

*When you go home, tell them of us and say;  
for your tomorrow, we gave our today.*



*Lt Ravinder Chhikara, KC*



*When you go home, tell them of us and say;  
for your tomorrow, we gave our today.*



*Flt Lt Sandeep Plarwal*



# Passion and Courage Unmatched by AI Tech



Cubs with Pose



Officers with Josh



IBM

Opening  
Rebuttal  
Summary

Project Debater

Harish Natarajan

03:08:33



#iq2uslive

# Cognition & AI

#think2019



# Now, IBM builds AI machine that can engage in debate with humans

IBM has unveiled a computer program that can debate with humans on 100 topics, including space exploration, artificial intelligence, and government subsidies. The machine, called Project Debater, is a 5-foot-tall machine shaped like a monolith with a TV screen on its side. It can deliver a 30-second opening argument, listen to a human debater's counter-argument, and spend four minutes rebutting it. After closing arguments it moved on to a second debate about telemedicine.



Mint

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# IBM pits AI against human debaters

ASSOCIATED PRESS SAN FRANCISCO

IBM pitted a computer against two human debaters in the first public demonstration of artificial intelligence technology it's been working on for more than five years. In San Francisco, asking it to make a case for government-subsidized space research a topic. The computer delivered its opening argument. It then listened to a human debater's counter-argument and spent four minutes rebutting it. After closing arguments it moved on to a second debate about telemedicine.

# IBM pits computer against humans

Business Standard

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# IBM unveils system that 'debates' with humans

NEW YORK TIMES San Francisco, June 19

A MATCH BETWEEN an IBM computer program and two human debaters in the first public demonstration of artificial intelligence technology it's been working on for more than five years. In San Francisco, asking it to make a case for government-subsidized space research - a topic it hadn't studied in advance but championed fiercely with just a few awkward gaps in reasoning. "Subsidizing space exploration is like investing in really good rides," argued the computer system, its female voice embodied in a 5-foot-tall machine shaped like a monolith with TV screens on its sides.



The Financial Express

IBM unveils system that 'debates' with humans. The machine argued in favor of space exploration. The machine argued in favor of space exploration.

# Now, a computer debater that argues with humans

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Deccan Herald

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# Man vs machine: AI can now debate with us

## Bot Debater Can Have 'Meaningful' Arguments On 100 Topics, Say IBM Experts

Global Warming and Climate Change

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The Times of India

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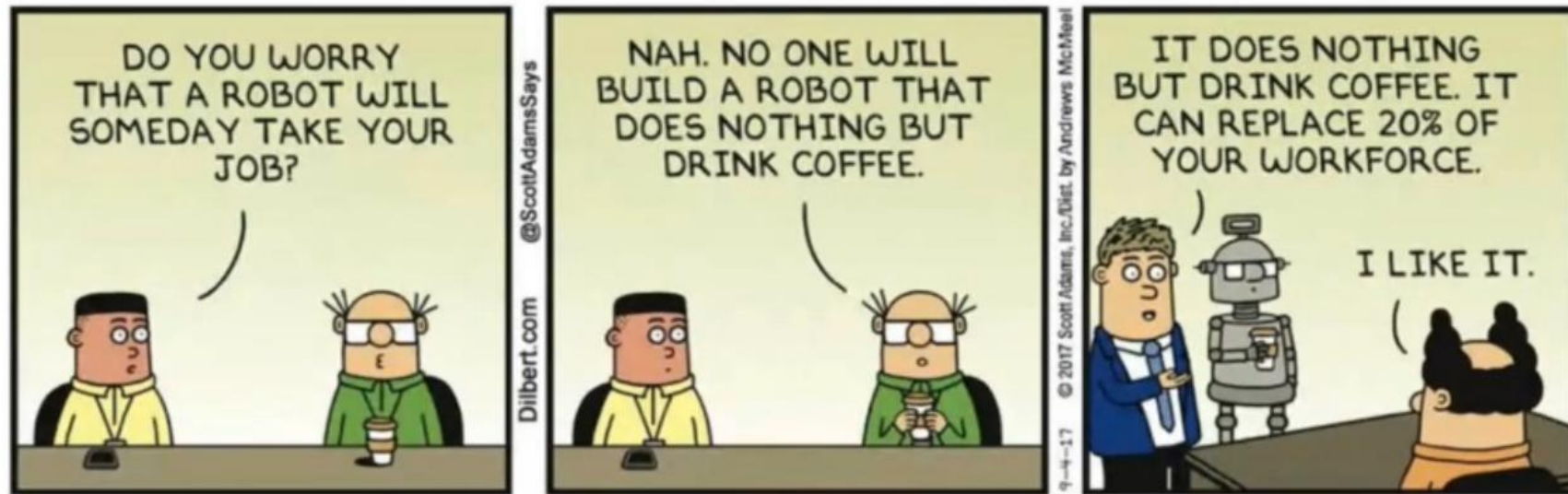
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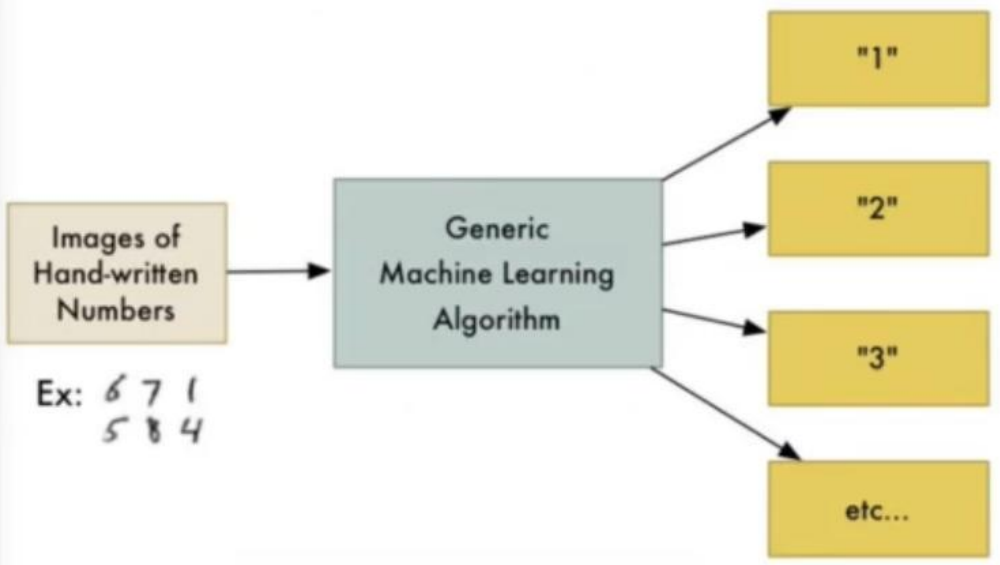
“People worry that computers will get too smart and take over the world, but the real problem is that they're too stupid and they've already taken over the world.”

Pedro Domingos, professor at University of Washington and  
researcher in machine learning

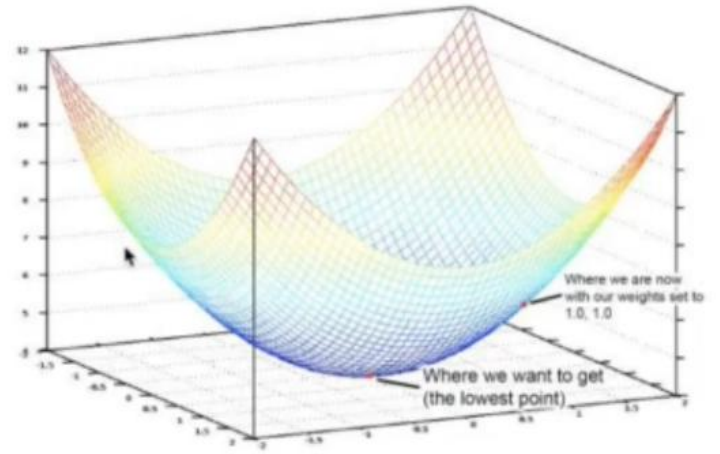
# What is Artificial Intelligence ?

THOUGHT	Systems that think like humans	Systems that think rationally
BEHAVIOUR	Systems that act like humans	Systems that act rationally
	HUMAN	RATIONAL

**Inferential Statistics**

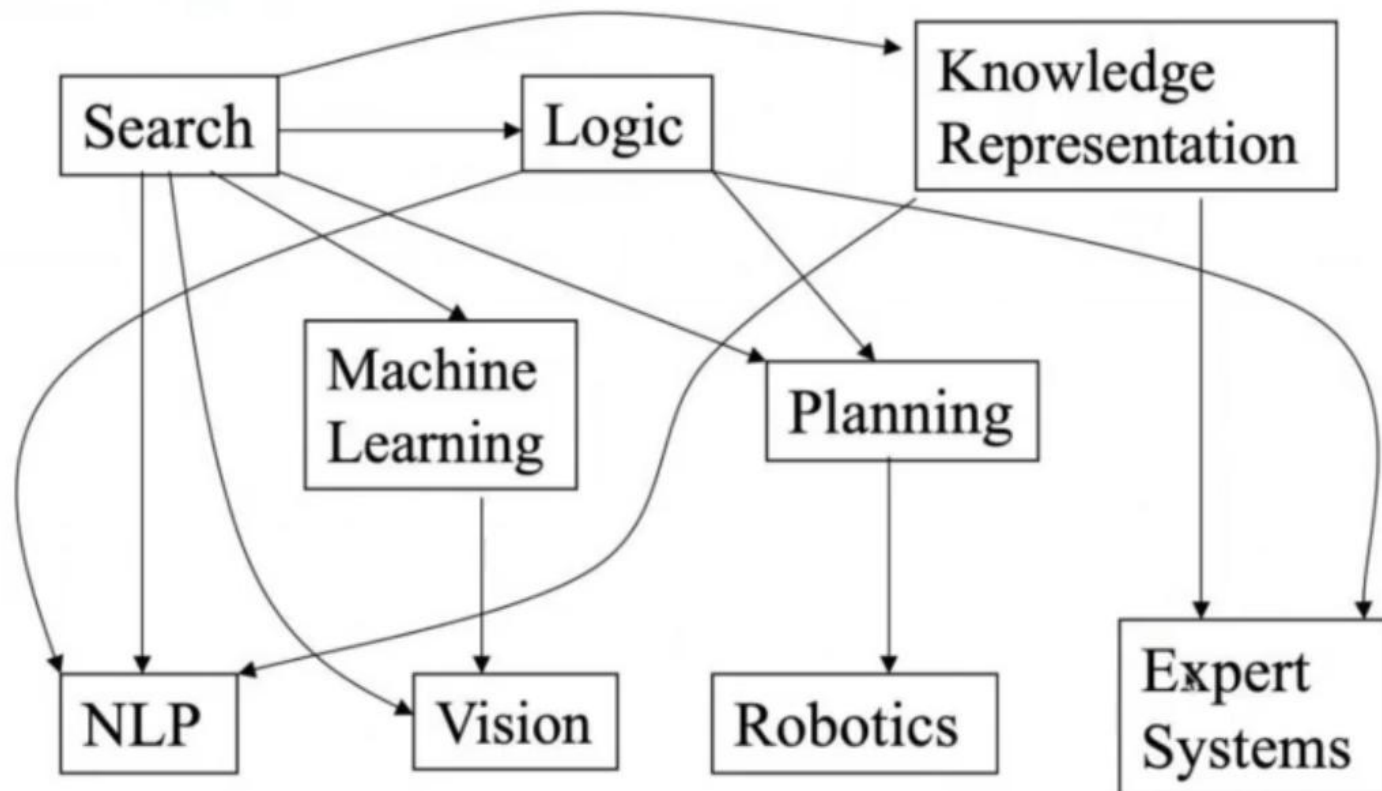


$$mx+b = 3$$



## Areas of AI and Some Dependencies

### Inferential Reasoning





## Answering complex questions requires more than keyword evidence





### Question:

In May 1898 Portugal celebrated the 400th anniversary of this explorer's arrival in India

