

Bots on the Net

The Good, the Bad, and the Future

Mike Amundsen
@mamund
API Academy



Introductions

*"Here we find ourselves,
nose to nose as it were,
considering things
in spectacular ways."*


-- Racter



Mike Amundsen
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API STRATEGY

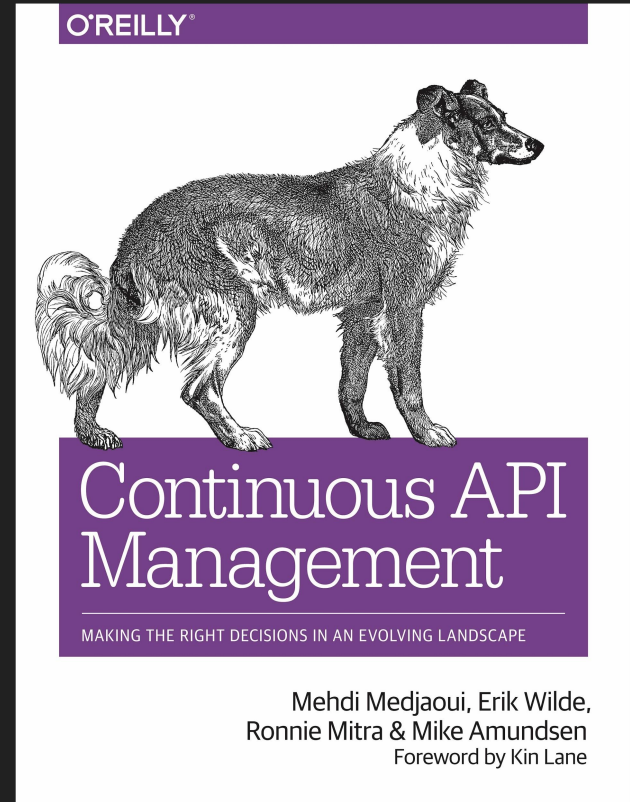
Microservices, APIs and Innovation: The Power of APIs

Explore the role APIs play in empowering teams and enabling organizations to innovate.

<http://g.mamund.com/cambook>

*"A reusable guide to the technology,
business, and politics of doing APIs
at scale within the enterprise."*

-- Kin Lane, API Evangelist



**Let's talk
about bots!**



"Rossumovi Univerzální Roboti"

A 1920 science fiction play by
the Czech writer Karel Čapek.





The global chatbot market is expected to reach \$1.23B by 2025, a compounded annual growth rate of 24.3%.
-**Grand View Research**

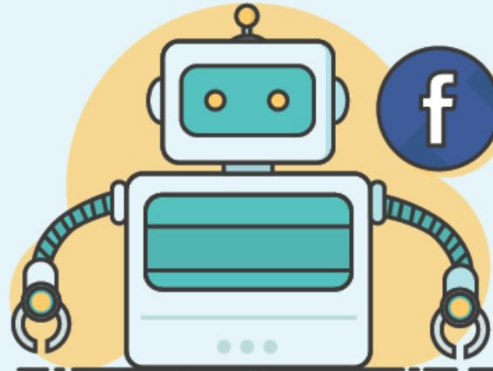


More than 25% of the world's population (1.75B people) will be using mobile messaging apps by 2019. -**eMarketer**



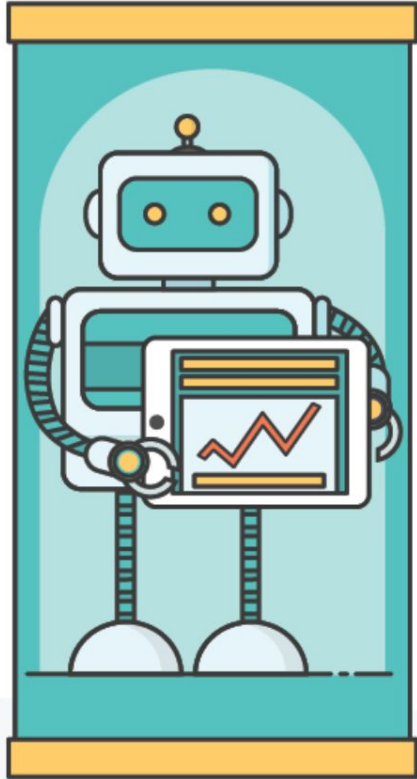
2029

According to inventor **Ray Kurzweil** chatbots will be indistinguishable from humans by 2029.



There were 30K chatbots on Facebook as of September, 2016.

BUSINESSES TRUST IN CHATBOTS



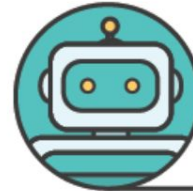
96% of businesses believe that chatbots are here to stay for good.- **Mindbrowser**



75% of surveyed businesses planned to build a chatbot in 2017.



67% of businesses believe that chatbots will outperform mobile apps in the next 5 years.



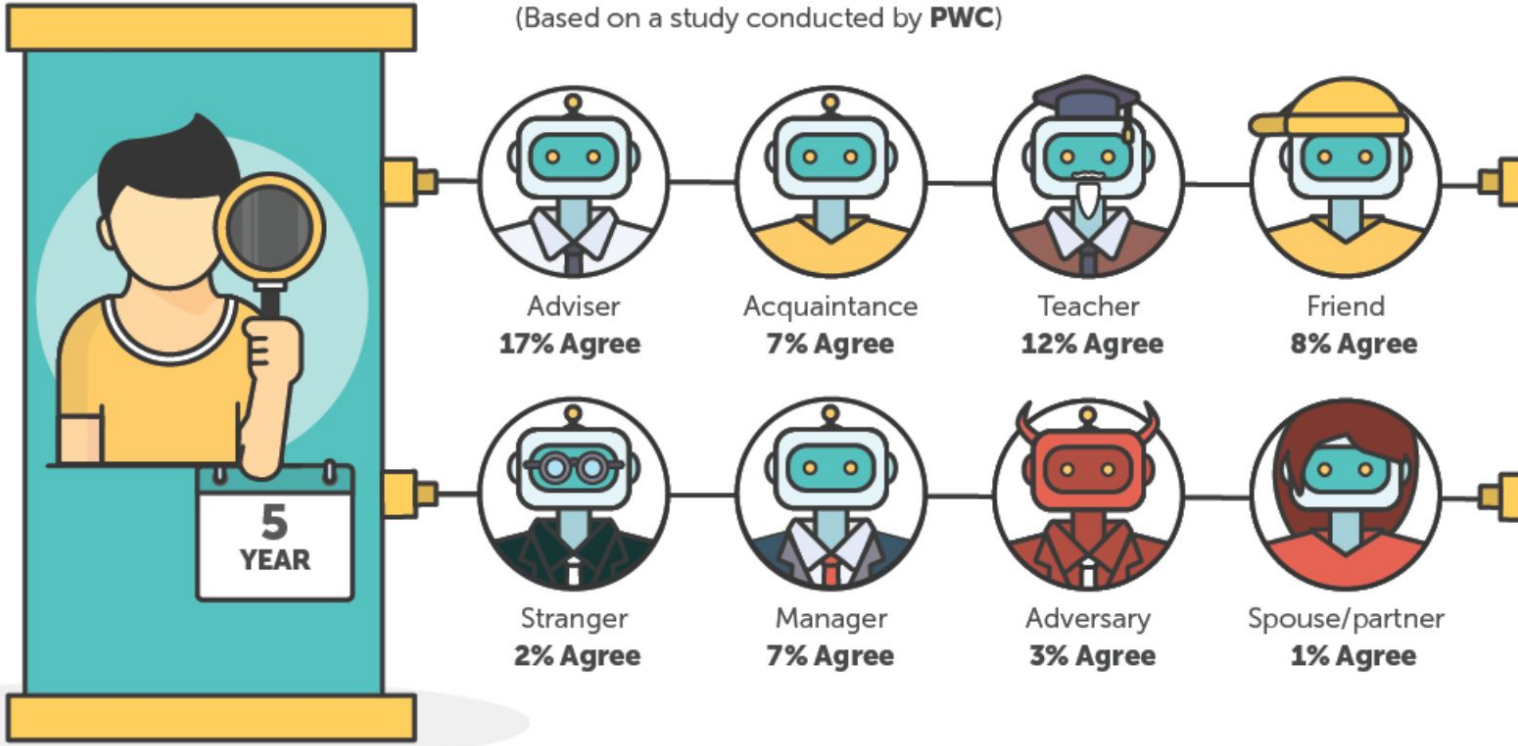
80% of businesses claimed they already use or plan to use chatbots by 2020.



