



Fascinating Tales of a Strange Tomorrow

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ROBOT WAREHOUSES

Manpower shortages in the future may require mechanized handling of the necessities of life—food, clothing, building components and so on. As the population grows, the size of storage facilities will have to keep pace. Here is a

robot warehouse of the future, operated by a corps of mechanical men controlled by a lone operator in a control cupola suspended from a ceiling monorail. Directed electrically, never tiring, a robot warehouseman would pursue his duties as energetically as the proverbial ant.



AI: the story so far

1956

Dartmouth Summer Research Project



John McCarthy (1927-2011)

1956 - Coined the term "Artificial Intelligence"

1958 - Invented LISP

1971 - Received the Turing Award

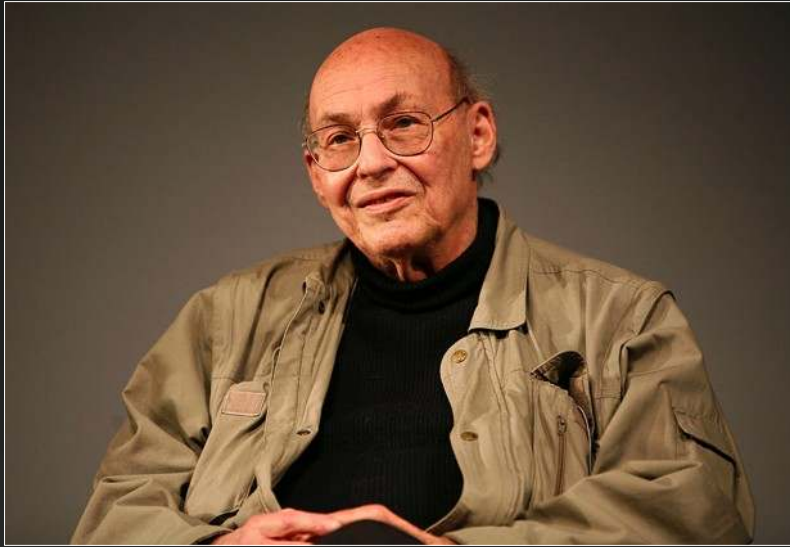
Forbidden Planet



Robbie the Robot

It's 2001. Where is HAL?

« No program today can distinguish a dog from a cat, or recognize objects in typical rooms, or answer questions that 4-year-olds can! »



Marvin Minsky (1927-2016)

1959 - Co-founded the MIT AI Lab
1968 - Advised Kubrick on "2001: A Space Odyssey"
1969 - Received the Turing Award



HAL 9000 (1992-2001)

Google

YAHOO!

amazon.com[®]

facebook

Millions of users... Mountains of data... Commodity hardware...
Bright engineers... Need to make money....

Gasoline waiting for a match!

12/2004 - Google publishes Map Reduce paper

04/2006 - Hadoop 0.1

The rest is history

Fast forward a few years

- ML is now a **commodity**, but still no HAL in sight
- Traditional Machine Learning doesn't work well when **features** can't be **explicitly** defined
- So what about solving tasks that are **easy for people** but hard to **describe formally**?
- Is there a way to get **informal knowledge** into a computer?
- Why would **AI** and **neural networks** work this time?

AI: why it is different this time

- Everything is digital: **large data sets** are available
 - Imagenet: 14M+ labeled images <http://www.image-net.org/>
 - YouTube-8M: 7M+ labeled videos <https://research.google.com/youtube8m/>
 - AWS public data sets: <https://aws.amazon.com/public-datasets/>
- Deep neural networks can now be trained thanks to **GPUs**.
 - State of the art networks have **hundreds** of layers
 - Baidu's Chinese speech recognition: 4TB of training data, +/- 10 Exaflops
- **Cloud elasticity** makes training affordable
 - **Grab** a lot of resources for fast training, then **release** them
 - Using a DL model is lightweight: you can do it on a **Raspberry Pi**

