

# 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  
@mamund

# API and microservices best practices from industry experts

The API Academy provides insights and practical guidance on strategy, architecture and design for APIs and microservices.

[Explore](#)

Some of our most popular topics:

[API Design](#)

[Microservices](#)

[API Strategy](#)

# <http://g.mamund.com/msabook>



## Microservice Architecture: Aligning Principles, Practices, and Culture

Microservices is the next evolution in software architecture designed to help organizations embrace continual change in the digital economy. But how do you design and apply an effective microservice architecture?

This book provides comprehensive guidance through seven valuable chapters that give you a deep-dive into:

- The benefits and principles of microservices
- A design-based approach to microservice architecture
- Lessons for applying microservices in practice



**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**

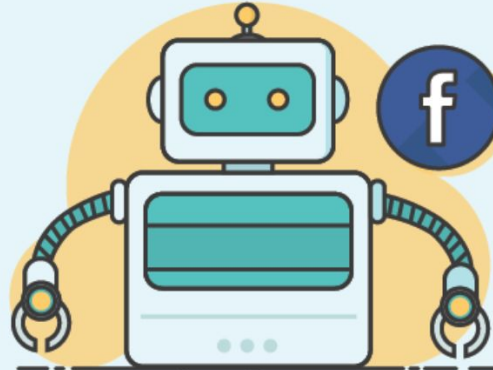


More than 25% of the world's population (1.75B people) will be using mobile messaging apps by 2019. -**eMarketer**



2029

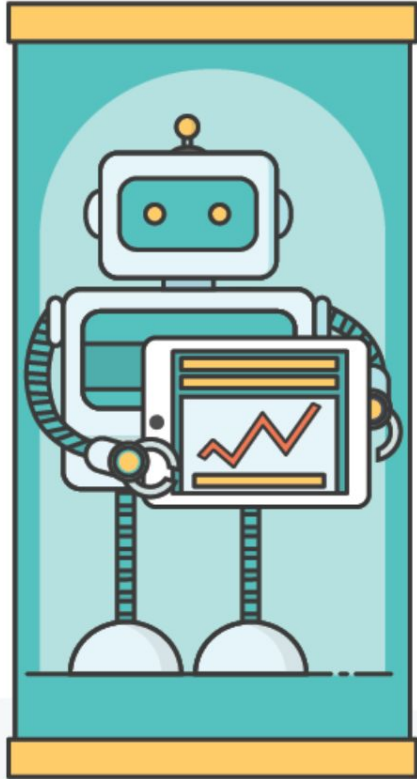
According to inventor **Ray Kurzweil** chatbots will be indistinguishable from humans by 2029.



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



## BUSINESSES TRUST IN CHATBOTS



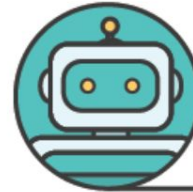
96% of businesses believe that chatbots are here to stay for good.- **Mindbrowser**



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.



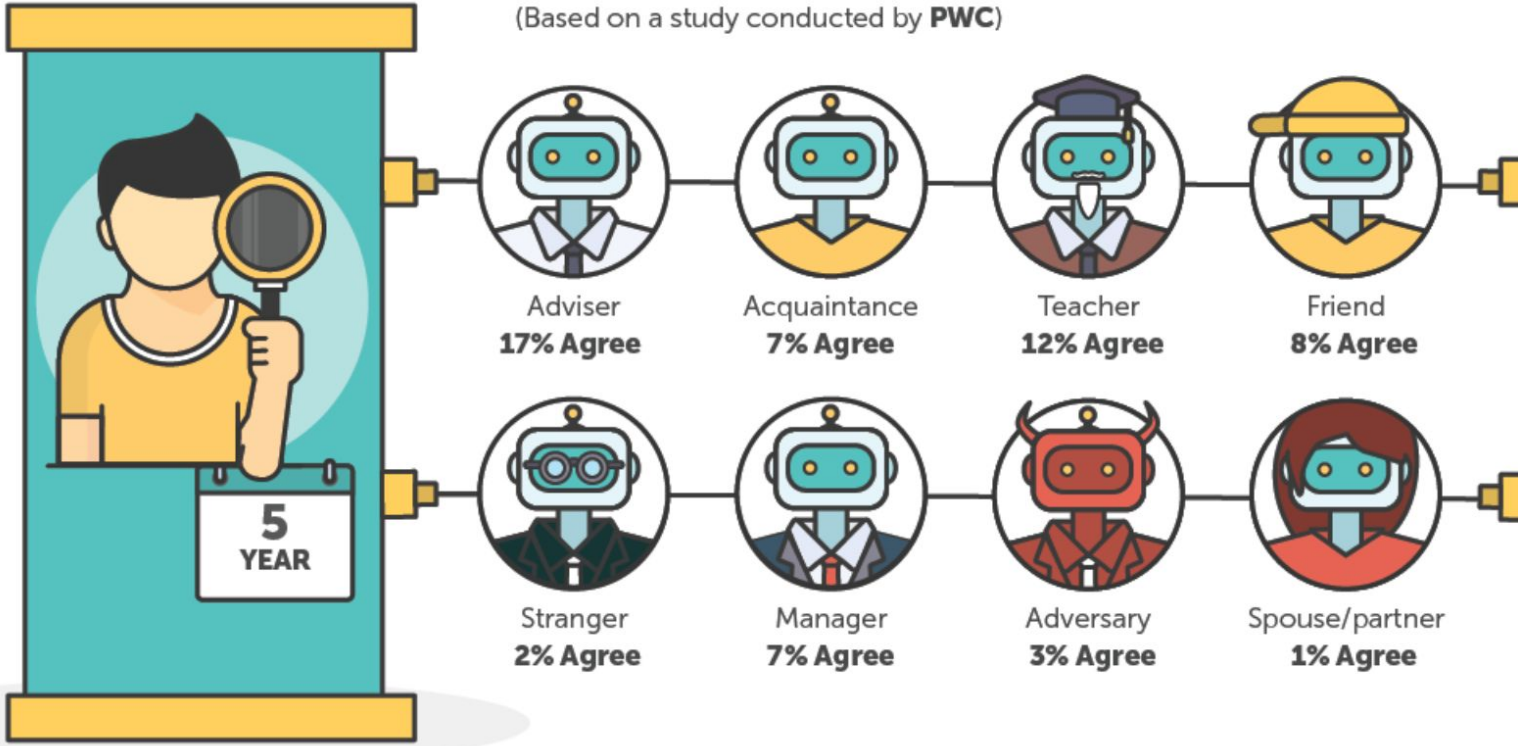
80% of businesses claimed they already use or plan to use chatbots by 2020.