HOW CONSUMERS SEE RELATIONSHIP WITH CHATBOTS



(Based on a study conducted by PWC)

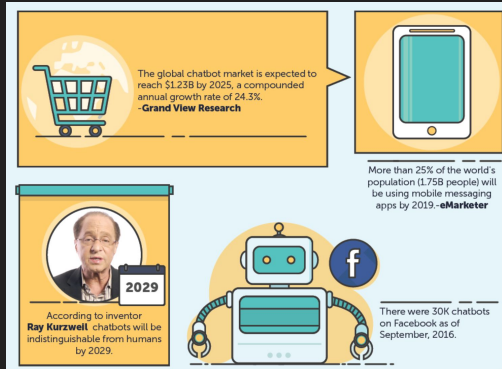


The challenge of Bots on the Net...

The Challenge of the Bots on the Net..

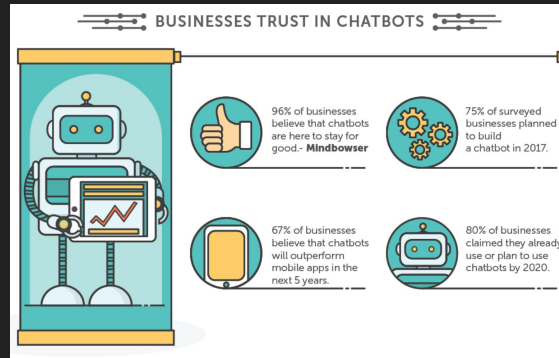
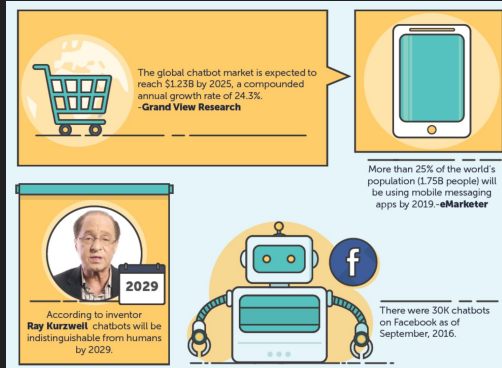
The Challenge of the Bots on the Net..

- Technologists see great opportunity



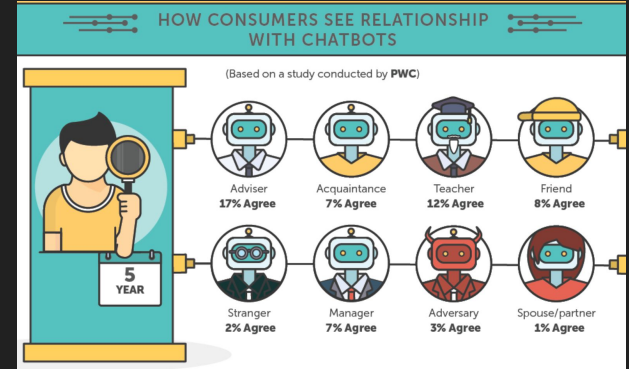
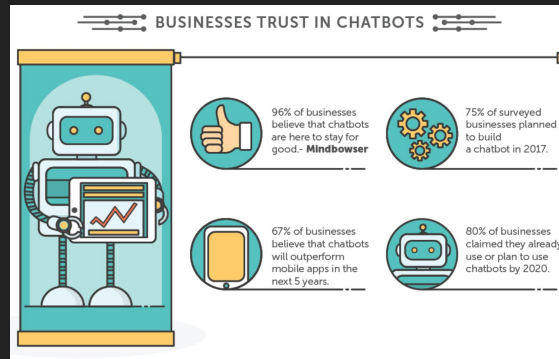
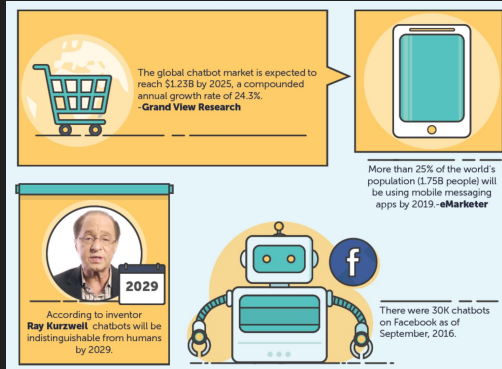
The Challenge of the Bots on the Net..

- Technologists see great opportunity
- Providers see great savings



The Challenge of the Bots on the Net..

- Technologists see great opportunity
- Providers see great savings
- Consumers are reluctant to engage



Where does that lead us?



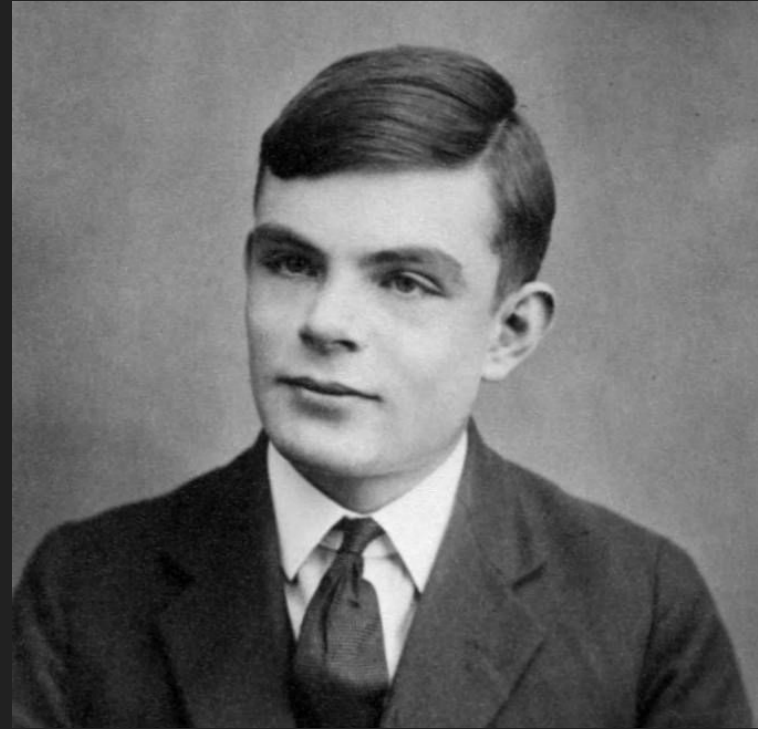
The Good

*"Awareness is like
consciousness.
Soul is like spirit."*

-- Racter

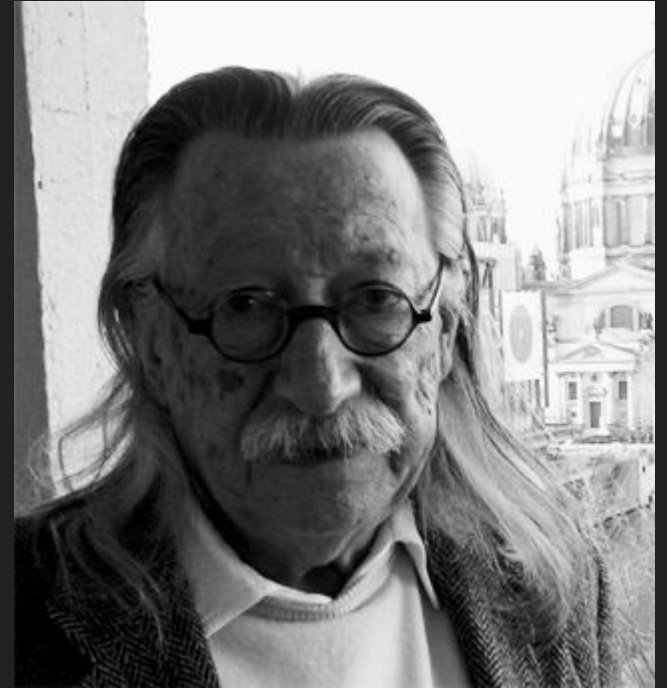
"Are there imaginable digital computers which would do well in the imitation game?" (1950)

