



Research in the Intelligence Age: Remaining Relevant in the 4th Industrial Revolution

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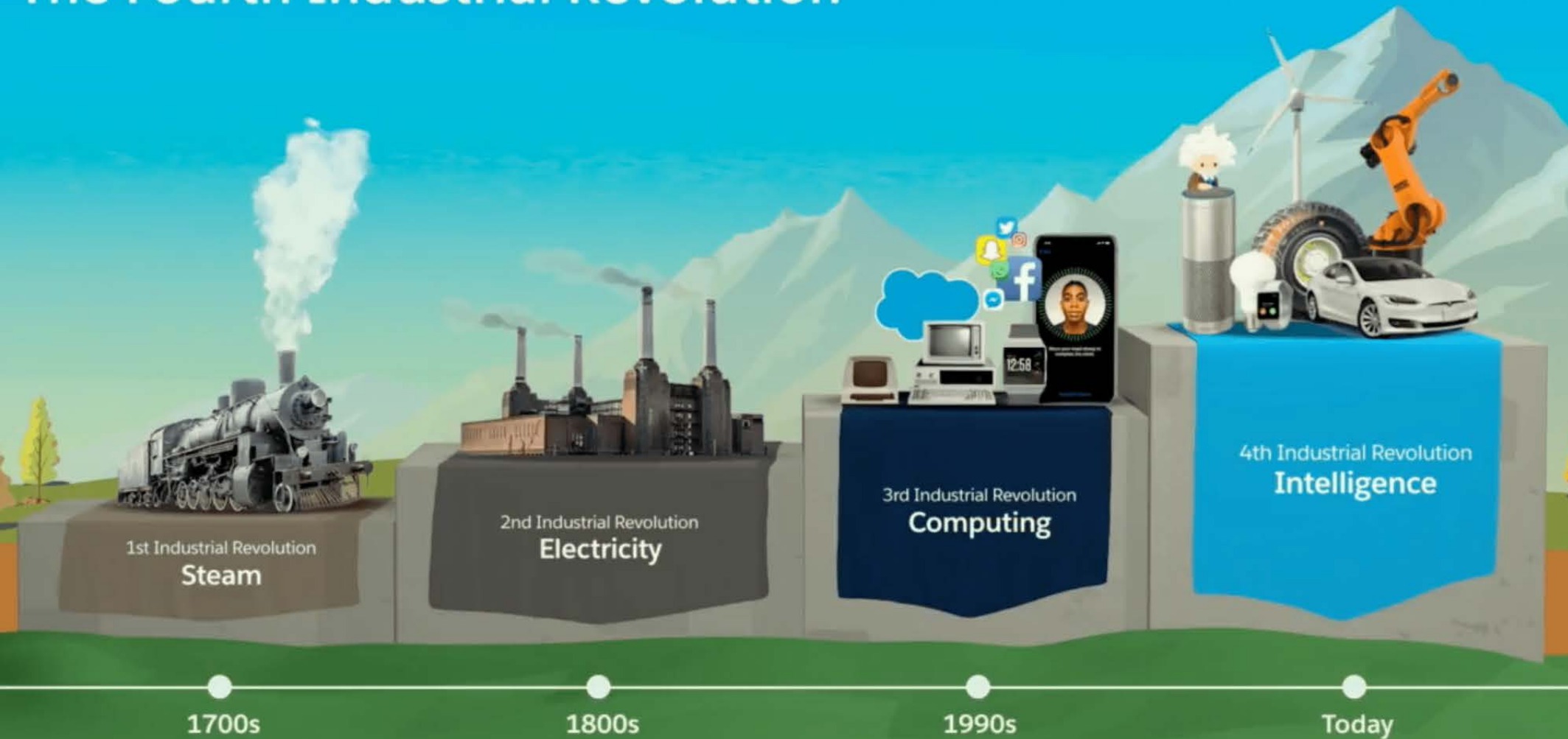
Agenda

- The 4th Industrial Revolution
- Driving Forces of AI
- Modern Evolution of AI in Computing
- Manifestations of Machine Intelligence
- Implications for Consumer Research



