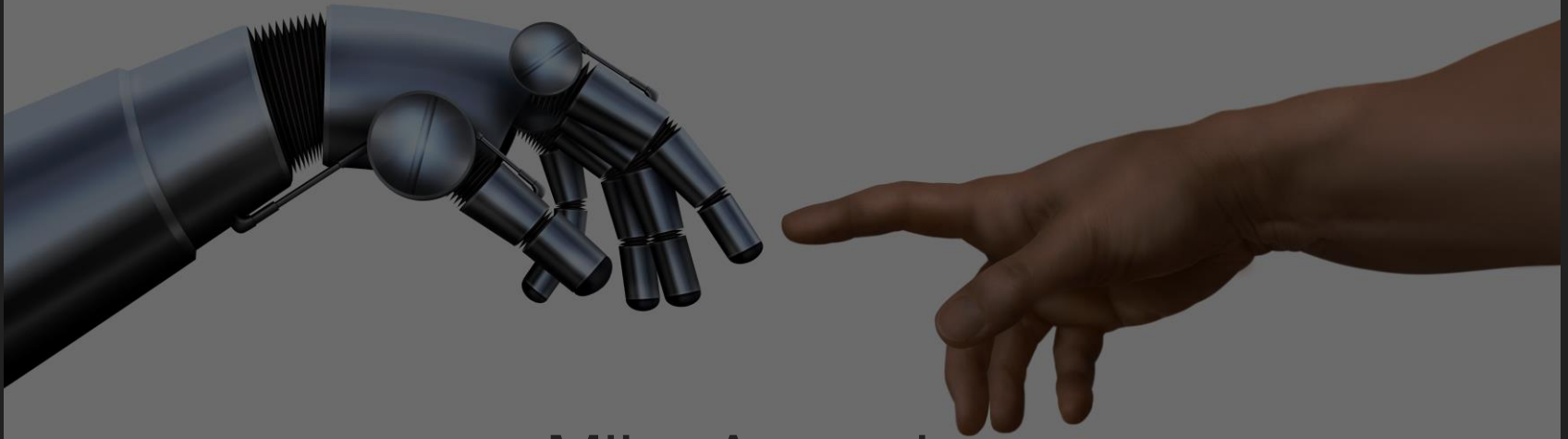


Coming to Terms with our Autonomic Future



Mike Amundsen
API Academy / CA Technologies
@mamund

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Prologue

Prologue

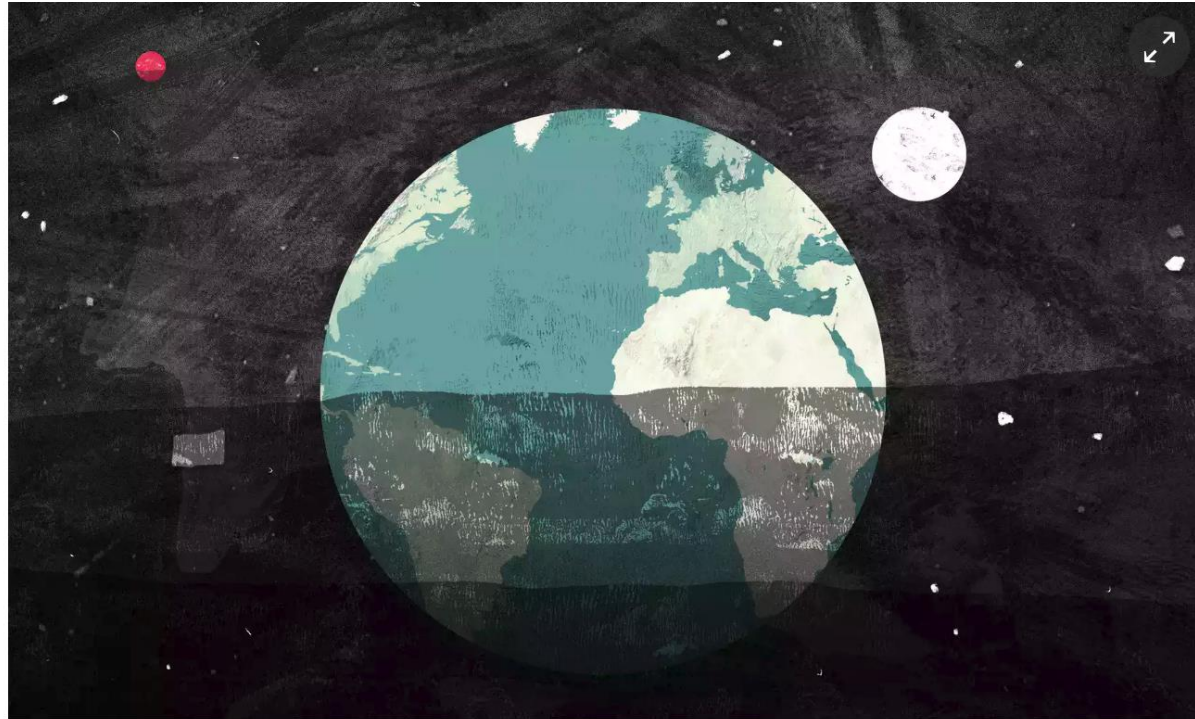
“Don’t worry, be happy!”



This is the most dangerous time for our planet

Stephen Hawking

We can't go on ignoring inequality, because we have the means to destroy our world but not to escape it

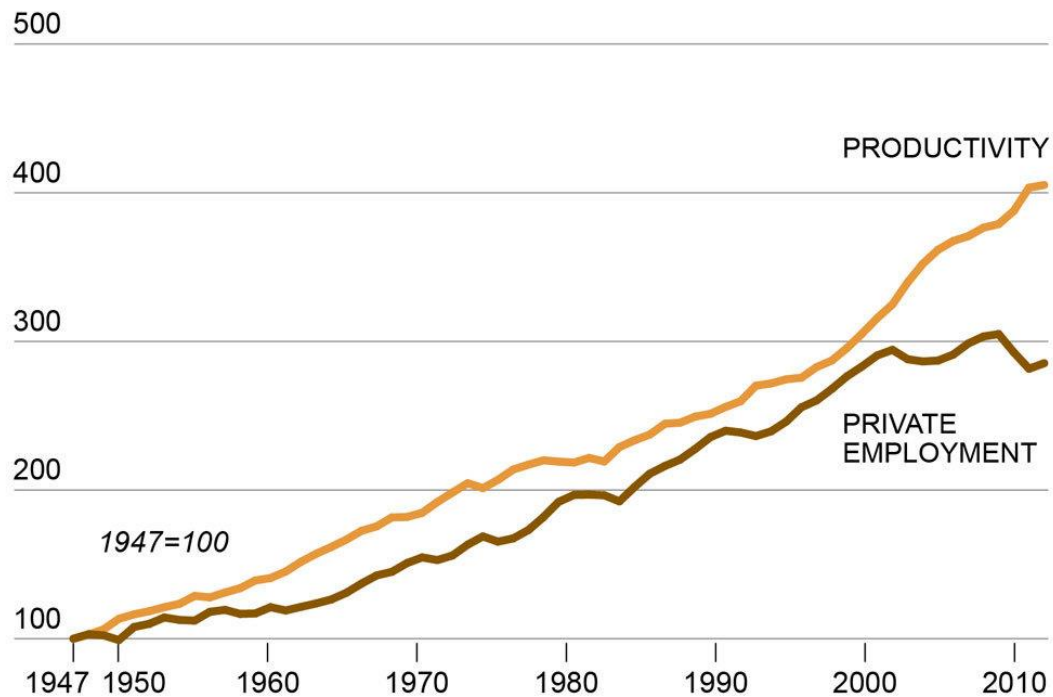


“The automation of factories has already decimated jobs in traditional manufacturing, and the rise of artificial intelligence is likely to extend this job destruction...”