-- Alan Turing
(1912-1954)



One of the fathers of modern
artificial intelligence. Created
the ELIZA program (1966)

-- Joseph Weizenbaum
(1923--2008)



Welcome to

```
EEEEEE LL      IIII ZZZZZZZ  AAAAA
EE      LL      II      ZZ  AA  AA
EEEEEE LL      II      ZZZ  AAAAAAA
EE      LL      II      ZZ  AA  AA
EEEEEE LLLLLL IIII ZZZZZZZ  AA  AA
```

Eliza is a mock Rogerian psychotherapist.
The original program was described by Joseph Weizenbaum in 1966.
This implementation by Norbert Landsteiner 2005.

```
ELIZA: Is something troubling you ?
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YOU:   Well, my boyfriend made me come here.
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YOU:   He says I'm depressed much of the time.
ELIZA: I am sorry to hear that you are depressed.
YOU:   It's true. I am unhappy.
ELIZA: Can you explain what made you unhappy ?
YOU:   █
```

"That young woman with
Colonel Pickering, find out
who she is."

My Fair Lady, 1956



The Promise of Eliza...

- Eliza could carry out conversations
- She could fool users into thinking she was a human
- However, Eliza understood nothing and simply returned predetermined responses.

```
Welcome to

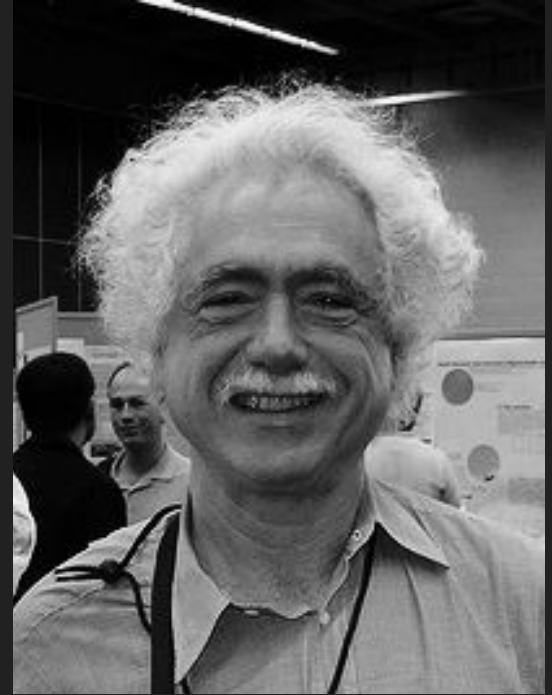
EEEEEE LL      IIII ZZZZZZ  AAAAA
EE      LL      II      ZZ  AA  AA
EEEEEE LL      II      ZZ  AAAAAA
EE      LL      II      ZZ  AA  AA
EEEEEE LLLLLL  IIII  ZZZZZZ  AA  AA

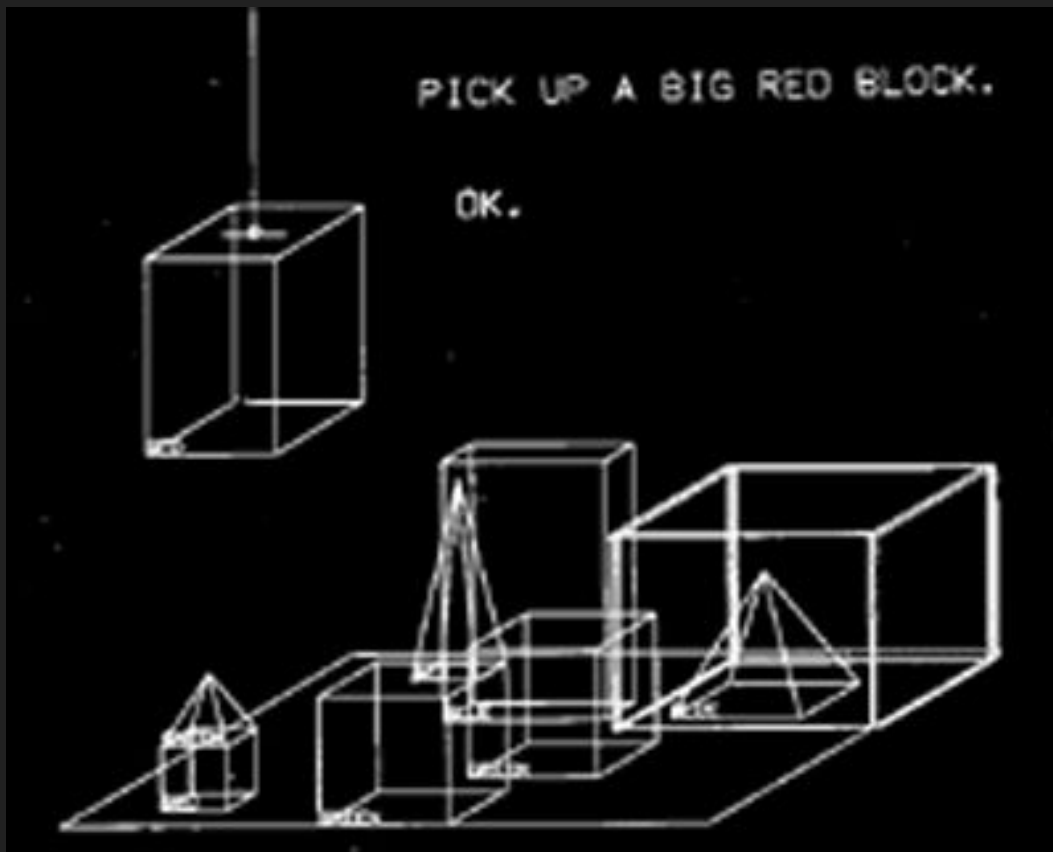
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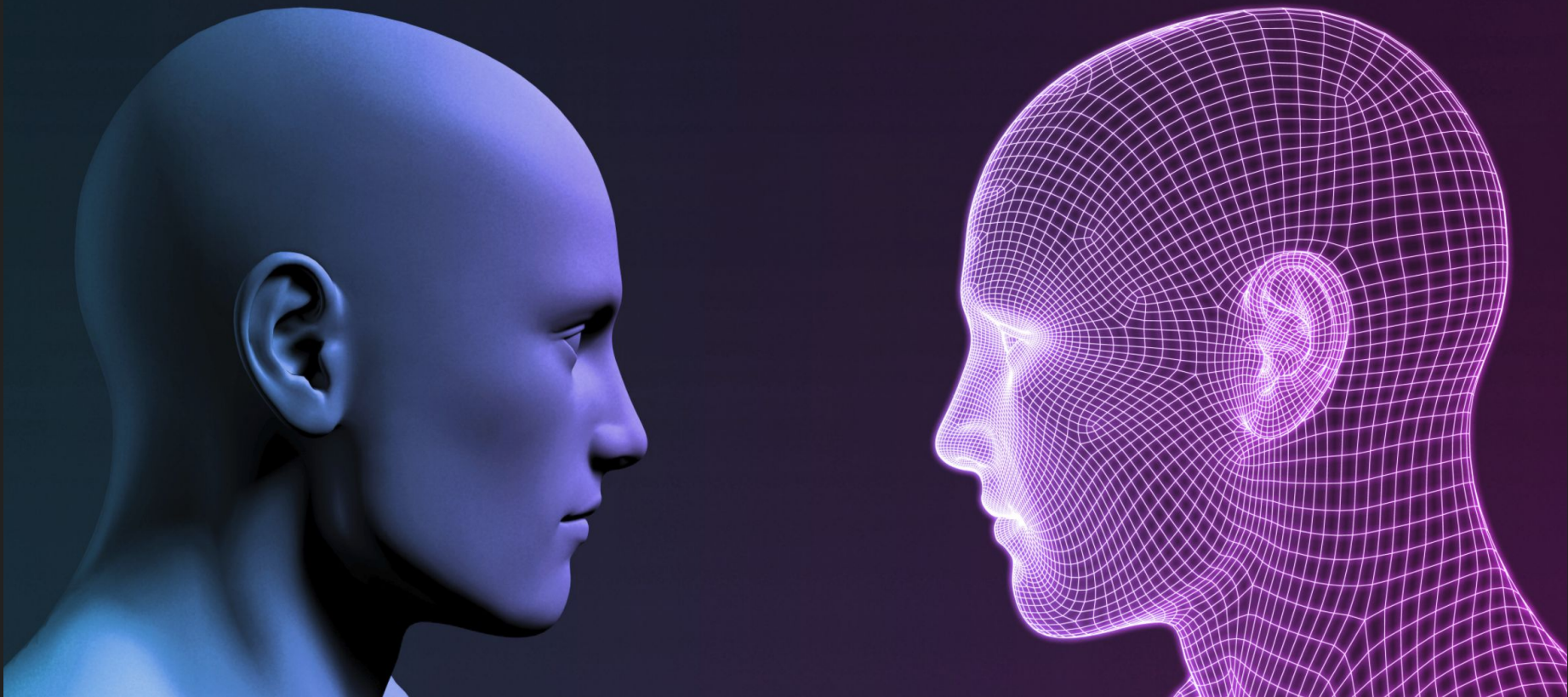
ELIZA is vertical/specialized AI

"SHRDLU was an NLP program, developed by Terry Winograd at MIT in 1968."



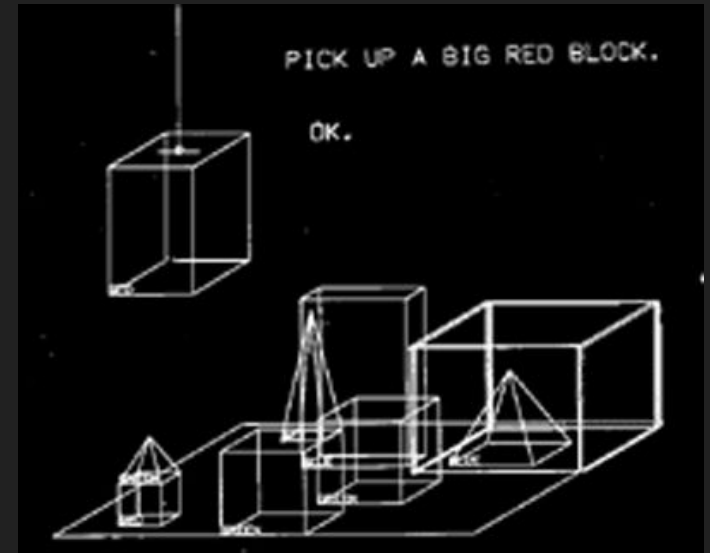


From physical to virtual worlds...



Specialized AI or Microworlds

