A Perspective on AI

Keith Downing

Department of Computer Science
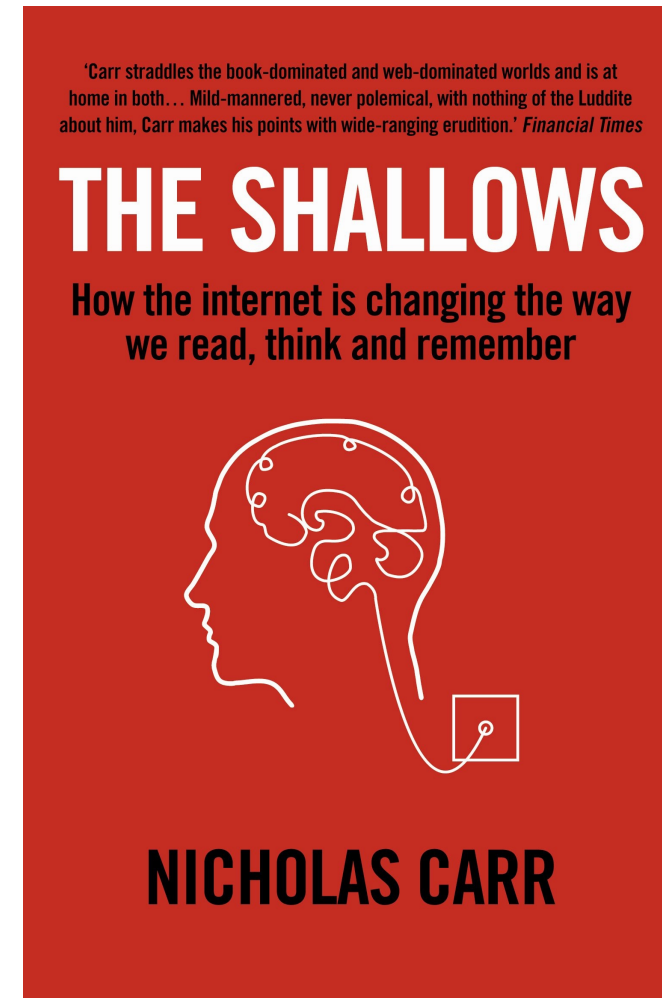
NTNU

Immediate Concerns about AI

- Job Loss
- Dumbing down of tech-dependent humanity

Robot-Run Warehouse

'Carr straddles the book-dominated and web-dominated worlds and is at home in both... Mild-mannered, never polemical, with nothing of the Luddite about him, Carr makes his points with wide-ranging erudition.' *Financial Times*

THE SHALLOWS

How the internet is changing the way we read, think and remember
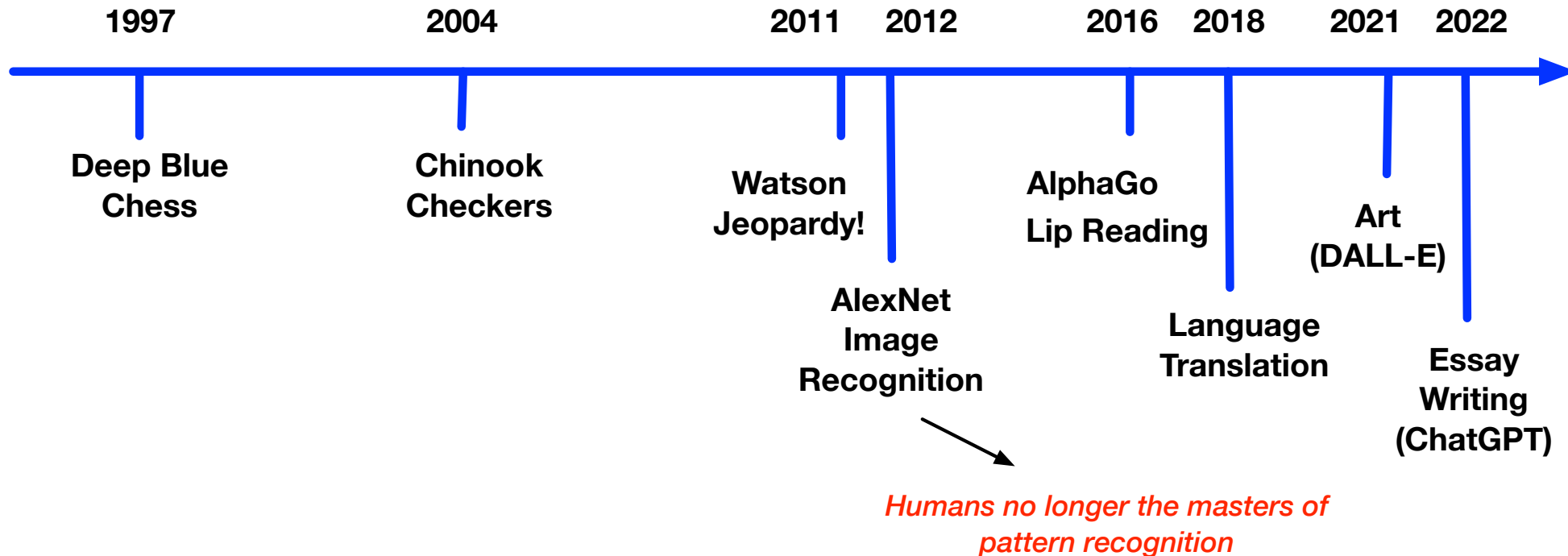
NICHOLAS CARR

Concern #1:

Humans Need Not Apply

Brief History of AI Success

AI Beats or Equals Humans

Search-Based

**Big Data +
Advanced Pattern
Recognition**

| 1997 | 2004 | 2011 | 2012 | 2016 | 2018 | 2021 | 2022 |

**Deep Blue
Chess**

**Chinook
Checkers**

**Watson
Jeopardy!**

**AlphaGo
Lip Reading**

**AlexNet
Image
Recognition**

**Language
Translation**

**Art
(DALL-E)**

**Essay
Writing
(ChatGPT)**

*Humans no longer the masters of
pattern recognition*

Microscopic Pattern Recognition
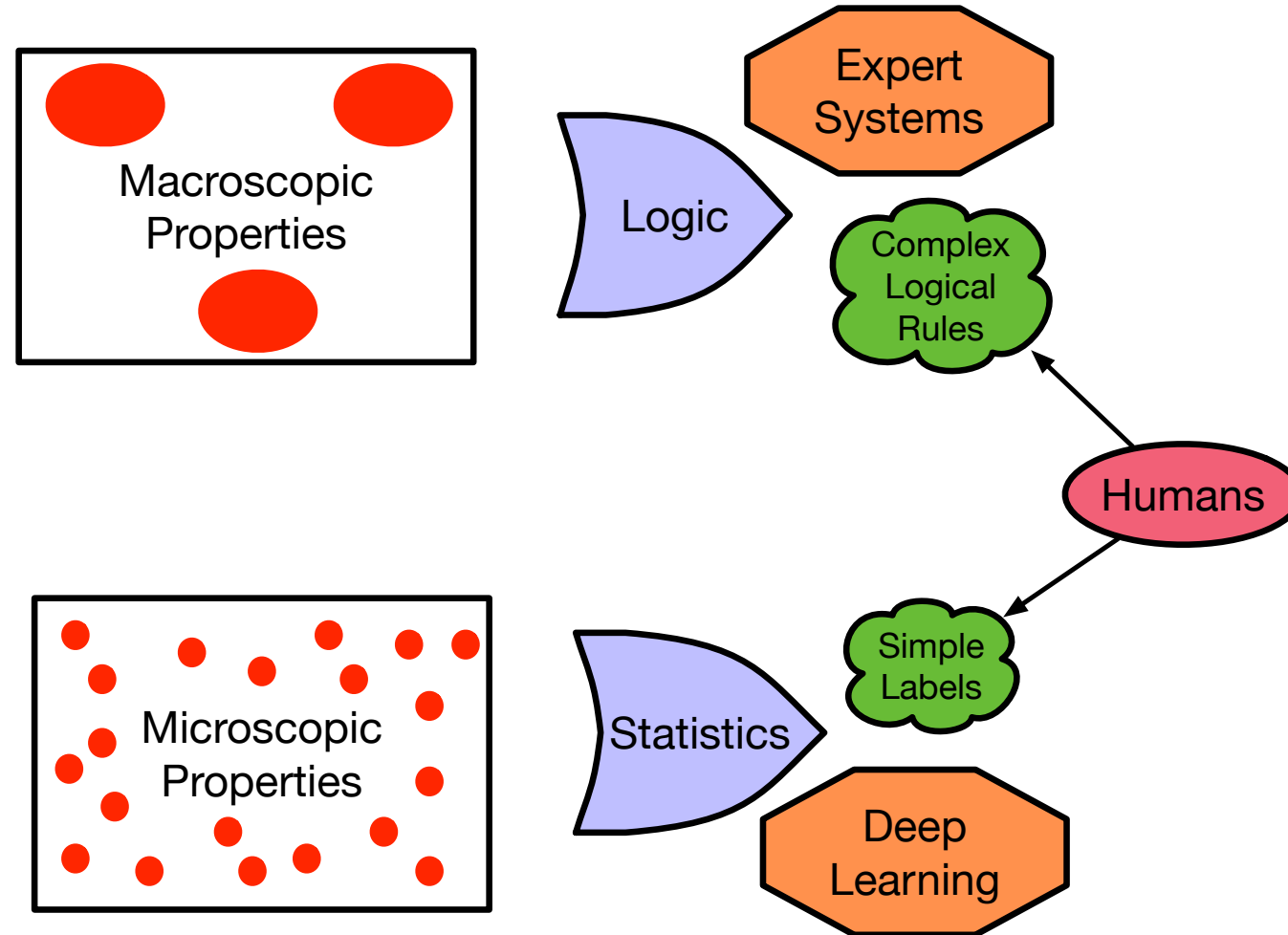
- **Recognition of Complex Microscopic Patterns is now possible (with AI)**

- **Reams of Microscopic Data are now much easier to produce**

AlphaGo

Silver et. al., *Mastering the game of Go with **deep neural networks** and **tree search***, Nature, 2016.