Stephen Hawking, 2016

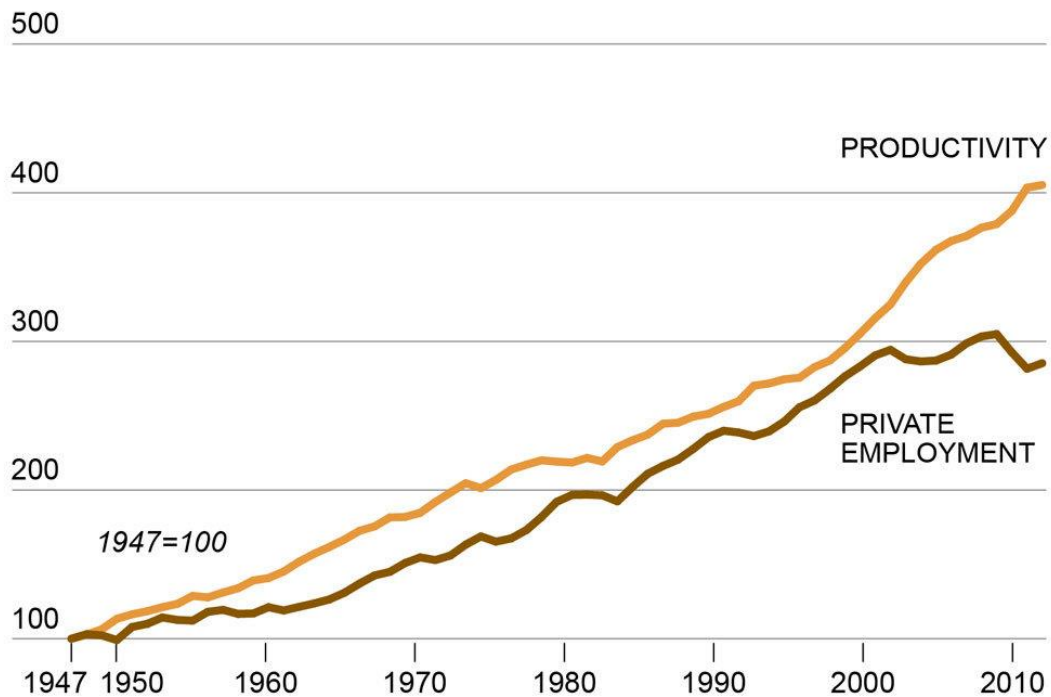


Productivity and employment in the United States, 1947-2011



Sources: U.S. Department of Labor, Bureau of Labor Statistics

Productivity and employment in the United States, 1947-2011

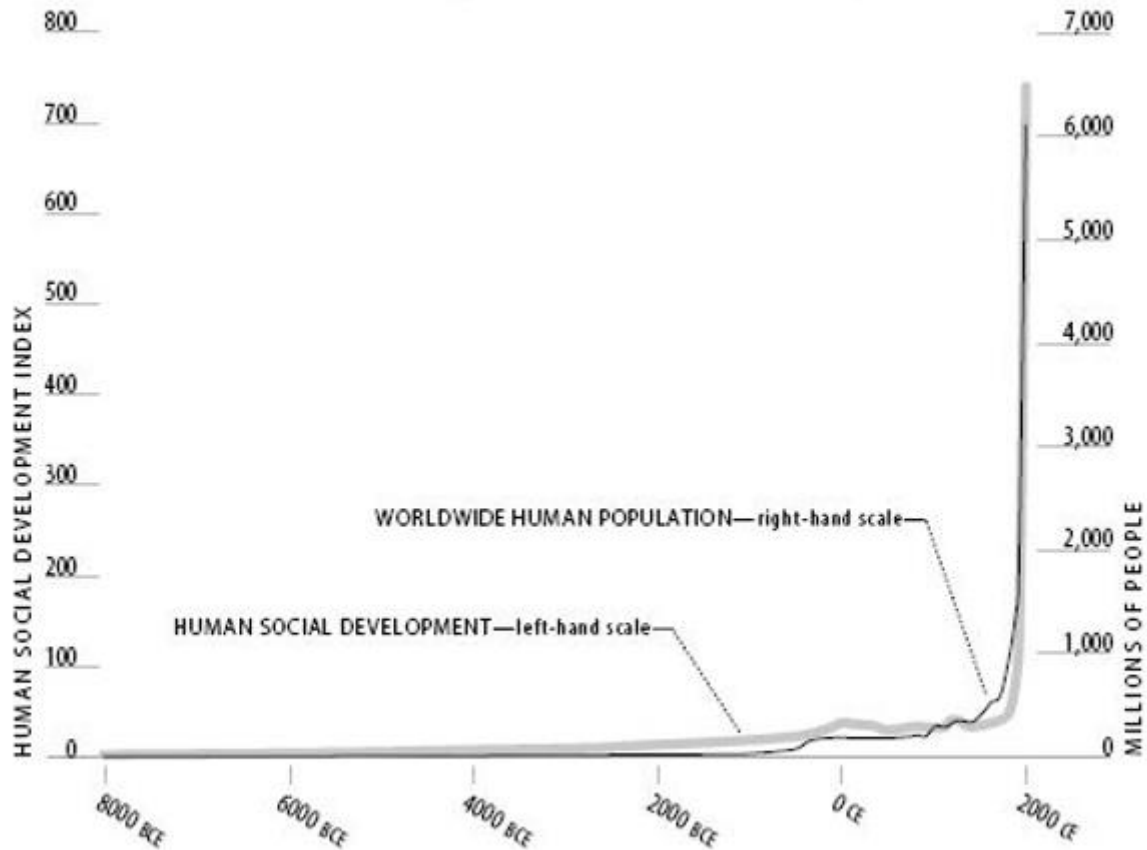


Sources: U.S. Department of Labor, Bureau of Labor Statistics

THE SECOND MACHINE AGE

WORK, PROGRESS, AND PROSPERITY
IN A TIME OF
BRILLIANT TECHNOLOGIES

ERIK BRYNJOLFSSON
ANDREW McAFEE

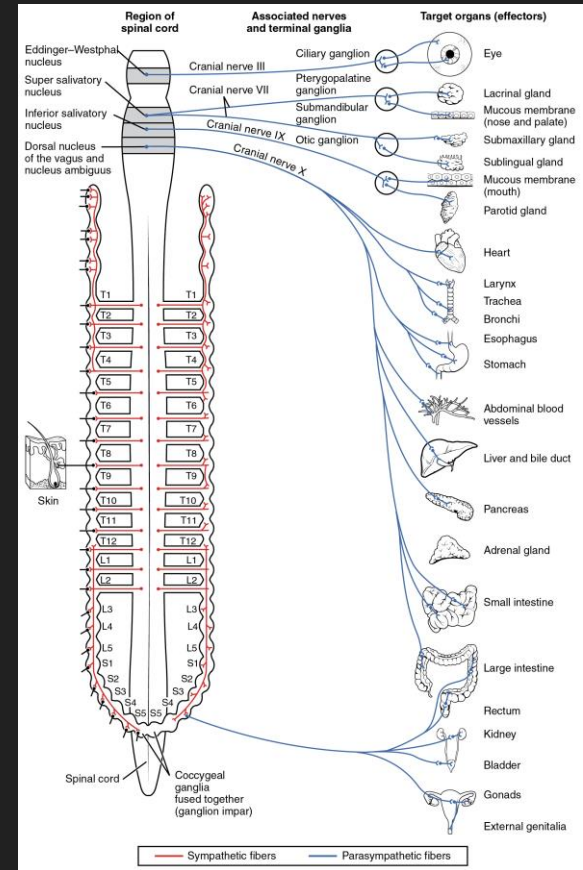




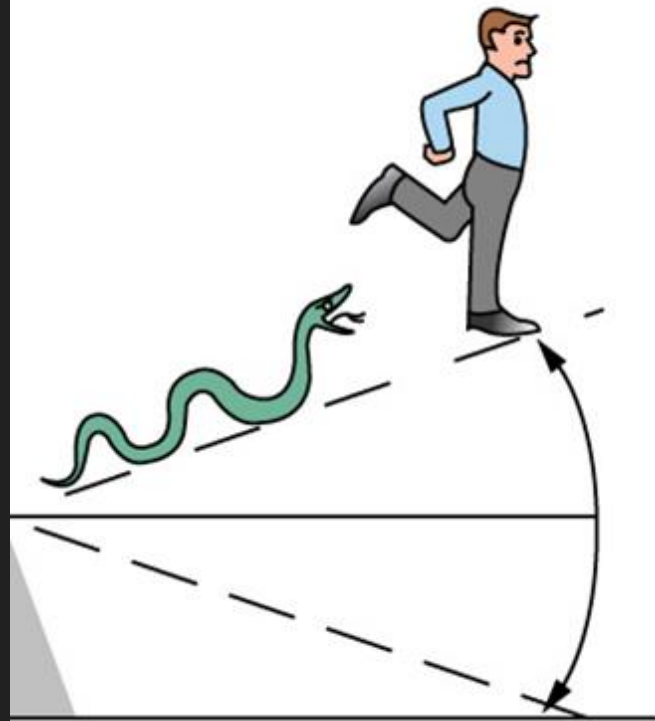
Autonomic, not Autonomous

“The autonomic nervous system is a control system that acts largely unconsciously and regulates bodily functions such as the heart rate, digestion, respiratory rate...”

Wikipedia

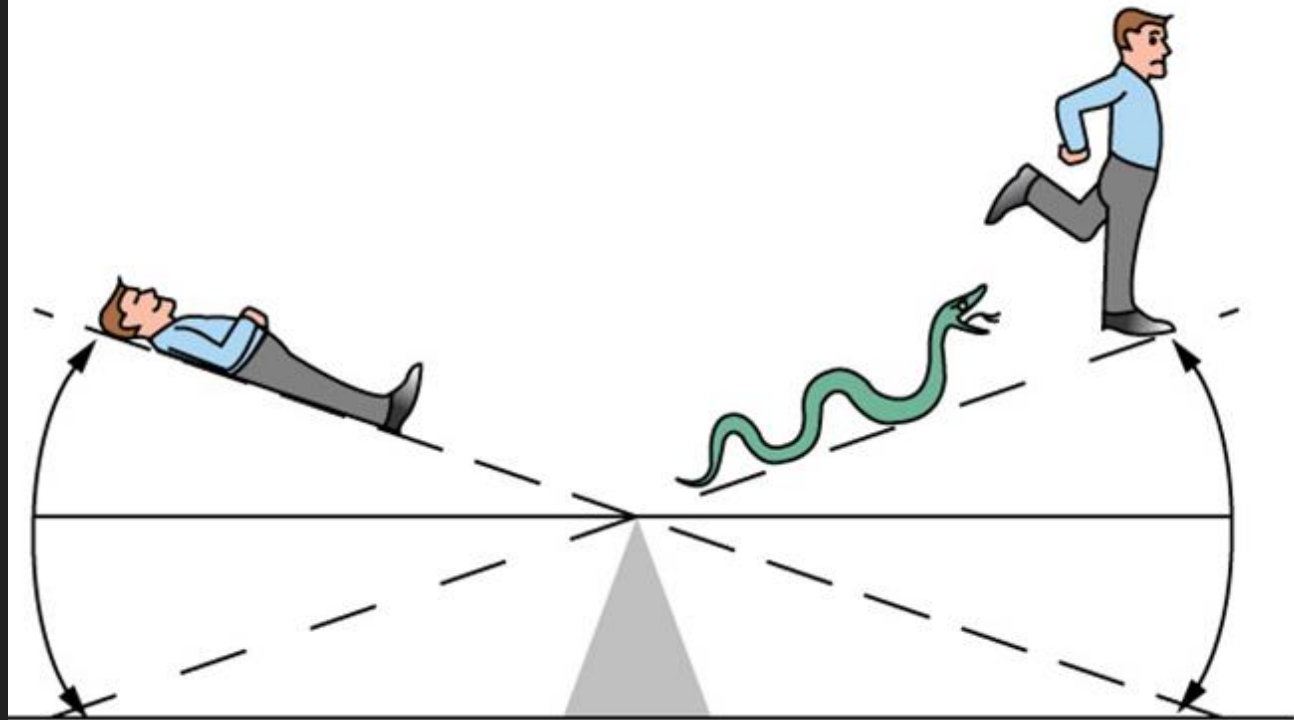


Fight-or-flight



Rest-and-digest

Fight-or-flight



Rest-and-digest

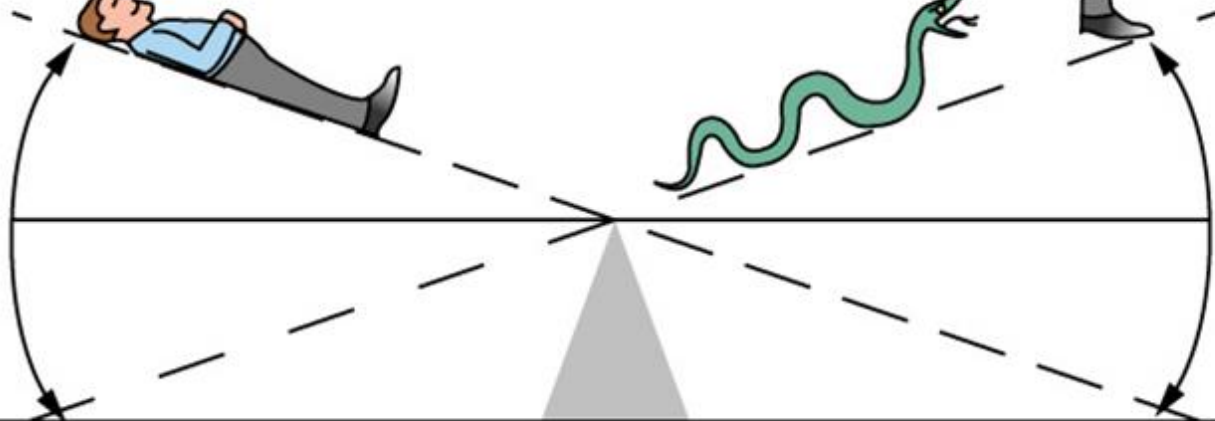
Fight-or-flight

Homeostasis
is a dynamic
balance
between
autonomic
branches.



Parasympathetic activity

Sympathetic activity



“Ok, let’s get started...”

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*“A new world has arisen:
the Rule of the Robots!”*

-- Rossums' Universal Robots, Karel Capek

Stephen Hawking, Elon Musk, and Bill Gates Warn About Artificial Intelligence

Google-owned Boston Dynamics released a video showing a 6' tall 320-lb humanoid robot named Atlas running freely in the woods

By [Michael Sainato](#) • 08/19/15 12:30pm



KAREL ČAPEK



ROBOTS



UNIVERSAL



ROSSUM'S

DRAMA

Karel Capek is best known for his science fiction including the play *R.U.R. (Rossum's Universal Robots)*, which introduced the word *robot*.





"A SHOCKER! FASCINATING!"

-New York Daily News

"A sizzler! Builds to high tension!" - Gene Shalt, NBC Radio Monitor
"Razzle Dazzle! Smooth suspense! Full-out entertainment!" - Time Magazine
"Wildly imaginative! The best I've seen in a long time!" - Barney Greer, Sunbelt News-Sunday
"Practically perfect!" - Kinsey Cary, New York Times
"Suspense is intense!" - American Girl



THIS IS THE DAWNING OF THE AGE OF
COLOSSUS
THE FORBIN PROJECT

On Screen

ERIC BRAEDEN · SUSAN CLARK · GORDON PINSENT

Screenplay by JAMES BRIDGES. Based on the Novel "Colossus" by O. F. JONES. Directed by JOSEPH SARGENT
Produced by STANLEY CHANE. A UNIVERSAL PICTURE. TECHNICOLOR® PANAVISION® **KODAK**

"A SHOCKER! FASCINATING!"

-New York Daily News

"A sizzler! Builds to high tension!" - *Gene Shalit, NBC Radio Monitor*
"Razzle Dazzle! Smooth suspense! Full-out entertainment!" - *Time Magazine*
"Wildly imaginative! The best I've seen in a long time!" - *Barnett Cerf, Barnhill Associates*
"Practically perfect" - *Winston Cady, New York Times*
"Suspense is intense" - *American Idol*



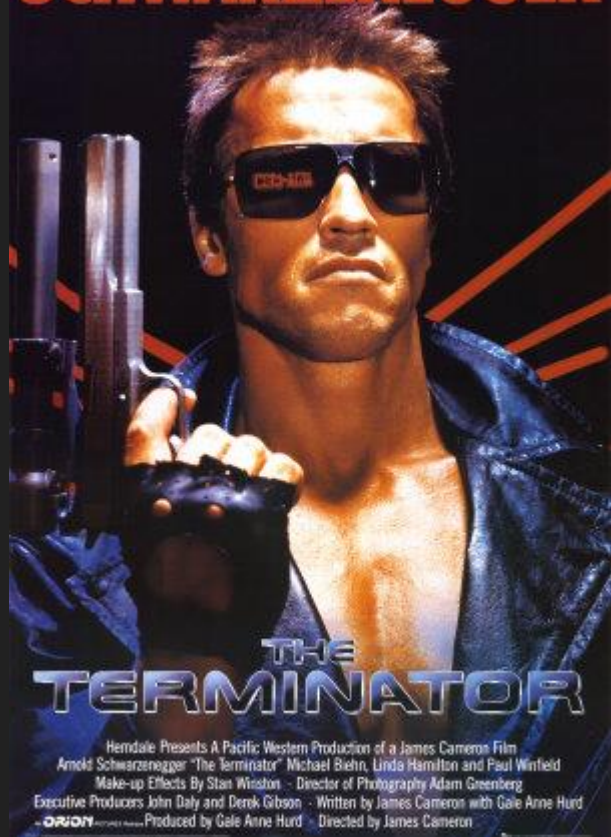
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SCHWARZENEGGER