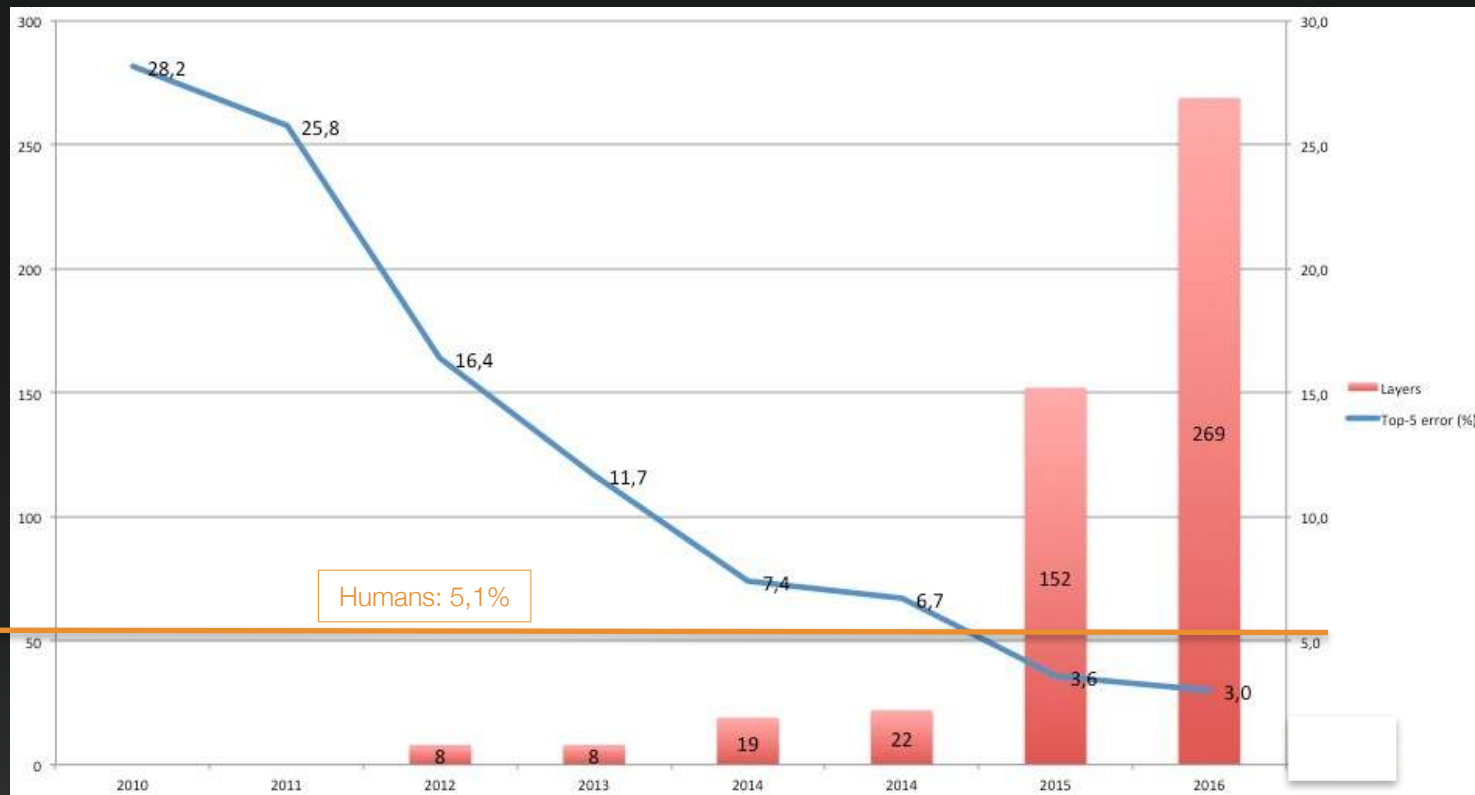


Applications of Deep Learning

Image classification



Same breed?