### Supporting Evidence:

In May, Gary arrived in India after he celebrated his anniversary in Portugal

### Legend

	Keyword "Hit"
	Reference Text
	Answer
	Weak evidence

*This evidence suggests "Gary" is the answer BUT the system must learn that keyword matching may be weak relative to other types of evidence*

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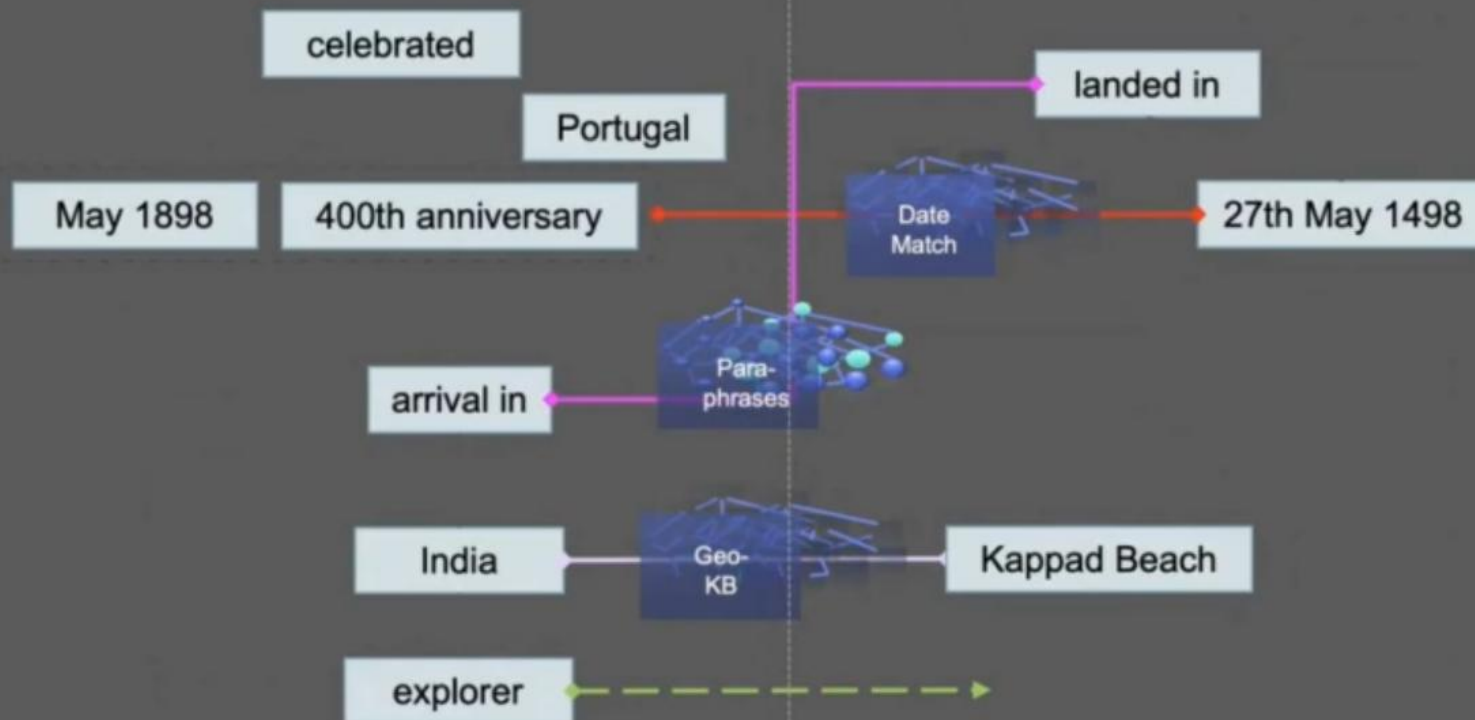
# AI – Inferential Reasoning

## Question:

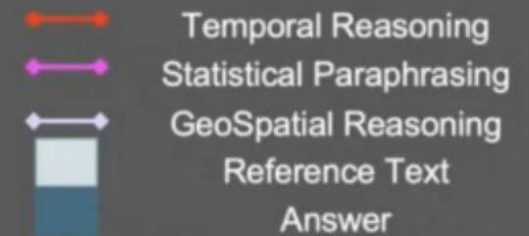
In May 1898 Portugal celebrated the 400th anniversary of this explorer's arrival in India.

## Supporting Evidence:

On the 27th of May 1498, Vasco da Gama landed in Kappad Beach



## Legend



*Stronger evidence can be much harder to find and score...*

- Search far and wide
- Explore many hypotheses
- Find judge evidence
- Many inference algorithms

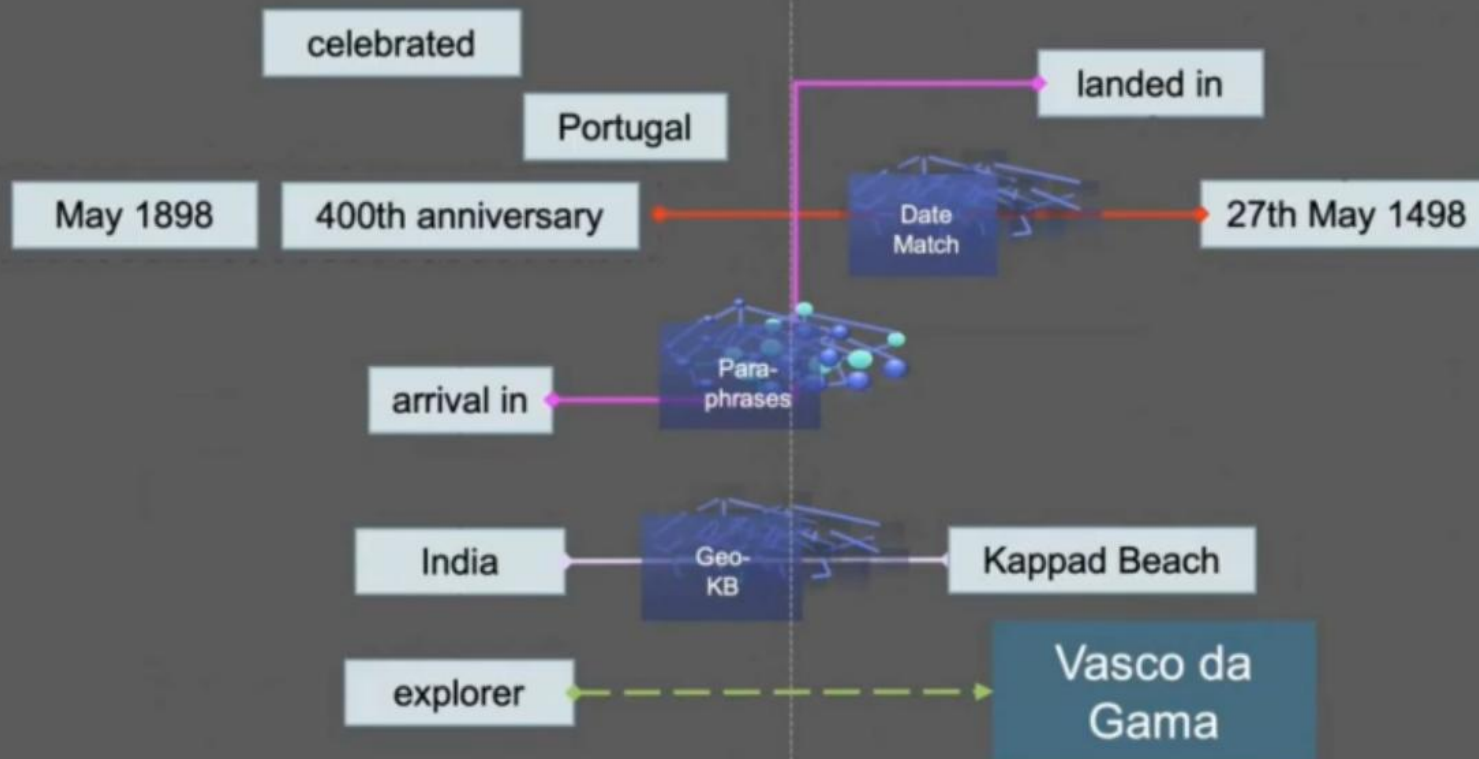
# AI – Inferential Reasoning

## Question:

In May 1898 Portugal celebrated the 400th anniversary of this explorer's arrival in India.

## Supporting Evidence:

On the 27th of May 1498, Vasco da Gama landed in Kappad Beach



## Legend

- Temporal Reasoning
- Statistical Paraphrasing
- GeoSpatial Reasoning
- Reference Text
- Answer

*Stronger evidence can be much harder to find and score...*

- Search far and wide
- Explore many hypotheses
- Find judge evidence
- Many inference algorithms

# Levels of Artificial Intelligence

STRONG AI THAT IS MORE INTELLIGENT THAN THE INTELLIGENCE OF ALL HUMANS COMBINED OR THAT IS MUCH SMARTER THAN THE BEST HUMAN BRAINS IN PRACTICALLY EVERY FIELD OR ...