THE TERMINATOR

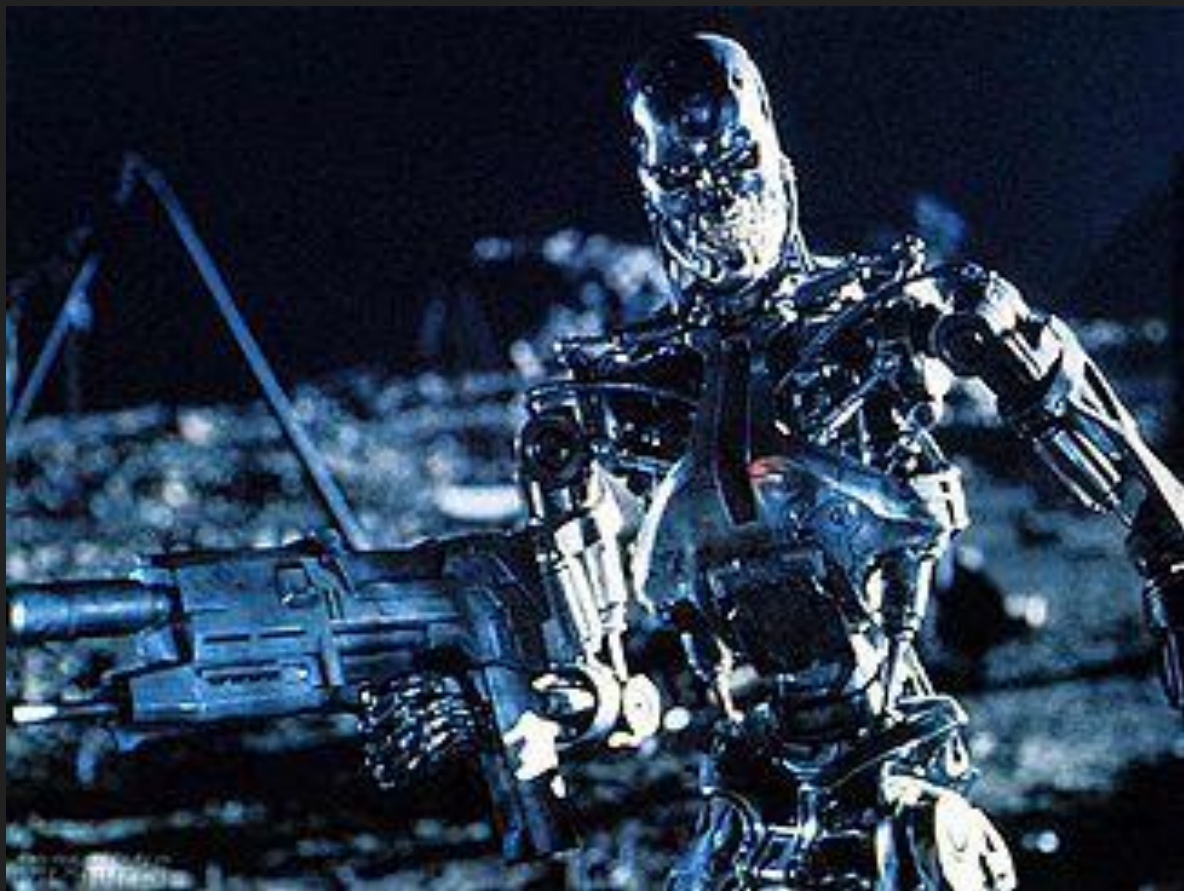
Hemdale Presents A Pacific Western Production of a James Cameron Film
Arnold Schwarzenegger "The Terminator" Michael Biehn, Linda Hamilton and Paul Winfield
Make-up Effects By Stan Winston - Director of Photography Adam Greenberg
Executive Producers John Daly and Derek Gibson - Written by James Cameron with Gale Anne Hurd
-ORION- Produced by Gale Anne Hurd - Directed by James Cameron

SCHWARZENEGGER



THE TERMINATOR

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Make-up Effects By Stan Winston - Director of Photography Adam Greenberg
Executive Producers John Daly and Derek Gibson - Written by James Cameron with Gale Anne Hurd
-ORION- Produced by Gale Anne Hurd - Directed by James Cameron



We fear what we don't understand.

“We are swift to attribute mental states to entities with eyes and movement patterns that look goal directed...”

Eric Schwitzgebel



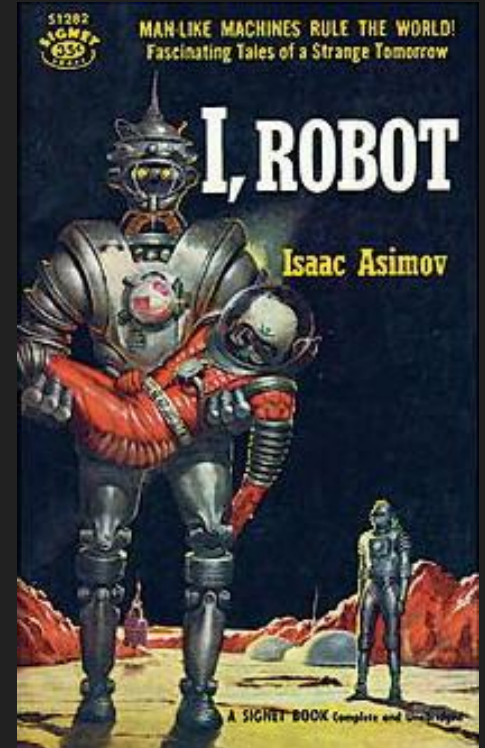
Robot-as-Menace [stories]
palled dreadfully and I
couldn't stand them.

Issac Asimov, 1982



Asimov's Three Laws of Robotics

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey the orders given it by human beings, except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.





“Should we be afraid of robots?”

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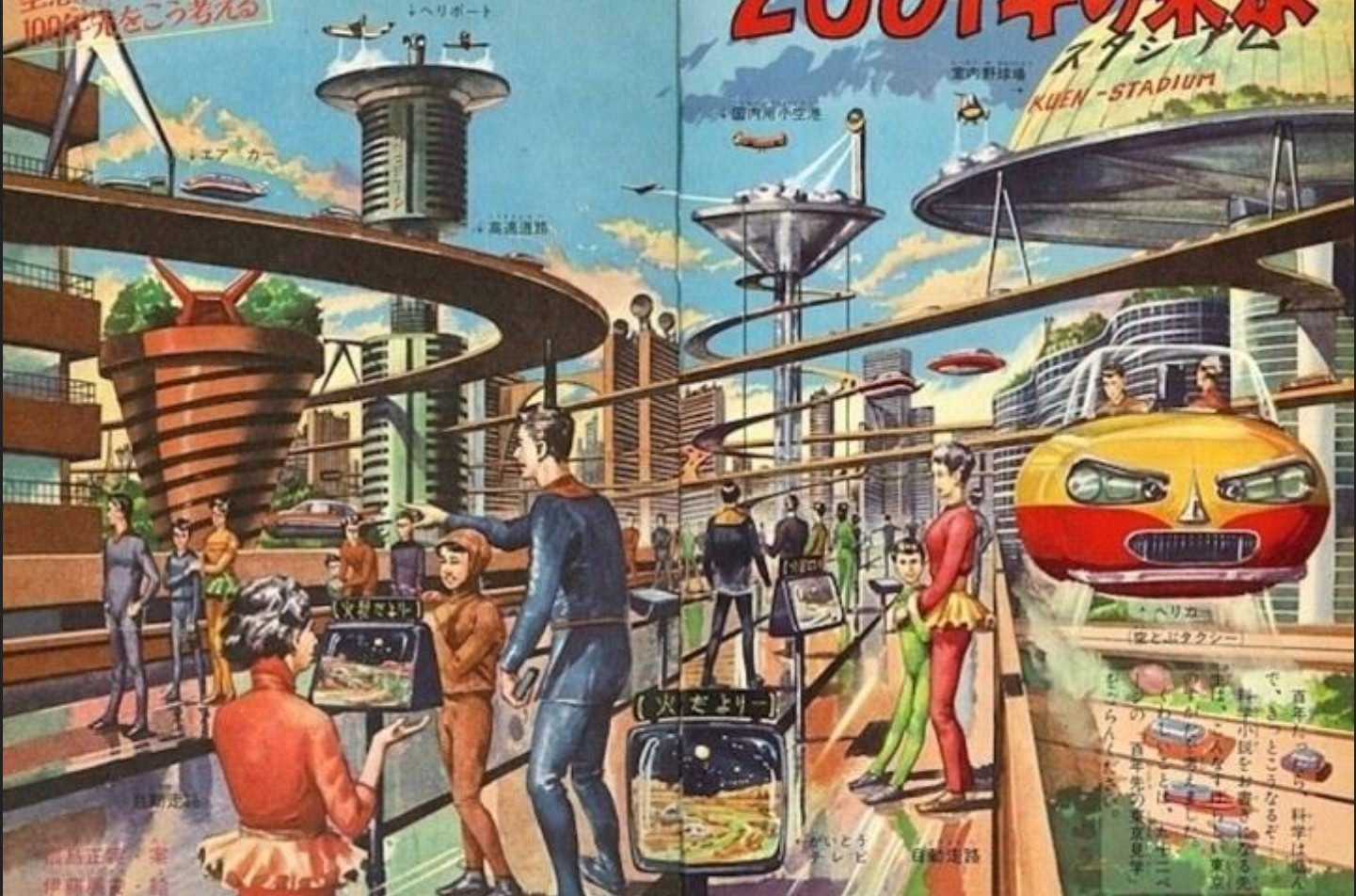
e