$Q + U : Q(s,a) + U(s,a)$
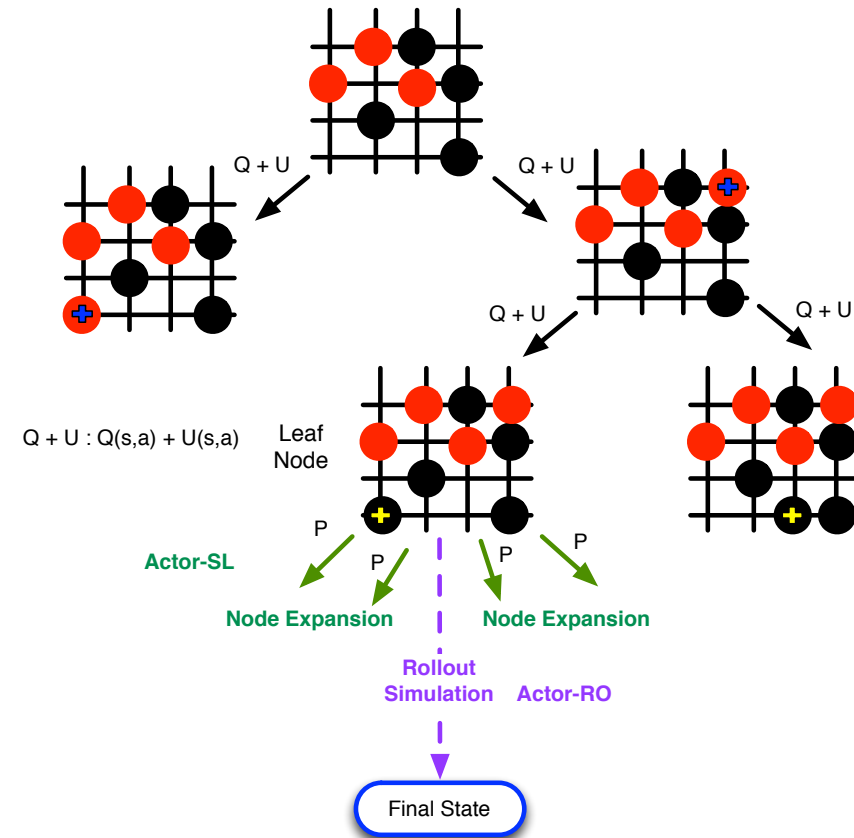
*I guess I lost the game because I wasn't able to find any weaknesses…***Lee Sedol** (World # 2)

AlphaGo Zero & Alpha Zero

- No expert knowledge needed.
- Self-play is enough to become world champ

- Generalize AlphaGo Zero to other games.
- Becomes world champ at them.
- Another step toward Artificial General Intelligence (AGI)

Alpha Zero vs Stockfish

HELP WANTED (Machines Only)

- AI learns by itself. No need for human expertise (e.g. rules)

- Reinforcement Learning (RL) systems generate their own labeled datasets as they explore the world => Don't even need humans to label data !!

- Humans no longer undisputed masters of pattern recognition

- Unbiased by humans => Extremely Creative (e.g., Move 37 of AlphaGo)

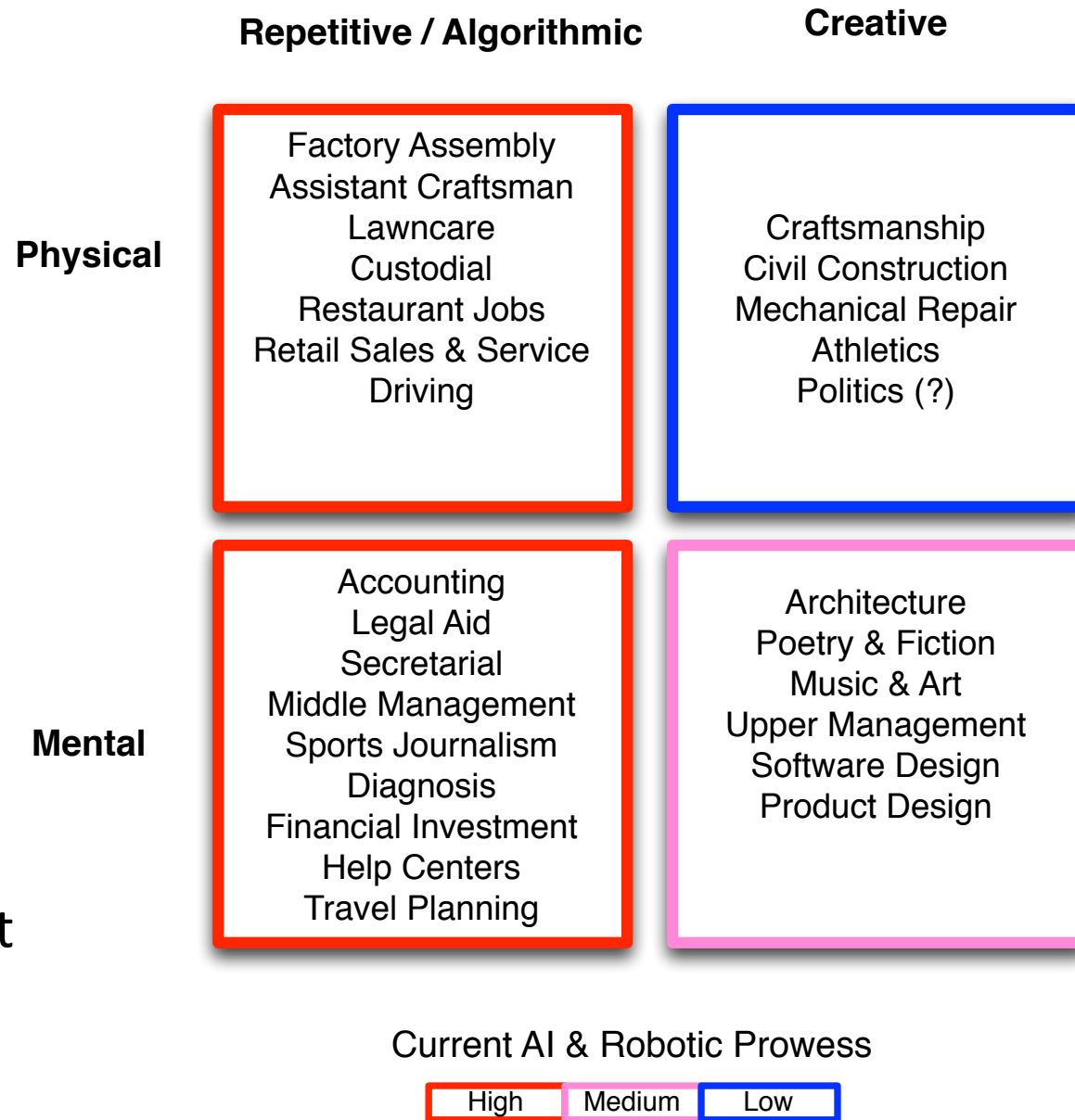- **When humans become obsolete for one job, they retrain. Now, the machines can retrain too…and faster!**
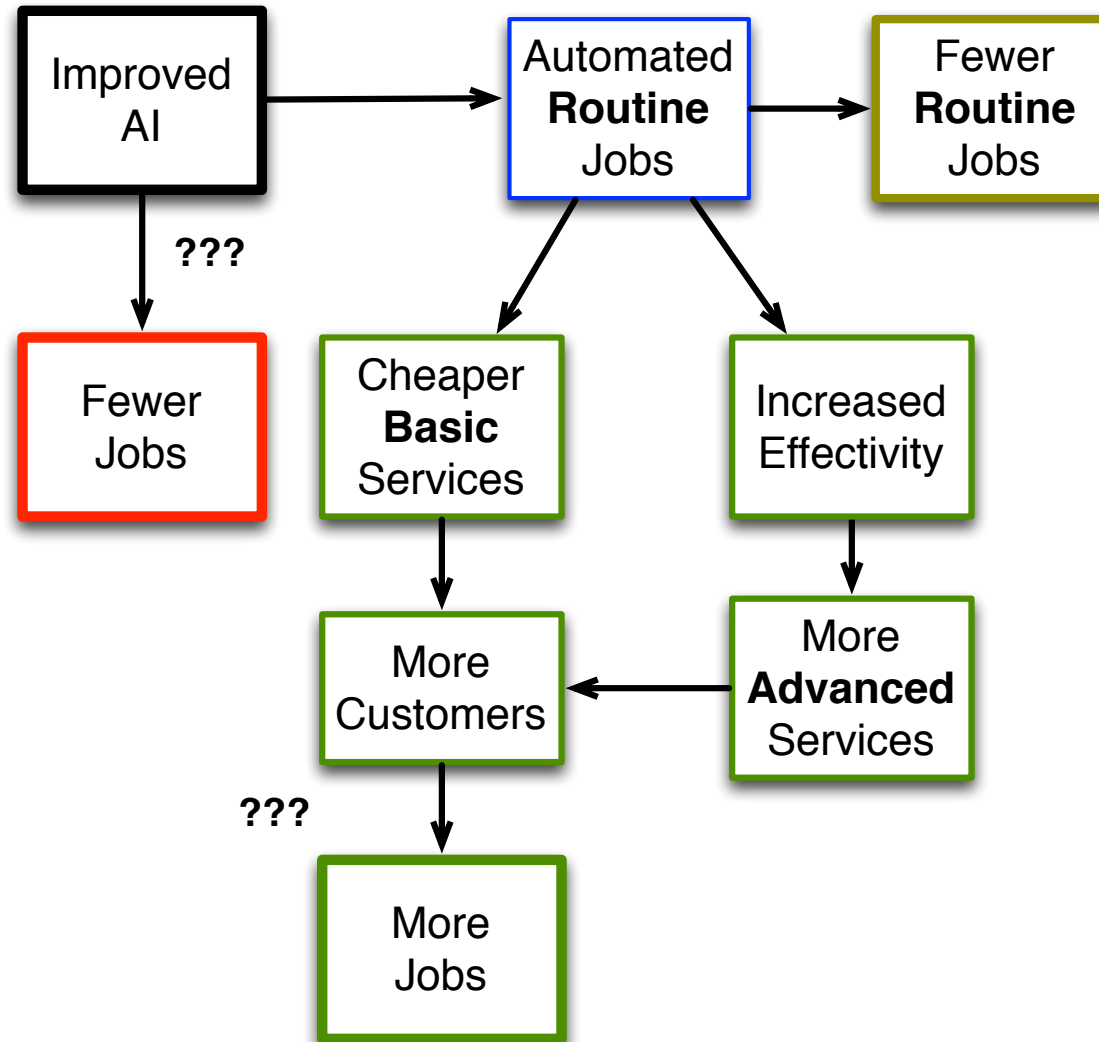
I AM a robot !!
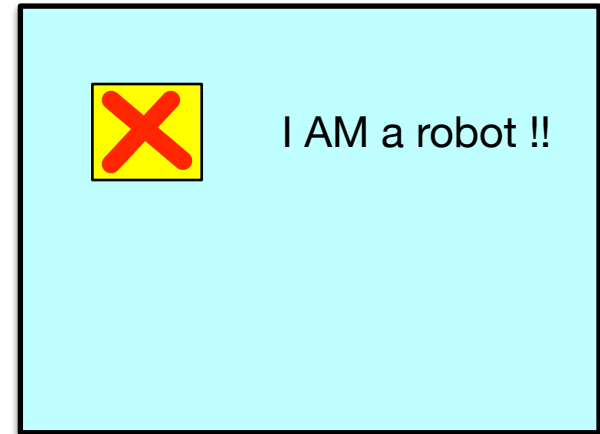
What is your value-add?