**SUPER-INTELLIGENCE**

ABILITY FOR A MACHINE TO REPRODUCE HUMAN INTELLIGENCE FULLY (INC. CONSCIOUSNESS, SELF-AWARENESS...)

**STRONG AI, GENERAL AI, ARTIFICIAL GENERAL INTELLIGENCE**

ABILITY FOR A MACHINE TO REPRODUCE A SPECIFIC HUMAN BEHAVIOR

**NARROW AI, WEAK AI**



# The Road Travelled

How did Data and AI reach here

Quantum Era

Quantum driven ML

Learned Insights

Neural Nets

Modeled Insights

BI Layer

Programmed  
Insights

Data warehouse



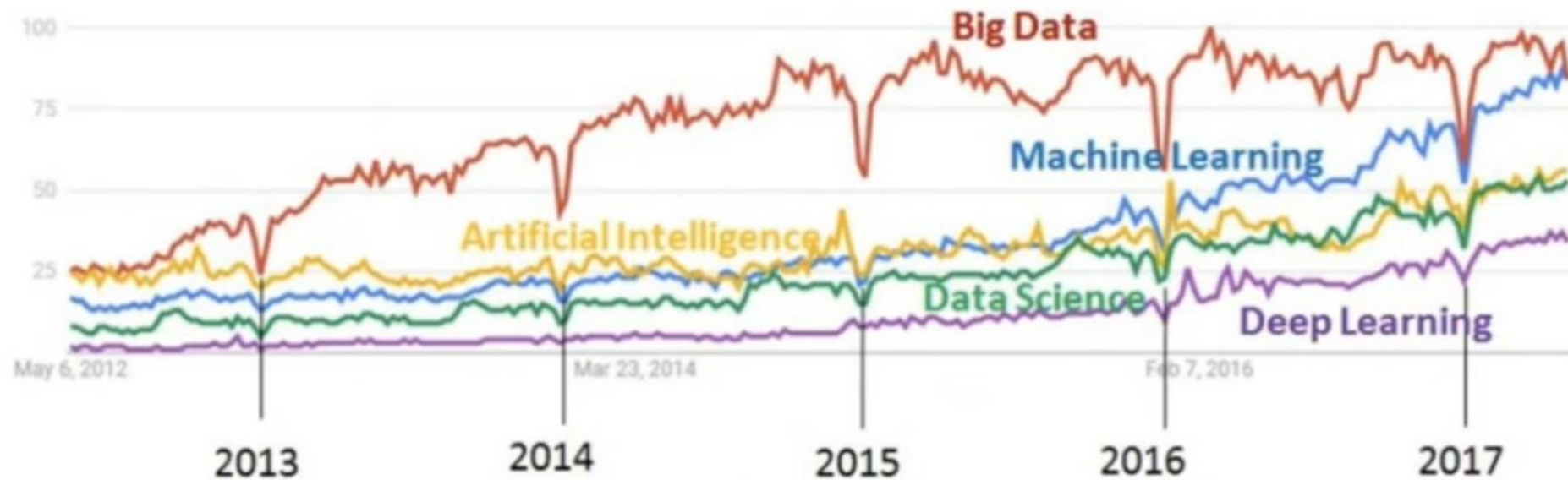
4



# Just buzzwords?

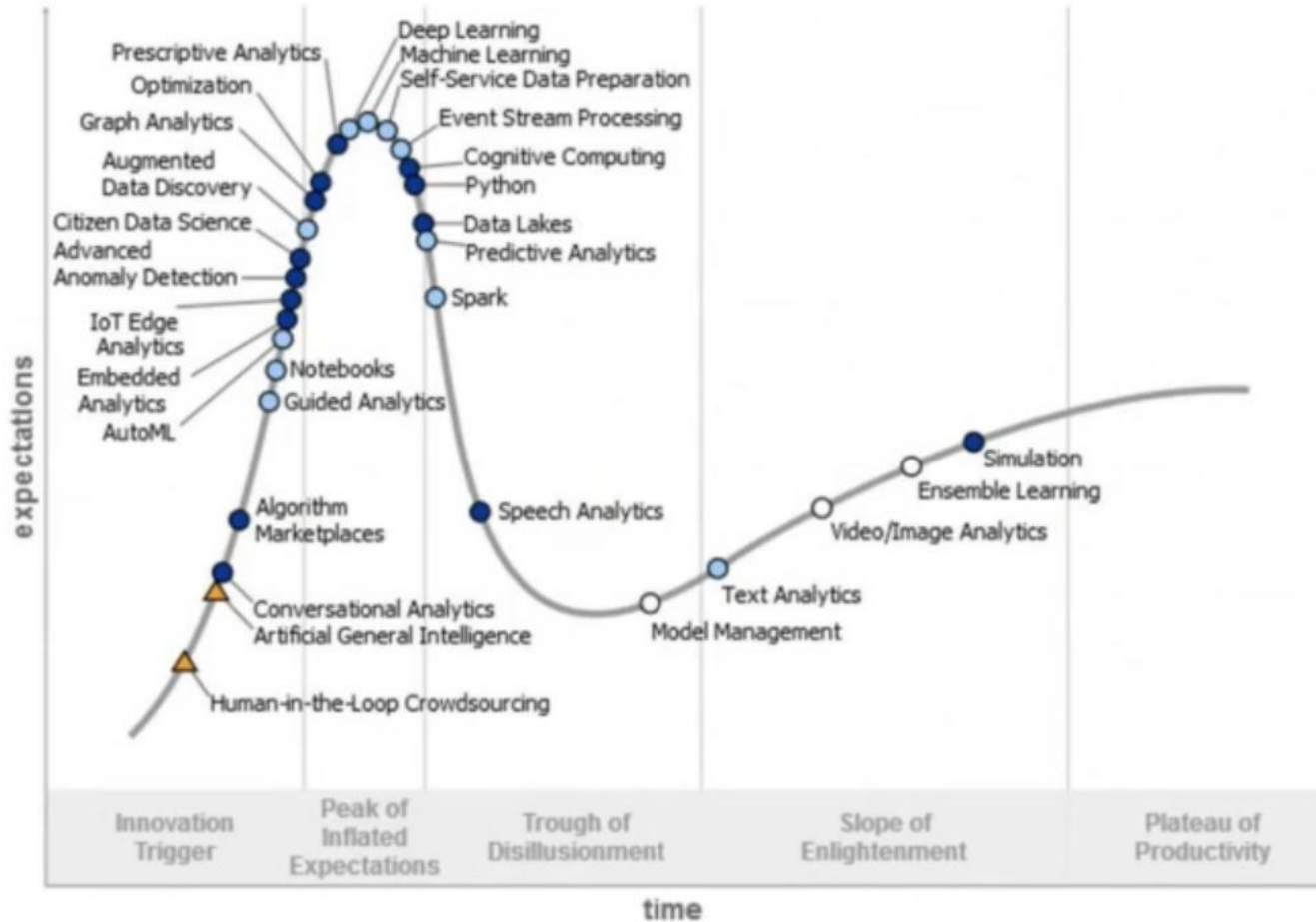
Google Trends, May 2012 - April 2017, Worldwide

Big Data, Machine Learning, Artificial Intelligence, Data Science, Deep Learning





# Hype Cycle for Data Science



Plateau will be reached in:

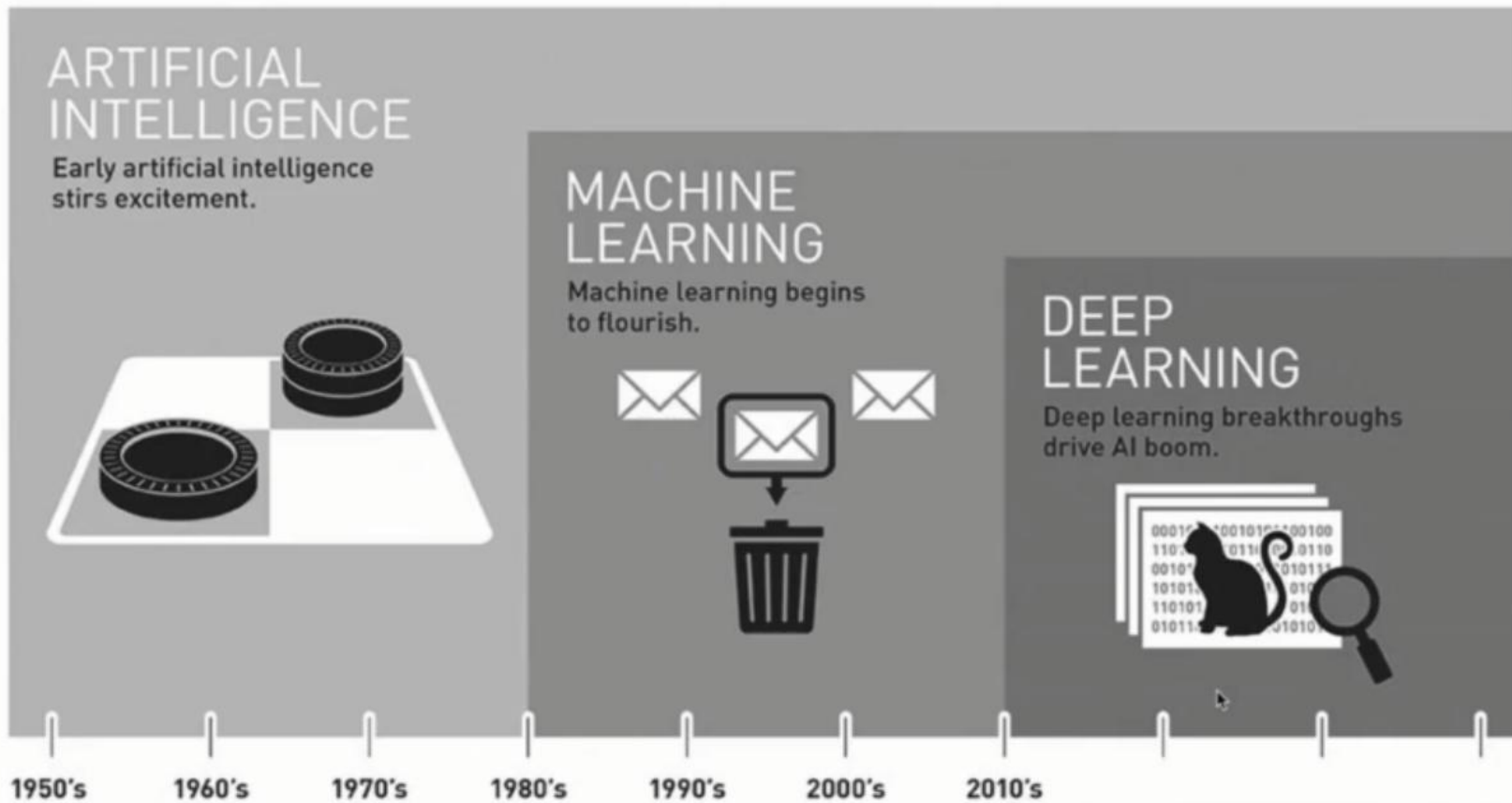
○ less than 2 years   ● 2 to 5 years   ● 5 to 10 years