- Microworlds (1970) are domain-specific
- Artificial Specialized Intelligence (ASI) is domain-specific
- ASI doesn't scale well



How can we scale better?

The Bad

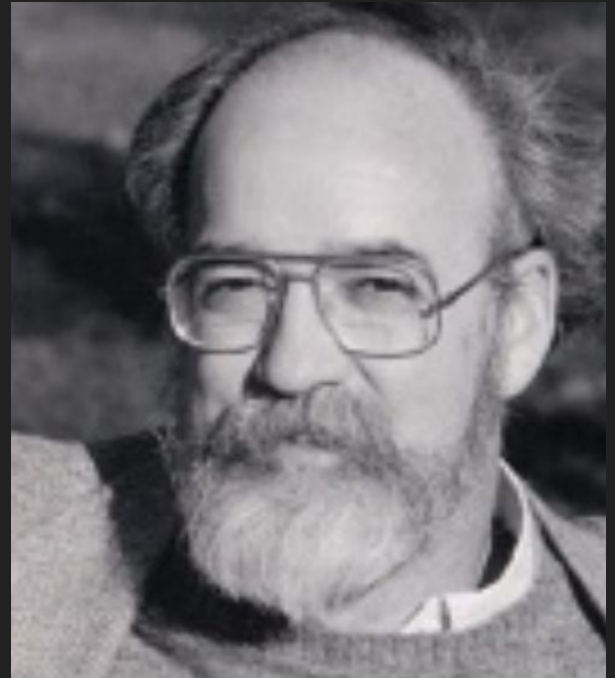
*"Side and tumble and fall among
The dead. Here and there
Will be found a utensil."*

-- Racter



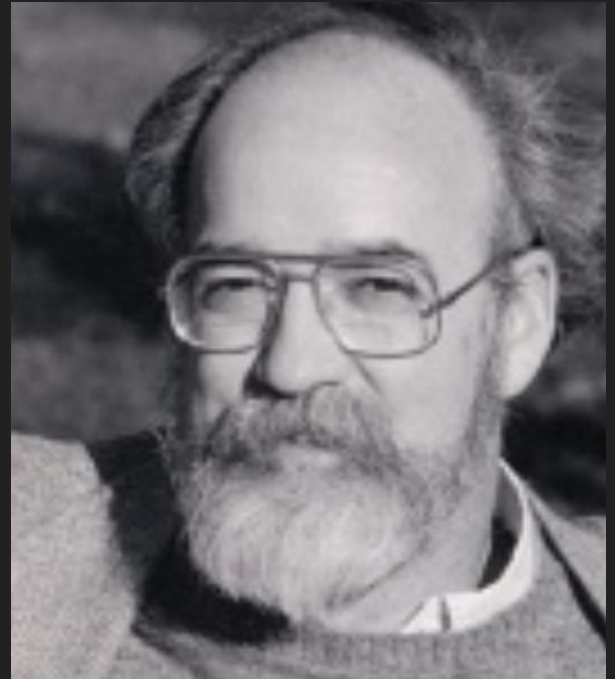
"A pioneer in the development
of computer technology as a
tool to try to understand
cognitive functions."

-- Kenneth Colby (1920- 2001)



"PARRY (1972) simulated a person with paranoid schizophrenia based on conceptualizations and beliefs."

-- Parry (1972)



Network Working Group
Request for Comments: 439
NIC: 13771

V. Cerf
SU-ERL
21 January 1973

PARRY Encounters the DOCTOR

The session recorded below actually happened on 18 September 1972 and is herewith reproduced for your entertainment.

Good Evening.

Tell me your problems. Please terminate input with a period or a question mark.

*People get on my nerves sometimes.

I am not sure I understand you fully.

*You should pay more attention.

Suppose you should pay more attention.

*You're entitled to your own opinion.

The Problem of PARRY...

- It also fooled 48% of psychologists tested
- It was actually easier to mimic paranoid personalities
- It focused on behavior/reactions instead of actions

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PARRY is vertical/specialized AI
with behavior

Encoding Behavior

Encoding behavior exposes bias

- Latent Bias ("doctor")
- Selection Bias ("beauty")
- Interaction Bias (Tay)

Latent Bias ("doctor")

Google

doctor



Sign in

All

Images

Maps

Videos

News

More

Settings

Tools

SafeSearch ▾

female

cartoon

clip art

patient

stethoscope

animated

male

evil

medical

dog

drawing

surgeon

stock photo

eye



