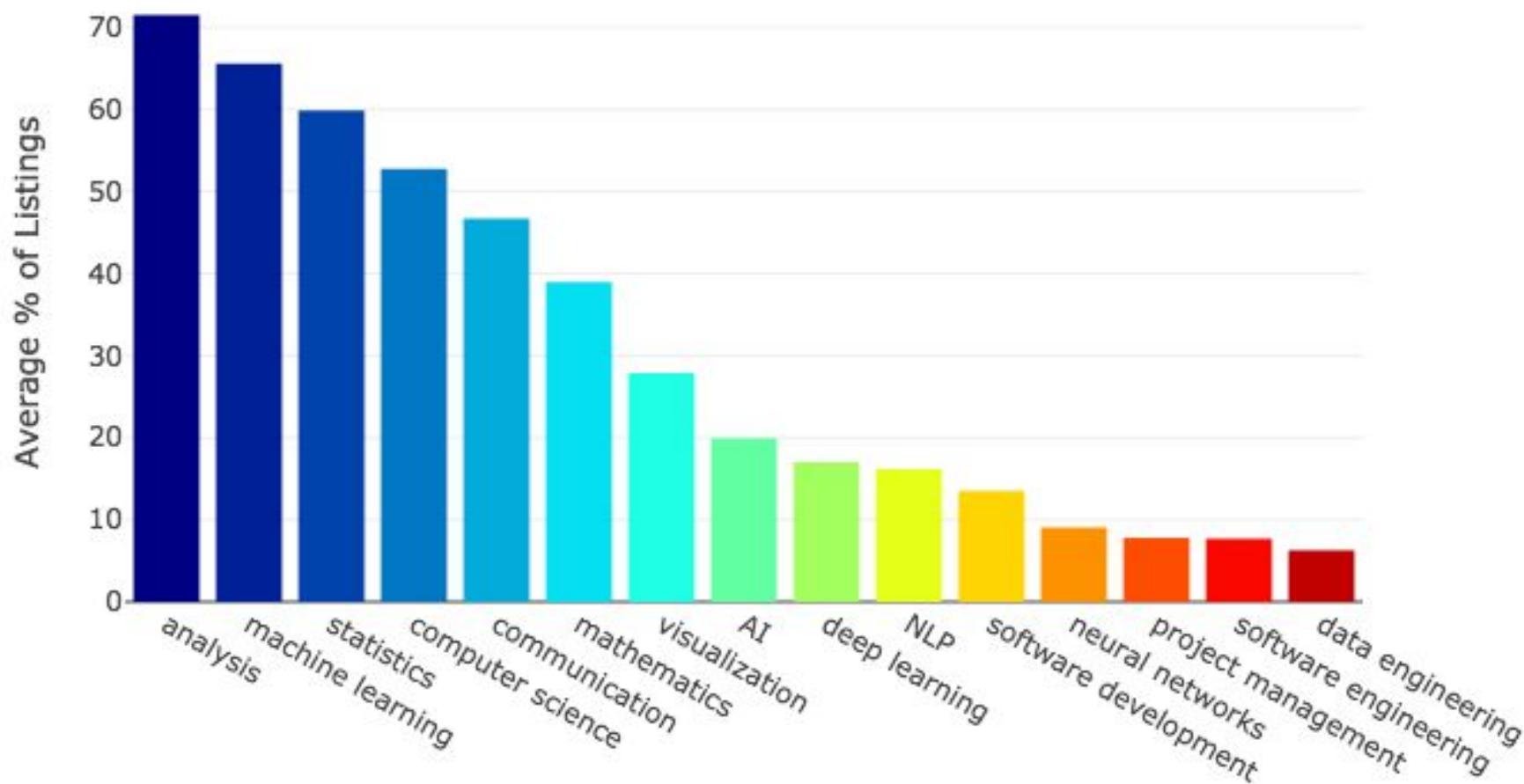
MagicQbe (Unified workload automation, similar with Rescale APIs)

SkyPort (Multiple/Hybrid Cloud Resources Manager)

Compatible with:
Slurm, Univa, LSF, PBS Pro, ...