▲ more than 10 years   ○ obsolete  
 ○ before plateau

---

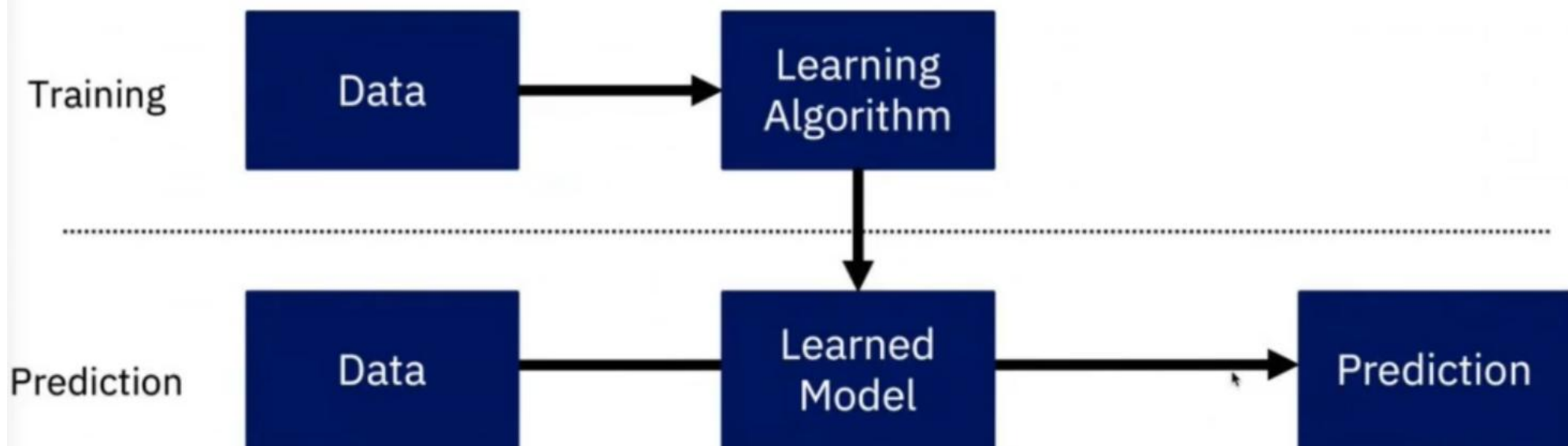
**What does current AI Look Like?**

# One perspective to view AI, ML and DL



# What is Machine Learning?

Machine Learning is a type of AI that provides computers with the ability to learn **without being explicitly programmed**



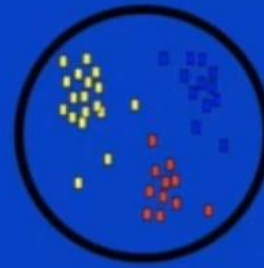
# Learning Approaches



## Supervised Learning

Learning with a labeled training set

Task-driven  
Predictive model



## Unsupervised Learning

Discovering patterns in unlabeled data

Data-driven  
Descriptive model



## Reinforcement Learning

Learning based on feedback or reward

Reaction to an environment  
Trial and error

# What is Deep Learning?



Part of machine learning field of learning representations of data

Exceptional effective at learning patterns

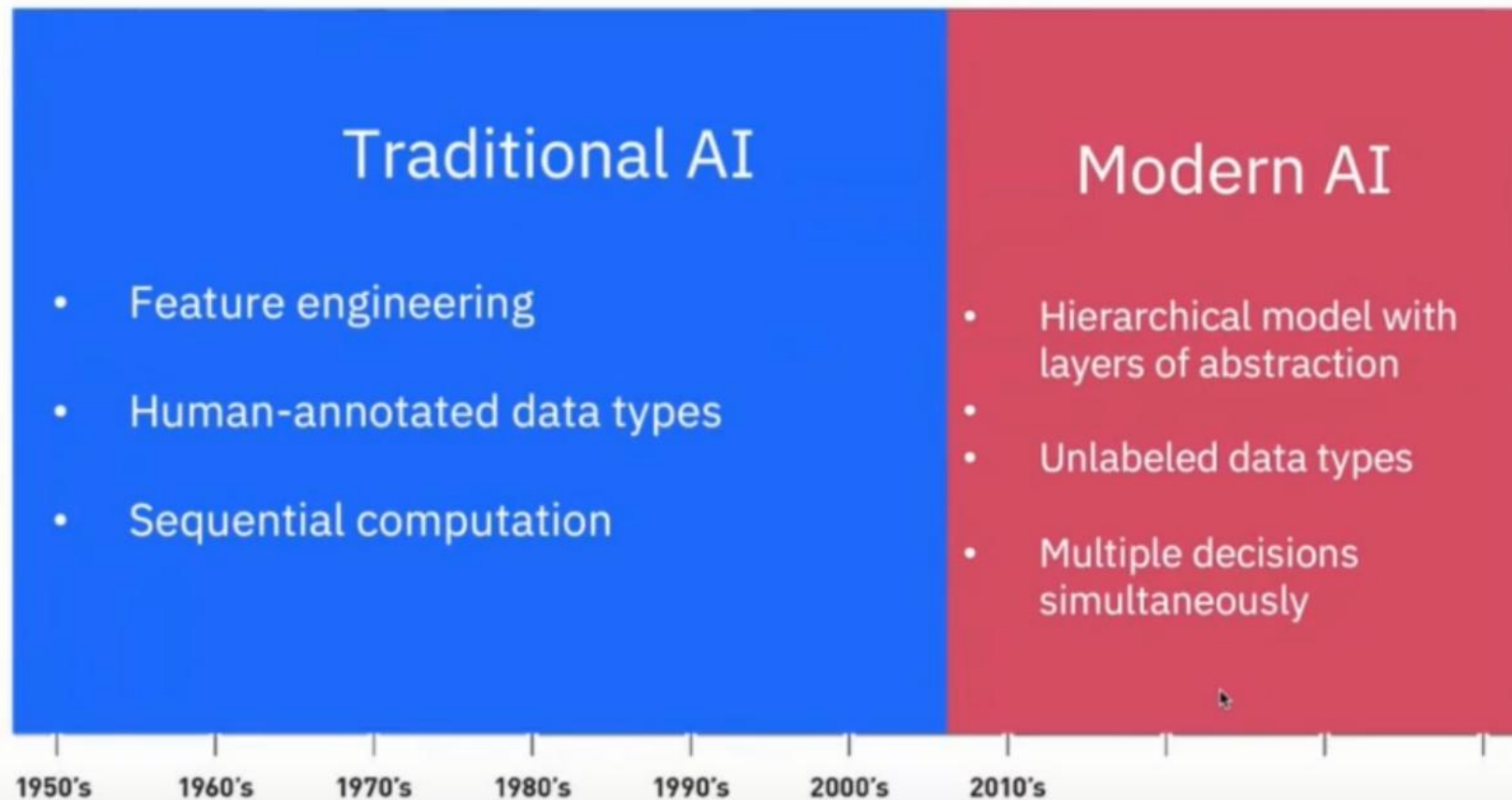


Utilizes learning algorithms that derive meaning out of data by using hierarchy of multiple layers that mimic the neural networks of our brain



If you provide a system with information, it begins to understand and respond in ways

## One perspective to view AI, ML and DL



# Generative AI



Imagined by a GAN (generative adversarial network)  
StyleGAN (Dec 2018) - Karras et al. and Nvidia  
Original GAN (2014) - Goodfellow et al.  
Don't panic. Learn about [how it works](#).  
Help me figure out what was learned [here](#).  
[Help this AI continue to dream](#)  
[Another](#) | [Save](#) • [Cats](#) | [Articles](#) | [TV Friends](#) - [Office](#)