*“Everybody will live only to
perfect themselves.”*

-- Rossums' Universal Robots, Karel Capek

くわしくは、92ページを。
空想科学小説家は
100年先をこう考える

2061年の東京



高正孝・案
伊藤真実・絵

で、きつとこなるぞ
百年先の東京見学
科学小説をお書きになる先
の、百年先の東京見学
をこらんとした。

ヘリポート
エアカー
高速度路

室内野球場
留内川小空港

KUEN-STADIUM

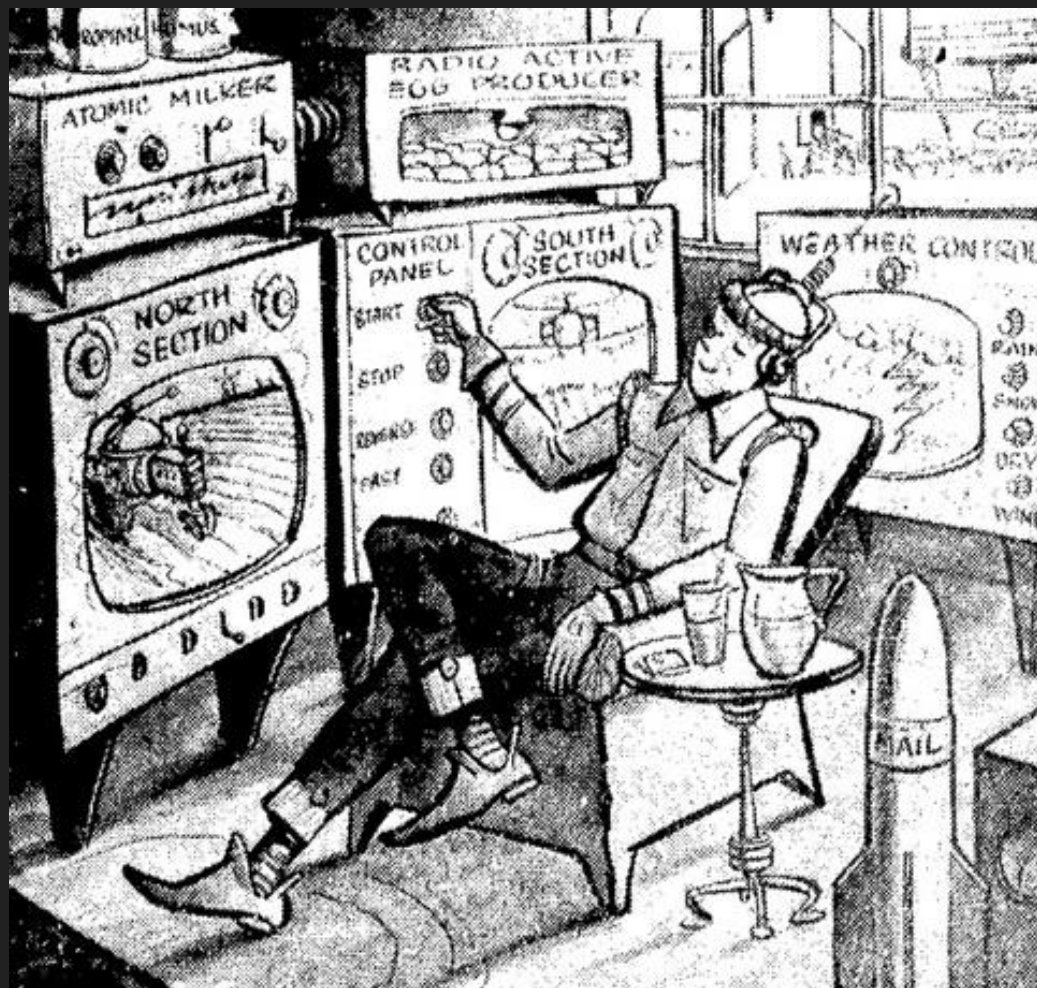
火どよりー
自動通路

がいとう
テレビ









Leave it to
ROLL-OH

PRODUCED BY
THE JAM HANDBY ORGANIZATION



Roll-On
Answer Door

Wash Dishes

Answer Phone

Get Hat

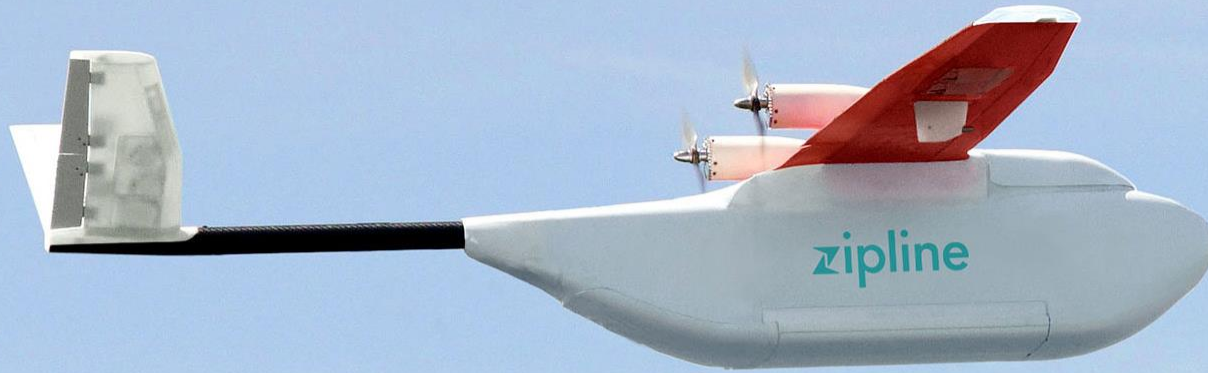
Clean House

Get Dinner

Make Bed

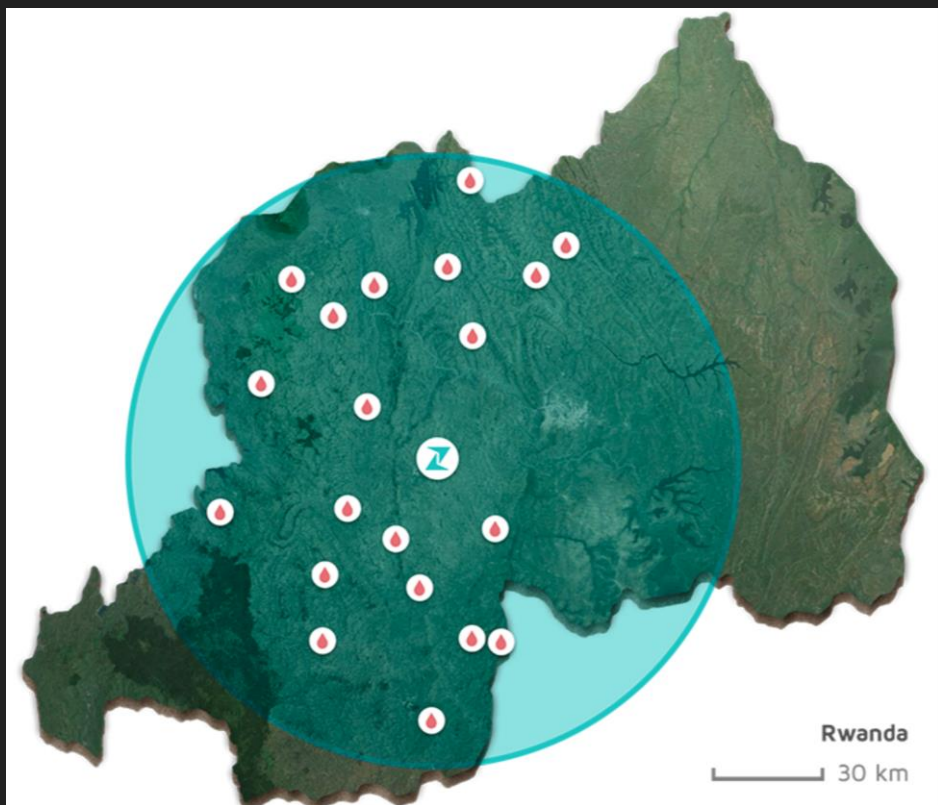
Fix Furnace

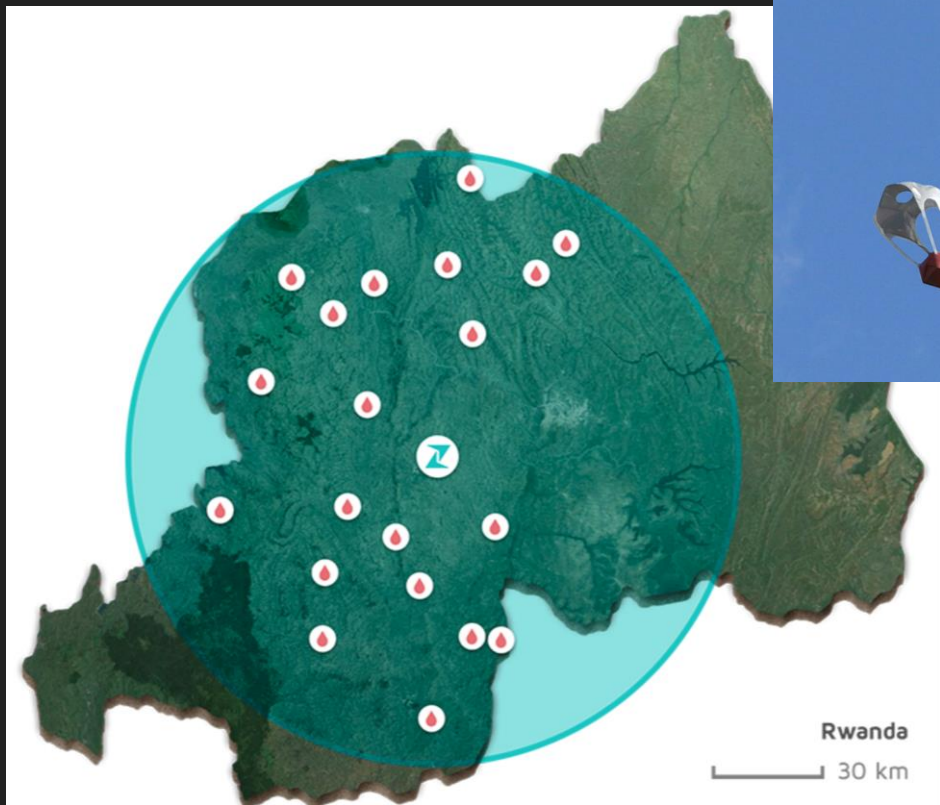
SCRAM!



Drones Marshaled to Drop Lifesaving Supplies Over Rwandan Terrain

The New York Times







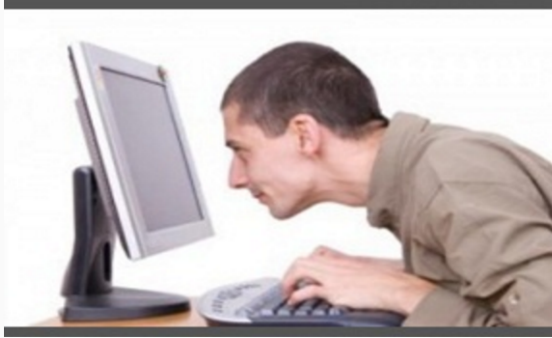












Do we depend on technology too much?



YES

or

NO

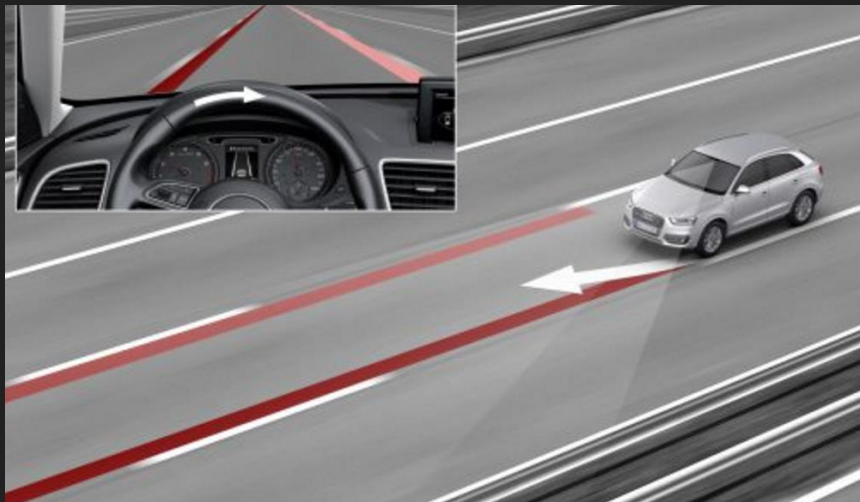


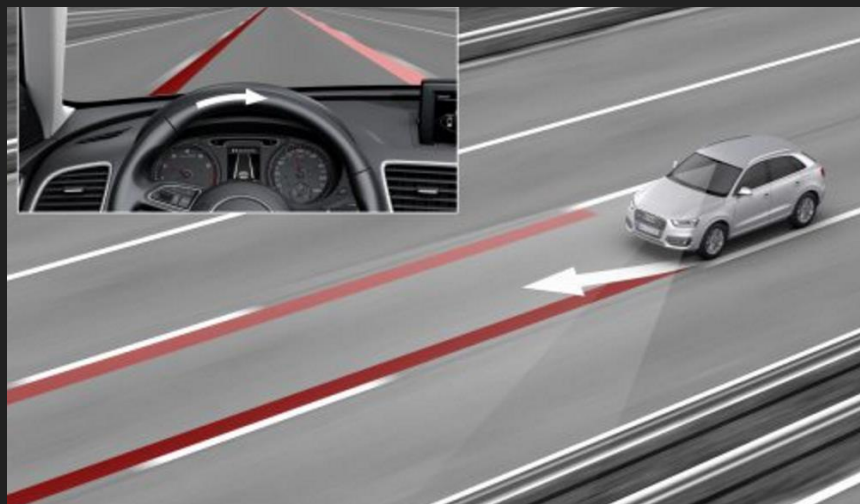
77% Say Yes



23% Say No









A map showing a route from Seattle to Bellevue. The route is highlighted in blue and red. A notification box is overlaid on the map, stating: "Faster route now available", "Save 10 minutes", "via WA-520 W and 15th Ave E". The notification box has two buttons: "Accept" and "No thanks". The map shows various landmarks and roads, including WA-520, WA-522, and WA-405. The notification box also shows a small icon of a car and a road sign.



“So, we’re good, right?”

aunting

I *F* *W* *E* *D* *a* *R* *e*

ealities

*“Terrible things may happen,
but that cannot be avoided.”*

-- Rossums' Universal Robots, Karel Capek

UPDATED FOR THE 21ST CENTURY

Technology, Jobs and Your Future

THE END OF WORK

The Decline of the Global Labor Force
and the Dawn of the Post-Market Era

JEREMY RIFKIN

"Thorough, thought-provoking and as radical as reality itself."

Copyrighted Material

Farmers in USA (% of pop)

75
1800



Farmers in USA (% of pop)

75

1800



50

1850



Farmers in USA (% of pop)

75

1800



50

1850

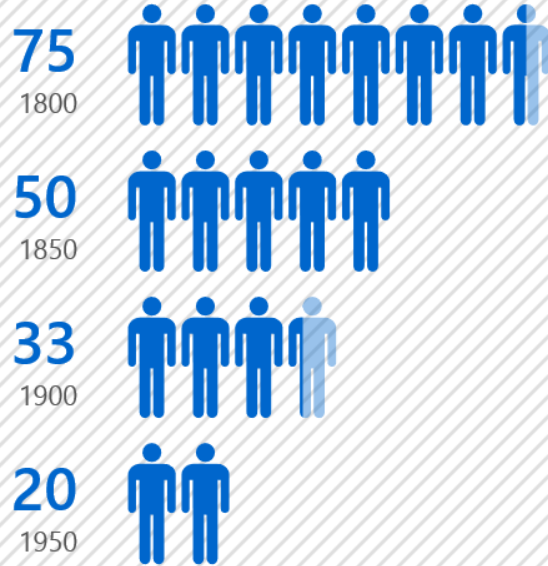


33

1900



Farmers in USA (% of pop)

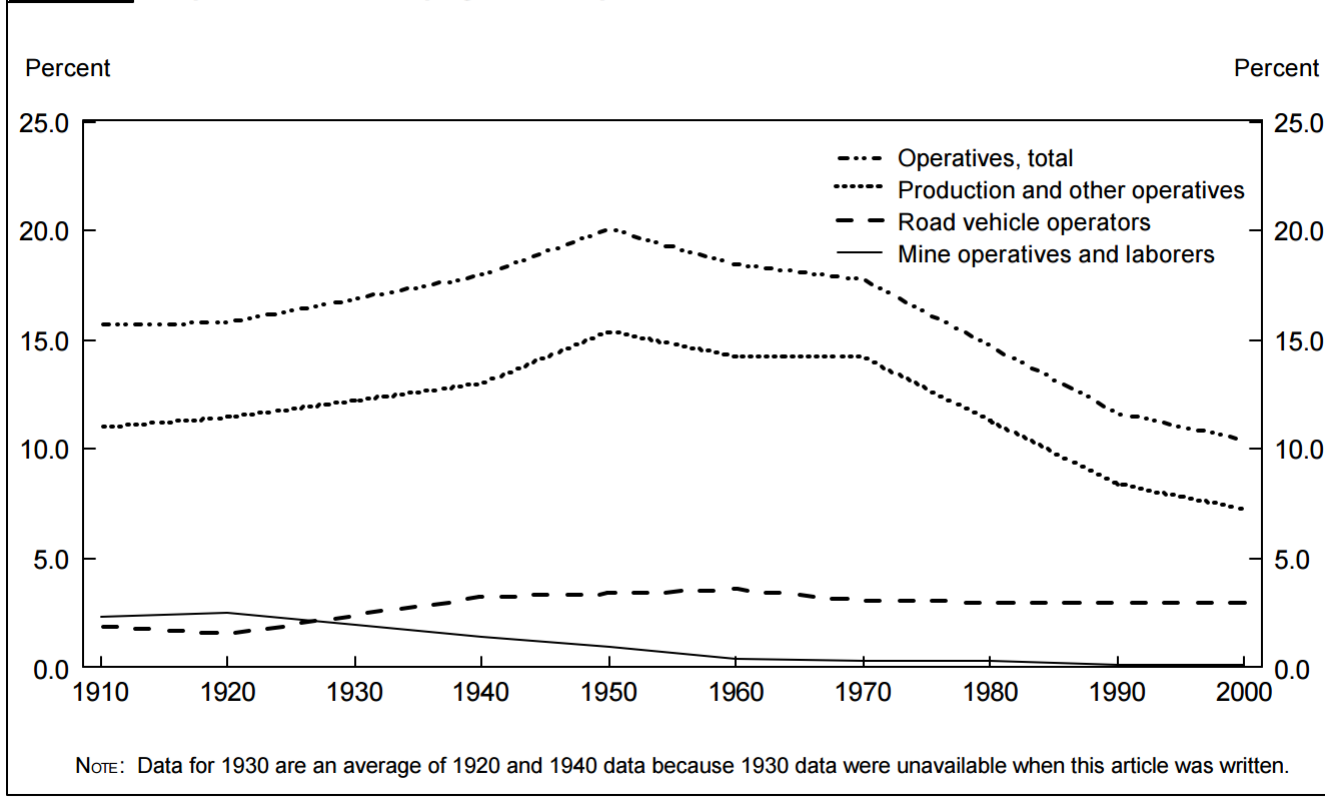


Farmers in USA (% of pop)