General Skills in Data Scientist Job Listings



Hiring a Data Scientist

Do's and Don't's

Do's

- Github
- Hackathon
- Years of experience
- Creative thinking

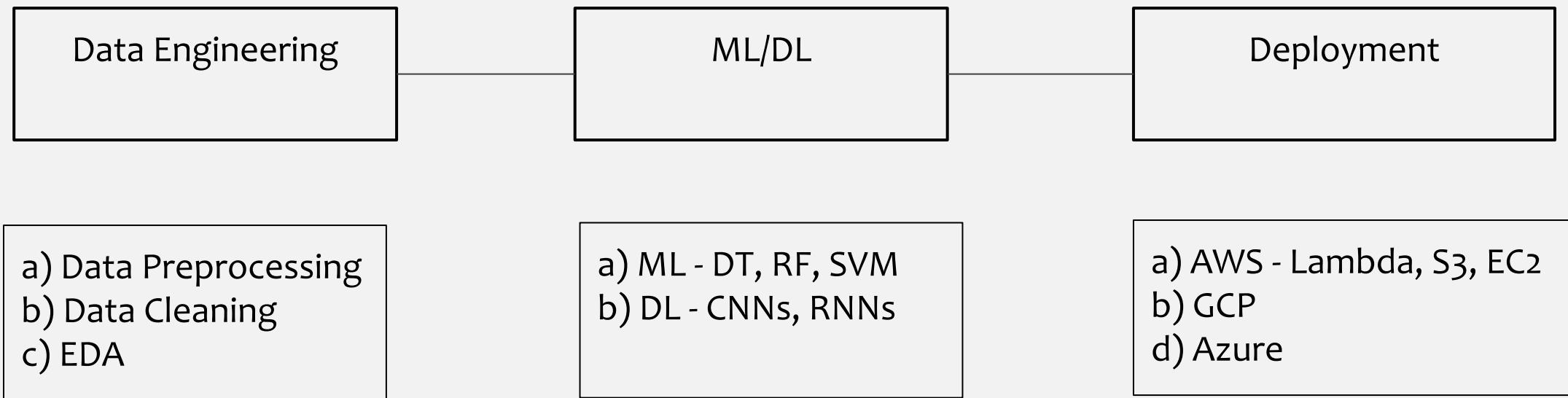


Don't

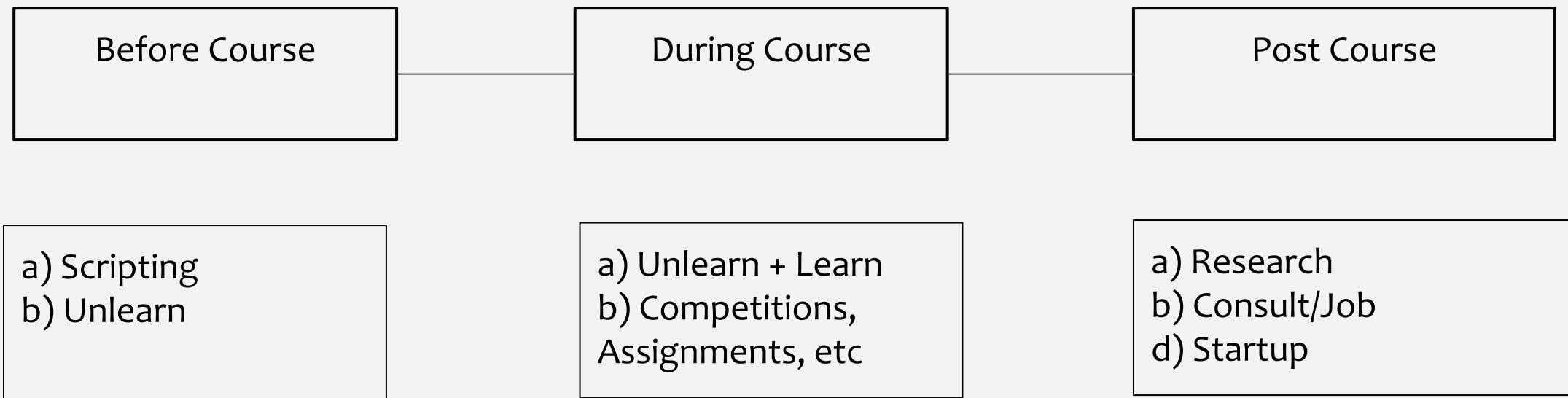
- Traditional mindset
- Years of experience



Full Stack AI Scientist



Full Stack AI Scientist



Do's and Don'ts



Do's and Don'ts - During Course

Do's

- a) Set the Vision ASAP with an expert & email yourself! What is your 5 year plan?
- b) Articulate your NOT to do list
- c) Get “switched on”, control the flow
- d) Build your professional profile within the next 30 days. e.g. linkedin, professional naukri, etc
(Have a budget)
- e) In tech table a budget and Upskill every 5 years!

Don't

- a) Do NOT Think ROI (maximize food, beverages, etc). War of the DJs (Oh X program is better than Y, etc)
- b) Do not go “with the flow”
- c) Find a challenging problem is extremely hard (hammer and nail)
- d) Linear (plenty) vs Nonlinear events (4)

Do's and Don'ts - Post Course

Do's

- a) Stakeholder management is very hard. Prime the pump starting now. Ear worm
- b) Find a champion within your organization
- c) Find a challenging problem with high ROI is extremely hard (hammer and nail).