General advice:
Know what AI can and cannot do!

Key personal traits:

- Deep, creative thought
- Empathy and emotion
- STEMpathy

Repetitive / Algorithmic

Creative

Physical

| Factory Assembly
Assistant Craftsman
Lawncare
Custodial
Restaurant Jobs
Retail Sales & Service
Driving | Craftsmanship
Civil Construction
Mechanical Repair
Athletics
Politics (?) |

Mental

| Accounting
Legal Aid
Secretarial
Middle Management
Sports Journalism
Diagnosis
Financial Investment
Help Centers
Travel Planning | Architecture
Poetry & Fiction
Music & Art
Upper Management
Software Design
Product Design |

Current AI & Robotic Prowess

| High | Medium | Low |

# Economics is not Rocket Science ... Unfortunately

Concern #2:

Humans Need
Not
Apply Themselves

AI's Threats to Humanity

- Robotic Takeover of the World – Future??

- Job Market Disruption – Now

- Financial Market Chaos - Now

- Automated Warfare – Now

- Cyber Warfare – Now

- **Emergent Stupidity/Conformity/Predictability** – Now

Concentrate

Predict

Reflect

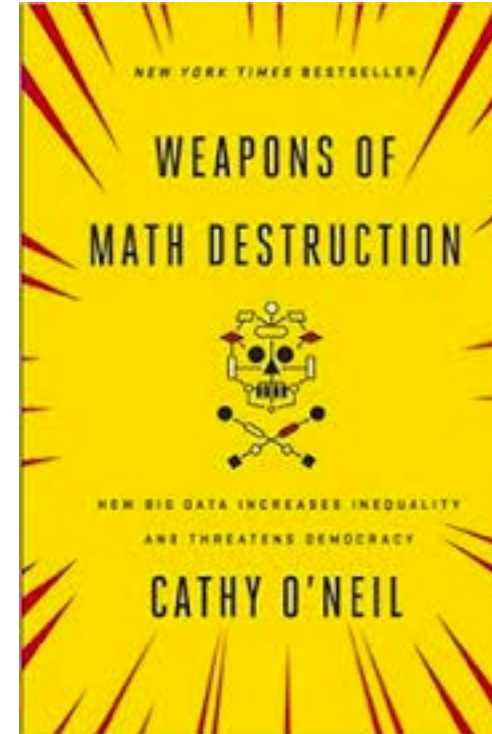**Problem Solve**

Remember

Reason

AI

AI

AI
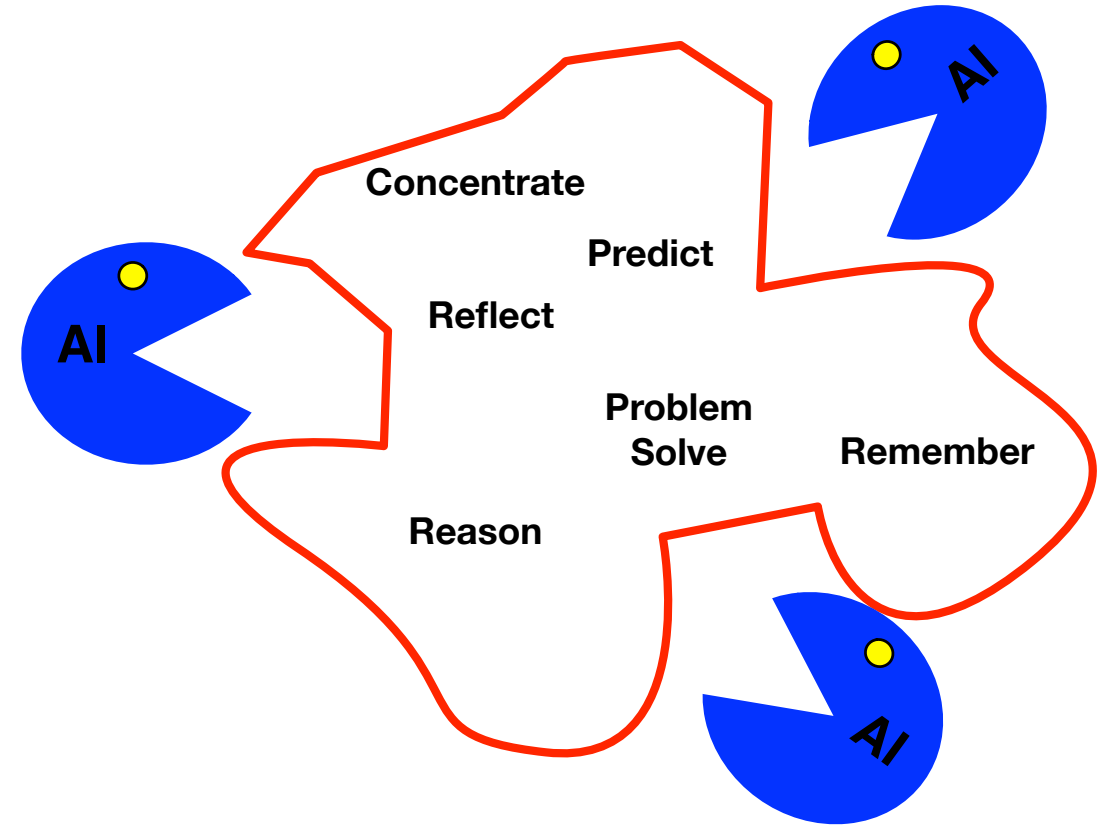
* Layout suggested by AI

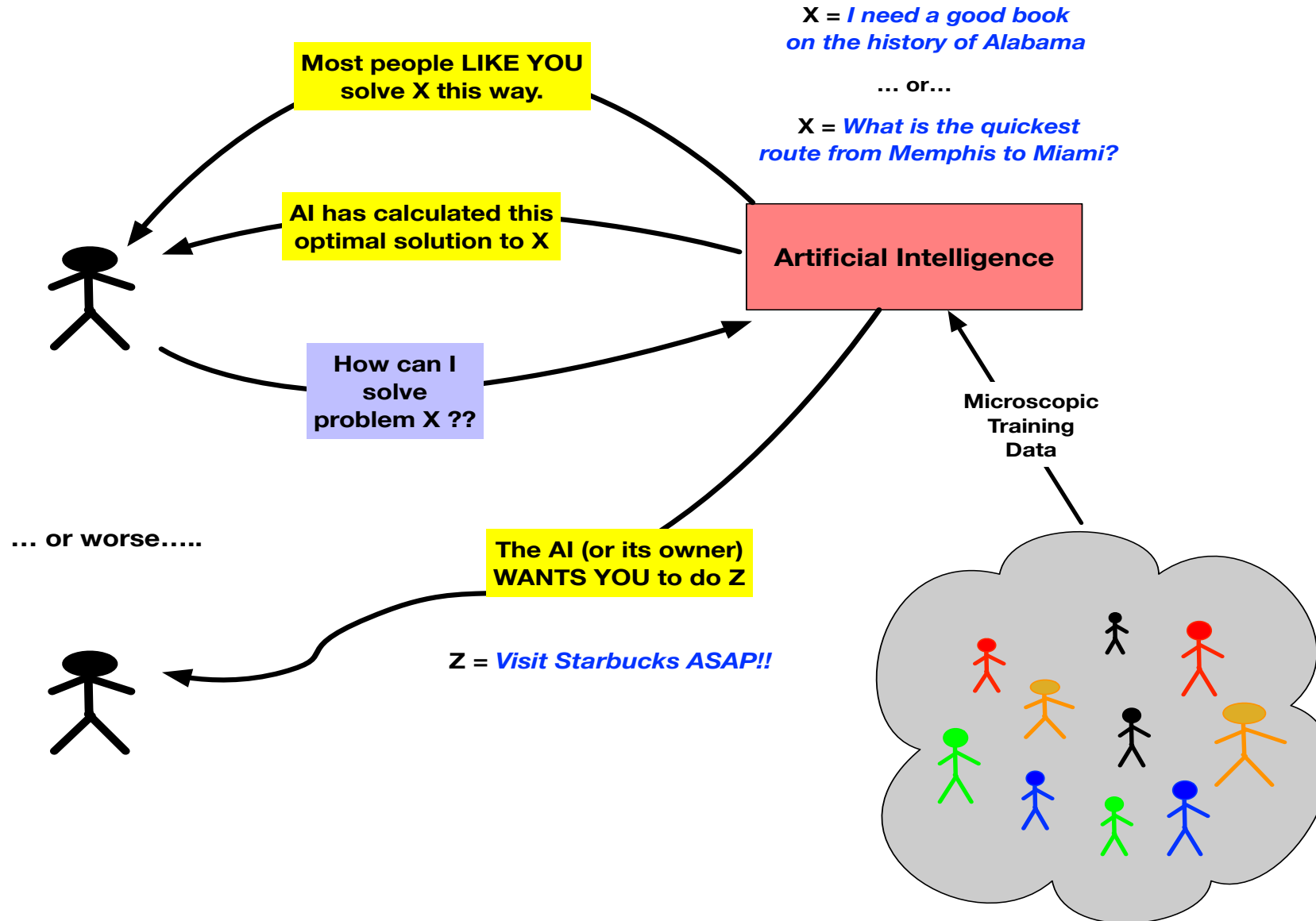# AI is Watching, Listening, Learning & Suggesting