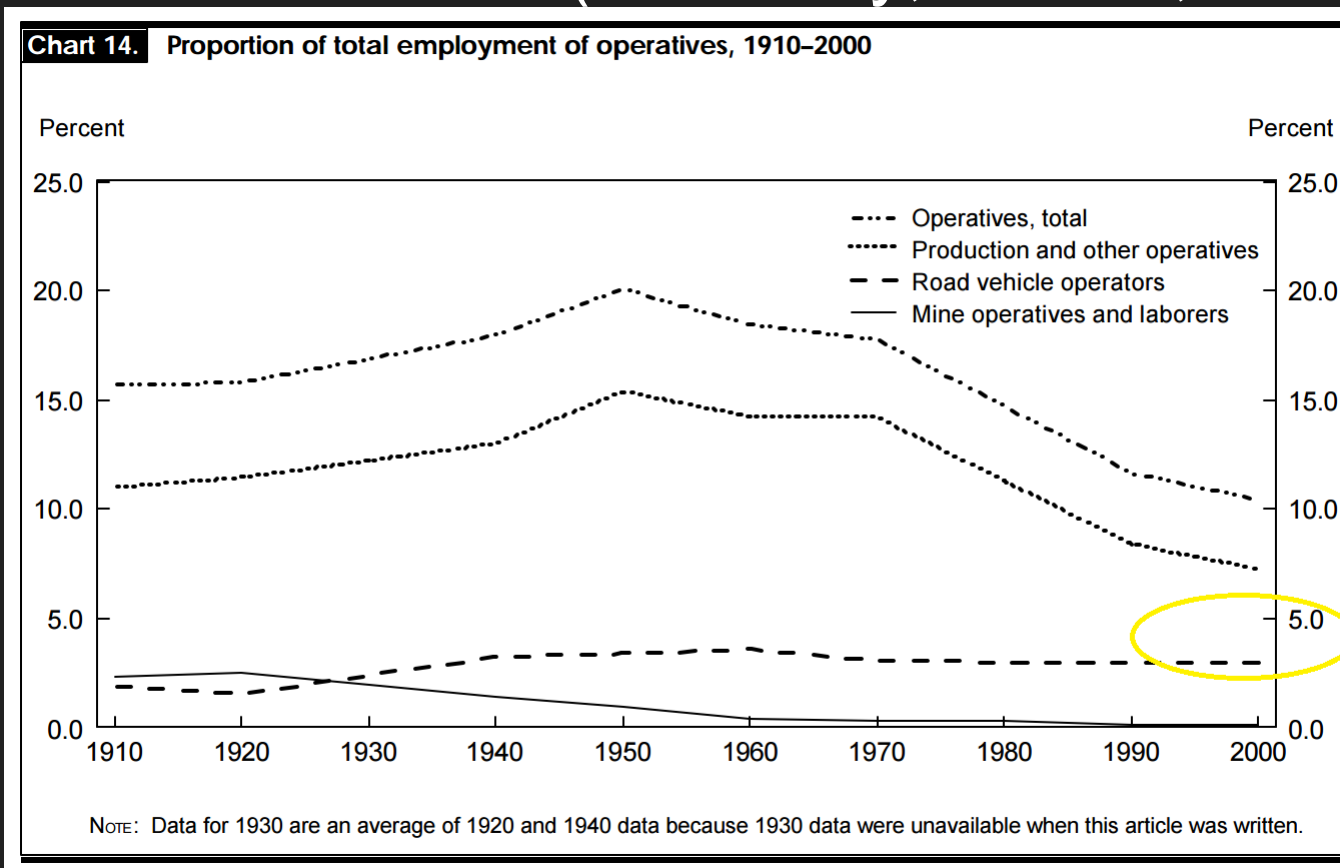


“Operatives” in the US (assembly, drivers, mining)

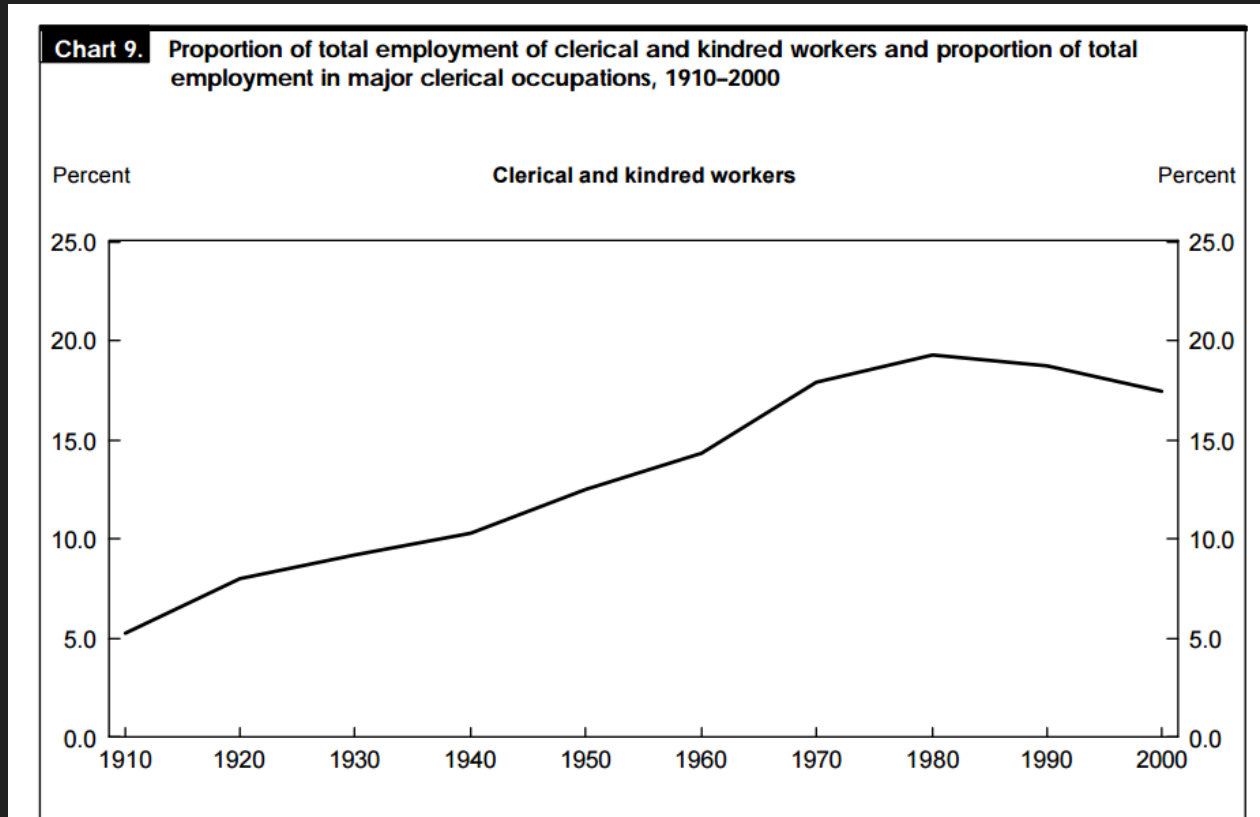
Chart 14. Proportion of total employment of operatives, 1910–2000



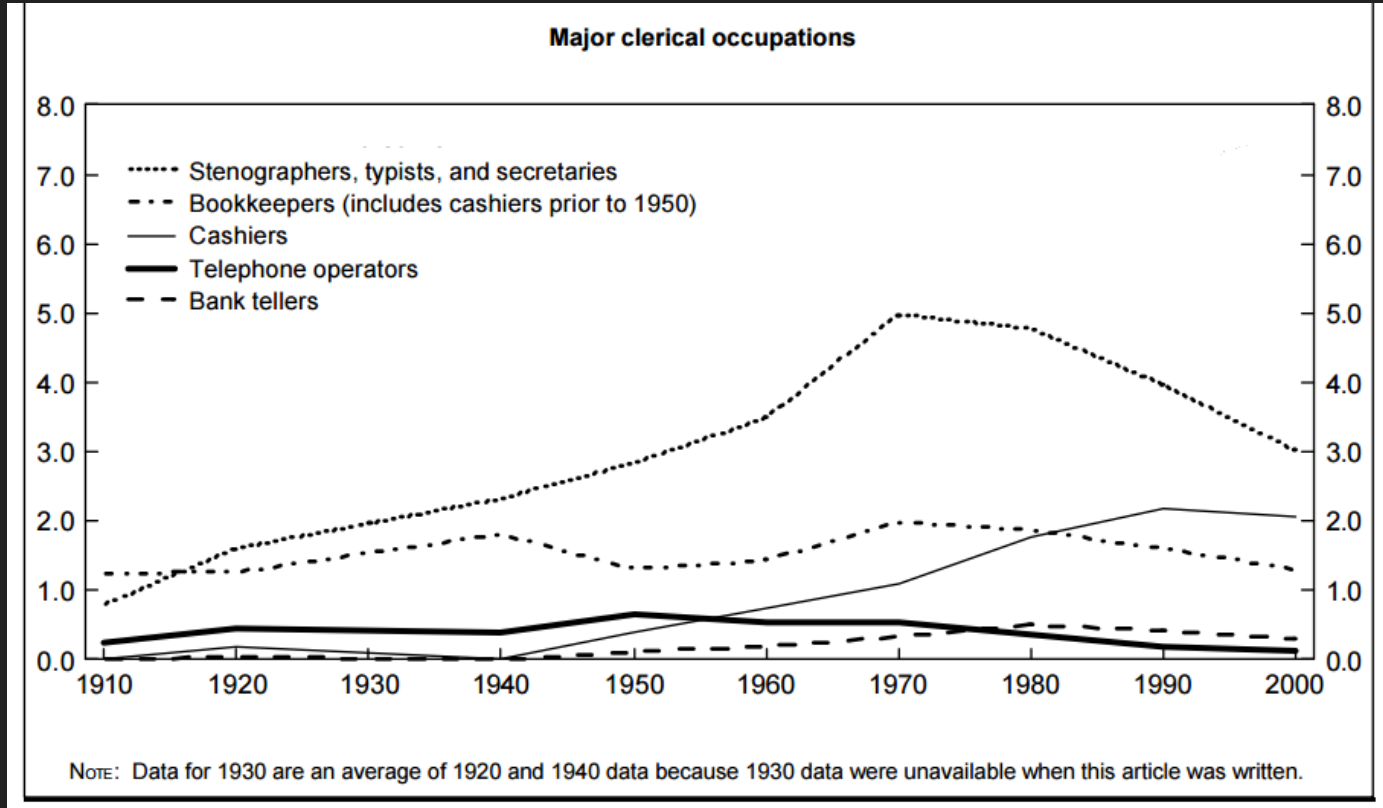
“Operatives” in the US (assembly, drivers, mining)