The Intelligent Revolution

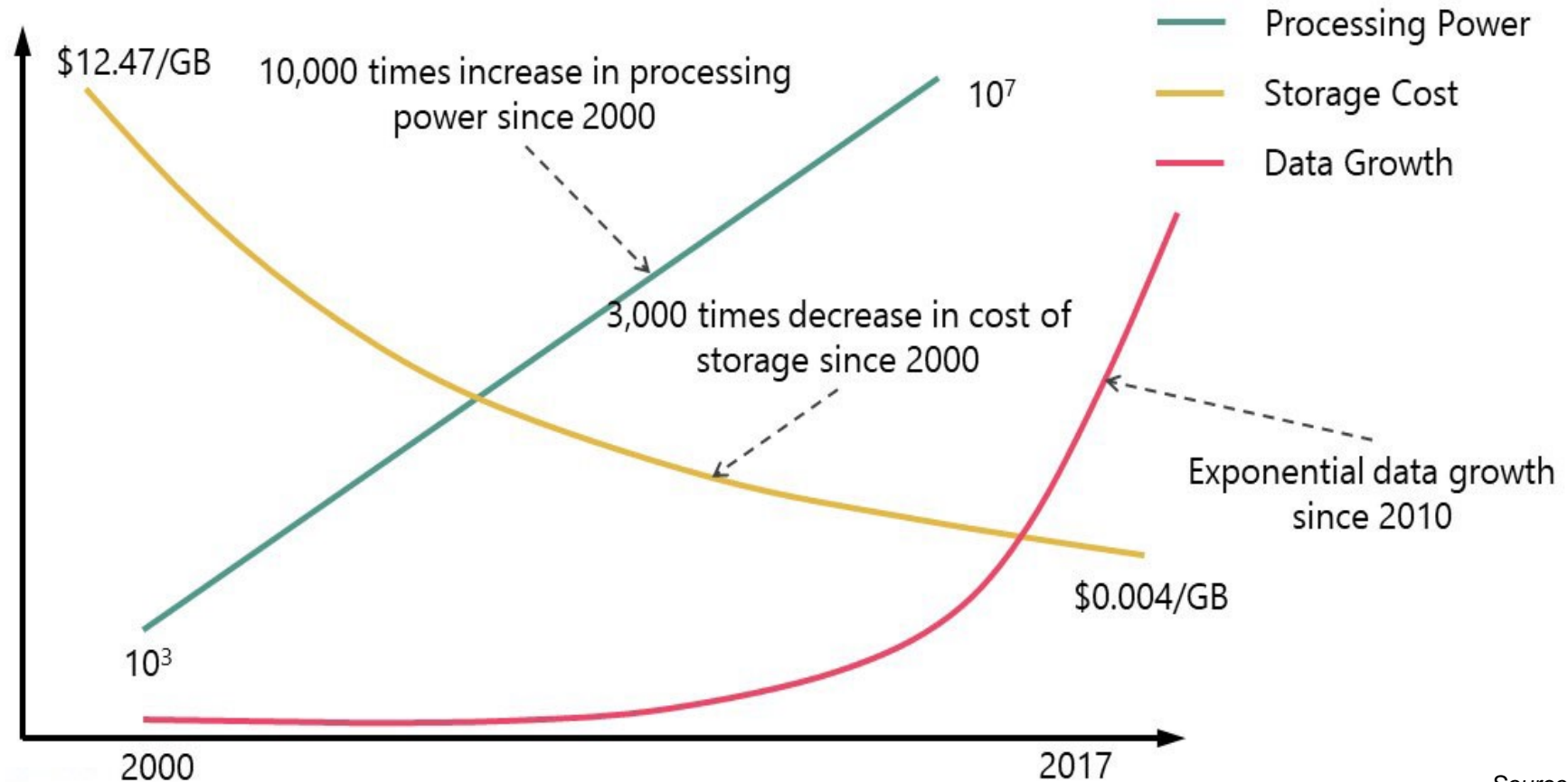
The Fourth Industrial Revolution





Three Macro Forces Driving the Intelligent Revolution

Exponential growth in data and computational power, and declining storage costs has laid the foundation for Artificial Intelligence (AI)



