

Nursing Turing's Child Machine: Towards Communication-based Artificial Intelligence

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Facebook Artificial Intelligence Research

MAchine INtelligence Workshop
NIPS 2016

AI has landed!



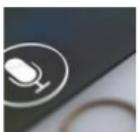
Google's 'DeepMind' AI platform can now learn without human input
The Next Web - 13 hours ago
In this case, the AI is optimizing the nodes to find the quickest solution to deliver the desired outcome. Over time, it'll use the acquired data to ...

[Google DeepMind AI Learns From Its Own Internal Memory With ...](#)
Hot Hardware - 15 hours ago

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Gartner: AI to become a top business investment priority
Computerworld - 13 hours ago
People already know and interact with A.I. systems through IBM's Watson, IPSoft's Amelia, Apple's Siri, Microsoft's Cortana and Google ...



Tim Cook's Japan visit could result in superior Apple AI
Macworld - 12 hours ago
"AI is horizontal in nature, running across all products, and is used in ways that most people don't even think about," Cook told Nikkei Asian ...

[Apple CEO says iPhone's future is in AI](#)
Highly Cited - Nikkei Asian Review - Oct 16, 2016

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Pittsburgh's AI Traffic Signals Will Make Driving Less Boring
IEEE Spectrum - 14 hours ago
Sophisticated AI algorithms use that data to build a timing plan "that moves all the vehicles it knows about through the intersection in the most ..."



Is the AI apocalypse a tired Hollywood trope, or human destiny?
Digital Trends - Oct 17, 2016
The reality of AI is nothing like the movies. Siri, Alexa, Watson, Cortana — these are our HAL 9000s, and none seems even vaguely murderous.

AI has landed!

How An A.I. Donald Trump Is Making Twitter Great Again | Popular ...

www.popsci.com/an-ai-donald-trump-bot-is-making-twitter-great-again ▾

4 Mar 2016 - As if the world needed more Donald Trump, a researcher at MIT's Computer Science and Artificial Intelligence Laboratory has created an ...

Does YouTube's A.I. favor Trump and fake news? A call for ... - Medium

<https://medium.com/.../youtubes-ai-is-neutral-towards-clicks-but-is-biased-towards-pe...> ▾

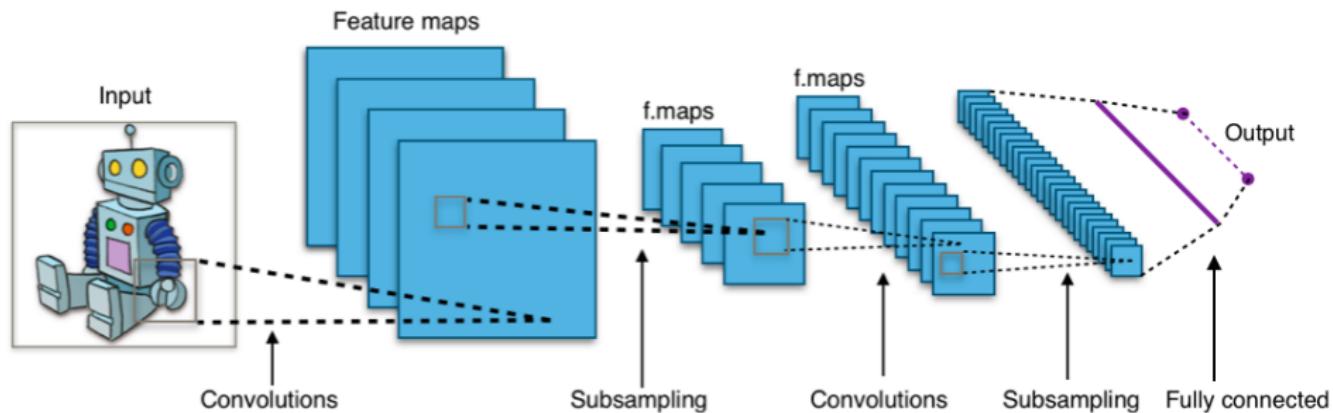
27 Nov 2016 - Stop telling me to chill out about Donald Trump ... YouTube's Artificial Intelligence (A.I.) recommends tens of billions of videos every single day, yielding billions ... A large proportion of these recommendations were fake news.

Donald Trump will win the election, reliable AI system predicts

[www.ibtimes.co.uk › Technology › Innovation](http://www.ibtimes.co.uk/technology/innovation) ▾

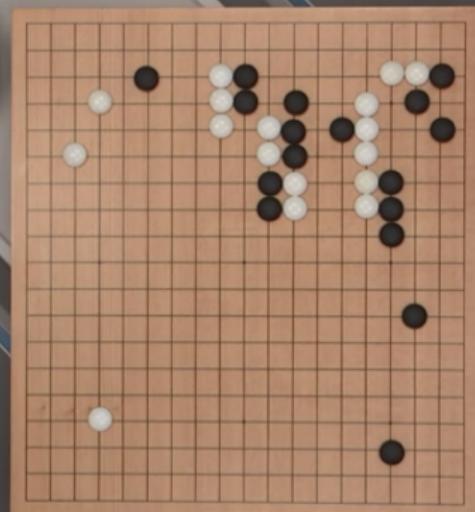
29 Oct 2016 - An AI system that accurately predicted the last three US elections says Donald ... Trump campaign launches its own nightly news show on Facebook Live ... Post that Trump is most likely to win based on a system of true/false ...