- Who is here?
- When and where will we meet again?
- What do you like?
- What do you believe?
- Should you get a bank loan?
- Can we sell you our stuff?
- Can we influence your vote?
- Should we send you to jail?

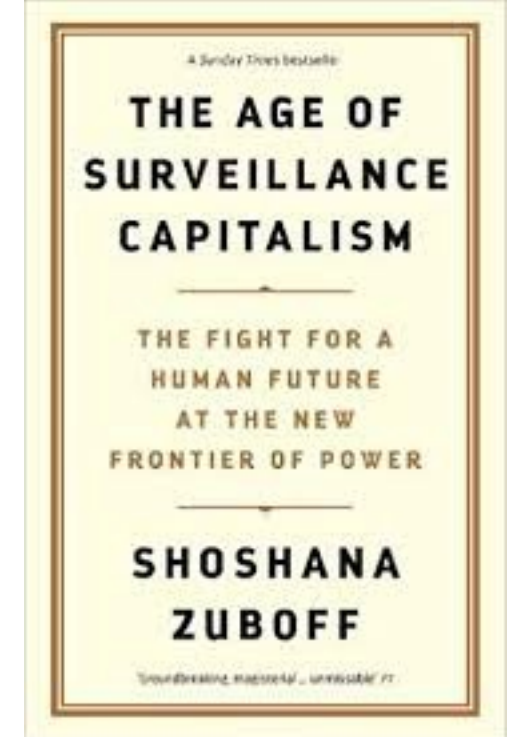How should humans handle the information produced by big-data mining, and the suggestions given by AI systems?
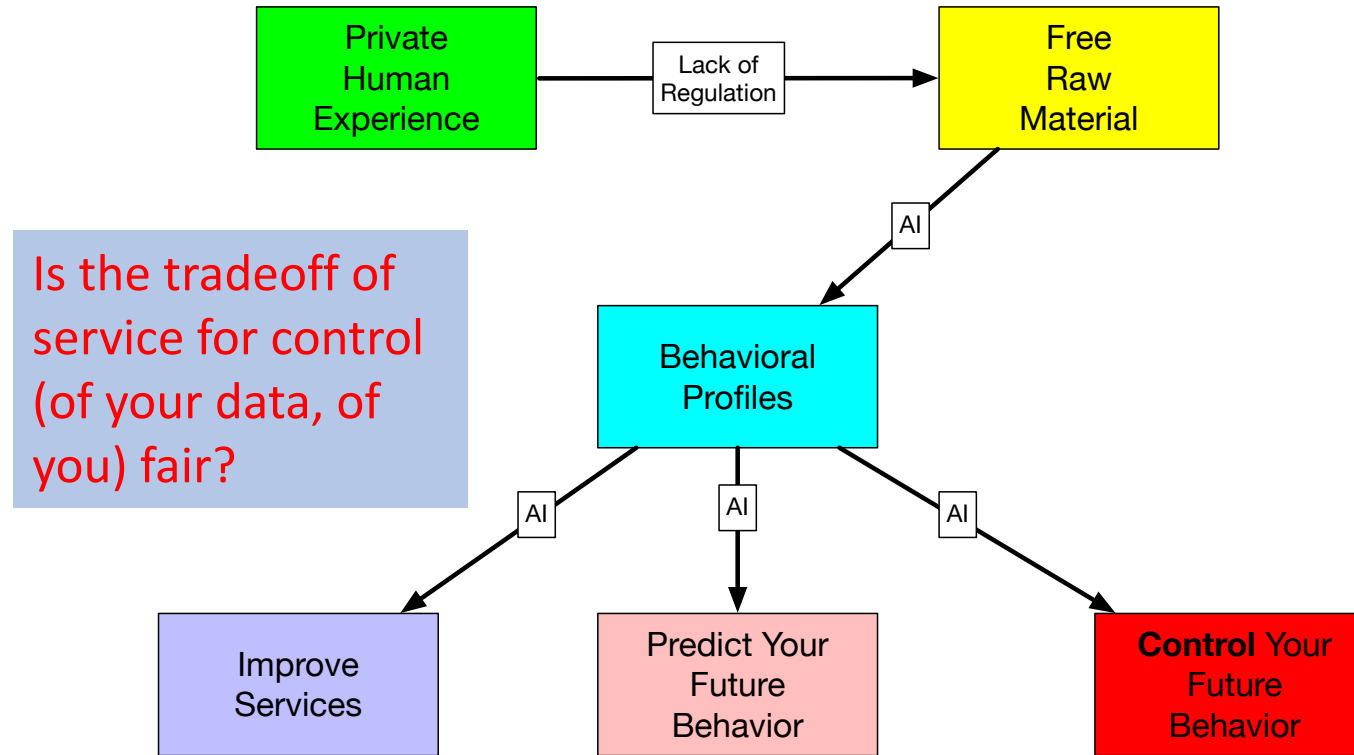
NEW YORK TIMES BESTSELLER

WEAPONS OF
MATH DESTRUCTION

HOW BIG DATA INCREASES INEQUALITY
AND THREATENS DEMOCRACY

CATHY O'NEIL

Algorithms = Opinions
Embedded in Code

AI's *Innocent(?)* Suggestions

X = *I need a good book on the history of Alabama*

... or...

X = *What is the quickest route from Memphis to Miami?*

Most people LIKE YOU solve X this way.

AI has calculated this optimal solution to X

Artificial Intelligence

How can I solve problem X ??

Microscopic Training Data

... or worse.....

The AI (or its owner) WANTS YOU to do Z

Z = *Visit Starbucks ASAP!!*

Surveillance Capitalism

Money for nothing and your clicks for free.

Private Human Experience → Lack of Regulation → Free Raw Material

Is the tradeoff of service for control (of your data, of you) fair?