#LOVE

— IS POSTED —

23,211

TIMES

GIPHY

— SERVES UP —

4,800,000

GIFS

NETFLIX

— USERS STREAM —

694,444

HRS
OF VIDEO

GRUBHUB

— RECEIVES —

8,683

ORDERS

INSTAGRAM

— USERS POST —

277,777

STORIES

YOUTUBE

— USERS WATCH —

4,500,000

VIDEOS

TWITTER

— USERS SEND —

511,200

TWEETS

188,000,000

EMAILS ARE SENT

TWITCH

— USERS VIEW —

1,000,000

VIDEOS

TUMBLR

— USERS PUBLISH —

92,340

POSTS

390,030

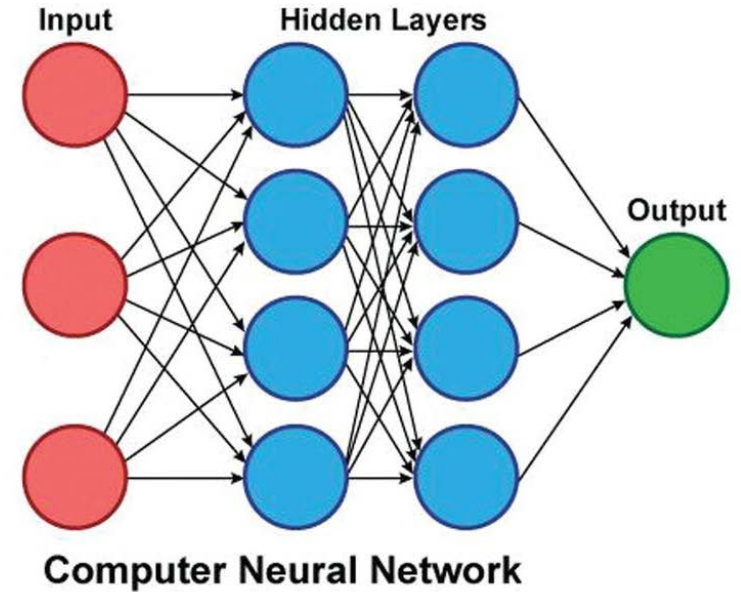
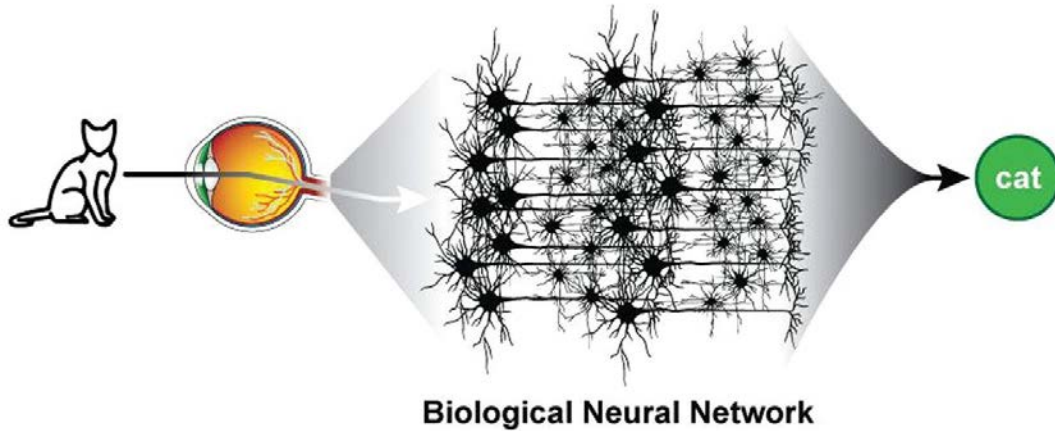
Source: domo.com

APPS ARE DOWNLOADED

2019
— every —
MINUTE



The abundance and proliferation of computational power and data enable machines to mimic human intelligence



The Innovation Revolution has an enormous impact on the development of disruptive technologies, and human and business productivity