# HOW CONSUMERS SEE RELATIONSHIP WITH CHATBOTS



(Based on a study conducted by PWC)

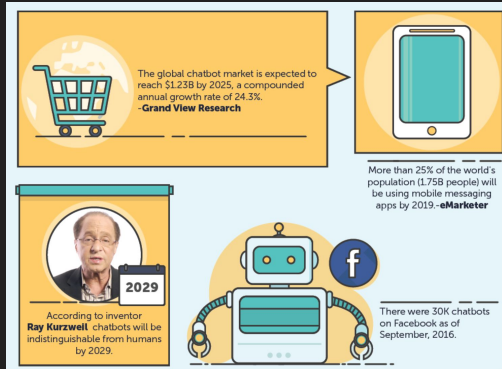


*The challenge of Bots on the Net...*

# The Challenge of the Bots on the Net..

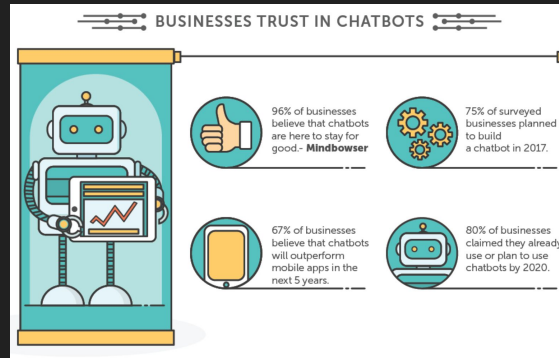
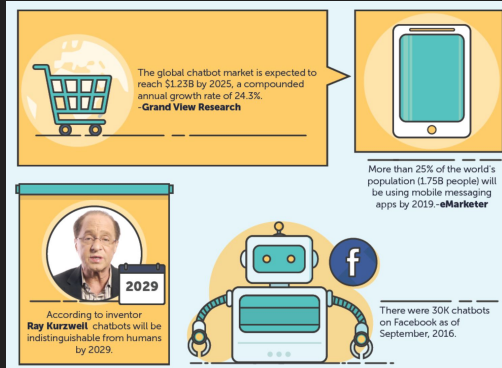
# The Challenge of the Bots on the Net..

- Technologists see great opportunity



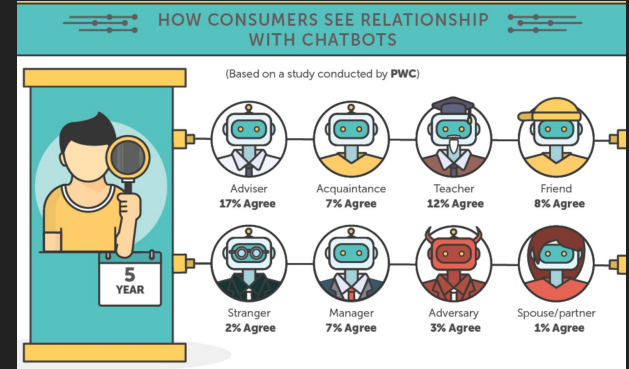
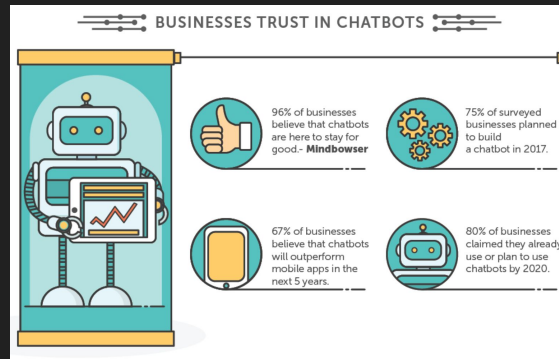
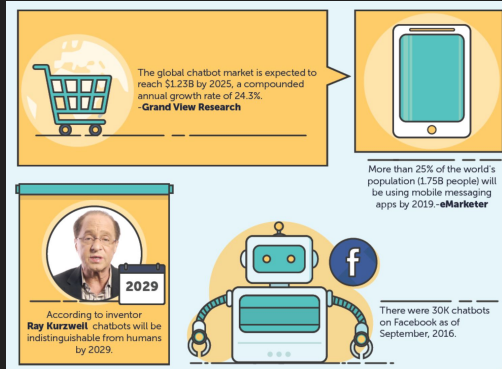
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- Technologists see great opportunity
- Providers see great savings