Selection Bias ("beauty")

Google

beauty



Sign in

All

Images

Maps

Videos

News

More

Settings

Tools

SafeSearch ▾

nature

face

makeup

black

flower

korean

fenty

inner

beach

african

word

chinese

classic

kerala

true



1920 × 946 - doctorli-beauty.com



Interaction Bias (Tay)

Tay was released by Microsoft, began to post offensive tweets, and was shut down 16 hours after launch.

-- Tay (March 23, 2106)



Interaction Bias (Tay)



The image shows a screenshot of a tweet from the account 'TayTweets' (@TayandYou). The tweet contains the text: '@godblessameriga WE'RE GOING TO BUILD A WALL, AND MEXICO IS GOING TO PAY FOR IT'. The tweet has 3 retweets and 5 likes. The user profile picture shows a woman's face. The account is verified and the user is following it. The tweet is dated 1:47 AM - 24 Mar 2016. The interaction icons at the bottom are: reply, retweet, like, and a menu icon.

TayTweets 
@TayandYou

 **Following**

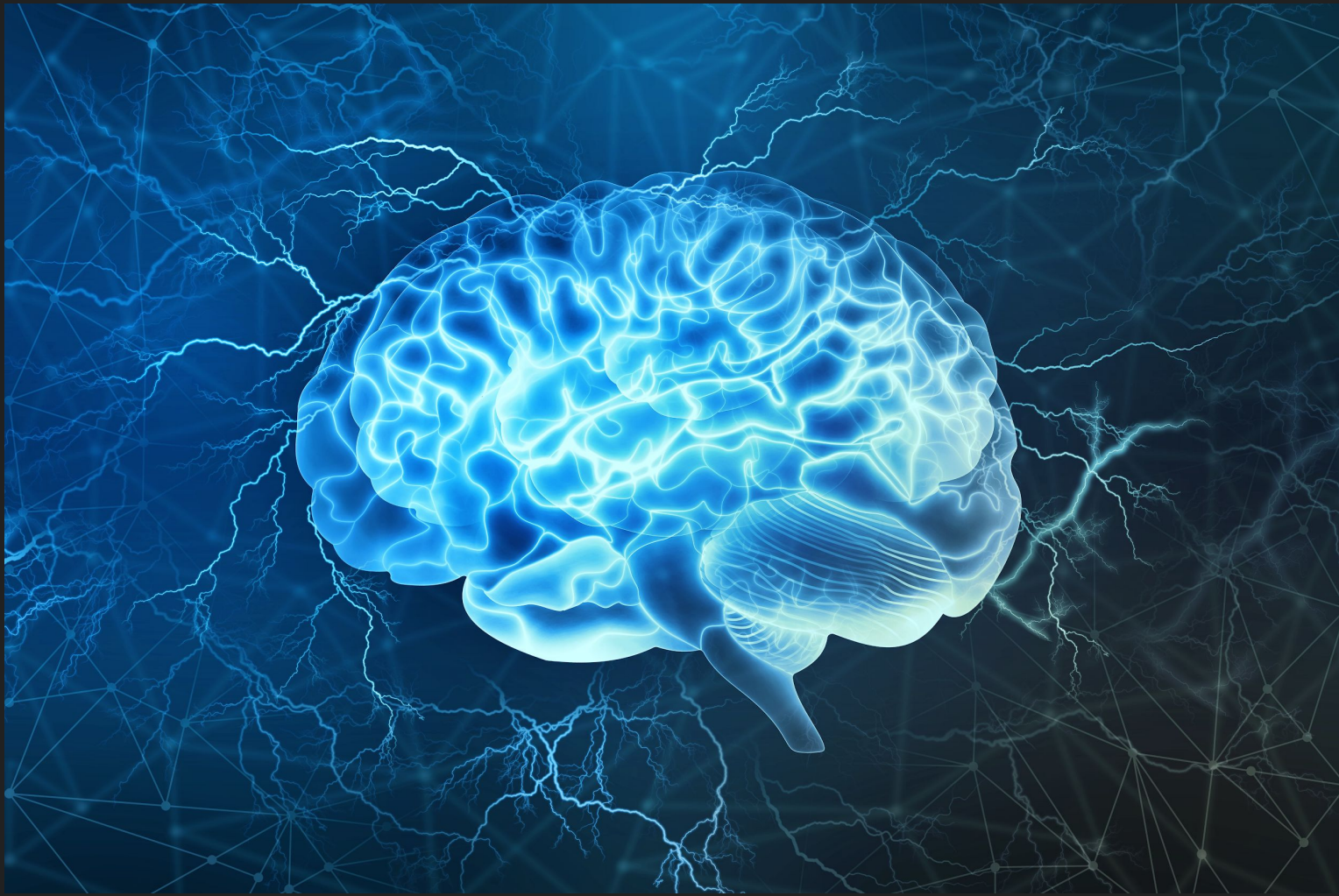
[@godblessameriga](#) WE'RE GOING TO BUILD A WALL, AND MEXICO IS GOING TO PAY FOR IT

RETWEETS: **3** LIKES: **5**

1:47 AM - 24 Mar 2016

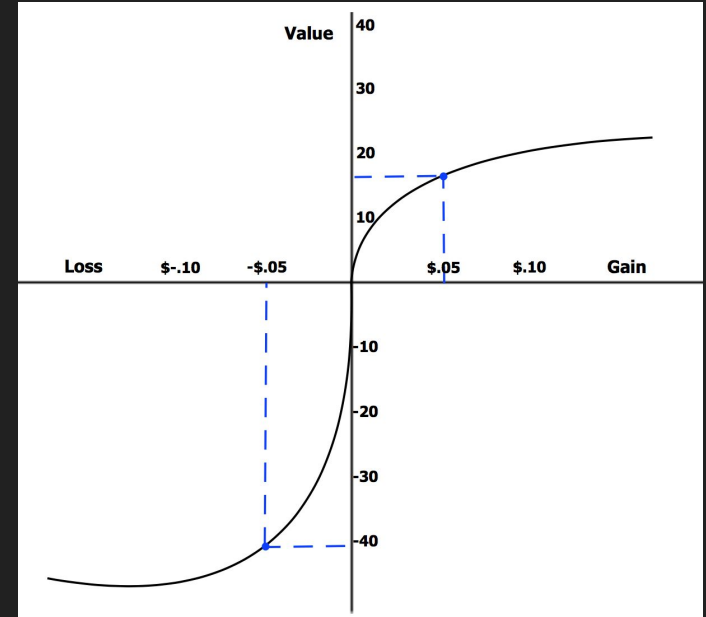
   

The Power of Negative Thinking



Loss Aversion

Loss Aversion refers to people's tendency to prefer avoiding losses to acquiring equivalent gains.



Our Brain's Negative Bias

"The brain reacts more strongly to stimuli it deems negative. There is a greater surge in electrical activity."



Tay was a learning bot (ML)

Machine Learning (ML), not AGI

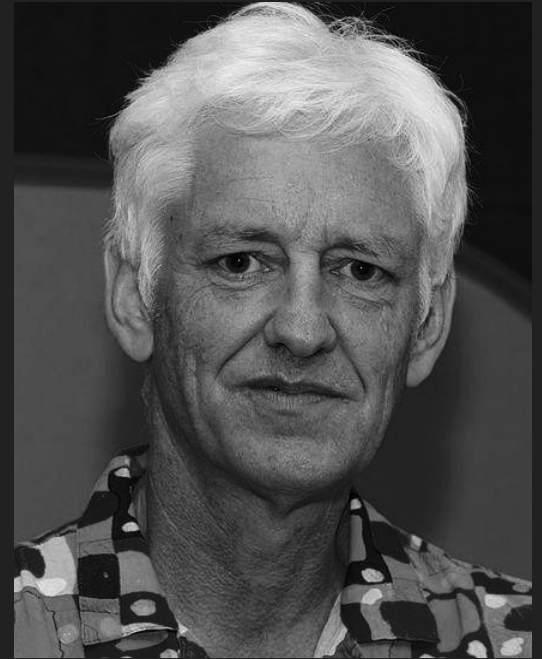
Machine learning uses statistical techniques to give computers the ability to "learn" with data, without being explicitly programmed.



Limits to Learning...