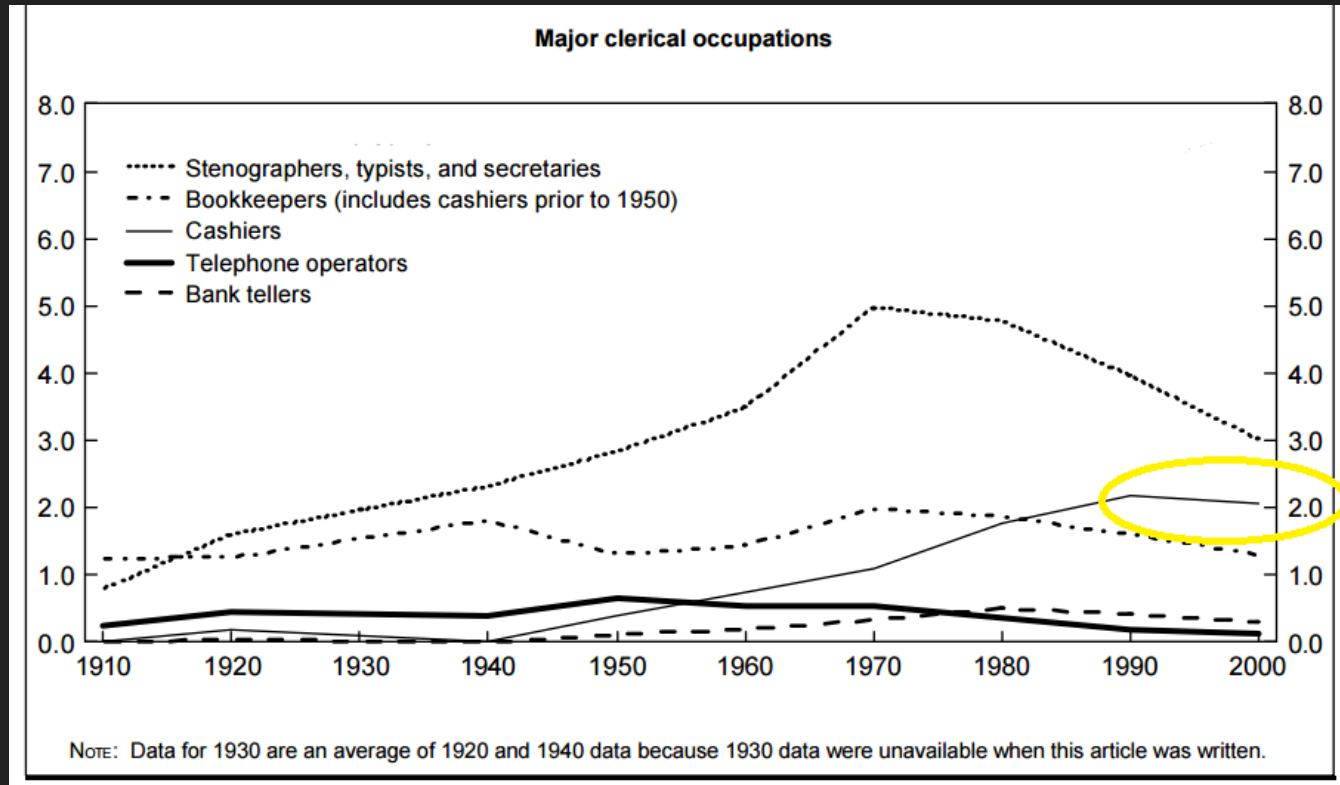
Clerical workers in the US (1900-2000)



Clerical workers in the US (1900-2000)

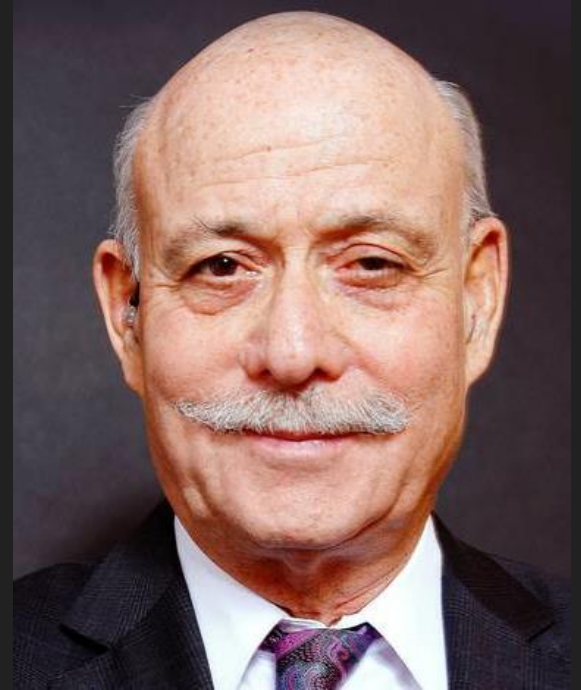


Clerical workers in the US (1900-2000)



“We are entering a new phase in human history - one in which fewer and fewer workers will be needed to produce the goods and services for the global population.”

Jeremy Rifkin, 1995



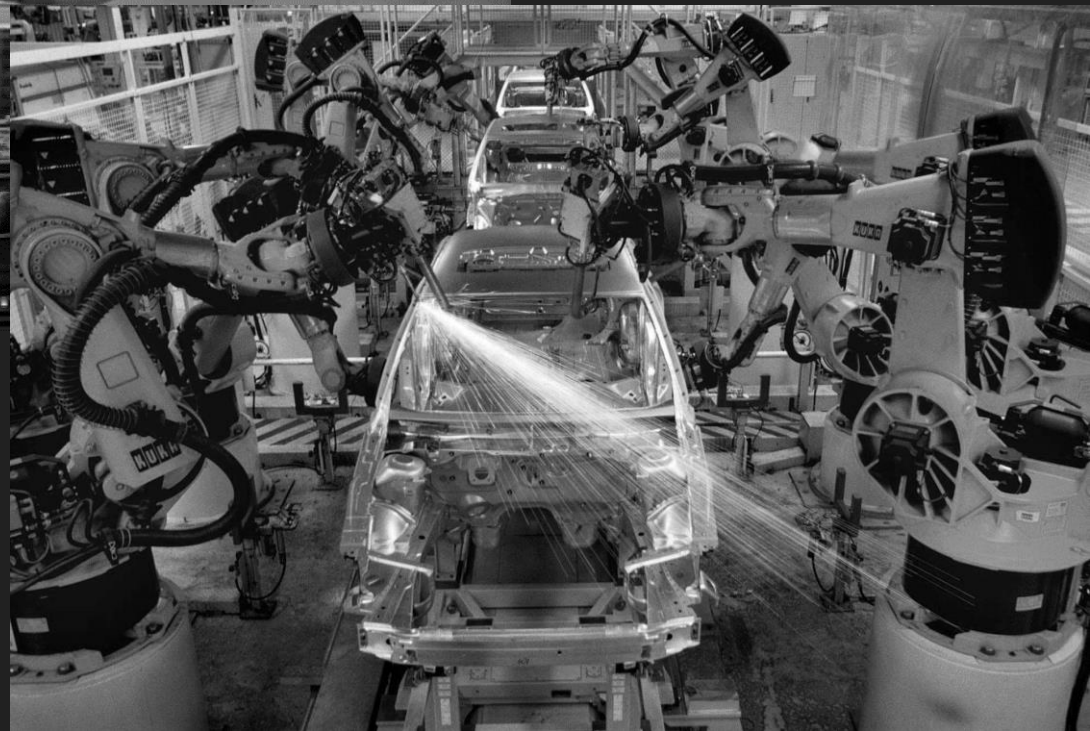


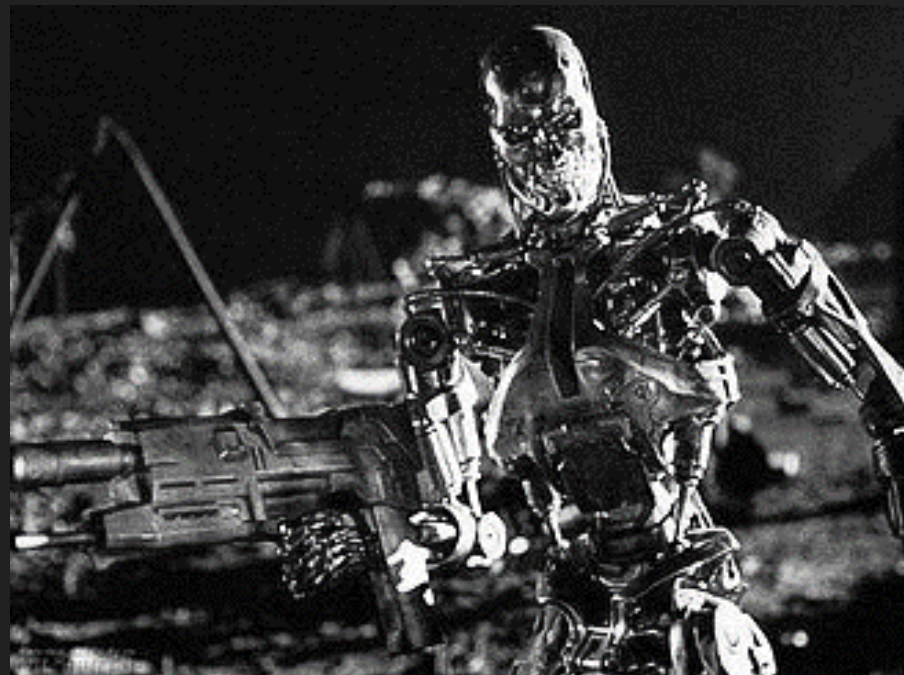
"Occupational changes during the 20th century", Bureau of Labor Statistics, 2006



"Occupational changes during the 20th century", Bureau of Labor Statistics, 2000

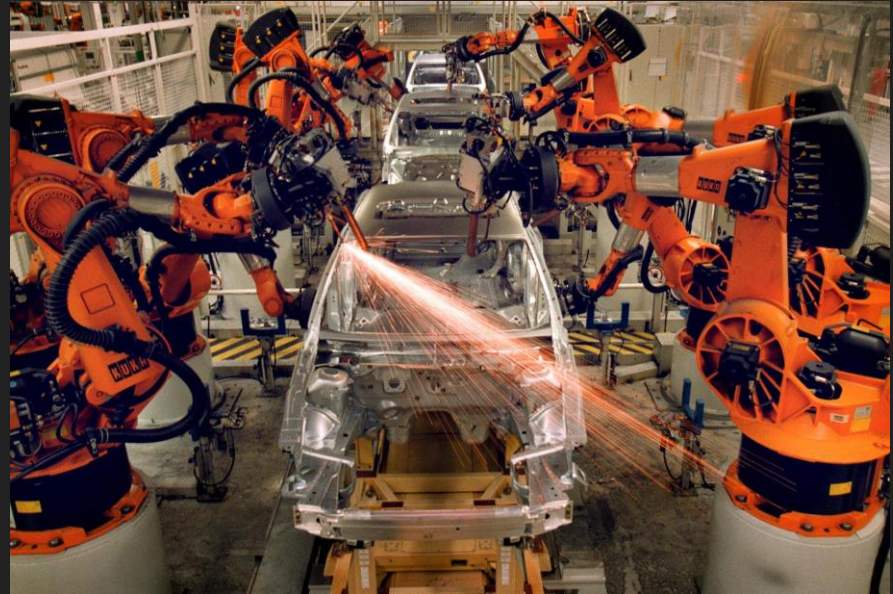


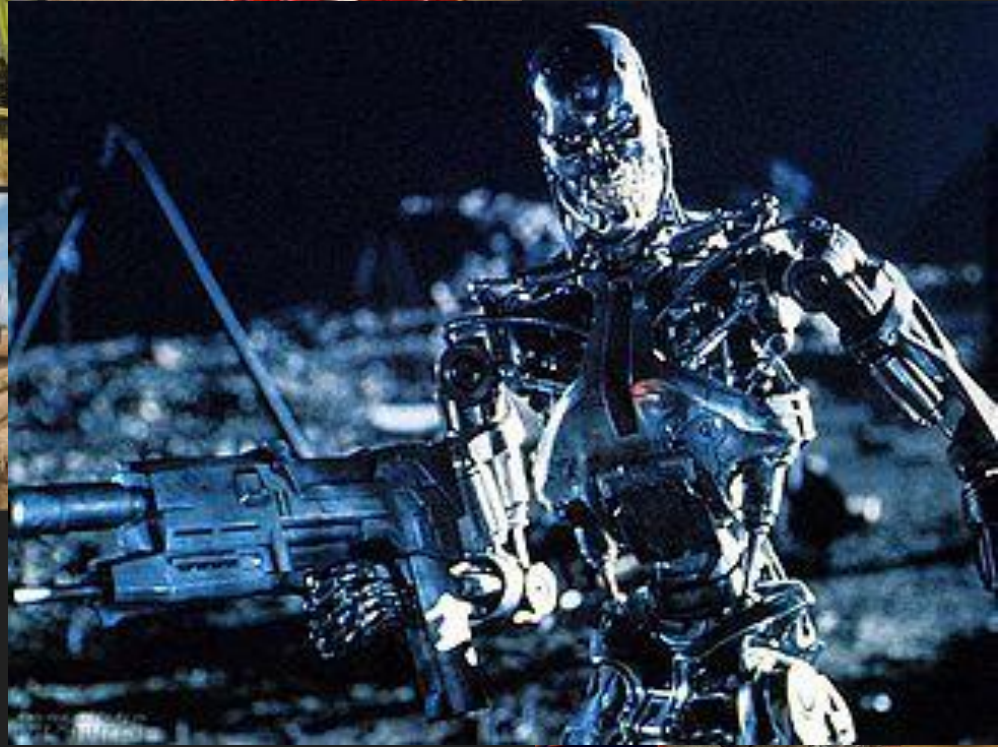












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The Decline of the Global Labor Force
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JEREMY RIFKIN

"Thorough, thought-provoking and as radical as reality itself."

Copyrighted Material

That's the past, what about the future?