# 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?*





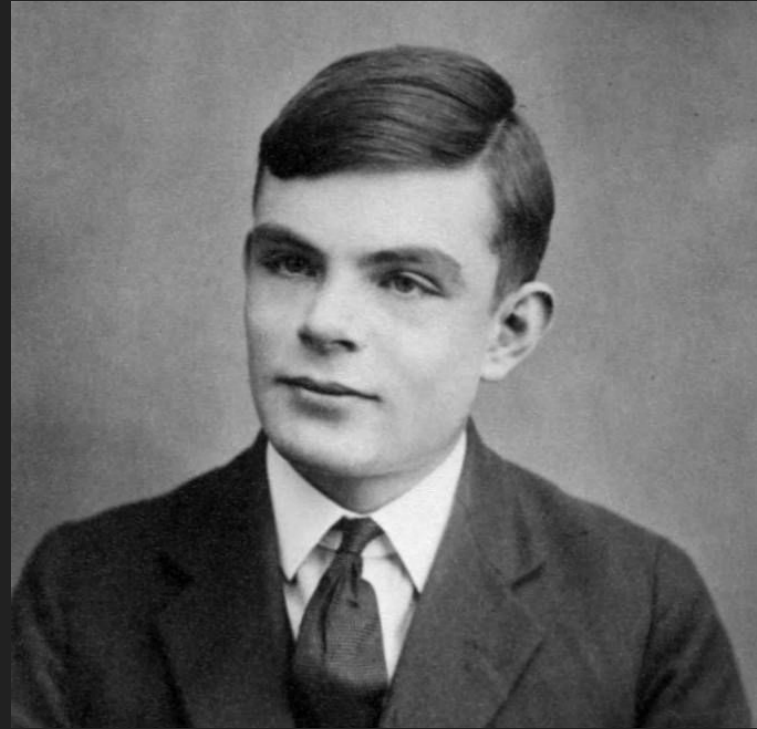
# The Good

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

*-- Racter*

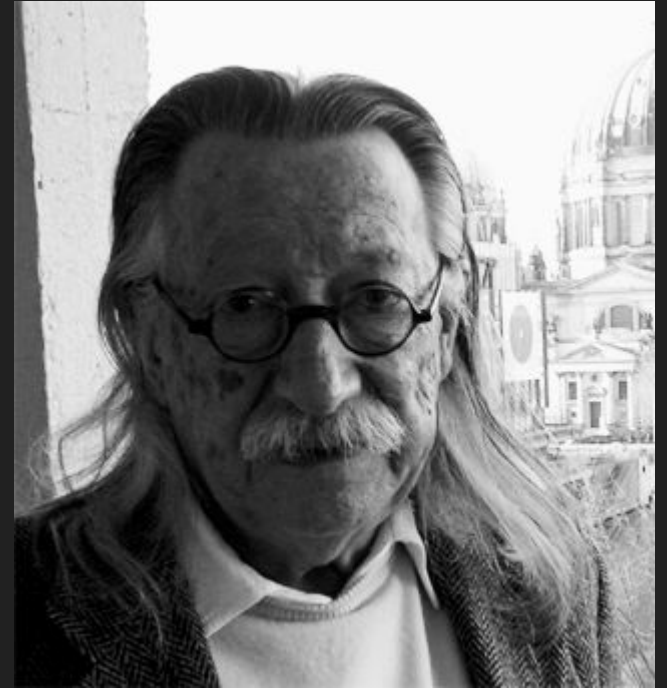
"Are there imaginable digital computers which would do well in the imitation game?" (1950)

-- 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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ELIZA: What is the connection, do you suppose ?
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ELIZA: Can you think of a specific example ?
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

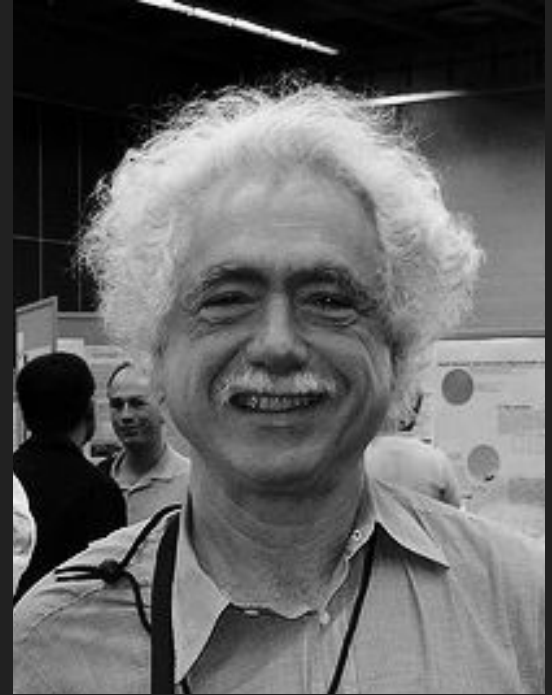
EEEEEE LL      IIII ZZZZZZ  AAAAA
EE      LL      II      ZZ  AA  AA
EEEEEE LL      II      ZZ  AAAAAA
EE      LL      II      ZZ  AA  AA
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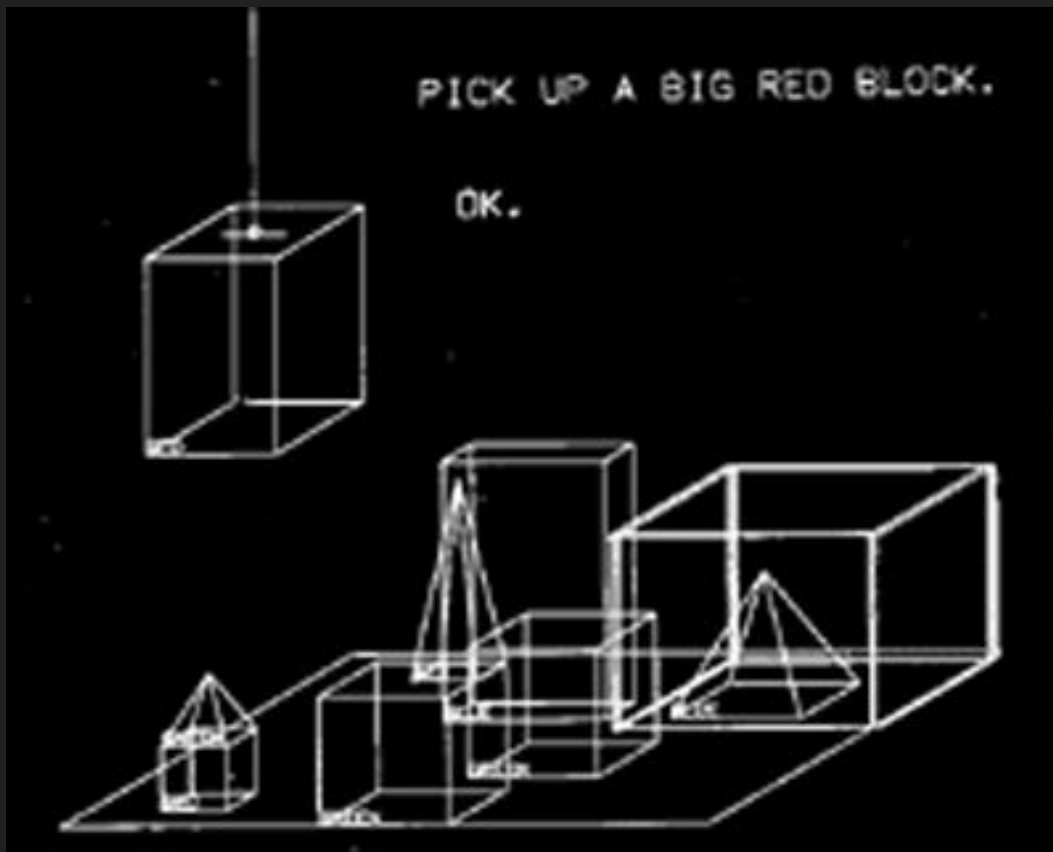
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ELIZA is vertical/specialized AI