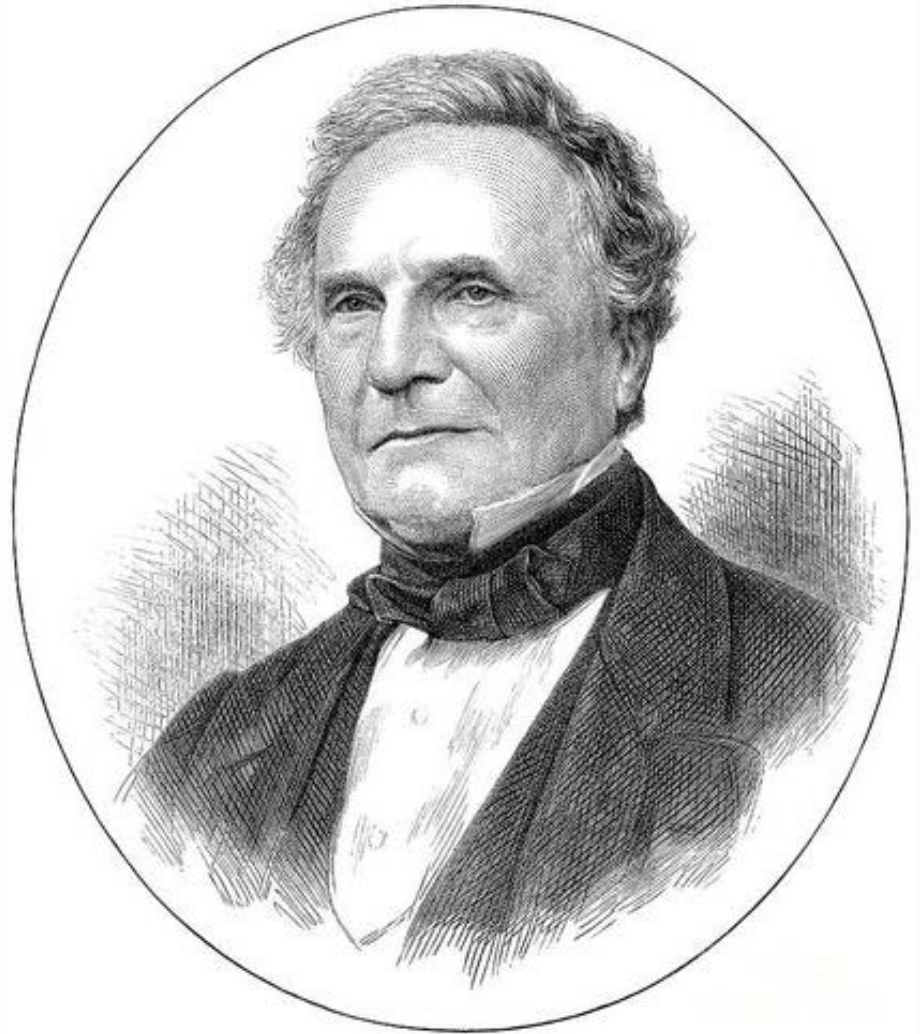
Modern Evolution of Artificial Intelligence