Quick Facts: Heavy and Tractor-trailer Truck Drivers

2015 Median Pay ?	\$40,260 per year \$19.36 per hour
Typical Entry-Level Education ?	Postsecondary nondegree award
Work Experience in a Related Occupation ?	None
On-the-job Training ?	Short-term on-the-job training
Number of Jobs, 2014 ?	1,797,700





[CAREERS](#)

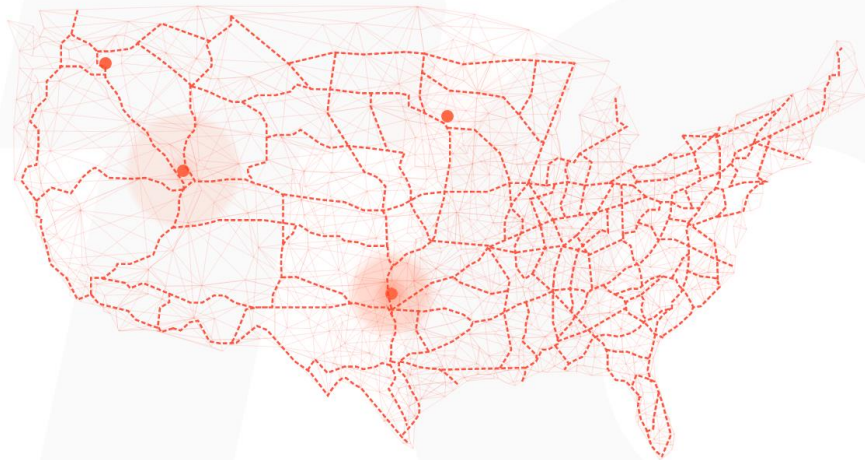
[CONTACT](#)

OUR VISION

Rethinking Transportation

Otto is designing a new approach to modern transportation, starting with self-driving trucks.

Long-haul transit is vital for nearly 70% of the things we buy, yet hundreds of thousands of preventable trucking accidents happen each year on American highways. We believe it's our responsibility to bring safer, self-driving technology to the road.





OTTO

OTTO
OTTOMOTTO LLC

US DOT 2840272
CA 484480

OTTO

PRIVATE OTTO'S CARRIER
NOT FOR HIRE

7P53375

Quick Facts: Cashiers

2015 Median Pay ?

\$19,310 per year
\$9.28 per hour

Typical Entry-Level Education ?

No formal educational credential

Work Experience in a Related Occupation ?

None

On-the-job Training ?

Short-term on-the-job training

Number of Jobs, 2014 ?

3,424,200



Amazon is opening a physical store without checkout lanes or cashiers

Updated by Timothy B. Lee | tim@vox.com | Dec 5, 2016, 10:50am EST



TWEET



SHARE



FREQUENTLY ASKED QUESTIONS

What is Amazon Go?

Amazon Go is a new kind of store with no checkout required. We created the world's most advanced shopping technology so you never have to wait in line. With our Just Walk Out Shopping experience, simply use the Amazon Go app to enter the store, take the products you want, and go! No lines, no checkout. (No, seriously.)

How does Amazon Go work?

Our checkout-free shopping experience is made possible by the same types of technologies used in self-driving cars: computer vision, sensor fusion, and deep learning. Our Just Walk Out Technology automatically detects when products are taken from or returned to the shelves and keeps track of them in a virtual cart. When you're done shopping, you can just leave the store. Shortly after, we'll charge your Amazon account and send you a receipt.



So I can just shop normally?

Yes! Just browse and shop like you would at any other store. Then you're on your way. No lines, no checkout.



TECHNOLOGY AT WORK v2.0

The Future Is Not What It Used to Be

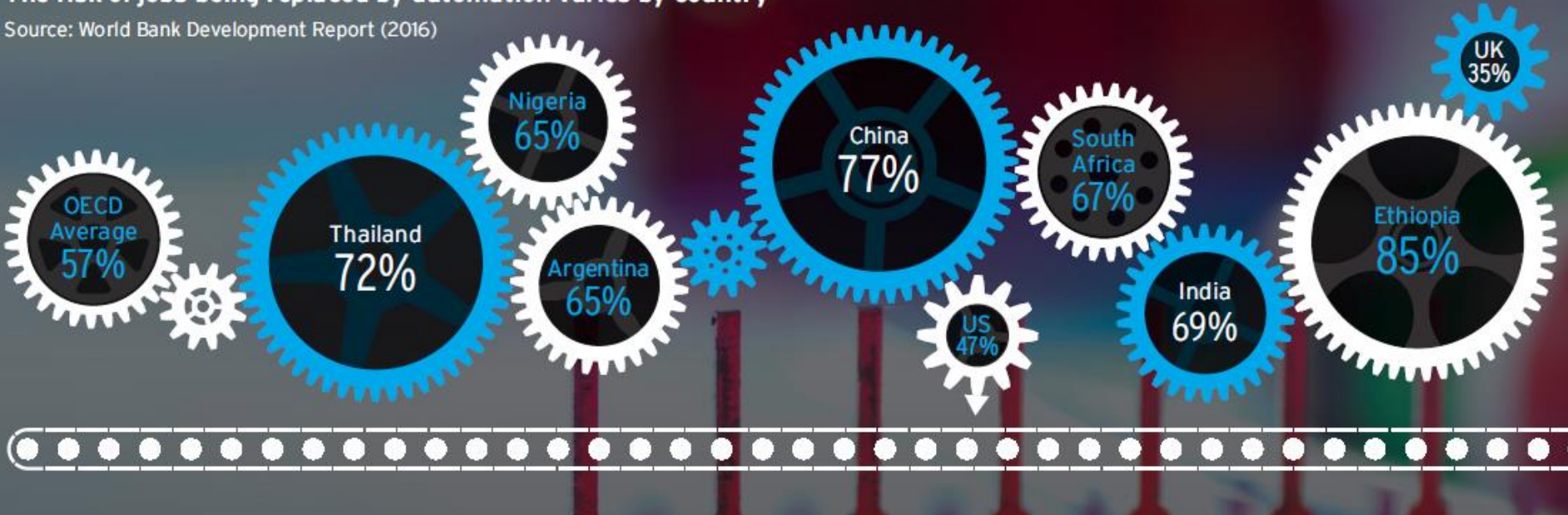
Citi GPS: Global Perspectives & Solutions

January 2016



The risk of jobs being replaced by automation varies by country

Source: World Bank Development Report (2016)



One factory has "reduced employee strength from 110,000 to 50,000 thanks to the introduction of robots", a government official told the South China Morning Post.

BBC Sign in News Sport Weather Shop Earth Travel Mo

NEWS

Home Video World UK Business Tech Science Magazine Entertainment & Arts

Technology

Foxconn replaces '60,000 factory workers with robots'

By Jane Wakefield
Technology reporter

25 May 2016 | Technology [Share](#)

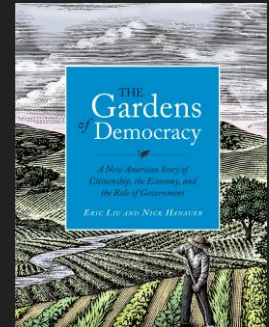
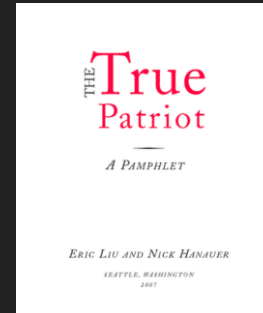


GETTY IMAGES

Epilogue

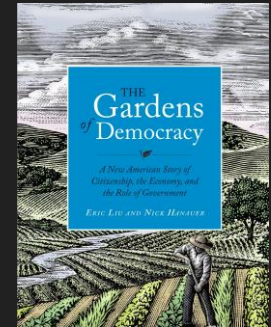
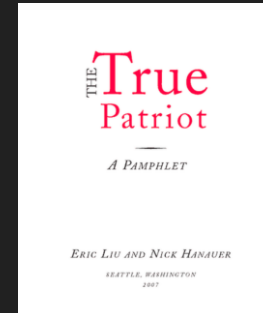
Epilogue

“So, now what?”



*“What do I see
in our future?
I see pitchforks.”*

Nick Hanauer, VC Investor



“You build it, you run it.”

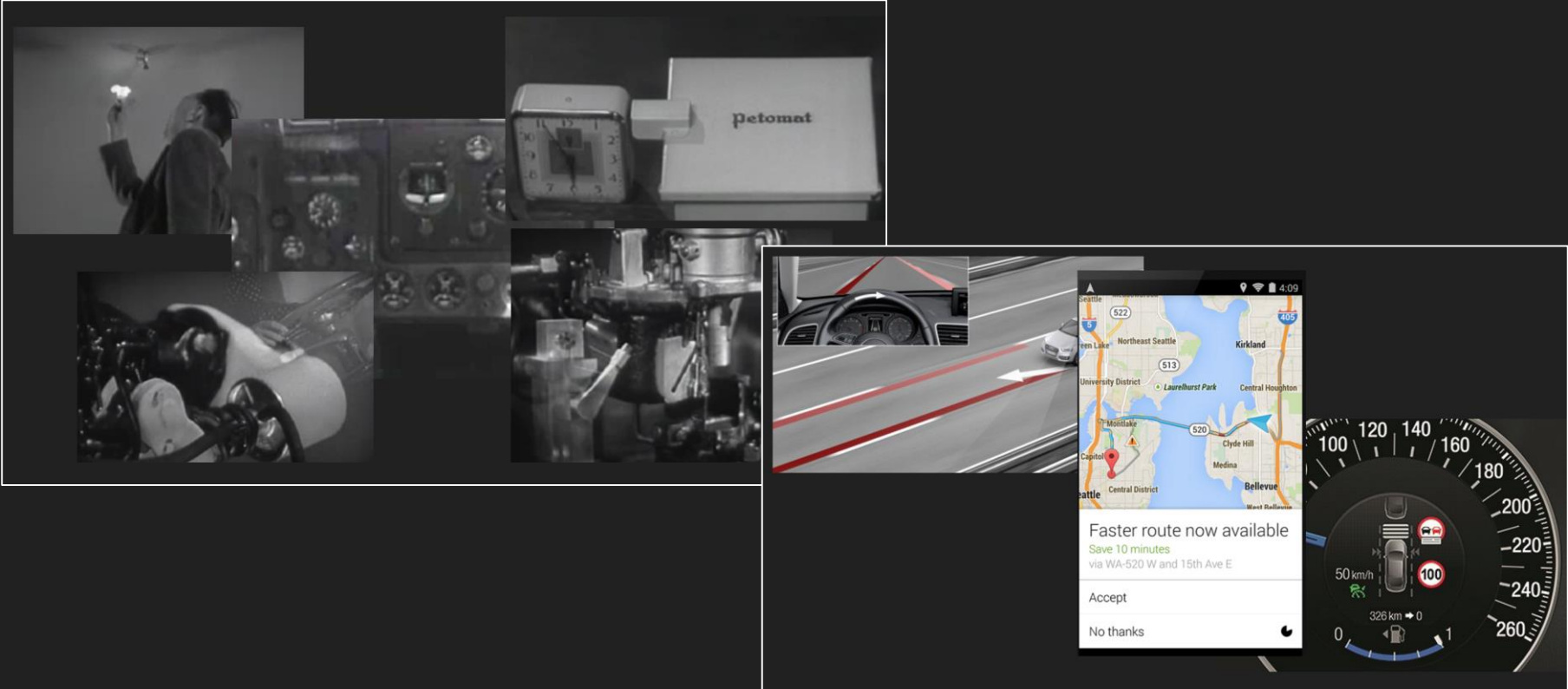
Werner Vogels, Amazon CTO



Get past irrational fear of technological expansion



Recognize the robots around us



In your thinking, separate “Jobs” from “Work”



Stop measuring progress via employment rate



Be mindful of the effects of new technology



BBC Sign in News Sport Weather Shop Earth Travel More

NEWS

Home Video World UK Business Tech Science Magazine Entertainment & Arts

Technology

Foxconn replaces '60,000 factory workers with robots'

By Jane Wakefield
Technology reporter

25 May 2016 | Technology [Share](#)

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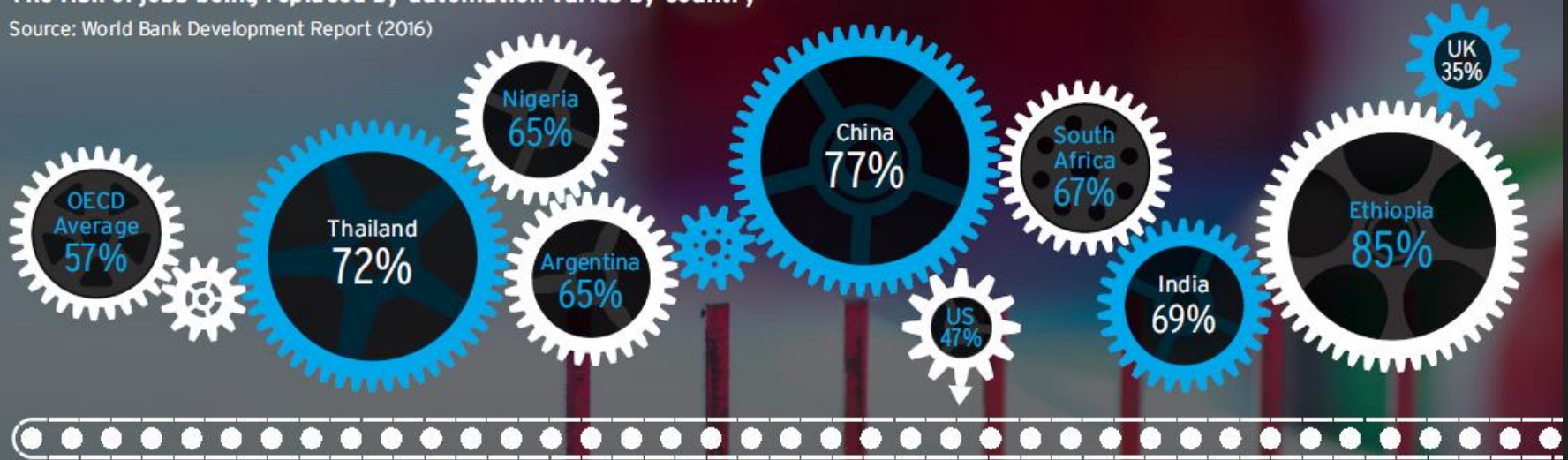
Get involved with projects that improve people's lives