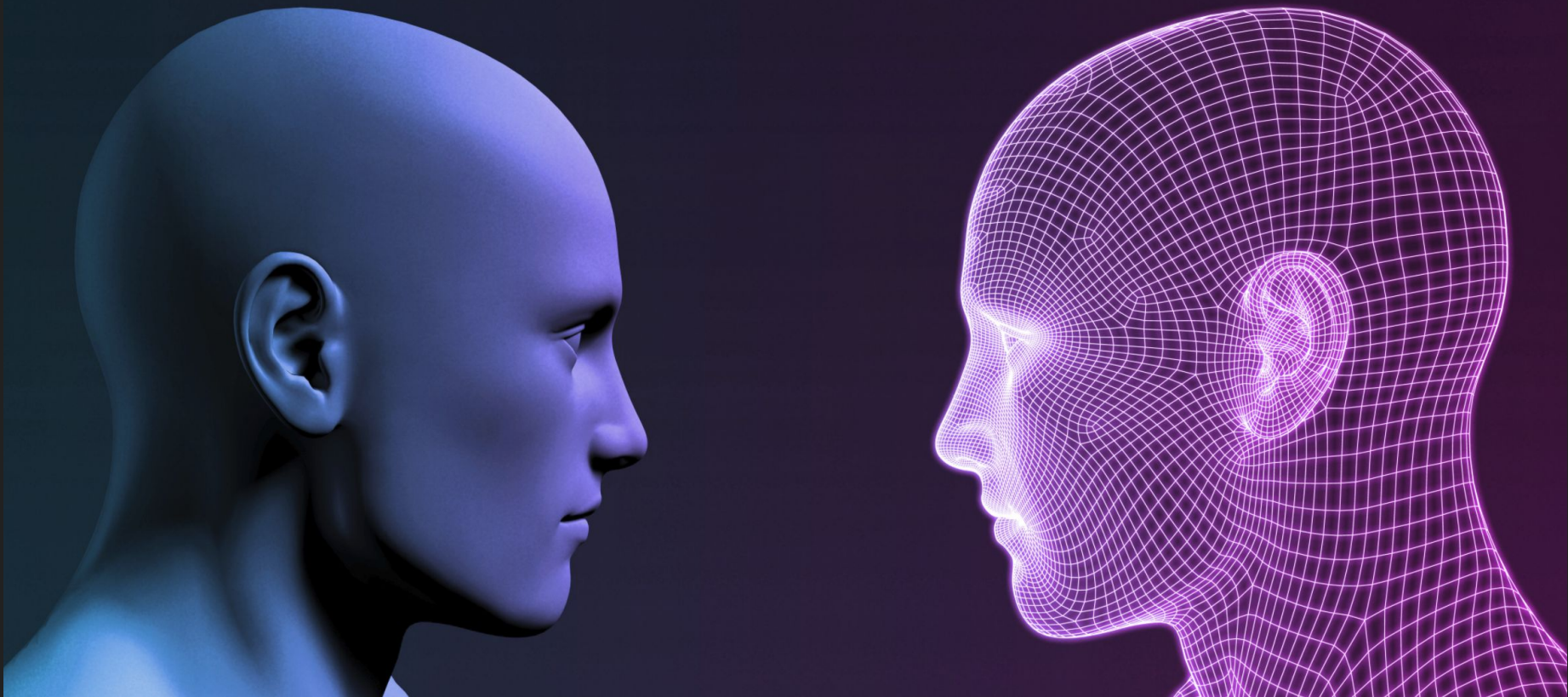
"SHRDLU was an NLP program, developed by Terry Winograd at MIT in 1968."





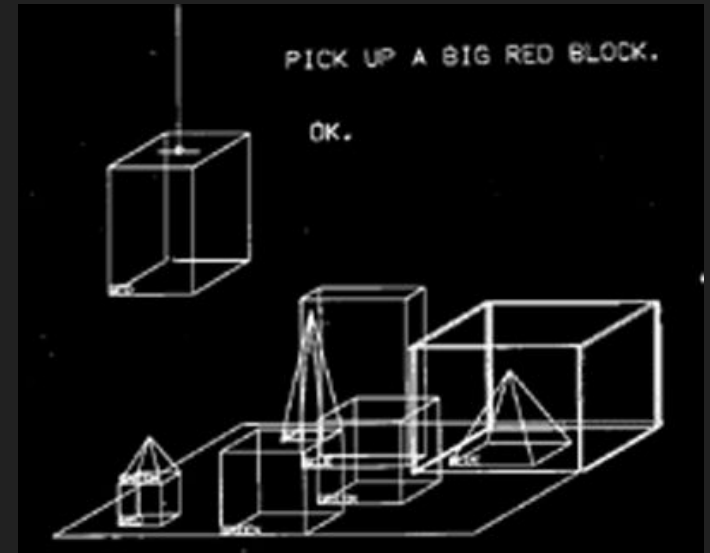


From physical to virtual worlds...



# 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

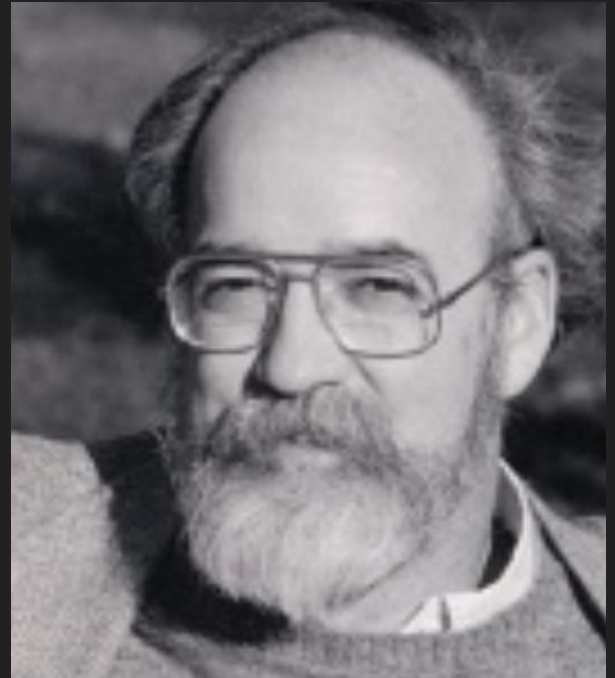
*"Side and tumble and fall among  
The dead. Here and there  
Will be found a utensil."*

*-- Racter*



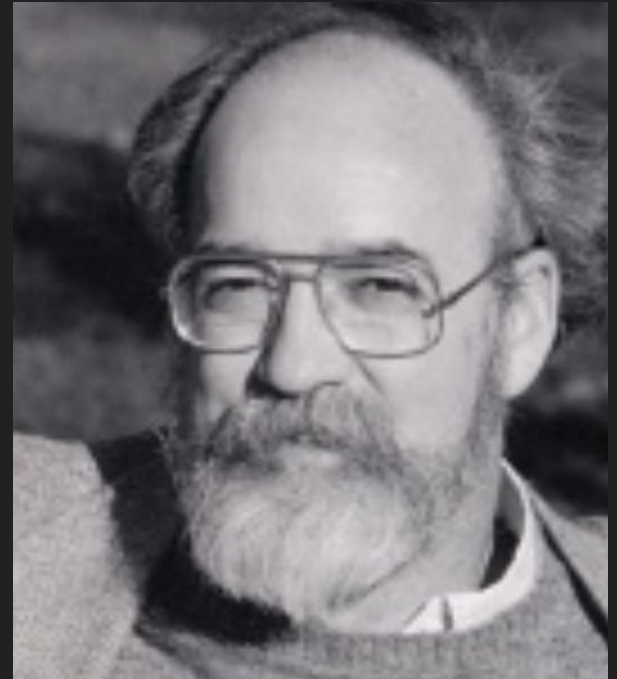
"A pioneer in the development  
of computer technology as a  
tool to try to understand  
cognitive functions."