Charles Babbage

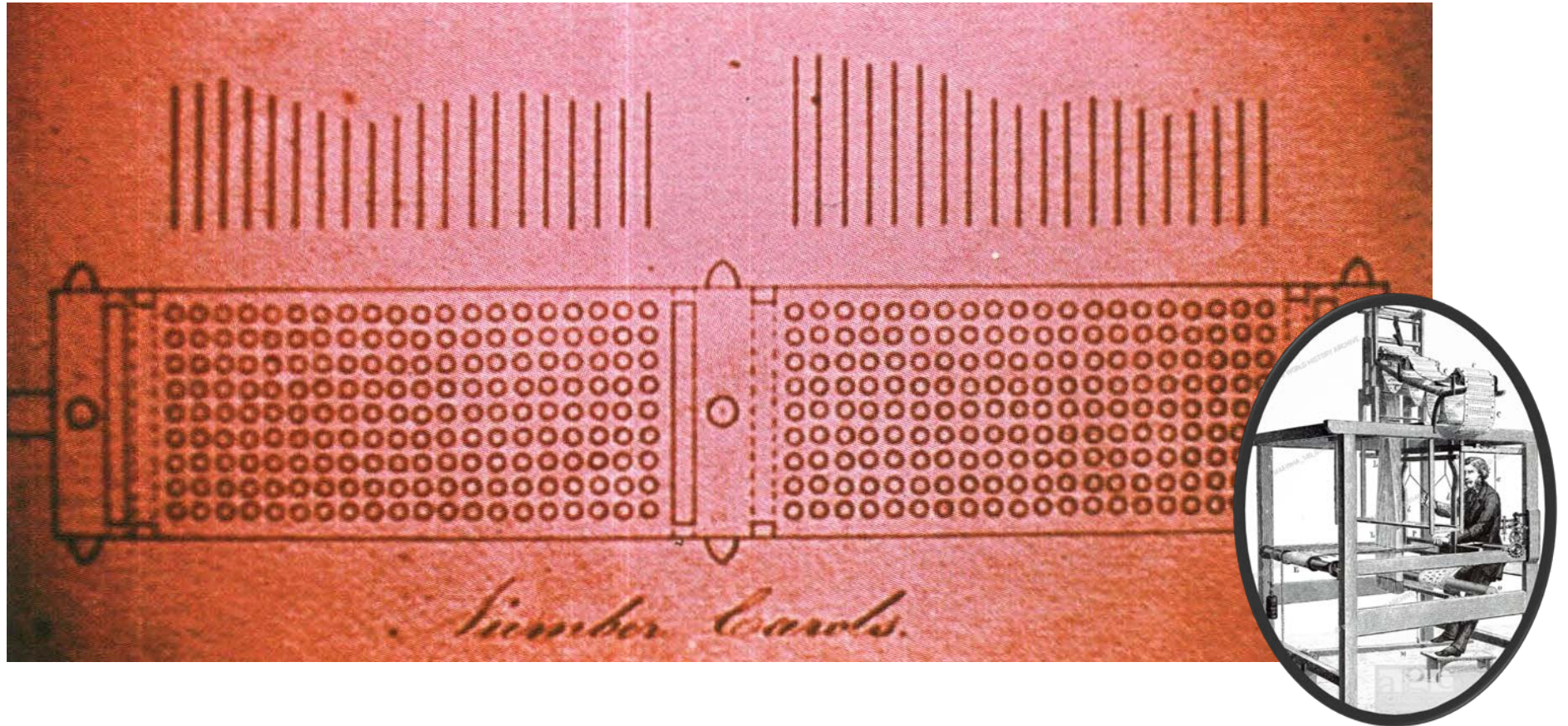
Born in 1791 - London, England

Mathematician and inventor

Credited with conceiving the first
automatic digital computer



Babbage envisioned performing any arithmetical operation on the basis of instructions from punched cards



Ada Lovelace

Born in 1815 - Middlesex, England

Mathematician and writer

Regarded as the first computer programmer and prophet of the computer age



Lovelace believed the Engine might act upon things besides a number, marking a fundamental transition from calculation to computation

$$\frac{x}{e^x - 1} = \frac{1}{1 + \frac{x}{2} + \frac{x^2}{2 \cdot 3} + \frac{x^3}{2 \cdot 3 \cdot 4} + \&c.}$$

of the Numbers of Bernoulli. See Note G. (page 722 et seq.)

Number of Operations.	Nature of Operation.	Variables acted upon.	Variables receiving results.	Indication of change in the value on any Variable.	Statement of Results.	Working Variables.										Result Variables.			
						v_1	v_2	v_3	v_4	v_5	v_6	v_7	v_8	v_9	v_{10}	v_{11}	v_{12}	v_{13}	v_{14}
1	$\times v_2 \times v_2$	v_2	v_2	$(v_2 = v_2)$	$2n$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	$- v_2 - v_2$	v_2	v_2	$(v_2 = v_2)$	$2n-1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	$+ v_2 + v_2$	v_2	v_2	$(v_2 = v_2)$	$2n+1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	$+ v_2 - v_2$	v_2	v_2	$(v_2 = v_2)$	$2n-1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5	$+ v_2 + v_2$	v_2	v_2	$(v_2 = v_2)$	$2n+1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	$- v_2 - v_2$	v_2	v_2	$(v_2 = v_2)$	$2n-1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	$- v_2 + v_2$	v_2	v_2	$(v_2 = v_2)$	$2n$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8	$+ v_2 + v_2$	v_2	v_2	$(v_2 = v_2)$	$2n+1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9	$+ v_2 + v_2$	v_2	v_2	$(v_2 = v_2)$	$2n+1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10	$\times v_2 \times v_2$	v_2	v_2	$(v_2 = v_2)$	$2n$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
11	$+ v_2 + v_2$	v_2	v_2	$(v_2 = v_2)$	$2n+1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12	$- v_2 - v_2$	v_2	v_2	$(v_2 = v_2)$	$2n-1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13	$- v_2 - v_2$	v_2	v_2	$(v_2 = v_2)$	$2n-1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
14	$+ v_2 + v_2$	v_2	v_2	$(v_2 = v_2)$	$2n+1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15	$+ v_2 + v_2$	v_2	v_2	$(v_2 = v_2)$	$2n+1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16	$\times v_2 \times v_2$	v_2	v_2	$(v_2 = v_2)$	$2n$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
17	$- v_2 - v_2$	v_2	v_2	$(v_2 = v_2)$	$2n-1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18	$+ v_2 + v_2$	v_2	v_2	$(v_2 = v_2)$	$2n+1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
19	$+ v_2 + v_2$	v_2	v_2	$(v_2 = v_2)$	$2n+1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
20	$\times v_2 \times v_2$	v_2	v_2	$(v_2 = v_2)$	$2n$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
21	$+ v_2 + v_2$	v_2	v_2	$(v_2 = v_2)$	$2n+1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
22	$- v_2 - v_2$	v_2	v_2	$(v_2 = v_2)$	$2n-1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
23	$- v_2 - v_2$	v_2	v_2	$(v_2 = v_2)$	$2n-1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
24	$+ v_2 + v_2$	v_2	v_2	$(v_2 = v_2)$	$2n+1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...
25	$+ v_2 + v_2$	v_2	v_2	$(v_2 = v_2)$	$2n+1$	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Here follows a repetition of Operations thirteen.