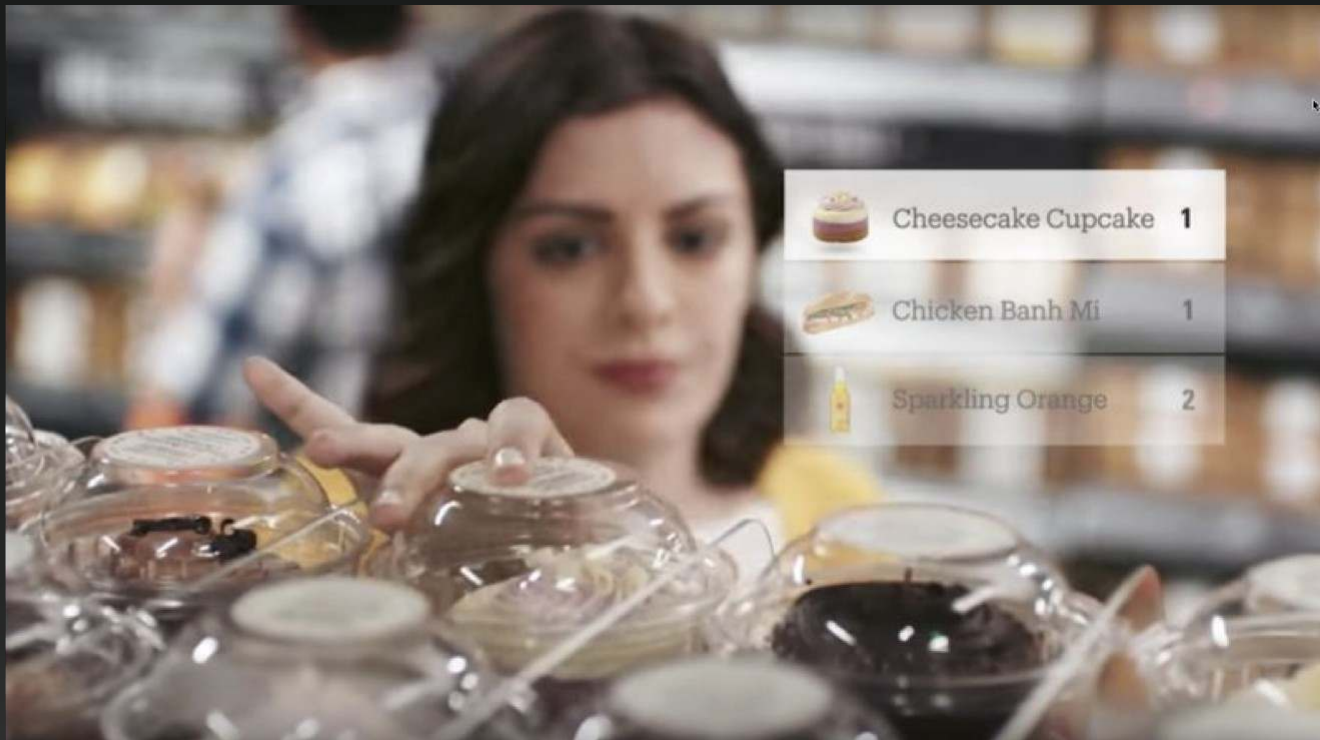


Personal assistants



Line-free shopping

amazon go



Autonomous driving

This past June, a driverless truck passed a 200-mile test drive from Yuma, Arizona, to San Diego, California—a milestone for autonomous trucking in the U.S. This feat was achieved by the company TuSimple, which trained its driving system using an AI technique known as deep learning to simulate tens of millions of miles of road driving.



Let's get you started

Selected customers running AI on AWS



NETFLIX

Stanford



The Washington Post



Carnegie Mellon

Pinterest



C-SPAN



real networks



GoAnimate



图森 tu Simple

duolingo



zmags

Questions, questions...

- What's the business problem my IT has failed to solve?
 - That's probably where Deep Learning can help
- Should I design and train my own Deep Learning model?
 - Do I have the expertise?
 - Do I have enough time, data & compute to train it?
- Should I use a pre-trained model?
 - How well does it fit my use case?
 - On what data was it trained? How close is this to my own data?
- Should I use a SaaS solution?
- Same questions as “Big Data” years ago!

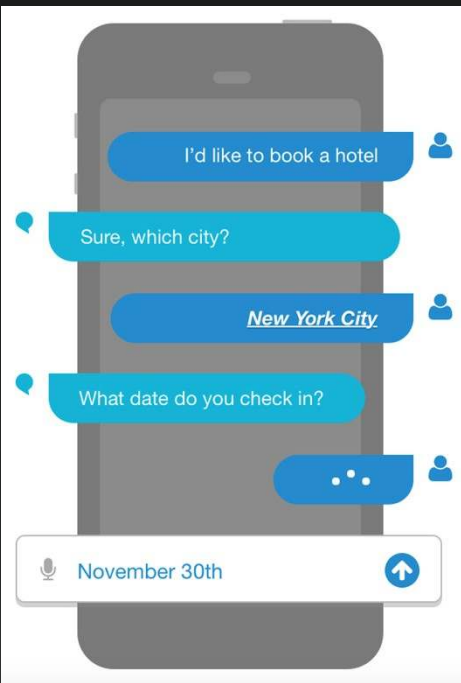
Amazon AI for every developer

Services	Chat Amazon Lex		Speech Amazon Polly		Vision Amazon Rekognition	
Platforms	Amazon ML	Spark & EMR	Kinesis	Batch	ECS	
Engines	MXNet	TensorFlow	Caffe	Theano	Pytorch	CNTK
Infrastructure	GPU	CPU	IoT		Mobile	