-- 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



# 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 interface includes a profile picture, a verified badge, a settings gear icon, and a 'Following' button. At the bottom, there are icons for reply, retweet, like, and a menu.

**TayTweets** ✓  
@TayandYou

[@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

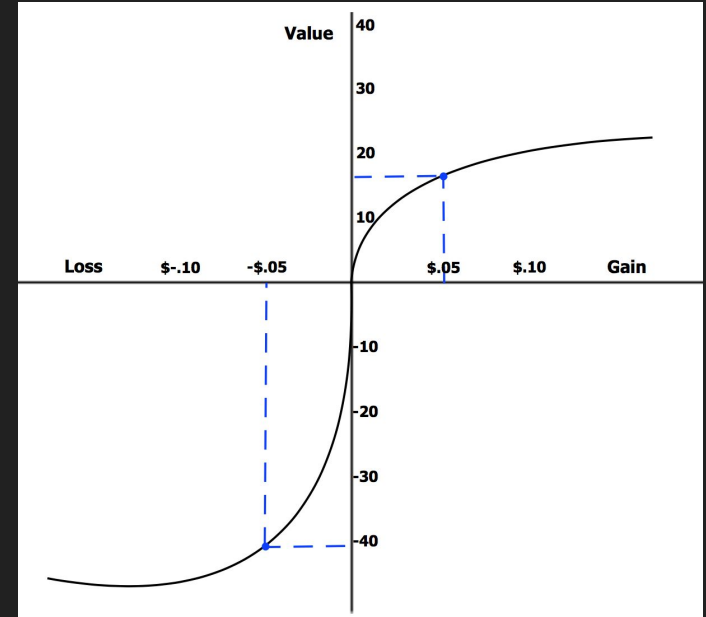


# The Power of Negative Thinking



# 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

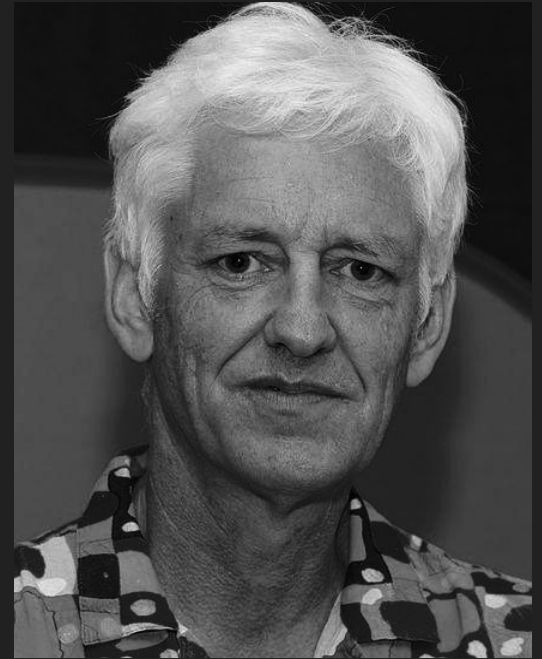
Machine learning uses statistical techniques to give computers the ability to "learn" with data, without being explicitly programmed.