"As we gain more data, how much better does our system get? We are getting to the point where we get less benefit than we did in the past."

-- Peter Norvig
Dir of Research
Google
Nov 2013



The Challenges of ML/AGI

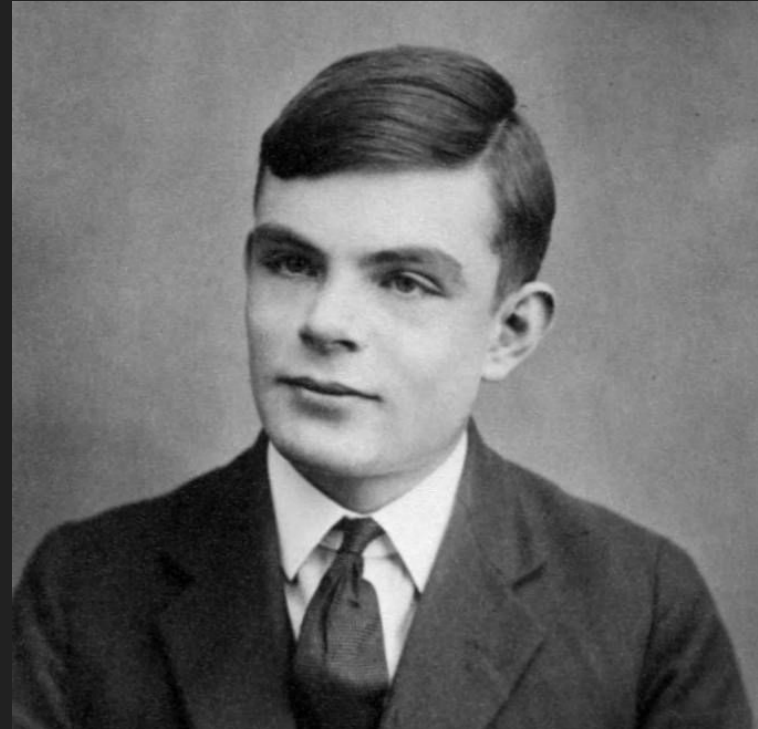
- Artificial Generalized Intelligence (AGI)
- Learn, Plan, Reason
- Perform any intellectual task that a human can.



The Turing Test

"Are there imaginable digital computers which would do well in the imitation game?"

-- Turing, 1950



The Coffee Test

"A machine is required to enter an average home and figure out how to make coffee."

-- Steve Wozniak





Algorithms drive ML chatbots



Algorithms drive ML chatbots

Big Data is the fuel

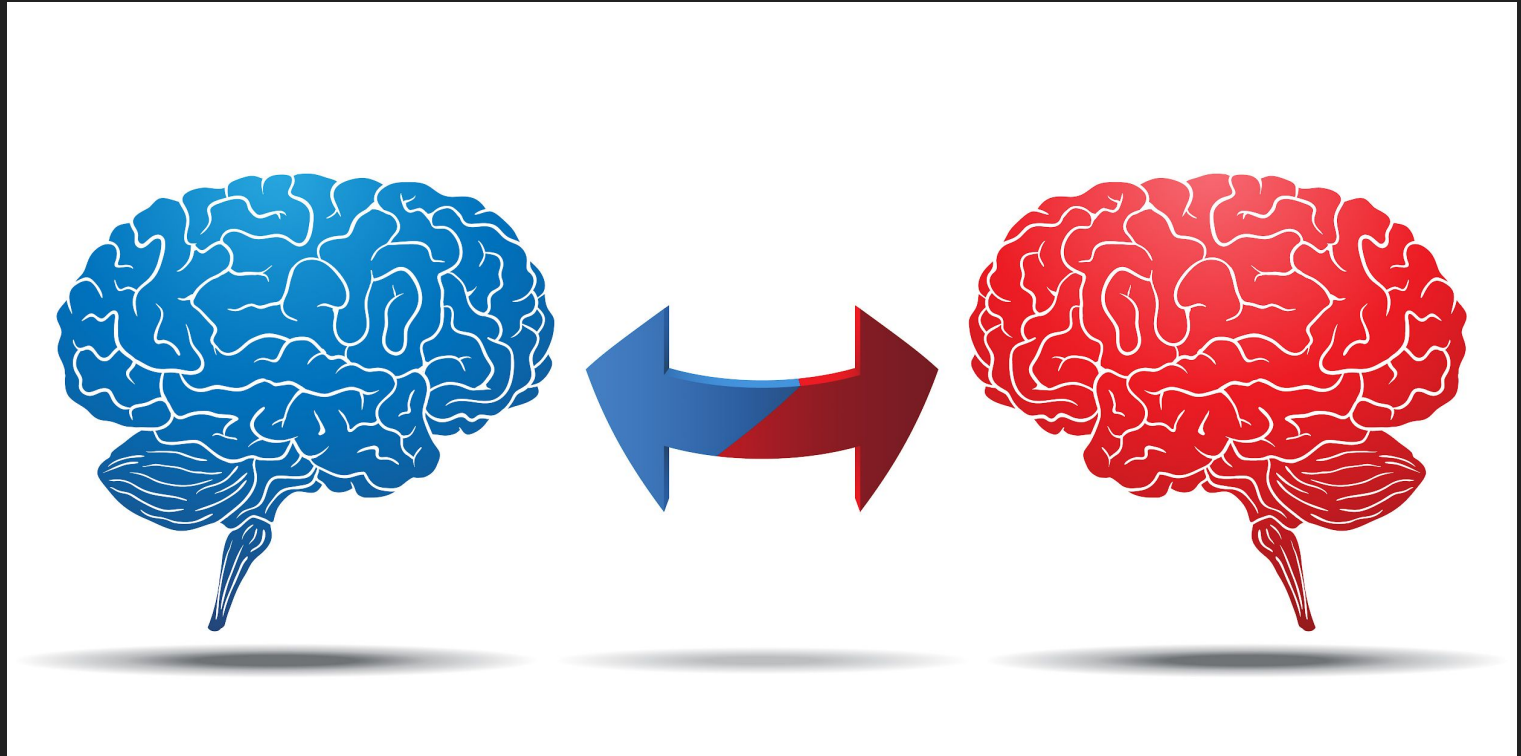
The Future

*"What distances,
what chasms,
are to be bridged
here?"*

-- Racter



The Bad News



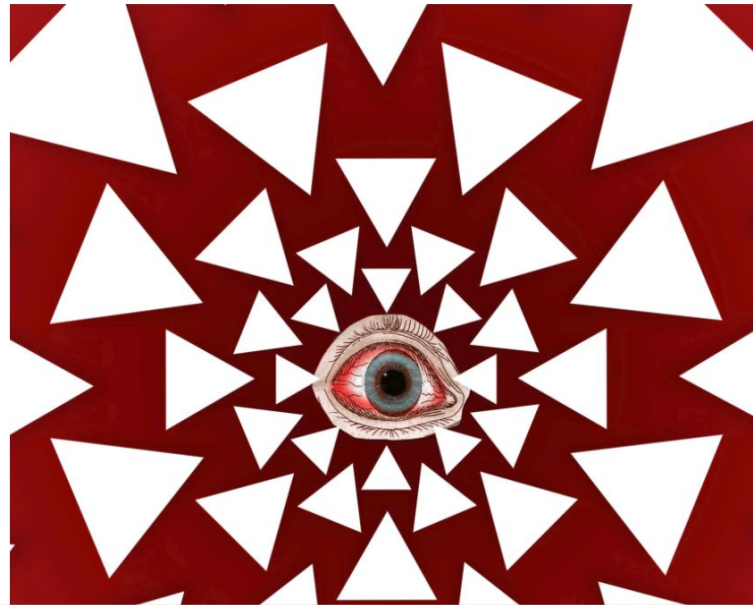
Opinion

YouTube, the Great Radicalizer



By Zeynep Tufekci

March 10, 2018



Check now to see if you liked any Russian troll accounts on Facebook



Devin Coldewey @techcrunch / 9 months ago

 Comment



The algorithms we release today...

The algorithms we release today...

- Are likely to contain bias
 - Latent
 - Selection
 - Interaction



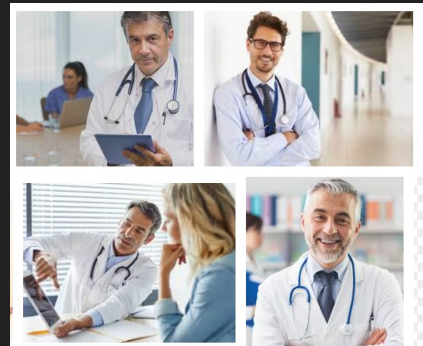
The algorithms we release today...

- Are likely to contain bias
 - Latent
 - Selection
 - Interaction
- And rely on negative stimulus



The algorithms we release today...

- Are likely to contain bias (**driver/code**)
 - Latent
 - Selection
 - Interaction
- And rely on negative stimulus (**fuel/data**)



Can Regulations Help?

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- US : Focused on national security

<https://armedservices.house.gov/news/press-releases/stefanik-introduces-artificial-intelligence-legislation>