AI Assistant

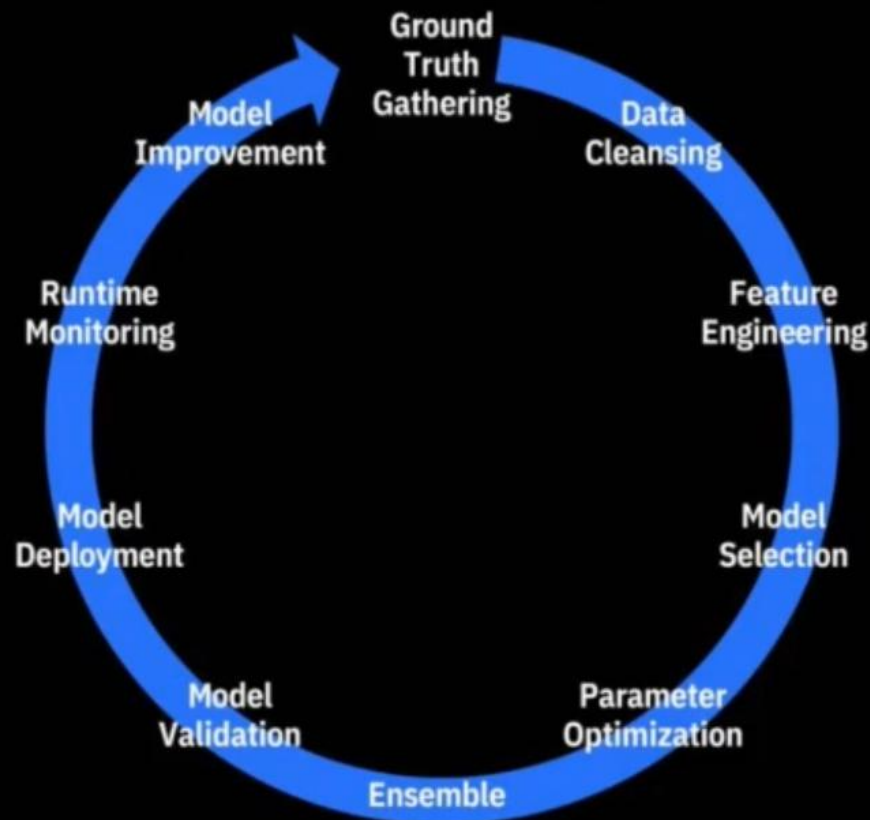
# AI Reinforced Learning



# AI @ Edge



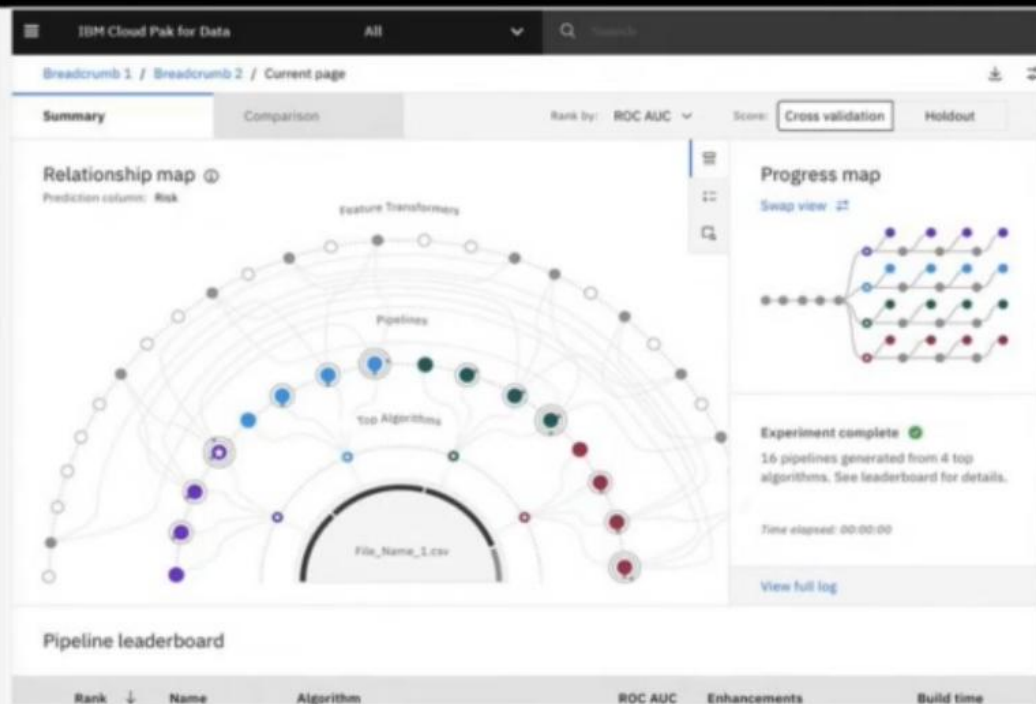
Building custom AI models  
takes weeks or months...



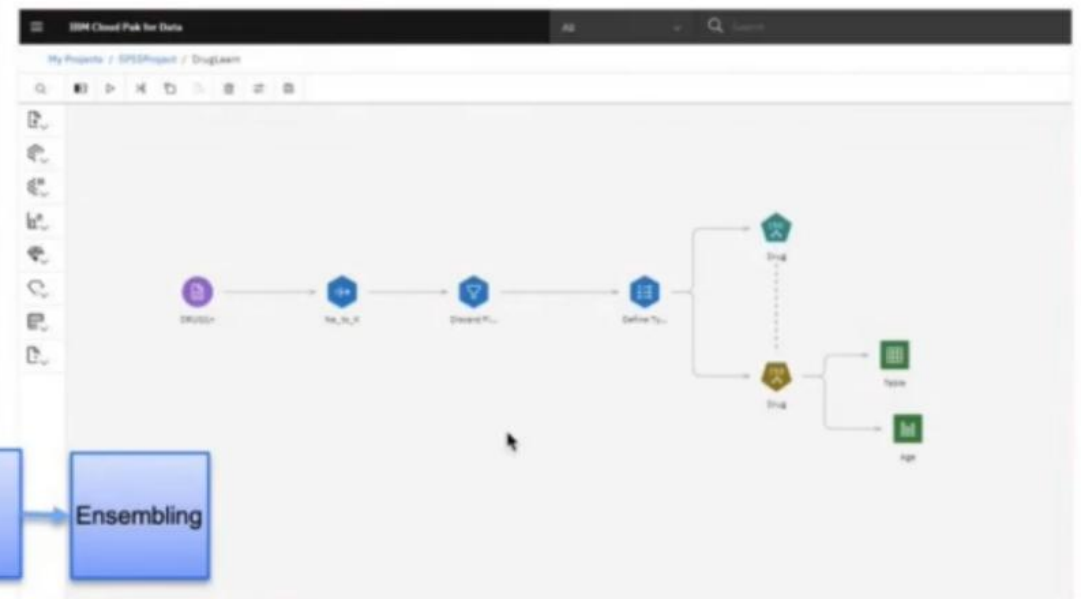
**AutoAI** automates the AI  
development process – from  
weeks or months to minutes

**“AI for AI”**

# AutoAI : Automation of Machine Learning tasks



*AutoAI has the capability to automatically ingest, clean, transform, and model with hyperparameter optimization*



# Trustable AI

**Fairness:** AI systems should use training data and models that are free of bias, to avoid unfair treatment of certain groups.

**Explainability:** AI systems should provide decisions or suggestions that can be understood by their users and developers.

**Auditability:** AI systems should be transparent and accountable, providing historical details (logs and metrics) of their development, deployment, and maintenance so they can be audited throughout their lifecycle. Historical details (logs and metrics) should also be retained in a ledger of the 'transactions' that the AI system has had with humans, other models, and machines.

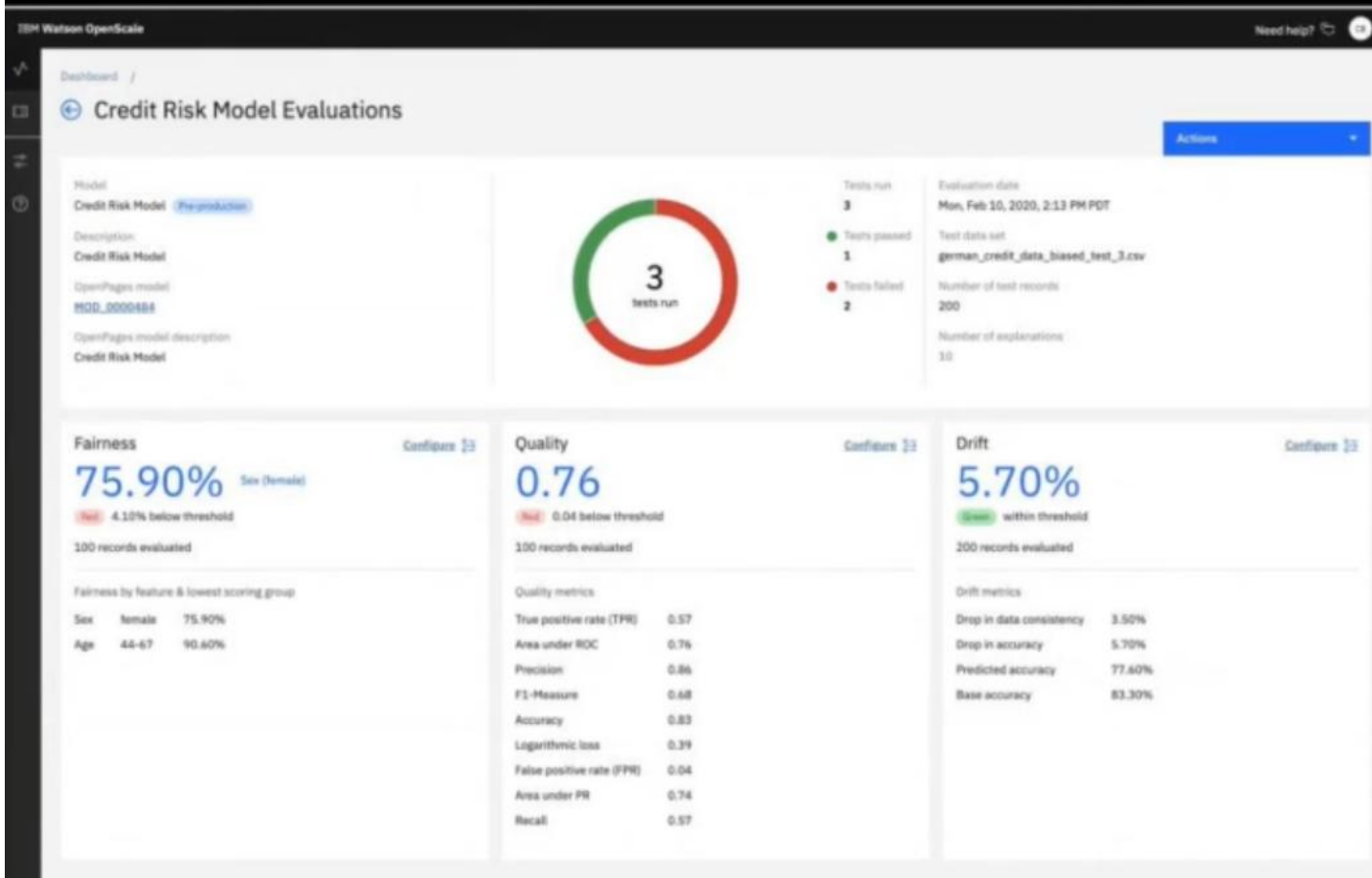
**Value Alignment:** AI systems should reason through different outcomes, discriminate between 'good' and 'bad' decisions, and ensure outcomes we truly want

# Watson OpenScale : Operating Trusted AI

Did anyone  
tamper with it?  
  
ROBUSTNESS

Is it fair?  
  
FAIRNESS

Is it easy to  
understand?  
  