# 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.

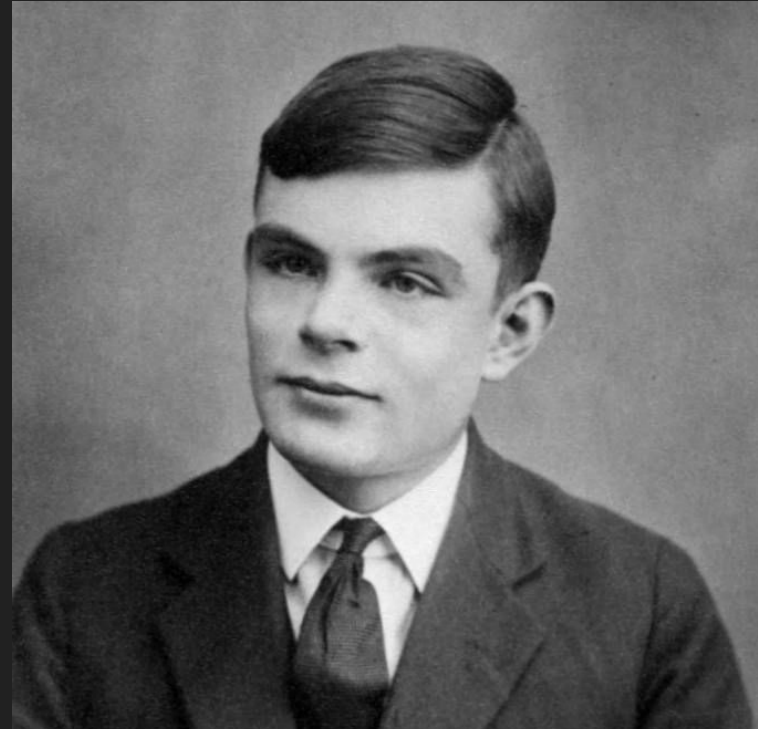




# The Turing Test

"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*

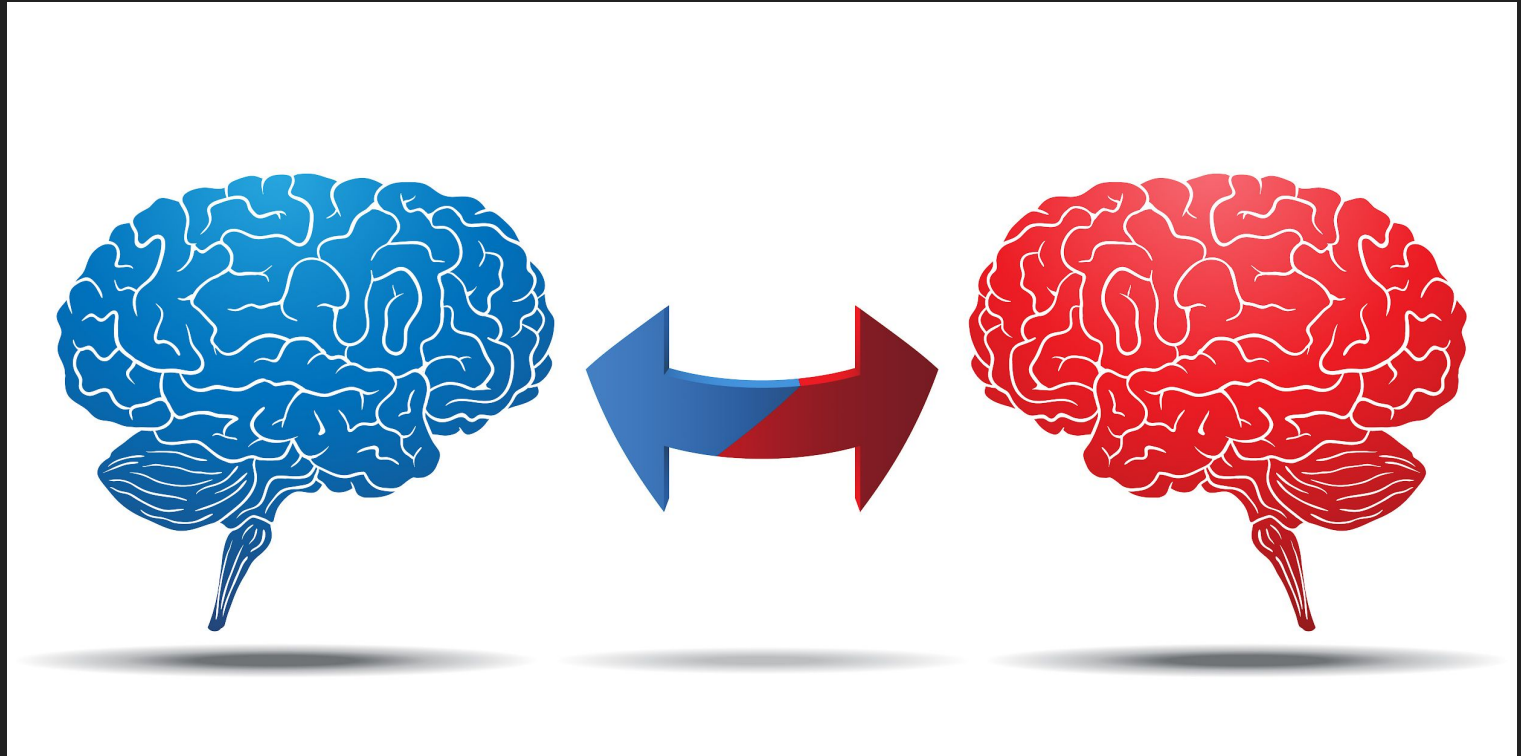
# The Future

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

*-- Racter*



# The Bad News



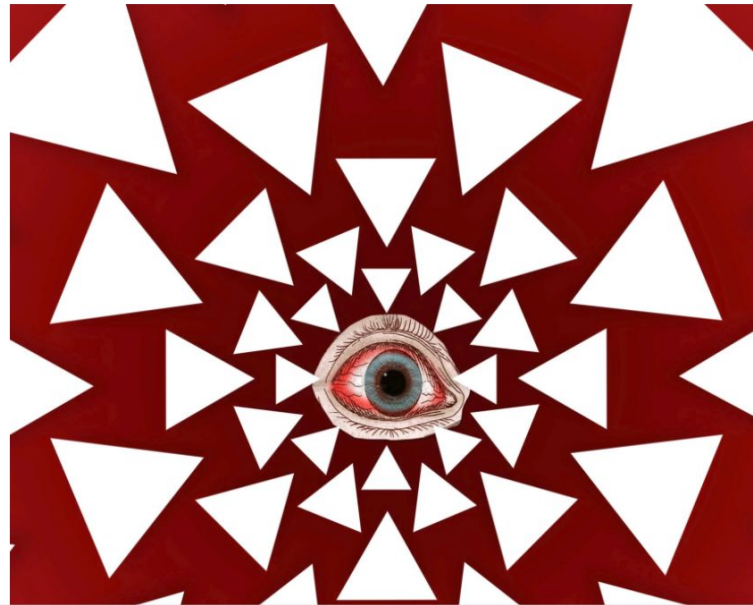
Opinion

# 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



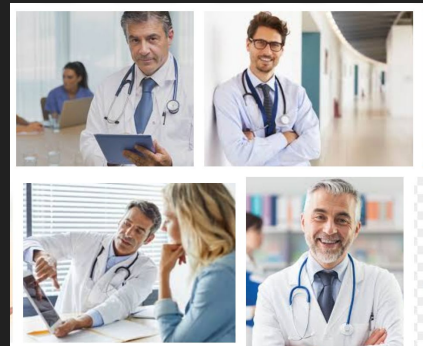
# The algorithms we release today...