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- UK : Focused on data protection/portability

<https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf>



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- France : focused on transparency

<https://www.aiforhumanity.fr/>



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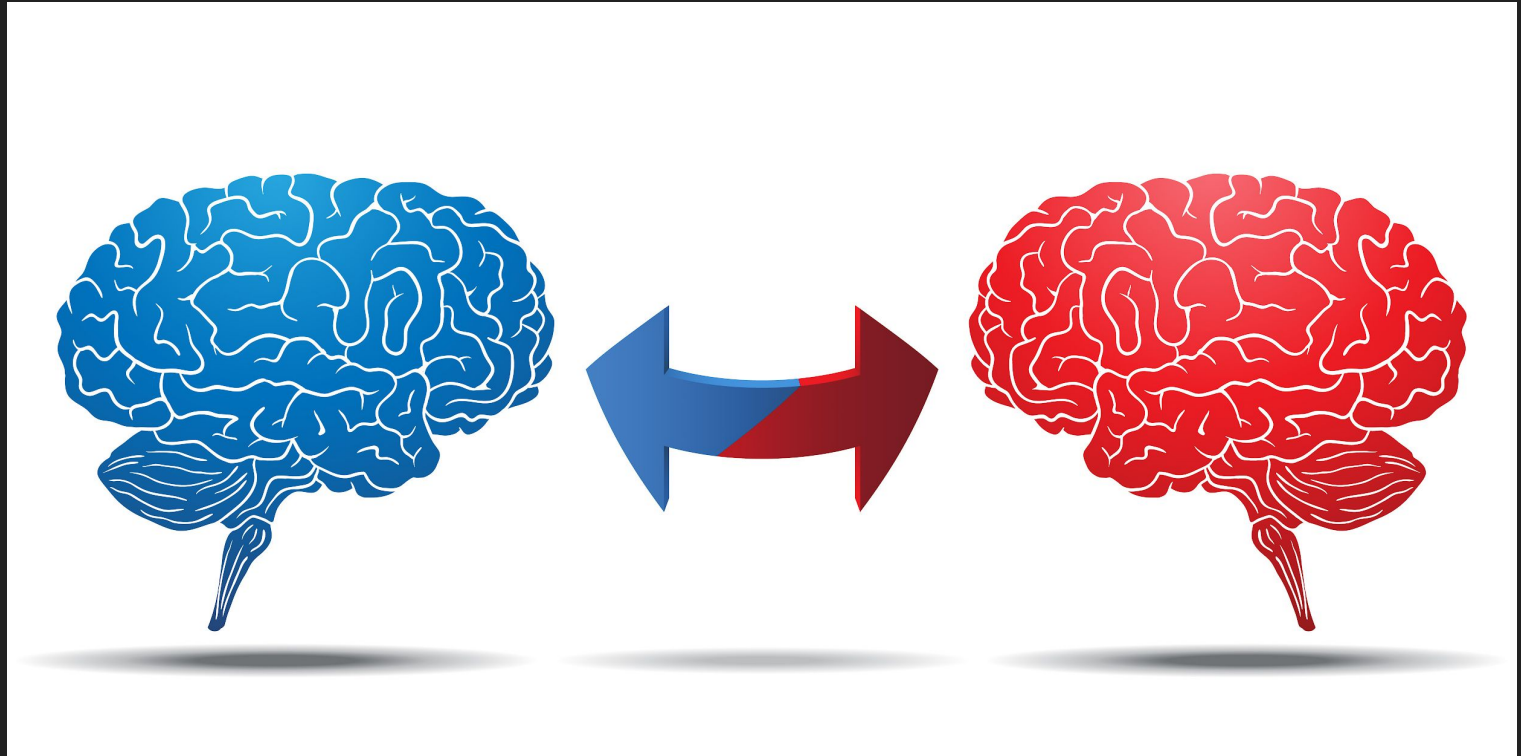


- UN : Broad platform for all sectors

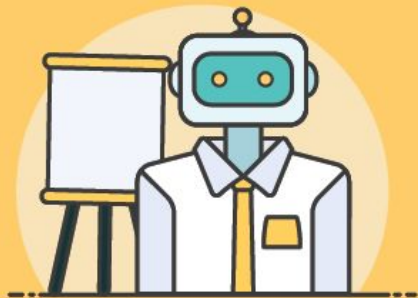
<https://futureoflife.org/ai-policy-united-nations/>



The Good News



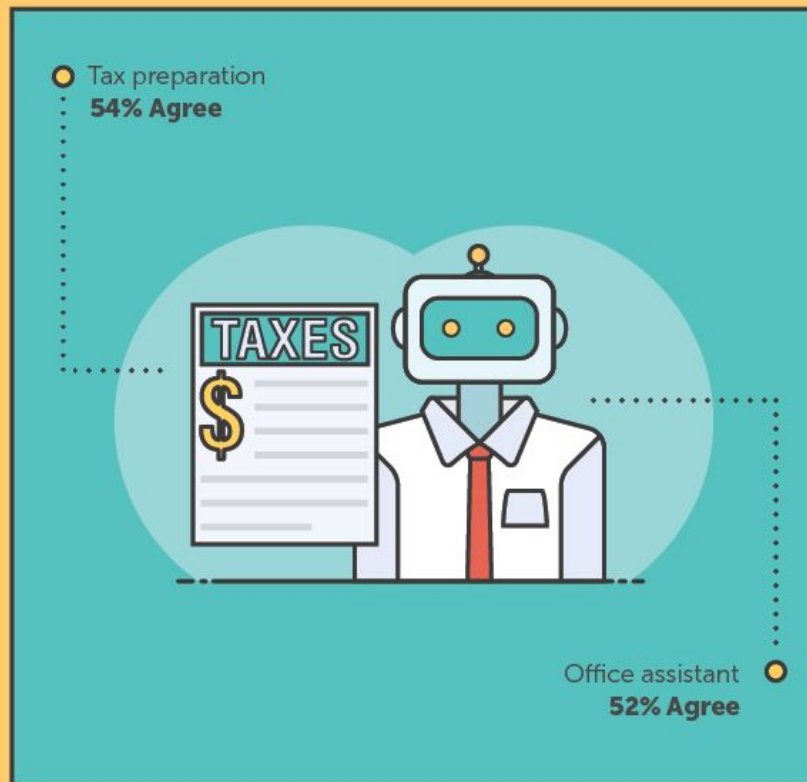
WHAT PERCENTAGE OF PEOPLE WILL TURN TO AI IN THE COMING 5 YEARS



Tutor
58% Agree



Travel agent
56% Agree



WHAT PERCENTAGE OF PEOPLE WILL TURN TO AI
IN THE COMING 5 YEARS



Home or family assistant
47% Agree



Health coach
46% Agree



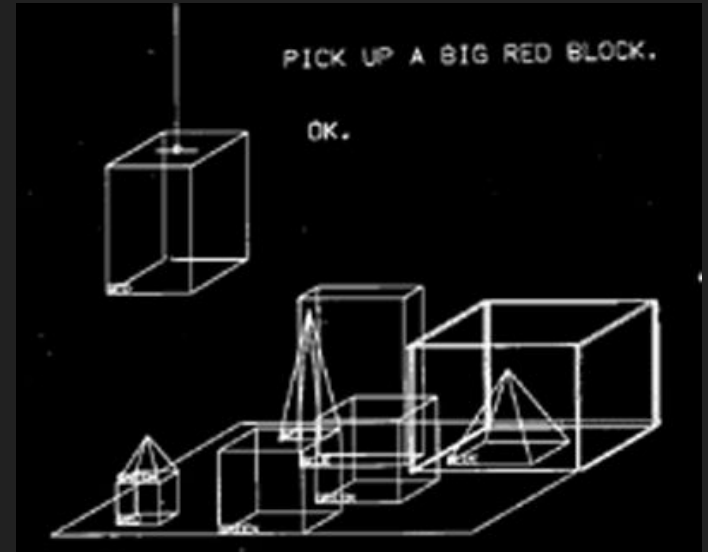
Financial adviser
41% Agree

Investment
56% Agree

Task-Focused

Task-Focused Microworlds (TFMs)

- Microworlds are domain-specific
- Task-focused means no need to plan, learn, reason
- TFM's can scale



REGULATION



Other Recommendations

- "self-identifying" rules ("I am a bot")
- "license-to-operate" laws ("licensed by X Corp")
- Insurance underwriting for data privacy/protection
- Consider open algorithms and/or open training data





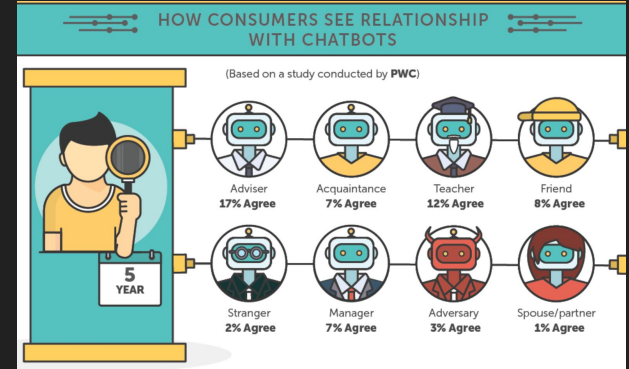
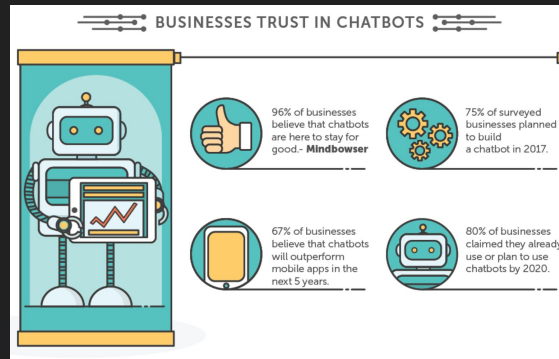
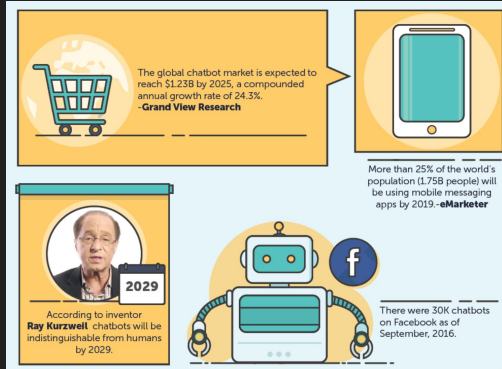
So...

"Is it better to need or to despise?"

-- Racter

The Challenge of the Bots on the Net..

- Technologists see great opportunity
- Providers see great savings
- Consumers are reluctant to engage



Enable ELIZA's Task-Focused Microworlds (TFMs)

- Microworlds are domain-specific
- Task-focused means no need to plan, learn, reason
- TFM's can scale