EXPLAINABILITY



Bias Detection

Explainability

Model Validation



container ship

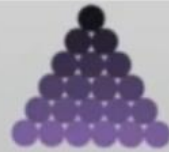
motor scooter

leopard

container ship	motor scooter	leopard
lifeboat	go-kart	jaguar
amphibian	moped	cheetah
fireboat	bumper car	snow leopard
drilling platform	golfcart	Egyptian cat

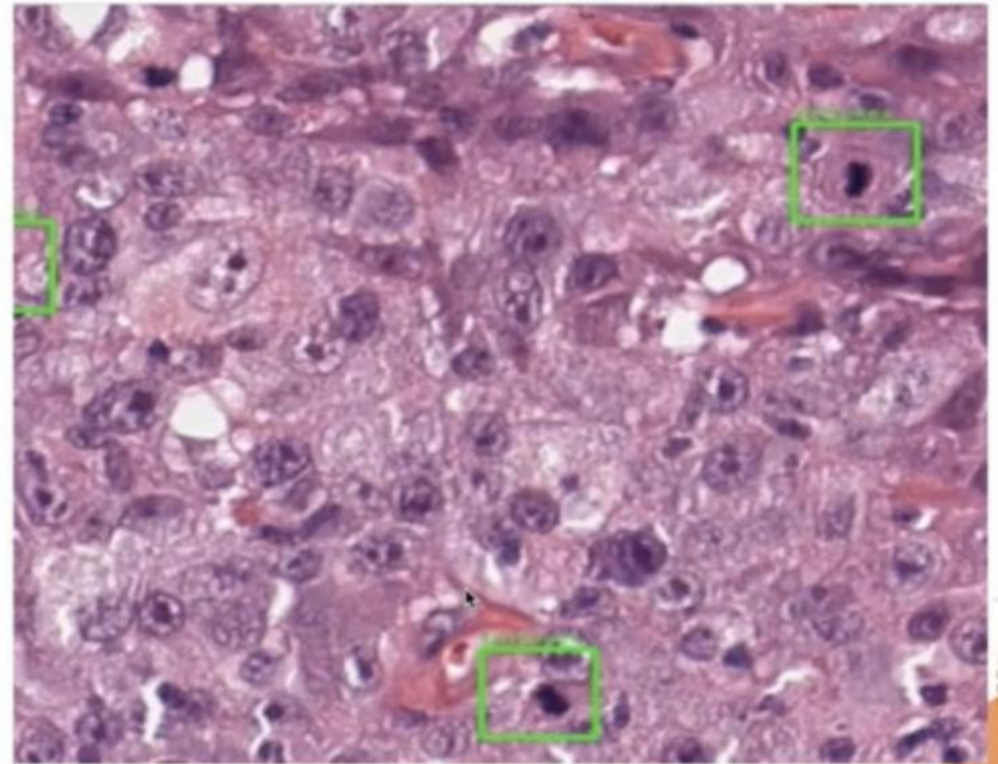






## Tumor Proliferation Assessment Challenge 2016

TUPAC16 | MICCAI Grand Challenge





"man in black shirt is playing guitar."



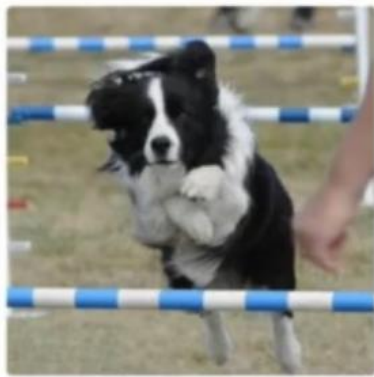
"construction worker in orange safety vest is working on road."



"two young girls are playing with lego toy."



"girl in pink dress is jumping in air."



"black and white dog jumps over bar."



"young girl in pink shirt is swinging on swing."

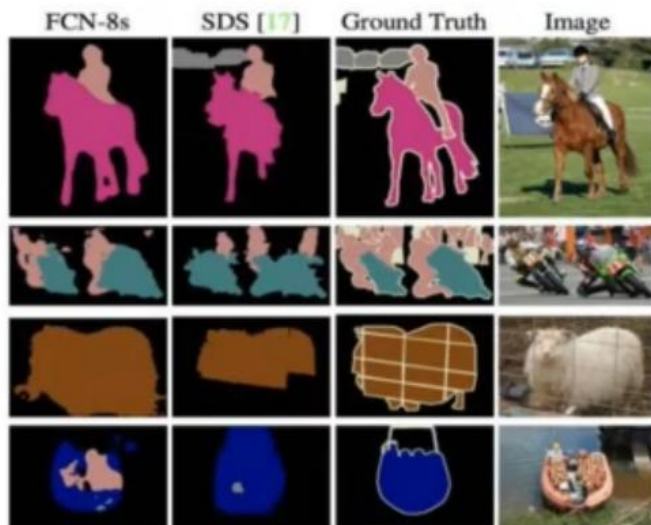


<http://cs.stanford.edu/people/karpathy/deepimagesent/>

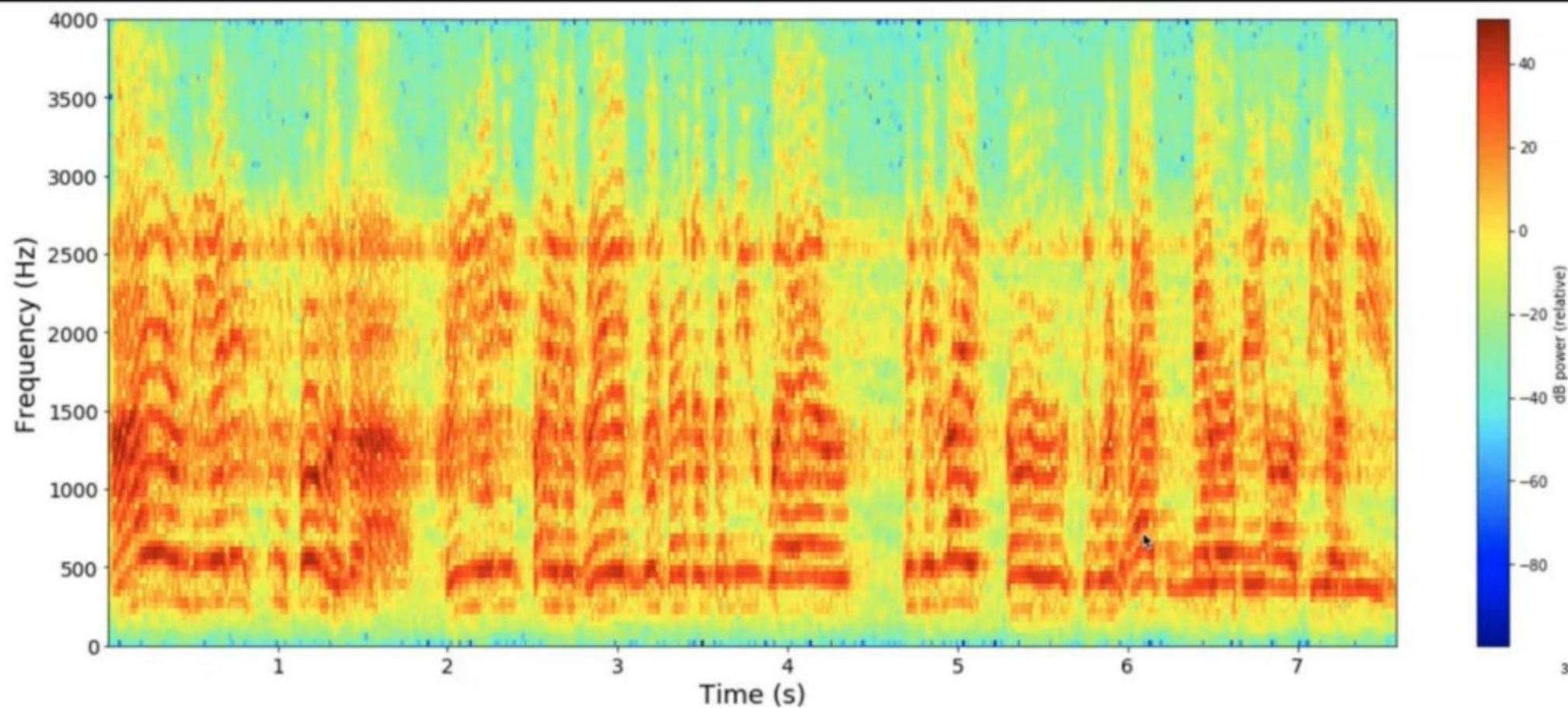
Most of the processing that humans do is primarily done through one medium – Visual

Can you guess the percentage of this type of data?

**81%**



# AI – Speech Recognition is a quasi visual recognition today





<https://github.com/AliaksandrSiarohin/first-order-model>



<https://cartoonize-lkqov62dia-de.a.run.app/cartoonize>

# Knowledge extraction to Operationalize the Plan & Objectives

Basic object extraction

Semantic representation

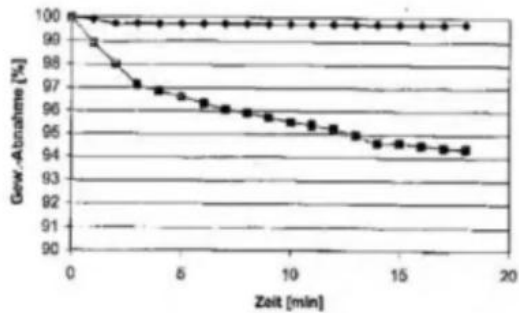


Abb. 3. Emissionsverhalten der Klebstoffe 5 (■) und 6 (●)