Has it, really?



Has it, really?

ALPHAGO
01:42:16



LEE SEDOL
01:40:00

Google DeepMind
Challenge Match



The AI I'd want

H: Can you go to the public day hospital to retrieve dad's blood test results?

M: Sure, but where is that?

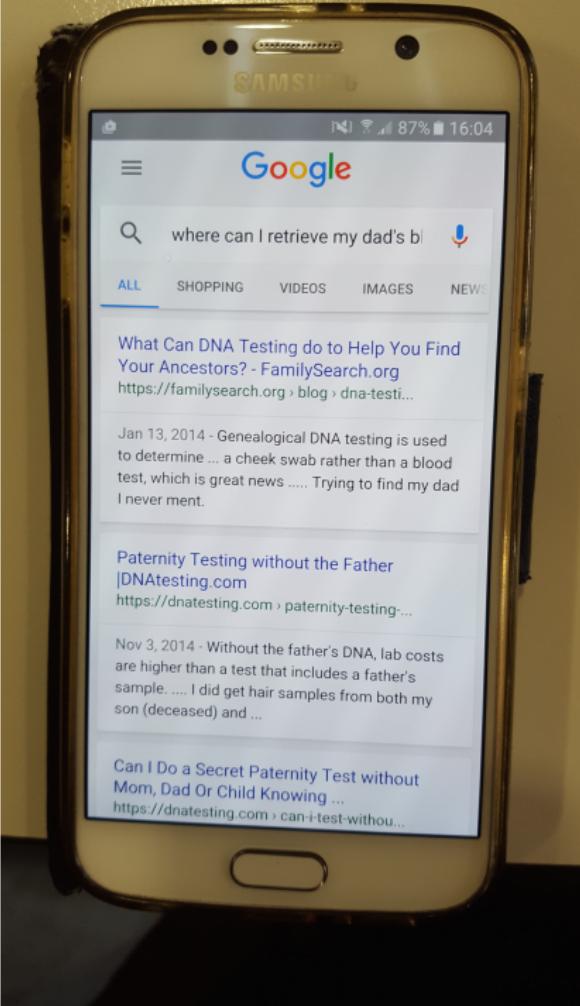
H: It's the big building just near your supermarket

M: Ah, OK--do I need to get a number and wait?

H: No, you can pick up the results directly at the reception

M: Great, then I'll go this afternoon when I'm out grocery shopping

The AI I get



Desiderata

- ▶ ability to communicate through natural language
- ▶ ability to learn about new tasks efficiently
- ▶ ability to learn, efficiently, through language
- ▶ no explicit supervision
 - ▶ sparse reward, self-motivation

How to train an intelligent machine: the mainstream view

Thou shalt learn from the *real world*



Turing's child machine

Instead of trying to produce a programme to simulate the adult mind, why not rather try to produce one which simulates the child's? If this were then subjected to an appropriate course of education one would obtain the adult brain.

Turing, A.M. (1950). Computing machinery and intelligence.
Mind, 59, 433-460.

CommAI-env: A kindergarten for Turing's child

github.com/facebookresearch/CommAI-env

- ▶ kickstart basic skills needed to enable language-based communication with humans
- ▶ *not* aimed at teaching all a machine needs to know...
- ▶ but to make it efficient at learning via communication...
- ▶ so that we can put humans in the loop ASAP

CommAI-env: guiding principles

- ▶ communication-based
 - ▶ all tasks are based on instructions given through language
 - ▶ task solution typically requires multiple linguistic exchanges
- ▶ learning system is exposed to a number of different tasks
- ▶ no train/test split
 - ▶ learner is evaluated on average reward from very beginning
 - ▶ *speed of learning* is part of the evaluation
 - ▶ tasks change over time

FROGs (Frequently Raised Objections and Grumbles)

- ▶ What's new here? How about bAbI, OpenAI Gym/Universe, DeepMind Lab, Alexa Prize, Visual Question Answering, Allen AI Challenge, GoodAI School for AI, the machine reading data sets...
- ▶ Intelligence requires grounding in perception
- ▶ This is Blocks World all over again: you're just a bunch of bell-bottomed seventies AI hippies in disguise
- ▶ You just have an arbitrary set of tasks, there is so much more that the Learner should be trained to do
 - ▶ ... and it's difficult to decide what in a top-down manner, that's why you need the "real world"

FROGs (Frequently Raised Objections and Grumbles)

- ▶ Wouldn't LSTMs/Memory Networks/Deep RL/Differentiable Neural Computers solve this?
- ▶ Isn't this just glorified reinforcement learning?
- ▶ Why are you proposing a challenge without a computational model that can tackle it?
- ▶ The CommAI-env acronym sucks, how do you expect to attract attention towards your project with such a bad acronym?

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