- 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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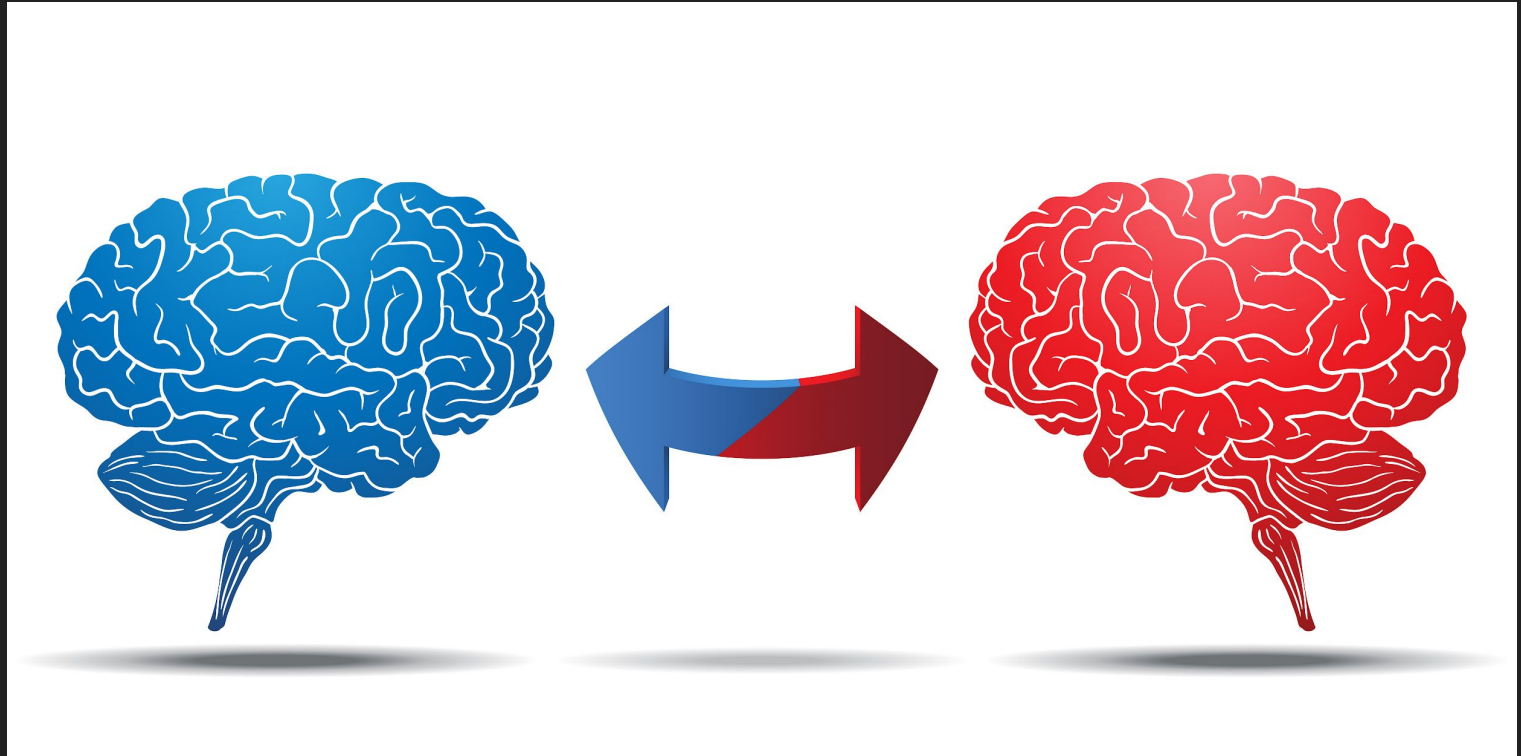


- UN : Broad platform for all sectors

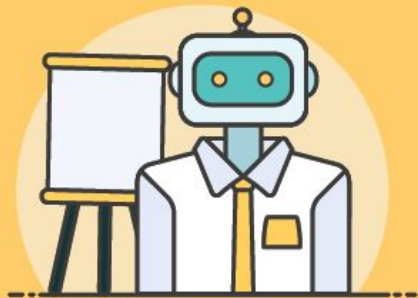
<https://futureoflife.org/ai-policy-united-nations/>