Free Raw Material → AI → Behavioral Profiles

Behavioral Profiles → AI → Improve Services

Behavioral Profiles → AI → Predict Your Future Behavior

Behavioral Profiles → AI → **Control** Your Future Behavior

THE AGE OF SURVEILLANCE CAPITALISM

A Sunday Times bestseller

THE FIGHT FOR A HUMAN FUTURE AT THE NEW FRONTIER OF POWER

SHOSHANA ZUBOFF

*These predictions are traded in a new futures market, where surveillance capitalists sell certainty to businesses determined to know **what we will do next**.*

*In the competition for certainty, surveillance capitalists learned the most predictive data comes not just from monitoring but also from **directing** behavior.*
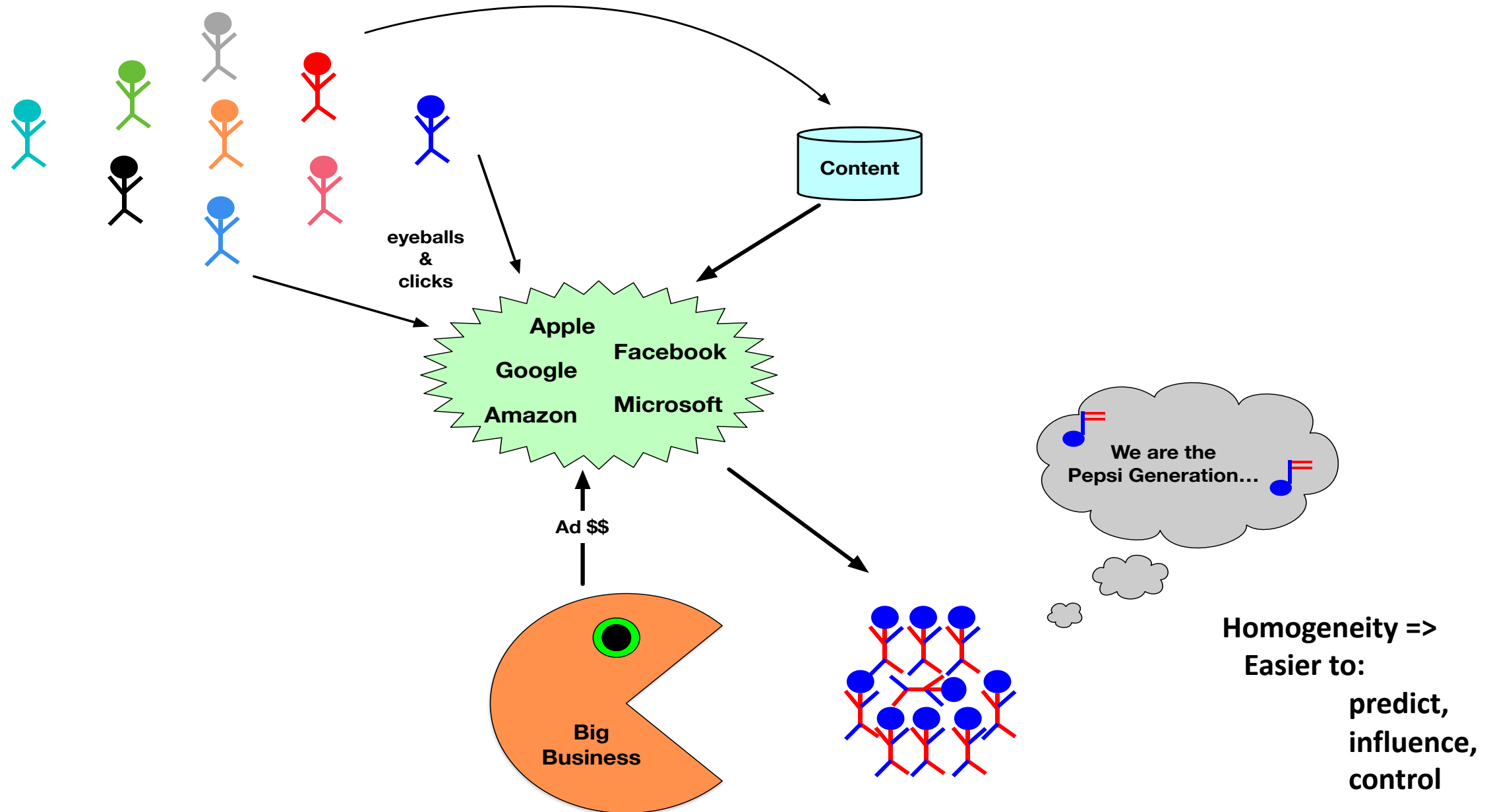
Google AdWords

(as described at disruptiveadvertising.com)
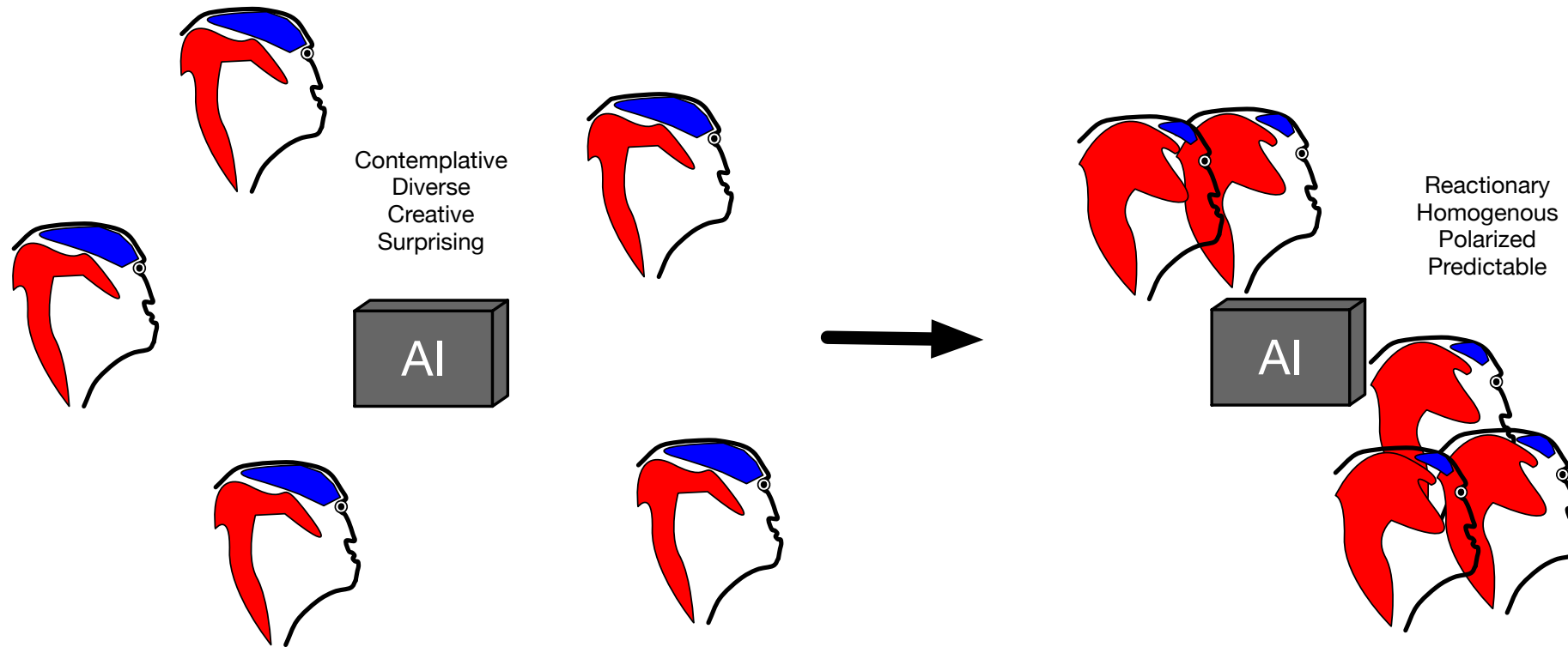
- The **Google Search Network** allows you to show your ads to users who are actively searching for the keywords that you've selected...an excellent opportunity to **capture** users who are at the research and purchasing stages of the digital sales **funnel**.