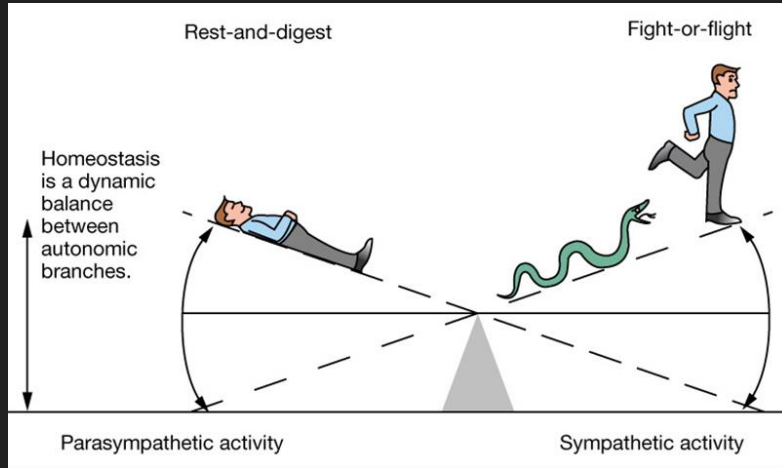
Consider working on “the big problems” facing us all

The risk of jobs being replaced by automation varies by country

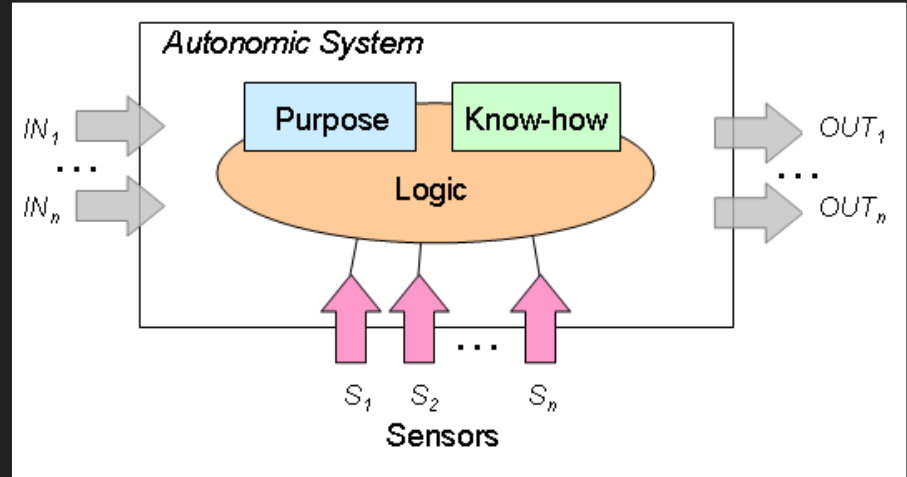
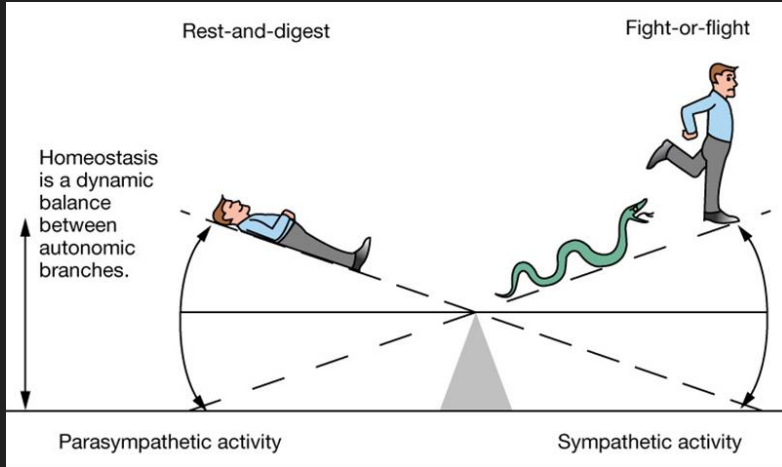
Source: World Bank Development Report (2016)



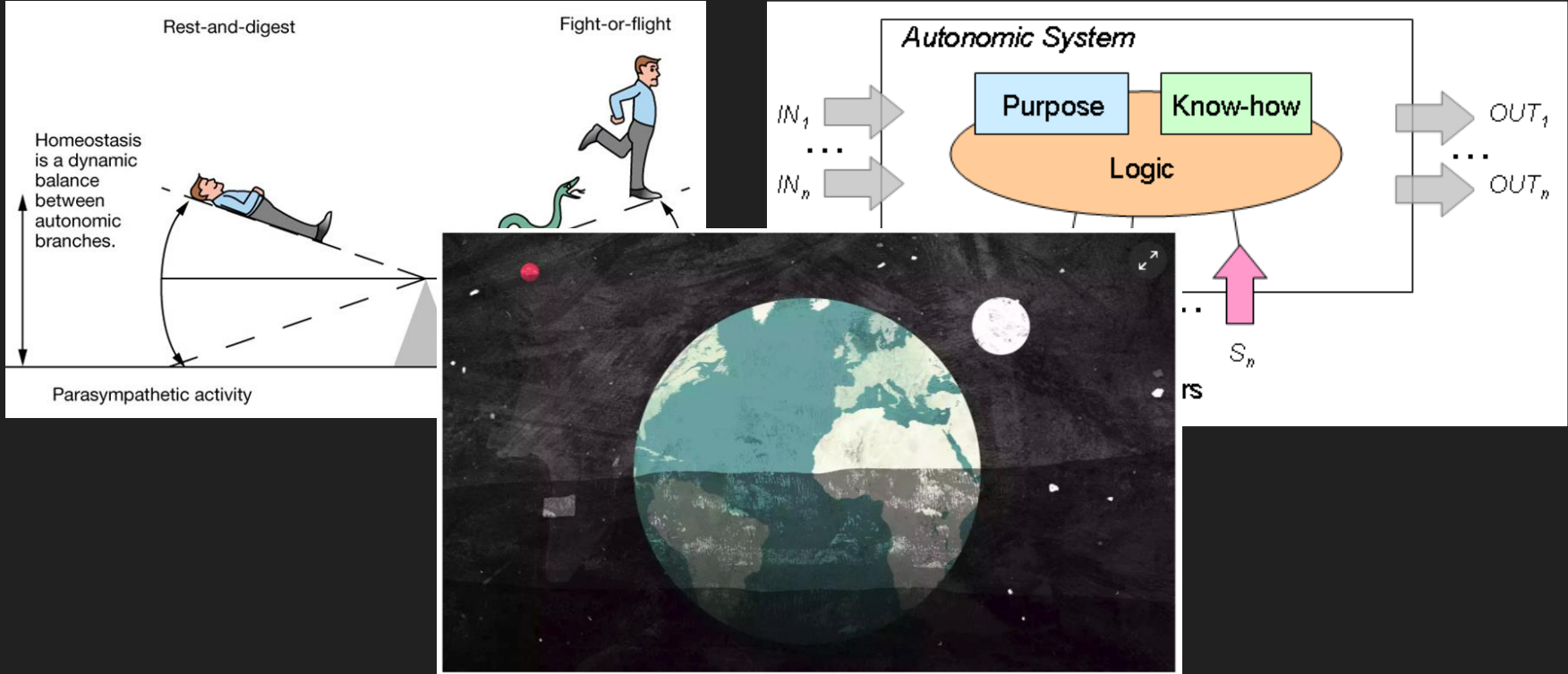
Think of the problem as autonomic & balancing



Think of the problem as autonomic & balancing



Think of the problem as autonomic & balancing



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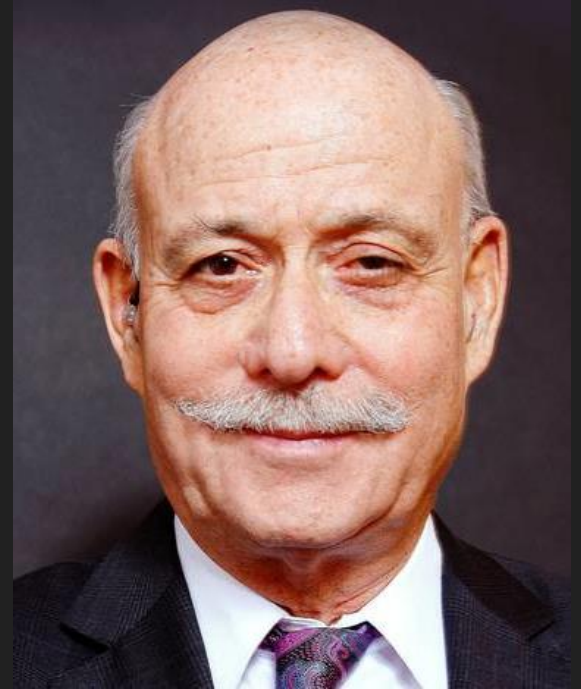
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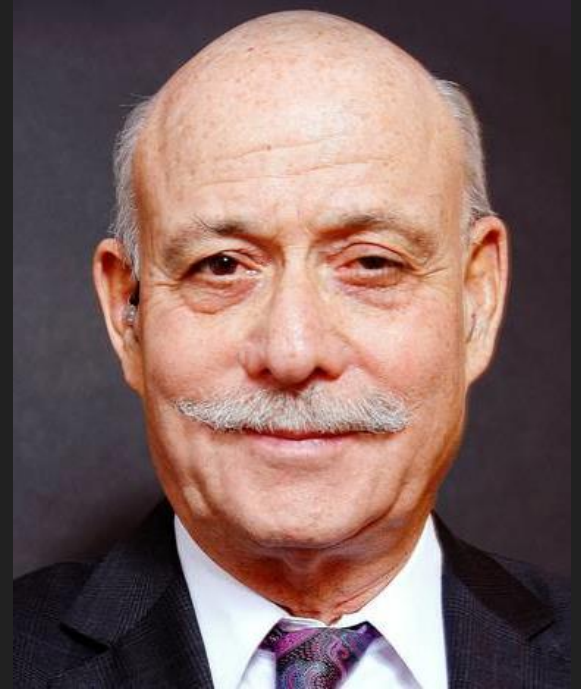
*“One thing I've learned over these
last 30 or 40 years is that
people make history.”*

Jeremy Rifkin



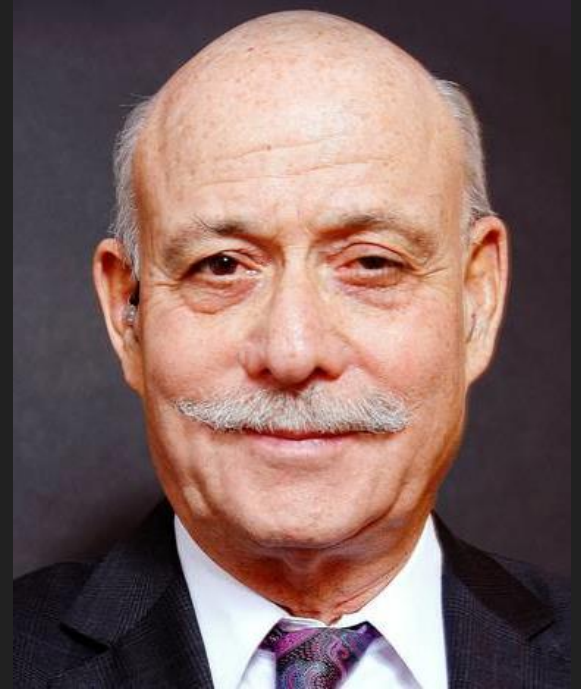
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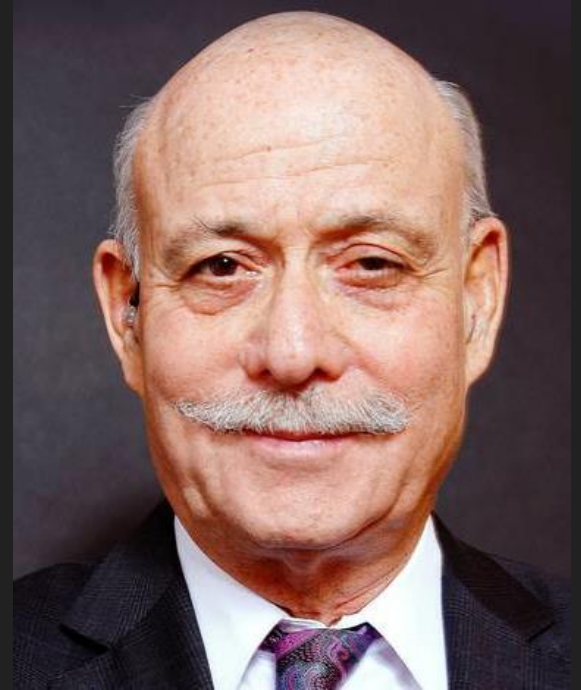
*“One thing I've learned over these
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*“One thing I've learned over these
last 30 or 40 years is that
people make history.”*

Jeremy Rifkin



Coming to Terms with our Autonomic Future



<http://g.mamund.com/2016-12-apidays/>

Mike Amundsen
API Academy / CA Technologies
@mamund