More information at aws.amazon.com/ai

Amazon Lex

BookHotel



Intents

An Intent performs an action in response to natural language user input

Utterances

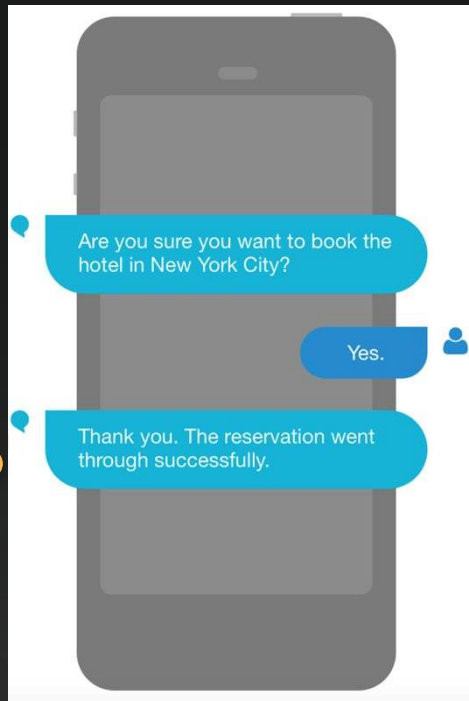
Spoken or typed phrases that invoke your intent

Slots

Slots are input data required to fulfill the intent

Fulfillment

Fulfillment mechanism for your intent



Amazon Polly

- A service that converts **text** into **lifelike speech**
- Offers **48 voices** across **24 languages**
- **Low latency** enable developers to build real-time systems
- Developers can store, replay and distribute generated speech



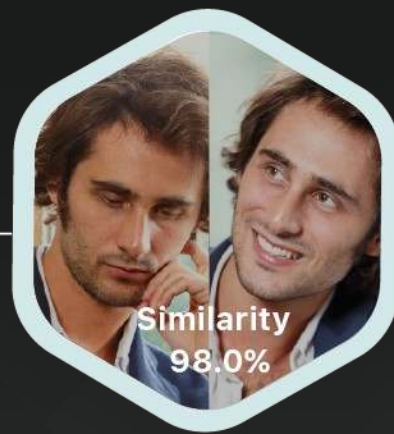
Amazon Rekognition



Object and
Scene
Detection



Facial
Analysis



Face
Comparison



Facial
Recognition

Apache MXNet: Open Source library for Deep Learning



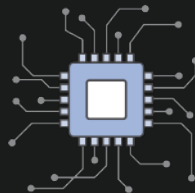
Programmable

Simple syntax,
multiple languages



Portable

Highly efficient
models for mobile
and IoT



High Performance

Near linear scaling
across hundreds of GPUs



Most Open

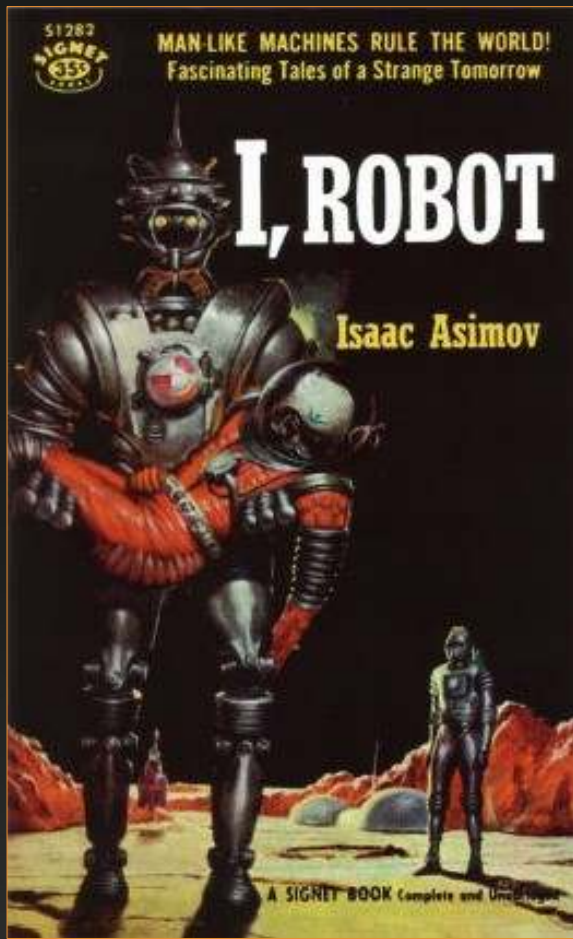
Accepted into the
Apache Incubator



Best On AWS

Optimized for
Deep Learning on AWS

More information at mxnet.io and
medium.com/@iulsimon



Will machines learn how to understand humans – not the other way around?

Will they help humans understand each other?

Will they end up ruling the world?

Who knows?

Whatever happens, these will be fascinating tales of our strange tomorrow.

Thank you

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