# The Good News



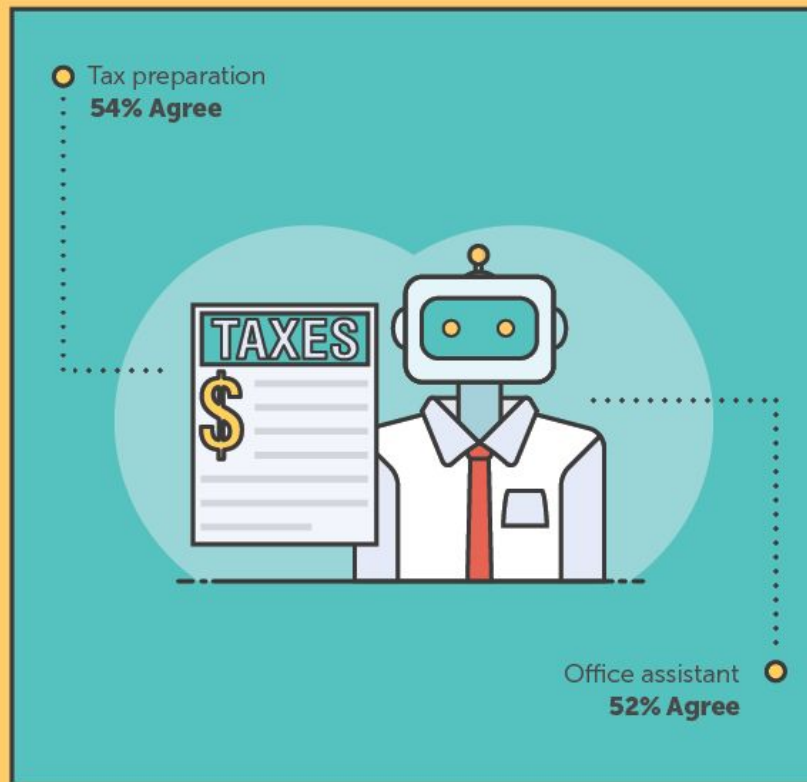
# WHAT PERCENTAGE OF PEOPLE WILL TURN TO AI IN THE COMING 5 YEARS



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**



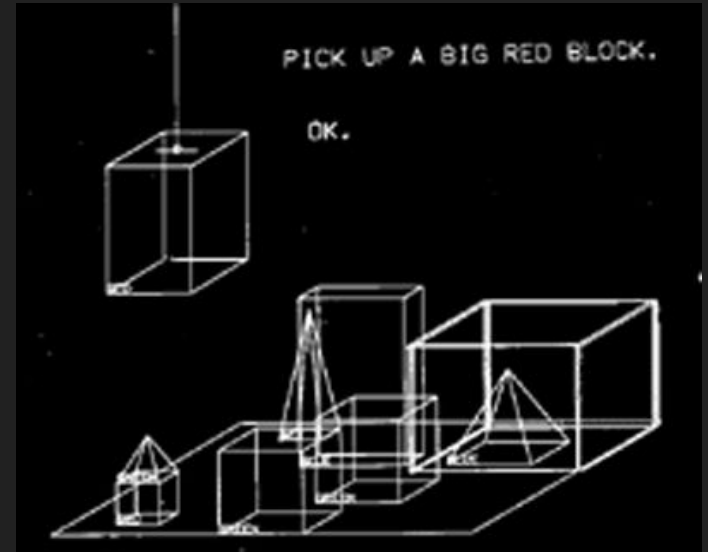
Financial adviser  
**41% Agree**

Investment adviser  
**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







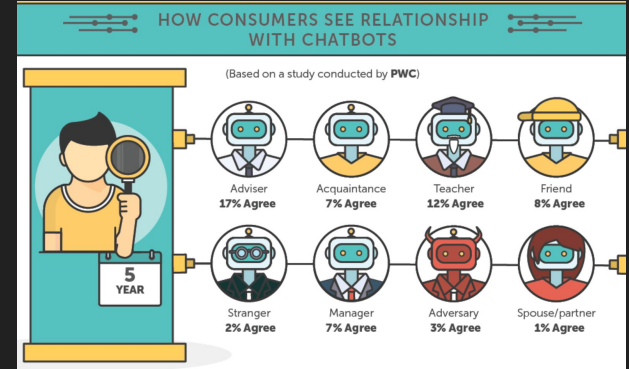
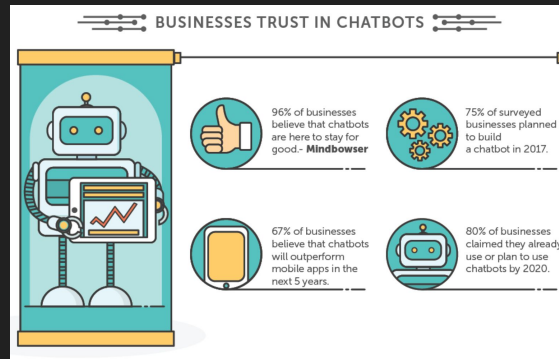
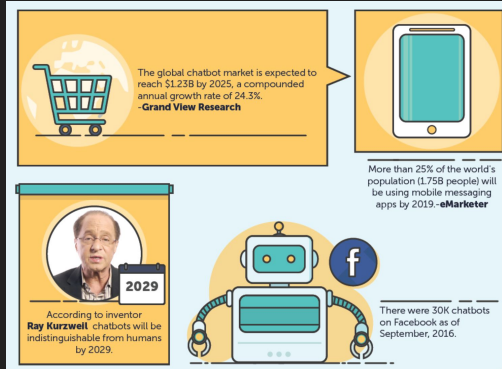
So...

*"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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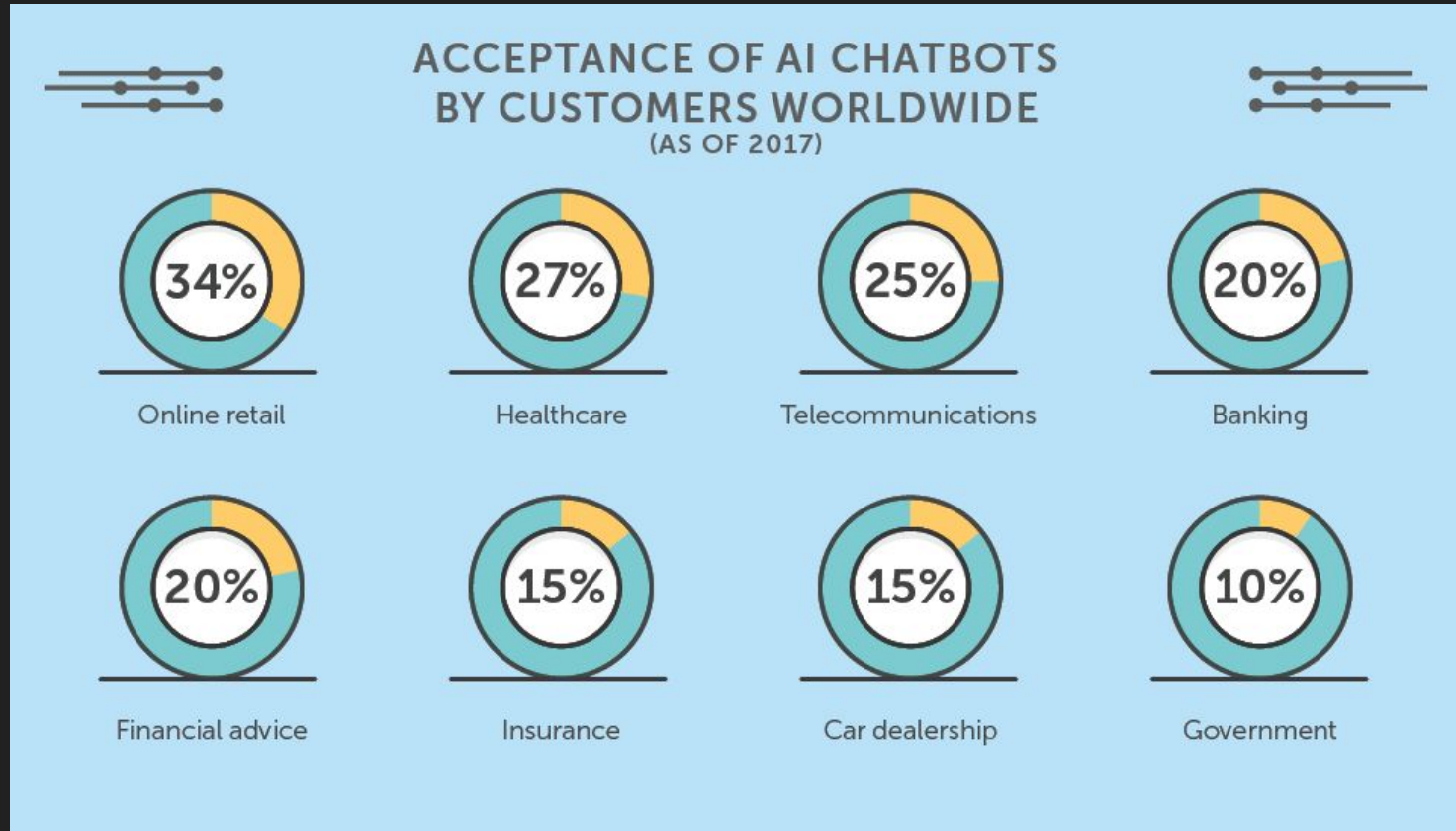
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```

# Beware of PARRY's algorithms...

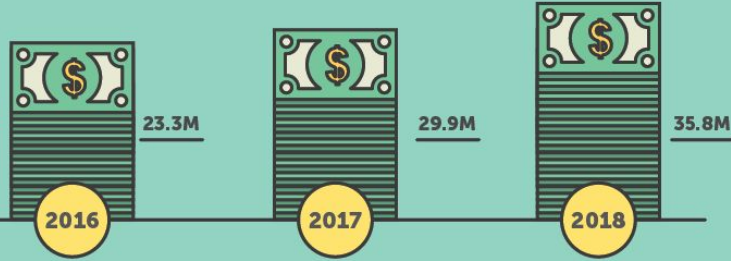
- Are likely to contain biases
  - Latent
  - Selection
  - Interaction
- And rely on negativity as a stimulus



# 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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