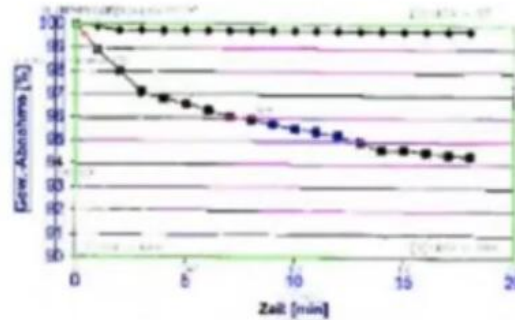
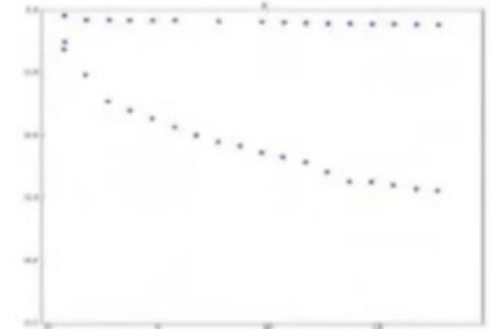
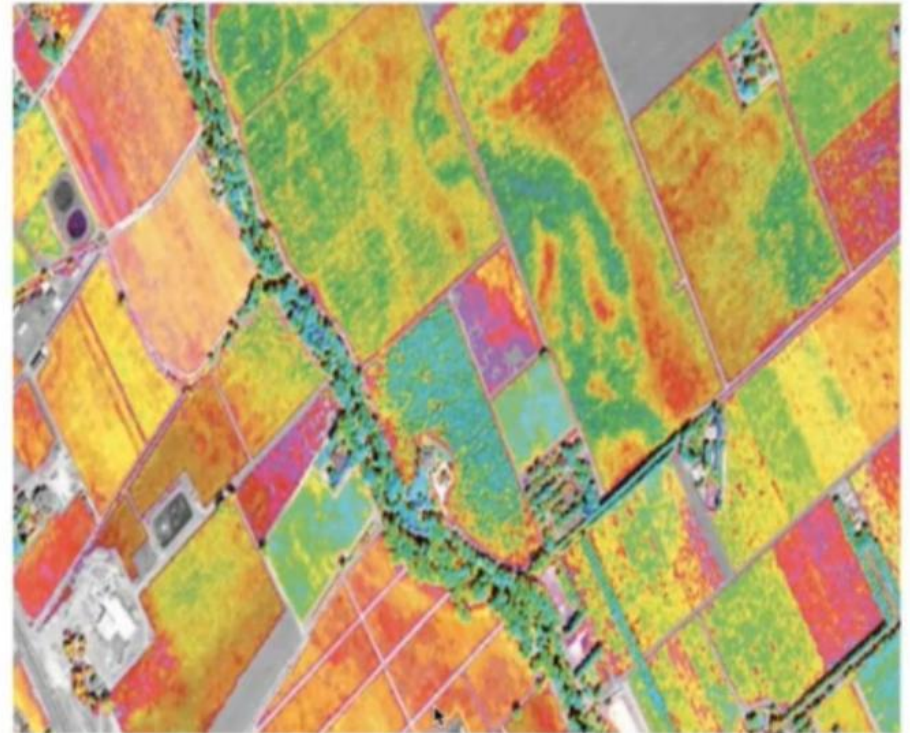
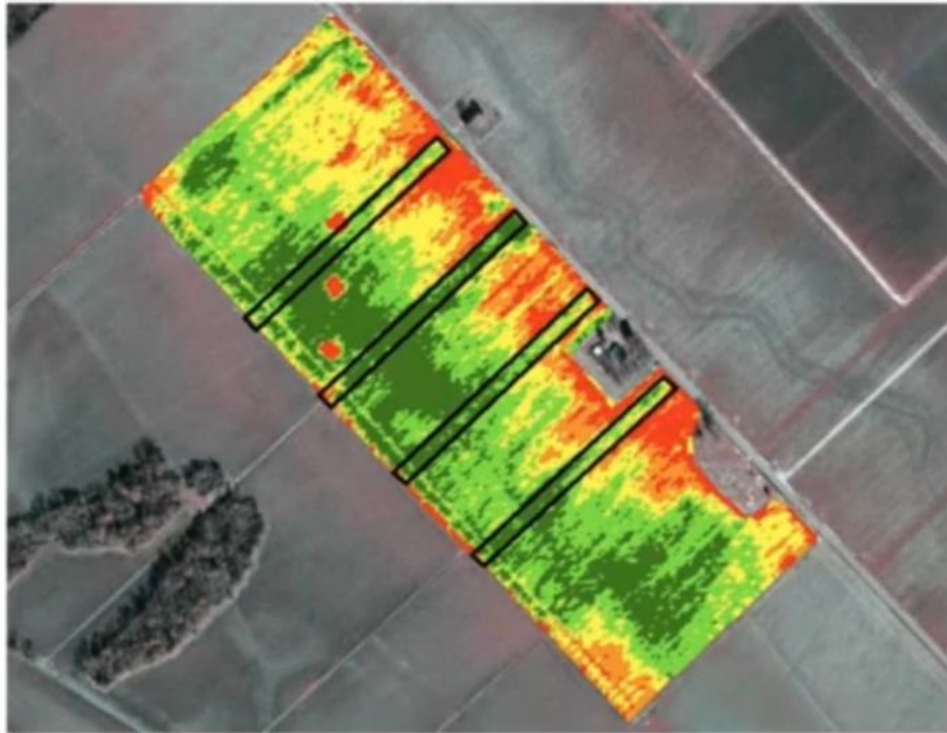


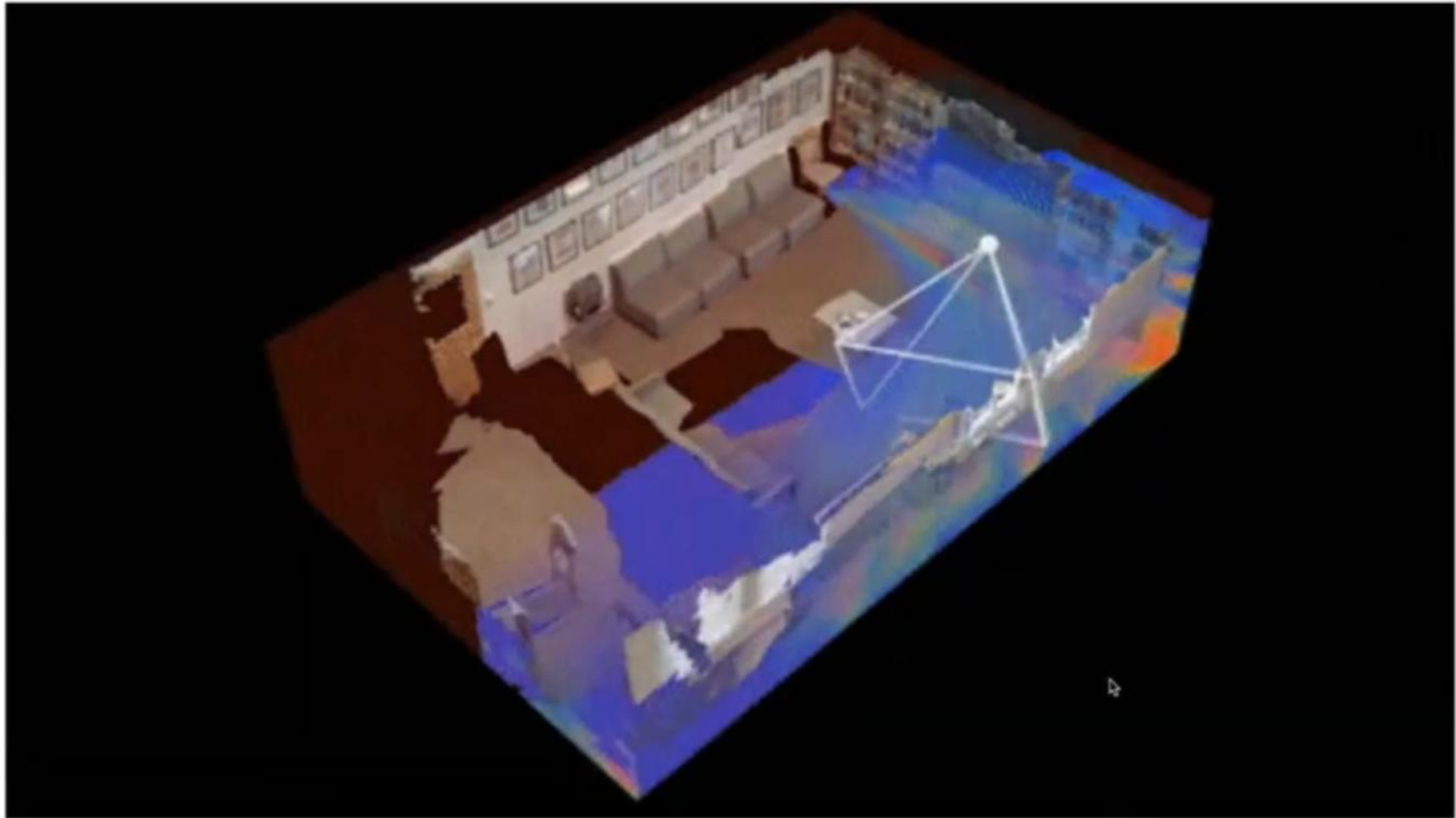
Abb. 3. Emissionsverhalten der Klebstoffe 5 (■) und 6 (●)