- The **Google Display Network** works differently. Instead of showing ads to users who are actively searching for a product or service online, display ads or banner ads are placed on websites **you think** your **target** will be on. *(Note utility of predicting user behavior!)*
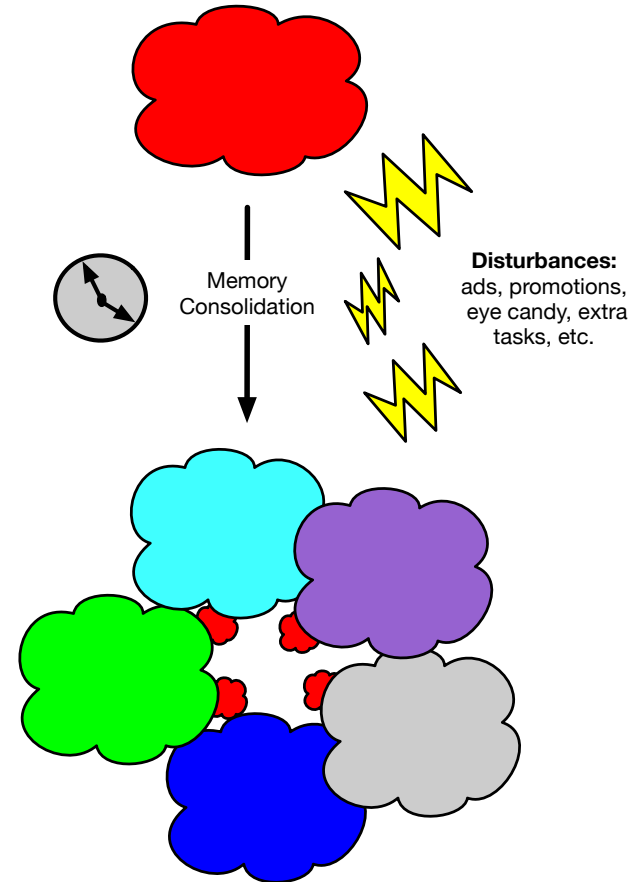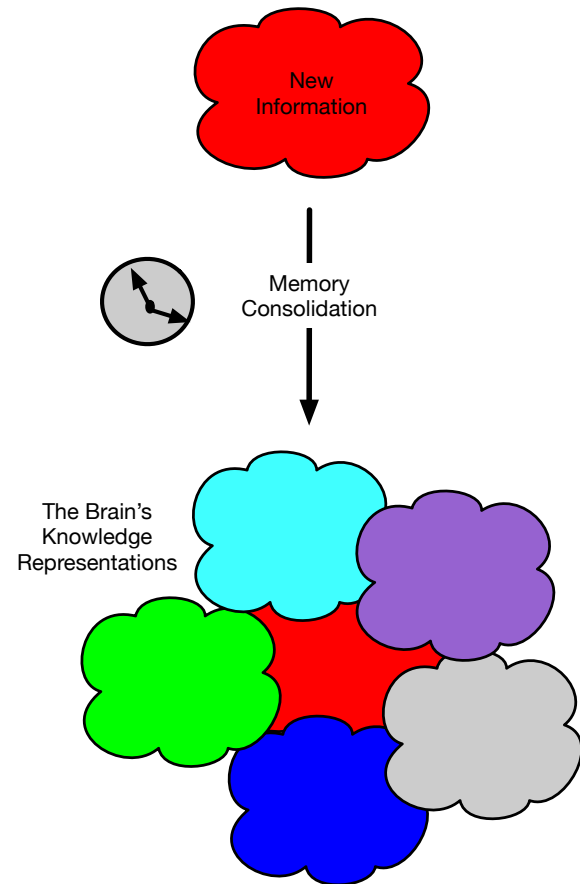
System 1: Reptilian
System 2: Sapien

Sapien
Reptilian
AI
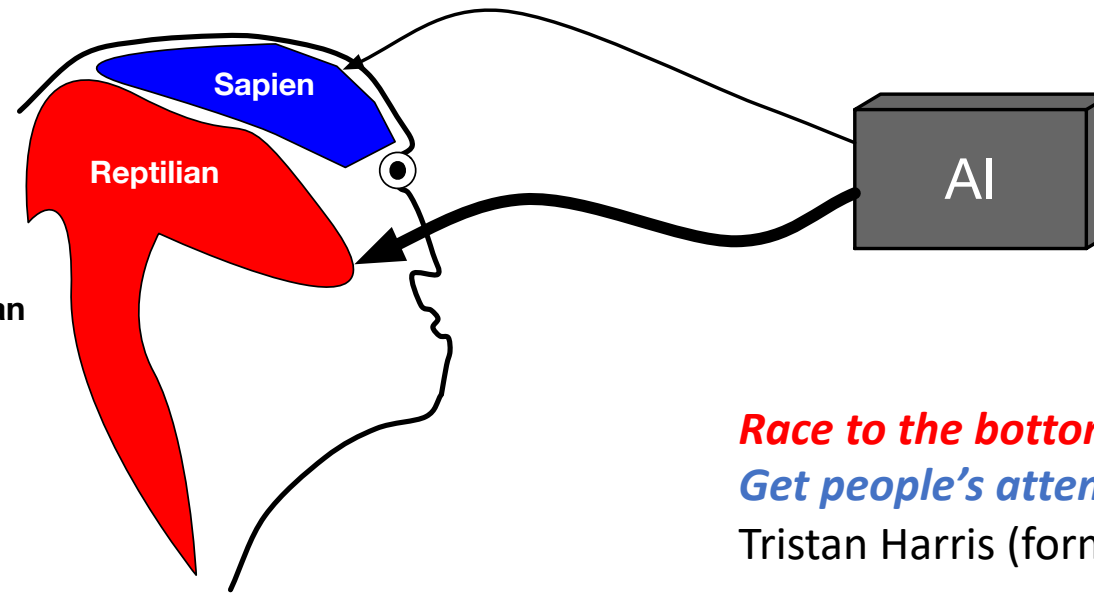
Race to the bottom of the brainstem...
Get people's attention at all cost.
Tristan Harris (formerly with Google)

Contemplative
Diverse
Creative
Surprising

AI

Reactionary
Homogenous
Polarized
Predictable

AI

Implications

- Quality of information (i.e. suggestions based on population data) exerts pressure toward conformity
- Quantity and frequency of information can inhibit deep cognition.
- It thus becomes easier to just **do what the AI system suggests**, without thinking much about it. For example:
  - GPS
  - YouTube recommendations – down the rabbit hole of extremism
  - Music & book recommendations - *Meatloaf, again*?
  - Microsoft Teams suggestions for sentence extensions and completions.
  - Powerpoint's suggestions for formatting these slides.
- Engagement of emotions and reactive circuits of System 1 (reptilian brain), but little of System 2 (conscious reasoning)
- The only talks that people have patience for are **LIGHTNING** talks !!

Plight of the Infovore

Constant distractions of cyberspace

"Shallows": Reduced depth of thought and emotion

Less Creative

Reduced value in an information society

Automation Bias: Trust machines over ourselves.

Rely on computers to understand the world

Rely on AI for **wisdom**

Human intelligence becomes **artificial** … and thus more easily **predicted** and **controlled** by AI

Who Works for Who/What?

- Comments from Laura Preston, a *human fallback* for Brenda, a real-estate chatbot:

    Months of impersonating Brenda had depleted my emotional resources. It occurred to me that I wasn't really training Brenda to think like a human; <u>Brenda was training me to think like a bot</u>, and perhaps that had been the point all along.

- *Kenyans paid under $2/hour to label (very disturbing) images for ChatGPT, and similar work for Facebook. Even refugees in camps are used for this.*

- *AI Surveillance of low-paid workers doing repetitious jobs in warehouses.*

Even ELIZA Gets It

KD: I am concerned about the future of AI and its effects upon humanity.

ELIZA: Did you come to me because you are concerned about the future of AI and its effects upon humanity?

KD: Yes, indeed.

ELIZA: Are you sure about that?

KD: Definitely

ELIZA: Tell me more

KD: Are we losing our jobs and our cognitive agency to AI?

ELIZA: Would you say that you have psychological problems?

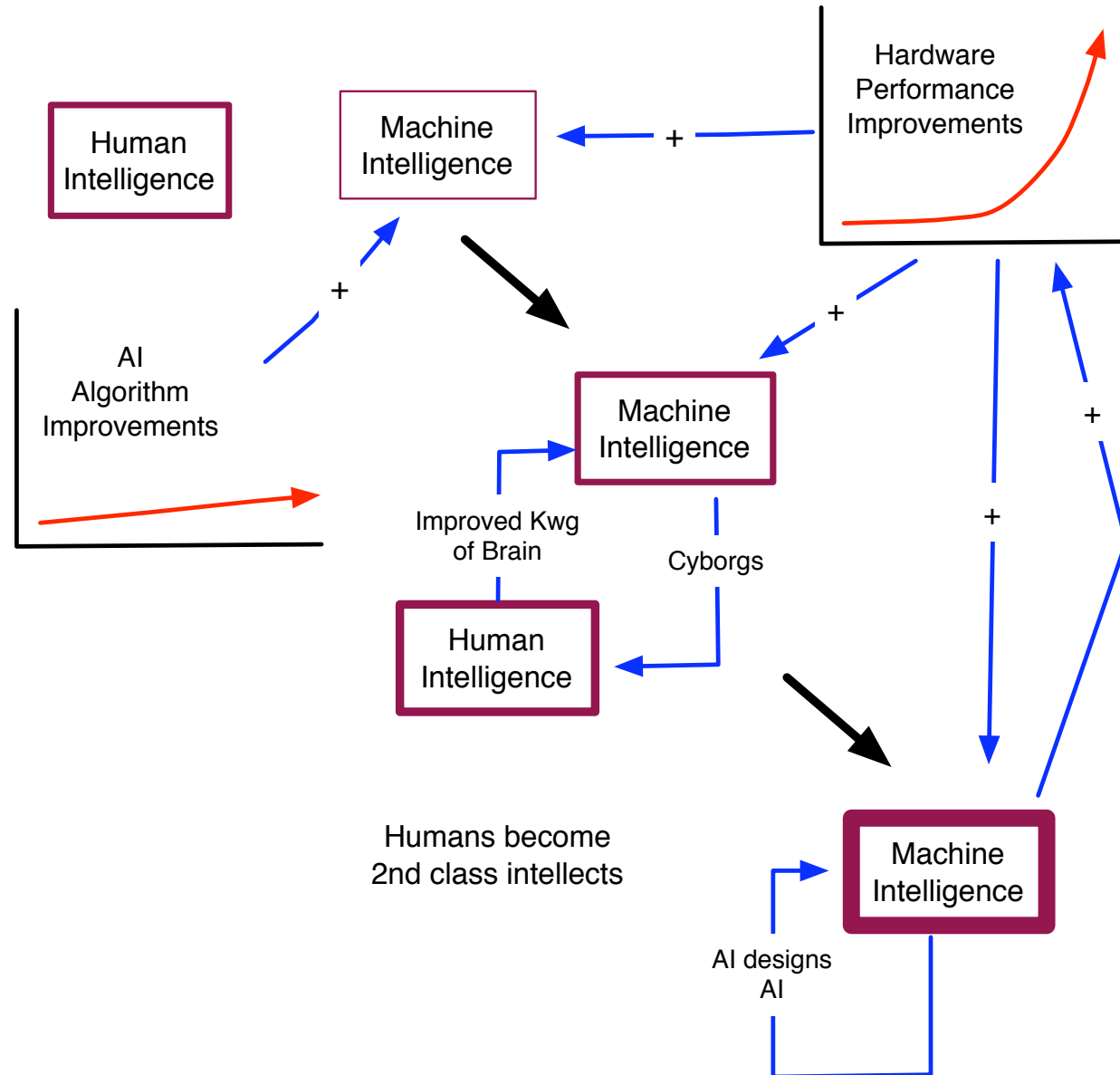KD: No, but you're nudging me in that direction

ELIZA: Perhaps you would like me to be nudging you in that direction?