Alan Turing

Born in 1912 - London, England

Mathematics, cryptanalysis, logic,
philosophy, mathematical biology,
computer and cognitive science, AI

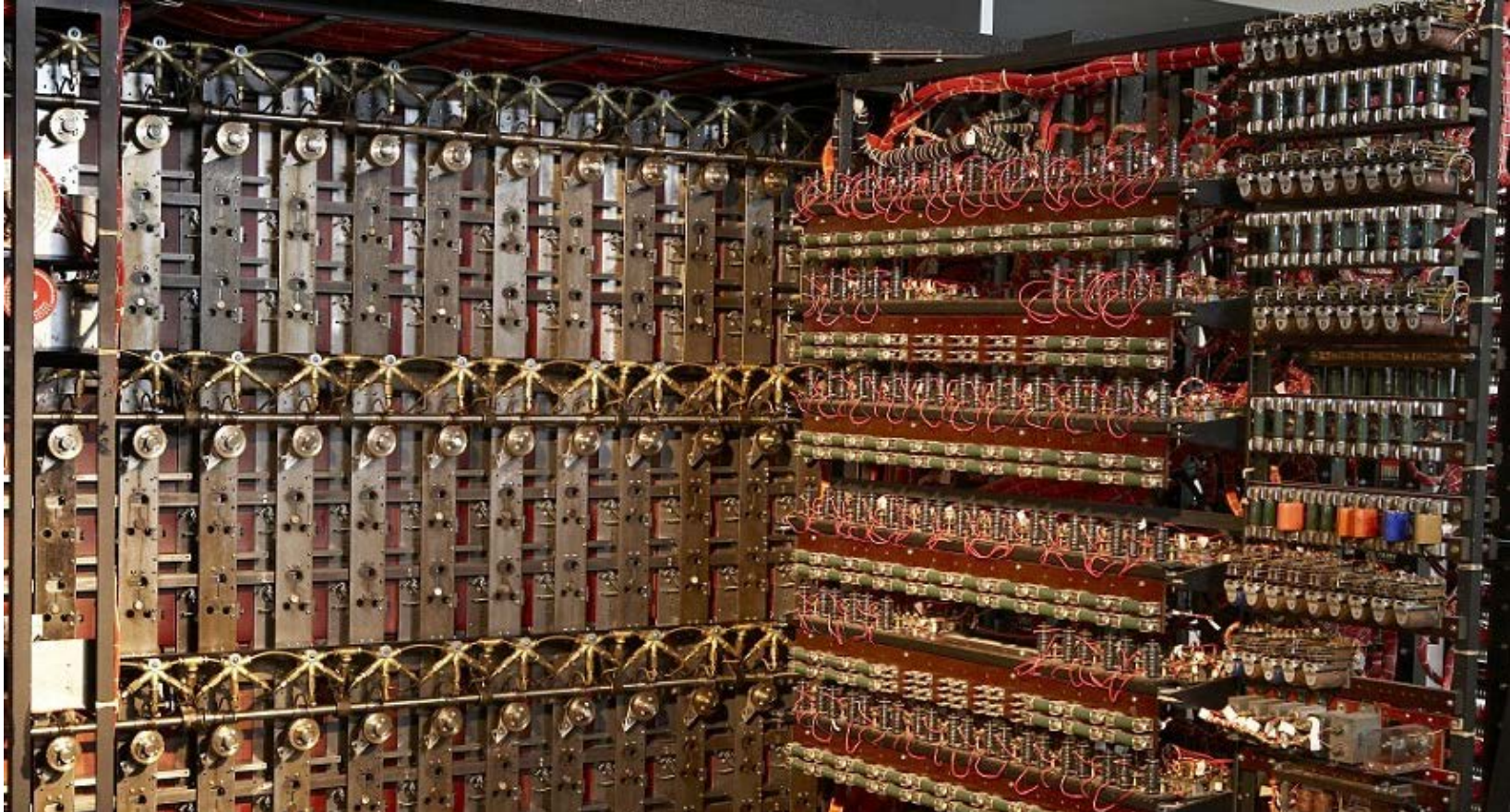
The father of Artificial Intelligence



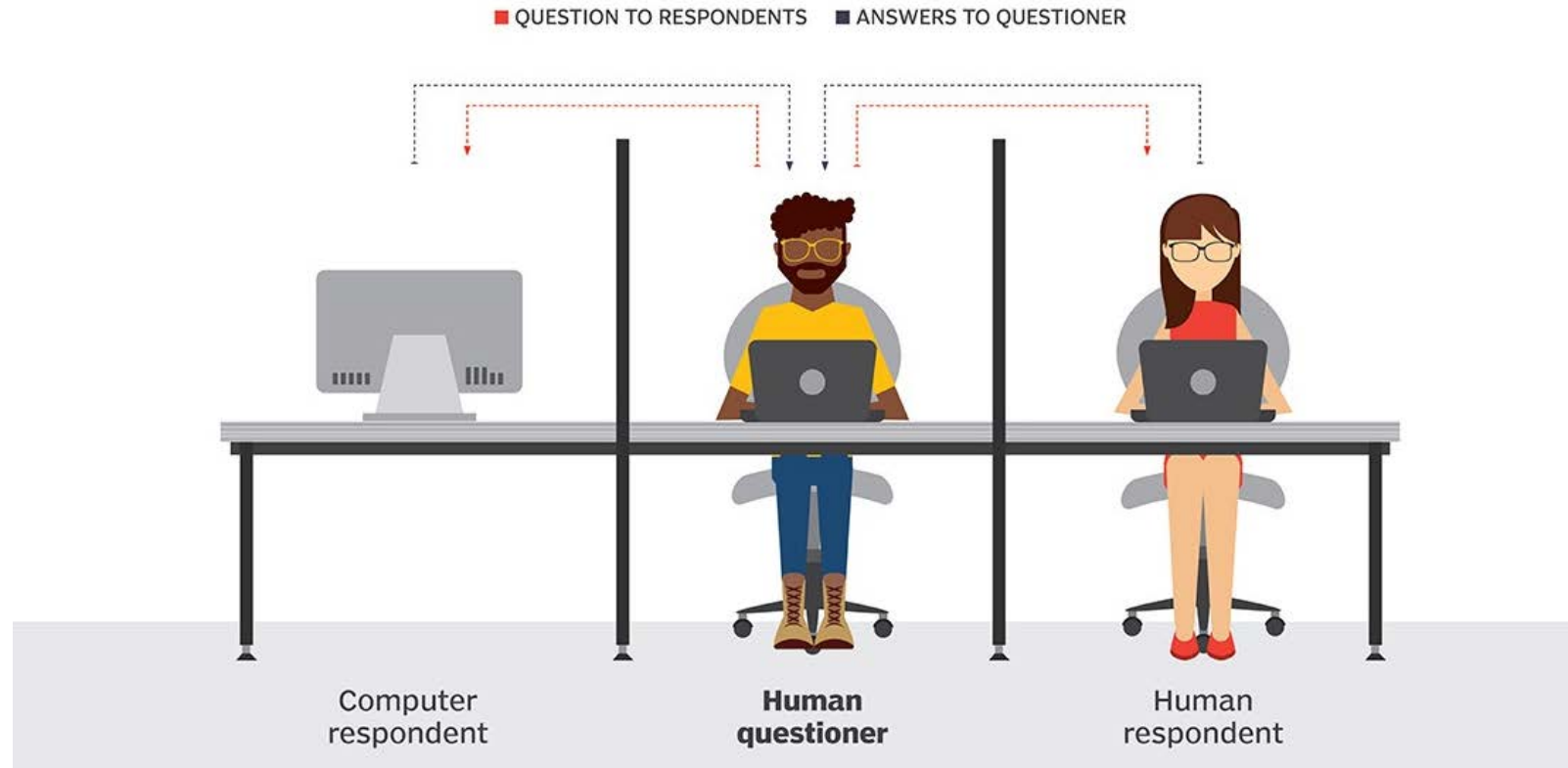
Enigma was a highly complex coding machine originally built by the Germans during WWI



The 'Bombe' successfully intercepted and decoded up to 84,000 Enigma messages a month, saving an estimated 14 million lives



After the war, Turing focused his efforts on computing, cognitive science, and artificial intelligence, creating the Turing Test



1 The accelerating pace of change ...



2 ... and exponential growth in computing power ...