Find the best nail and well, build the hammer (it might not be AI)

e.g. best vehicle to go for a movie in time might be a scooter & NOT a ferrari

- d) Always Unsexy areas! MIM (Money in Mundane). e.g. Construction, Defence, Manufacturing, etc

Don't

- a) Have a hammer (AI) and hit every nail
- b) NOT leverage the power of networking
- c) NOT show up for networking, events, etc
- d) Always SEXY areas (e.g. Cancer, e-commerce)

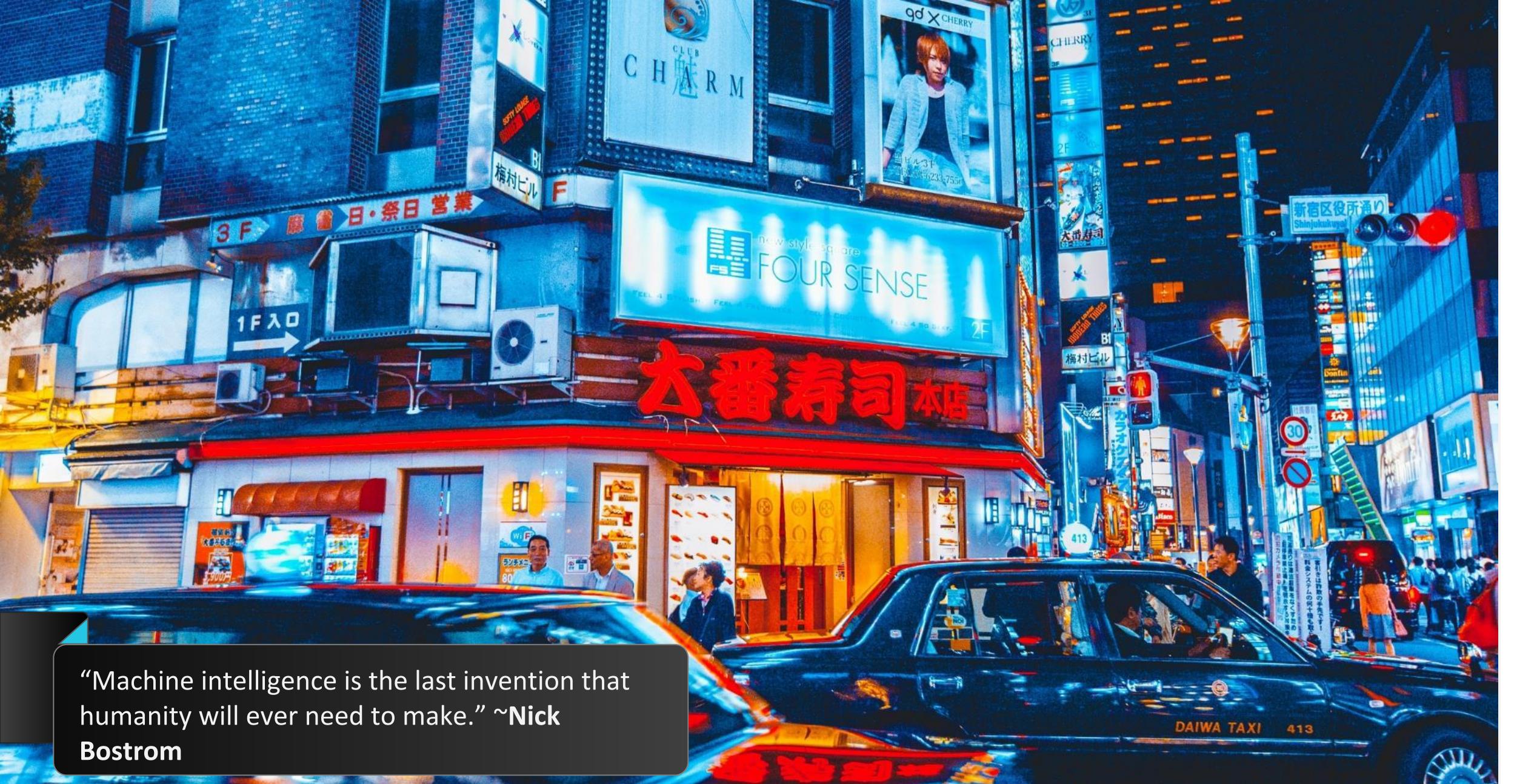
How does Flow look like?

Looks like

- a) You arrive ahead of class with a proactive mindset, every assignment, interaction with professor, boss is important
- c) You can easily toggle between a personal whatsapp & professional whatsapp
- d) You make more mistakes but more luck seems to come into play, more opportunities. It's difficult to manage them
- e) You love 7 am calls just as easily you can take 11 pm calls. Time is a sense of continuum & you have a grip over it
- f) You are fast, impatient, confident almost bordering on arrogance

Doesn't look like

- a) You arrive late, try to catch up. Keeps piling on
- b) Difficulty in getting up, easily distracted
- c) NOT show up for networking, events, etc; Love tooling around. Time flies really fast
- e) You protract endlessly wishing there were no calls
- f) You expect people around you to be fast, over confident, and arrogant (from a defensive mindset)



"Machine intelligence is the last invention that humanity will ever need to make." ~**Nick Bostrom**



Thank You

👤 Jayanth Rasamsetti
✉️ jr3281@columbia.edu