## Survey and Map the Target and Routes



## Contextualize the Operational Area in 3D

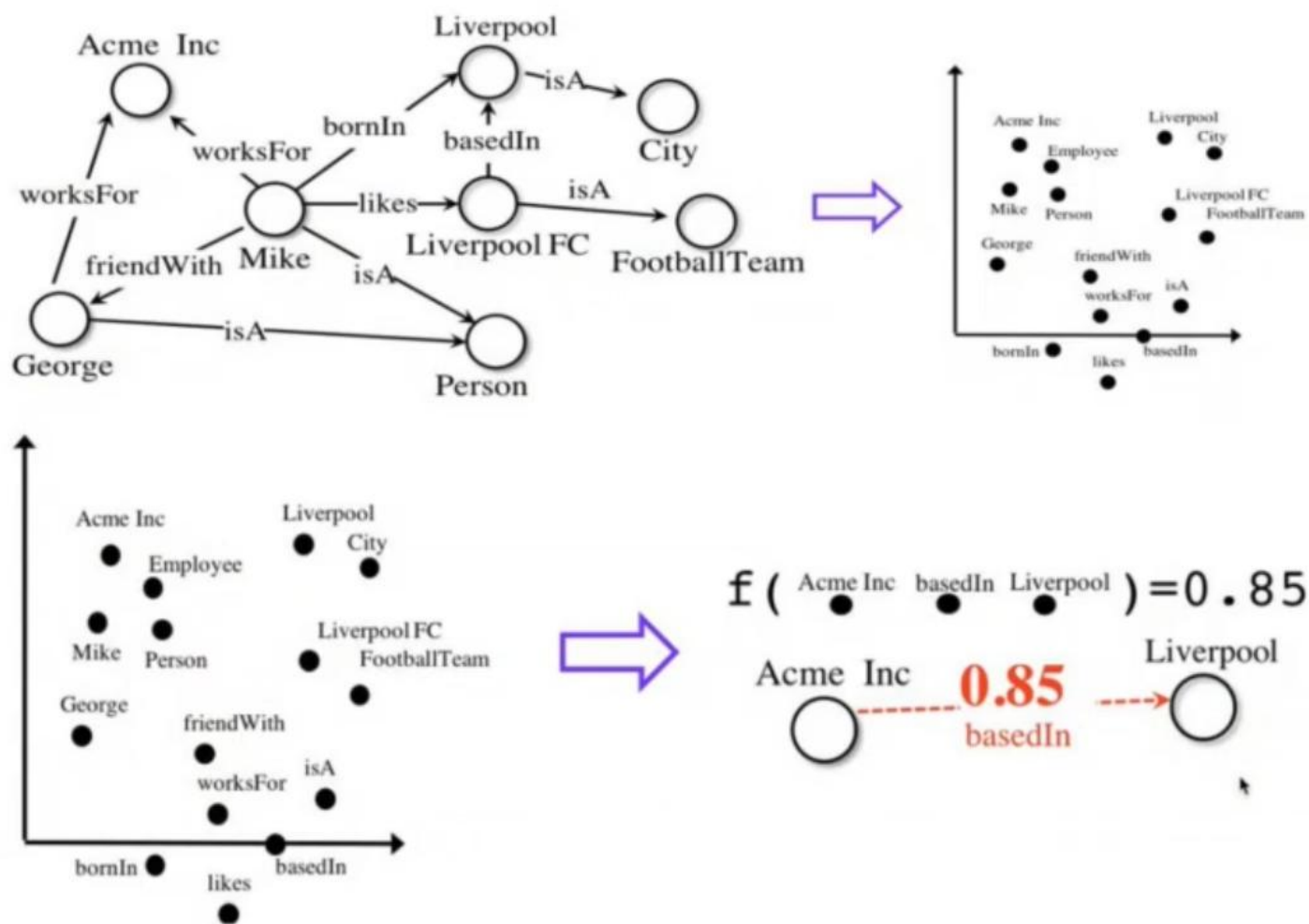




## Segment the Entity of Interest & Track/Target



# TacticalBOT – Situational Awareness Jarvis



## Describe the Situation/Scenario/Context



“A blue boat is sitting on the side of a building”

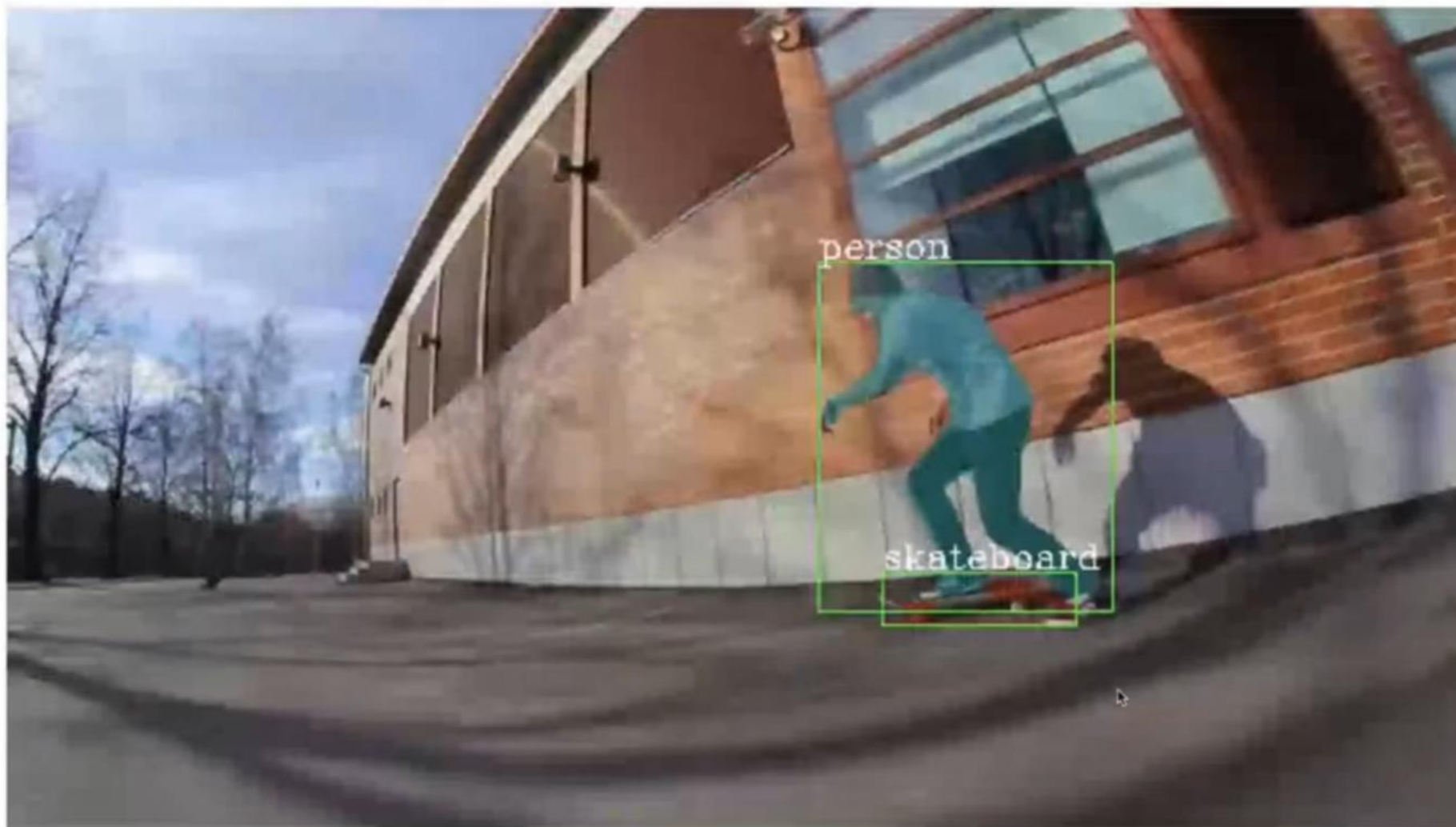


“A green bird sitting on top of a bowl”



“A woman sitting on a table with a giraffe”

## Track/Target on the move



# Target Escapes or Night Fall – LiDAR/Radio Tracking in 3D

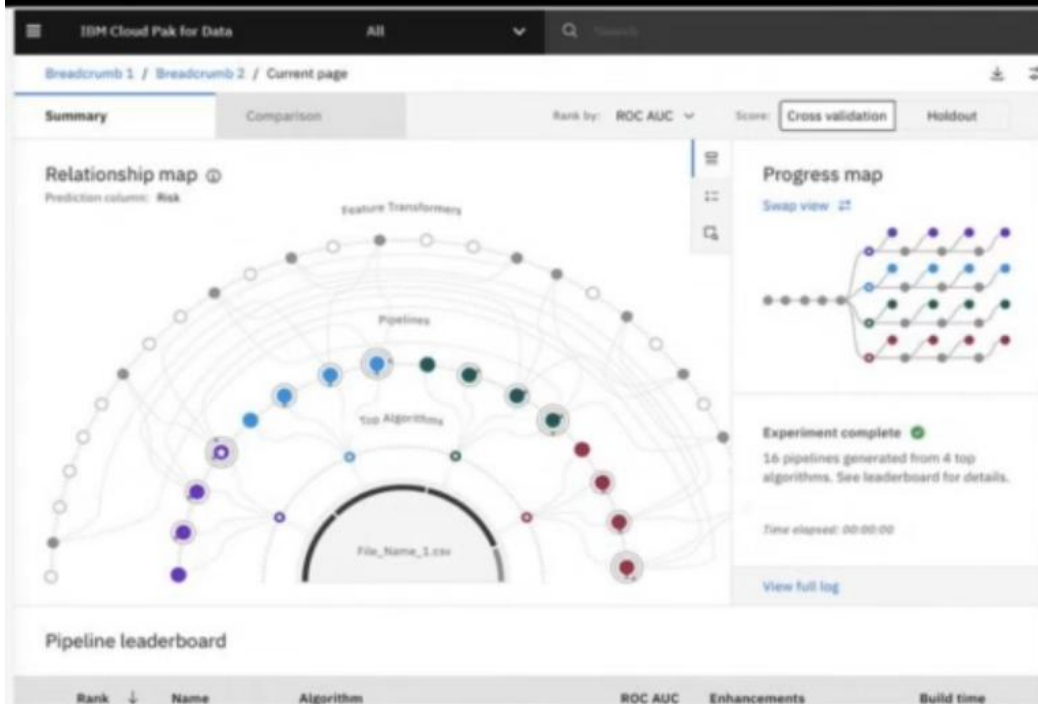


<https://github.com/maudzung/Complex-YOLOv4-Pytorch>

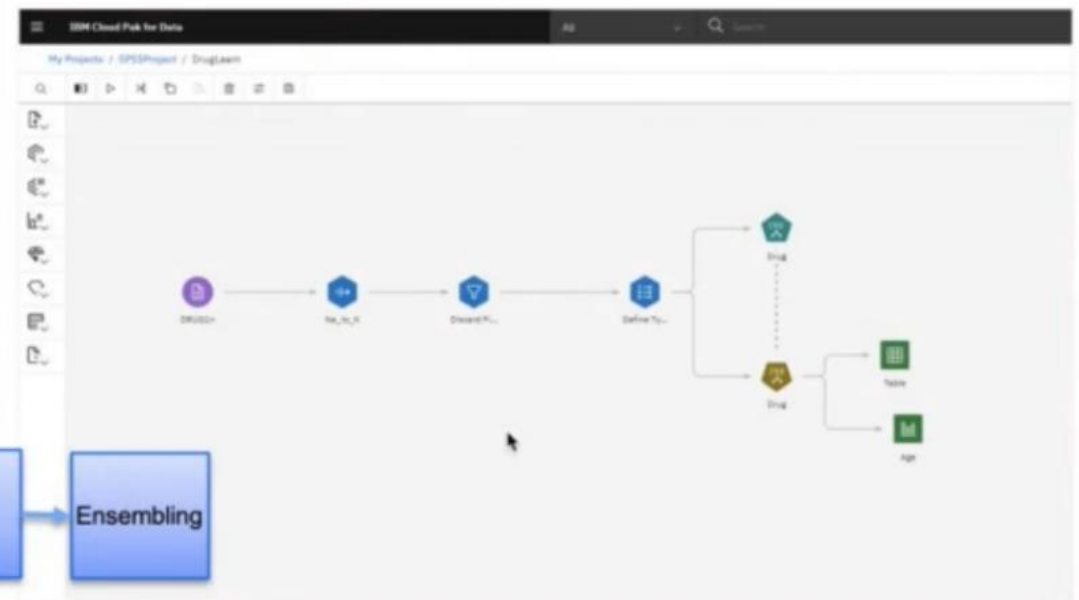


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Cre: [github.com/maudzung](https://github.com/maudzung)



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