Computer technology, shown here climbing dramatically by powers of 10, is now progressing more each hour than it did in its entire first 90 years

COMPUTER RANKINGS

By calculations per second per \$1,000



Analytical engine
Never fully built, Charles Babbage's invention was designed to solve computational and logical problems



Colossus

The electronic computer, with 1,500 vacuum tubes, helped the British crack German codes during WW II



UNIVAC I

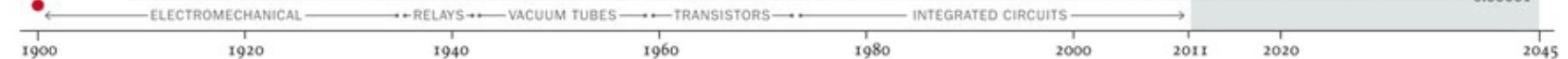
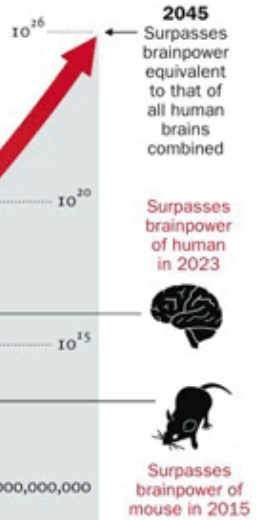
The first commercially marketed computer, used to tabulate the U.S. Census, occupied 943 cu. ft.



Apple II

At a price of \$1,298, the compact machine was one of the first massively popular personal computers

3 ... will lead to the Singularity





Manifestations of Machine Intelligence

October 30, 2019

Artificial Intelligence: A Boon for Insurance Underwriting?

The digitization of business is in high gear. Although some sectors have embraced this technology, others are slower to implement it. The insurance industry is no exception. While coverage for artificial intelligence in insurance is growing, it remains a niche market.

California has 33 million acres of forest. This company is training artificial intelligence to scour it all for wildfire



5,095 views | Oct 4, 2019, 11:52am

Transforming Online Learning With Artificial Intelligence



Aswin Pranam Contributor @

AI

I cover topics in artificial intelligence & digital innovation

How Is Artificial Intelligence Revolutionizing Small Businesses?

With time, AI has developed into a technology that delivers results and although expensive initially, it has become affordable for small businesses as well.



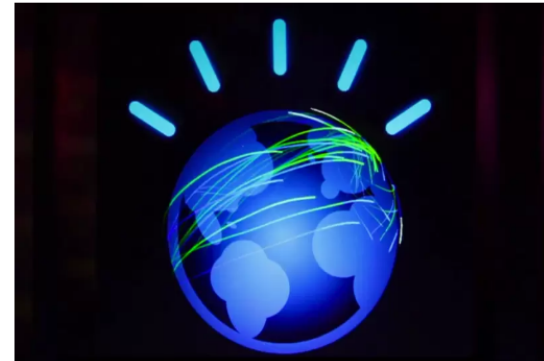
Artificial Intelligence

IBM's Watson is better at diagnosing cancer than human doctors



By IAN STEADMAN

Monday 11 February 2013



Credit IBM

Technology

Police officers raise concerns about 'biased' AI data

🕒 16 September 2019

INNOVATION / AI

Microsoft's AI Team Release a Bot That Can Generate Fake Comments, the Internet Asks Why

As if we needed more troll comments on

By Chris Young
October 02, 2019



Amazon drops secret AI recruiting tool that showed bias against women

by Krysia Lenzo | Fox News

BIG TECH BACKLASH · Published October 10, 2018

Artificial Intelligence and Ethics

Ethics and the dawn of decision-making machines

by JONATHAN SHAW

JANUARY-FEBRUARY 2019



Microsoft silences its new A.I. bot Tay, after Twitter users teach it racism [Updated]

Sarah Perez @sarahintampa / 10:16 am EDT • March 24, 2016







"AI is likely to be either the best or worst thing to happen to humanity."

- Stephen Hawking

Progressing Forward...by Learning from Where We've Been





Implications for Consumer & Market Research

Integrate to Evolve

- Automate tasks to help perform your job more effectively
- Quickly generate insights from large amounts of data
- Enable interactions with technology via natural-language conversations



- ✓ Enable businesses to survey the market continually
- ✓ AI solutions are producing insights in seconds that used to take teams of people days or even weeks to produce

Compliment to Enhance

Leverage traditional methods to enhance AI development:

- Prioritization (how can AI help your customers?)
- Build Hypotheses
- Ensure unbiased inputs
- Verify & confirm authenticity
- Fill unknown data gaps
- Ongoing contributions for future refinement

Human intelligence has the power of creativity to deal with unforeseen obstacles and change course accordingly



Thank You



Tanya Franklin
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