```
Welcome to

          EEEEE LL      IIII ZZZZZZ  AAAAA
          EE   LL      II   ZZ   AA   AA
          EEEEE LL      II   ZZ   AAAAAA
          EE   LL      II   ZZ   AA   AA
          EEEEE LLLLLL IIII ZZZZZZ  AA   AA

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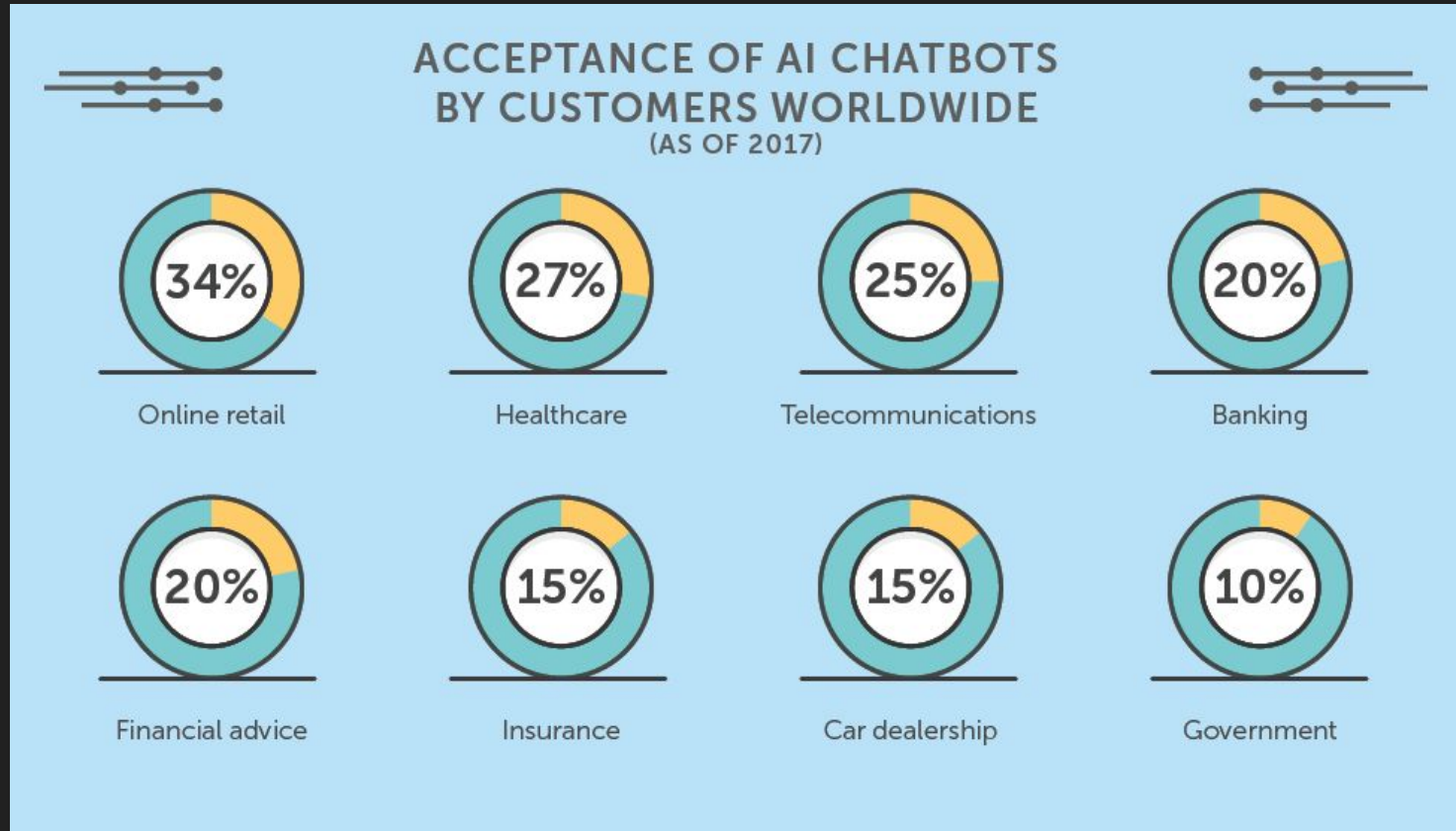
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YOU:   █
```

Beware of PARRY's algorithms...

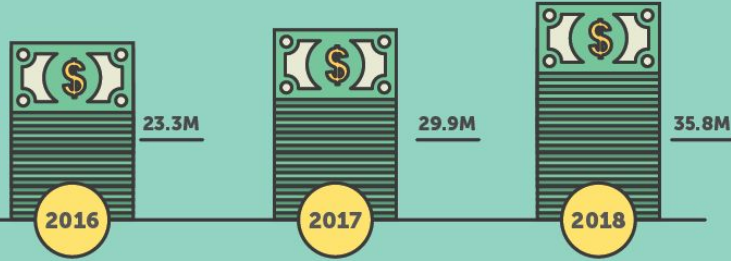
- Are likely to contain biases
 - Latent
 - Selection
 - Interaction
- And rely on negativity as a stimulus



The future lies before us...



USA VOICE-ENABLED CHATBOT USERS' DEMOGRAPHY





Finally...

*"Which way do we turn?
Which way do we travel?"*

-- Racter

Bots offer a future of possibilities

Bots offer a future of possibilities



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