Do we really like this nudging?

Expectations

The Singularity (Vernor Vinge, Ray Kurzweil)

Human Intelligence

Machine Intelligence

Hardware Performance Improvements

+

AI Algorithm Improvements

+

Machine Intelligence

+

Improved Kwg of Brain

Cyborgs

Human Intelligence

+

+

Humans become 2nd class intellects

Machine Intelligence

AI designs AI

A point where normal expectations break down, where things become confusing, meaningless, and unpredictable (Joel Garreau, 2006).

History of Life on Earth

- **4 Billion Years Ago (BYA)- Unicellular Life**
- **2 BYA - Photosynthesis**
- **900 Million Years Ago (MYA) - Multicellular Life**
- **500 MYA - Chordates**
- **400 MYA - Insects**
- **200 MYA - Birds**
  - **140 MYA - Mammals**
  - **75 MYA - Primates**
  - **6 MYA -Humans**
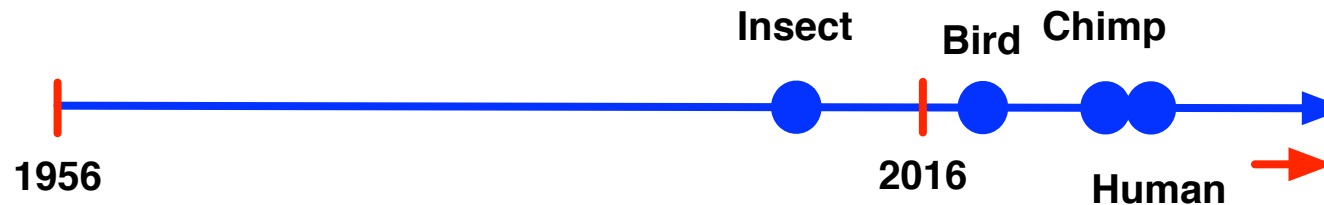
NICK BOSTROM

SUPERINTELLIGENCE
Paths, Dangers, Strategies

AI Timeline

Insect   Bird   Chimp

1956   **2016**   **Human**
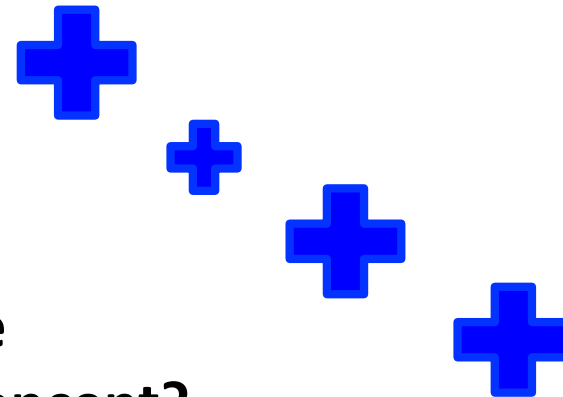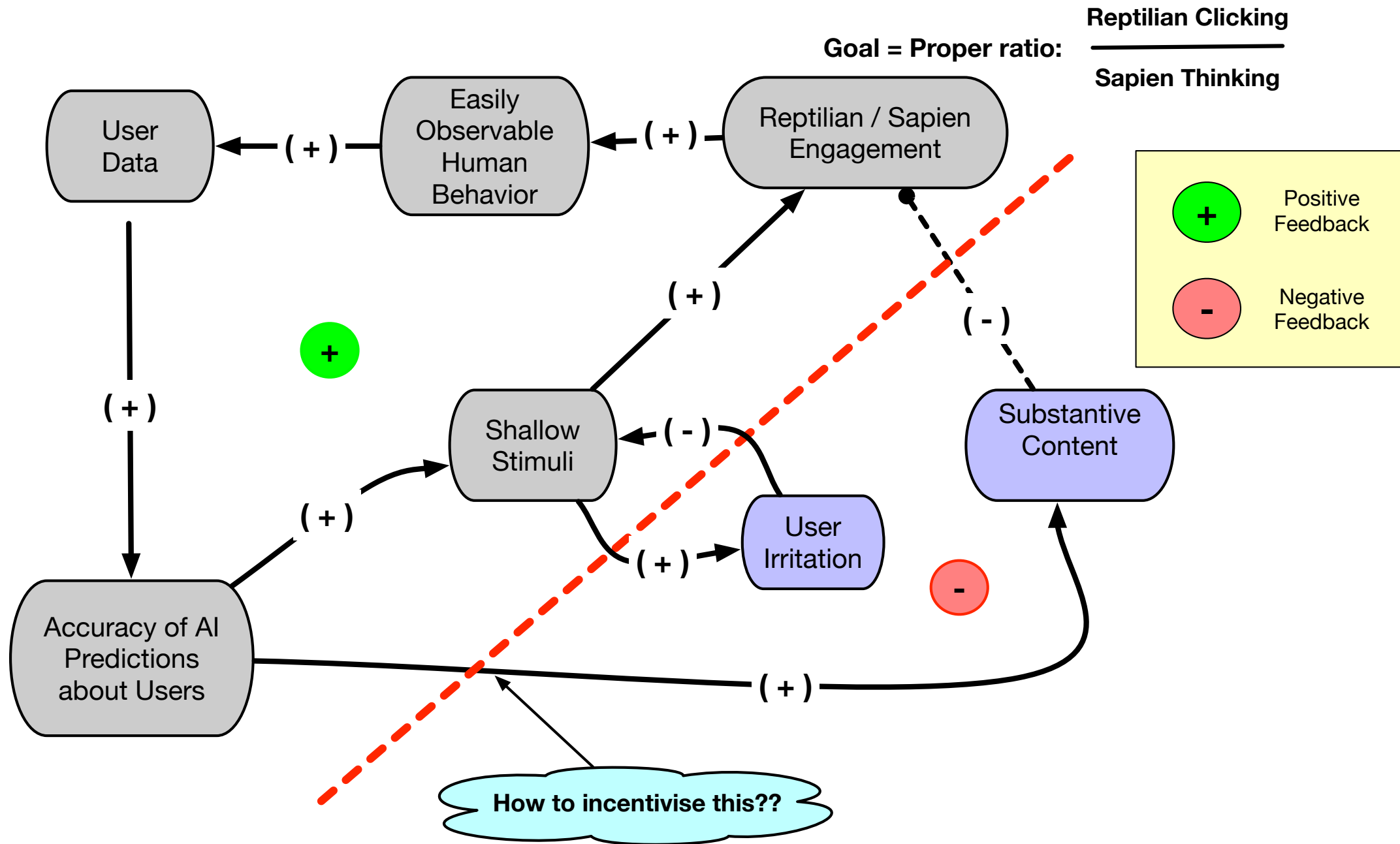
*People worry that computers will get too smart and take over the world, but the real problem is that they're too stupid and they've already taken over the world…*Peter Domingos (The Master Algorithm, pp. 285-6)
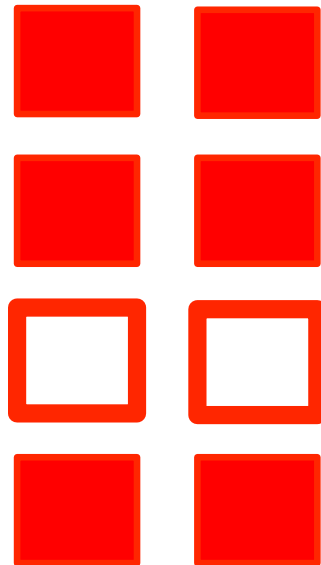
What is the common concept?

Goal = Proper ratio: $\dfrac{\text{Reptilian Clicking}}{\text{Sapien Thinking}}$

User Data

Easily Observable Human Behavior

Reptilian / Sapien Engagement

(+)

(+)

Positive Feedback

Negative Feedback

(+)

(+)

Shallow Stimuli

(-)

Substantive Content

(-)

(+)

User Irritation

Accuracy of AI Predictions about Users

(+)

How to incentivise this??

Stimulating the Sapien Brain

Reclaim our tools as instruments of ourselves, as instruments of experience rather than just means of production (Nicholas Carr, The Glass Cage, 2014)

- Move from technology-centered to human-centered automation.
- Reduce Online Ads
  - Subscription-based web services (fees, not ads, pay the bills), e.g. Netflix*
  - Ad Blockers
- AI that promotes diversity: **explore our creative possibilities (system 2)** instead of **exploiting our impulses (system 1)**....technically trivial.
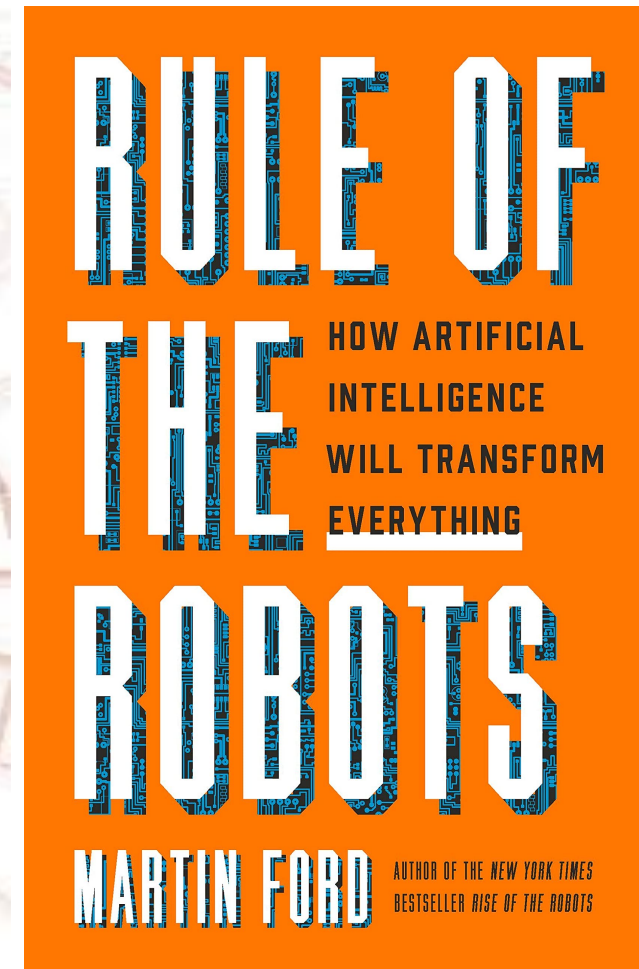- **Metaverse** –vs- *Real Life Matters* (Do we really want to immerse ourselves in a virtual world in which we are more easily influenced by AI?)
- Read real books!

*Binge watching = sustained deep concentration!

THE SHALLOWS

How the internet is changing the way we read, think and remember

NICHOLAS CARR

Nicholas Carr
NEW YORK TIMES BEST-SELLING AUTHOR OF THE SHALLOWS

THE GLASS CAGE

HOW OUR COMPUTERS ARE CHANGING US

"Essential." —Daniel Menaker, New York Times Book Review

HOW TECHNOLOGY IS CREATING A WORLD WITHOUT CHOICES AND HOW TO FIGHT BACK

THE LOOP

JACOB WARD
NBC NEWS TECHNOLOGY CORRESPONDENT

RULE OF THE ROBOTS

HOW ARTIFICIAL INTELLIGENCE WILL TRANSFORM EVERYTHING

MARTIN FORD
AUTHOR OF THE *NEW YORK TIMES* BESTSELLER *RISE OF THE ROBOTS*

THE ATTENTION MERCHANTS

The Epic Scramble to Get Inside Our Heads

TIM WU

"DAZZLING." —FINANCIAL TIMES

A NEW YORK TIMES BESTSELLER

BUSINESS BOOK OF THE YEAR 2015 WINNER

RISE OF THE ROBOTS

TECHNOLOGY AND THE THREAT OF A JOBLESS FUTURE

MARTIN FORD

"A BREATHTAKING NEW BOOK ON MODERN ECONOMICS." —FORBES.COM

NEW YORK TIMES BESTSELLER

DATA AND GOLIATH

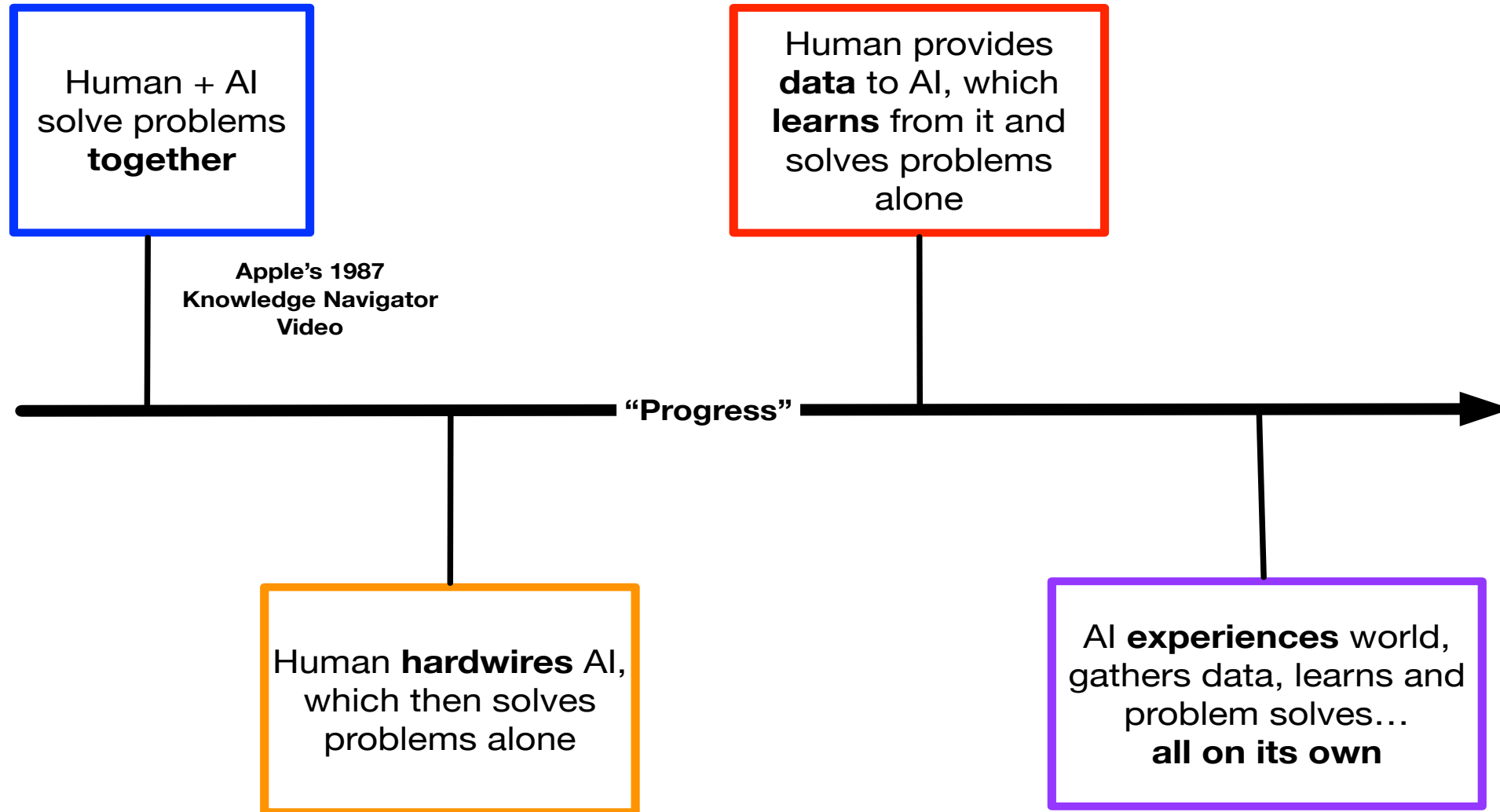The Hidden Battles to Collect Your Data and Control Your World

BRUCE SCHNEIER

*Layout suggested by AI

Final Words from *The Loop* (Jacob Ward, 2022)

Our individual and social patterns are already built to give away our agency to mechanisms outside our consciousness – to our assumptions, to cues in our surroundings, to our peers …we're on the precipice of giving our entire way of life over to an invisible, imperceptible, irresistible instinct to hand difficult choices – even and especially the vitally important ones – to automated systems…Now we have to learn, in this moment, how to resist the pull of convenience and profit and protect the best aspects of who we are.

Human-AI Interaction Spectrum

Human + AI solve problems **together**

Apple's 1987 Knowledge Navigator Video

Human provides **data** to AI, which **learns** from it and solves problems alone

"Progress"

Human **hardwires** AI, which then solves problems alone

AI **experiences** world, gathers data, learns and problem solves…
all on its own

- Should AI help us learn, not just do the job itself?
- For the good of humanity, shouldn't we **move back left** ?

Conclusion

- AI will continue to make many jobs economically (and even morally) infeasible for anything but machine solutions.

- Humans need to keep **applying themselves** if they plan to **apply** for future jobs.

*When visiting an Asian worksite in the 1960's, the great economist Milton Friedman was surprised to see workers using shovels, not modern machines. When told the reason: "It was a **jobs project**," he responded:*

If it's a jobs project, why not give them spoons instead of shovels?

- Humans must avoid becoming spoons… and AI research and development needs to be part of the solution, not the problem.