

The Second Wave of the Second Machine Age

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The Second Machine Age

Changing the world requires two things:

- *Power system*: move or transform things
- *Control system*: decide where and how

Industrial Revolution = Physical Power

- Steam engine (and Internal combustion engine, Electricity)
- Mostly a complement to humans

Second Machine Age = Mental Power

- Computers, Software, Big Data, Machine Intelligence
- Complement or substitute?

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The First Wave of the Second Machine Age

Teaching machines what we know

- “Coding” = codifying knowledge
 - Big wins: routine information processing
 - Examples:
 - Arithmetic and simple logic
 - Well understood algorithms and processes
 - Repetitive, precise physical work
- Mantra: *“Codify, Digitize, Replicate!”*
- Economics: High fixed costs, low marginal costs
 - Applications:
 - Payroll processing
 - Assembly lines machines
 - Tax preparation software

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The Bounty



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The Limits of the First Wave: Polanyi's Paradox

We can know more than we can tell...

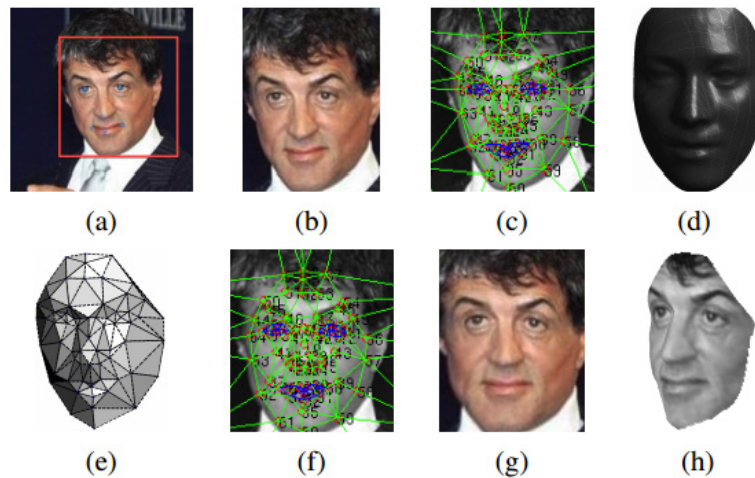
- Michael Polanyi, *The Tacit Dimension* (1964)

...Take an example. We know a person's face, and can recognize it among a thousand, indeed among a million. Yet we usually cannot tell how we recognize a face we know. So most of this knowledge cannot be put into words.

- Polanyi, *The Tacit Dimension*

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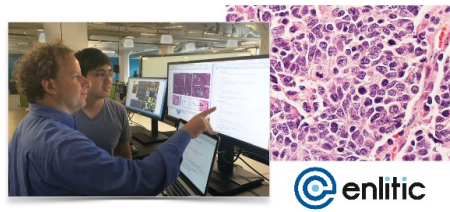
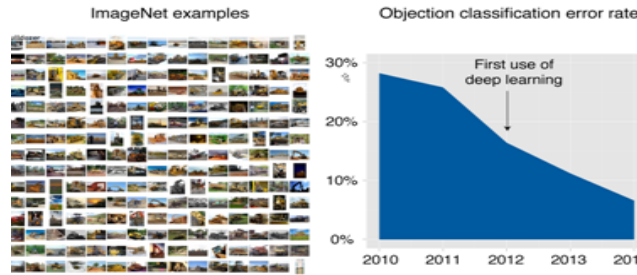
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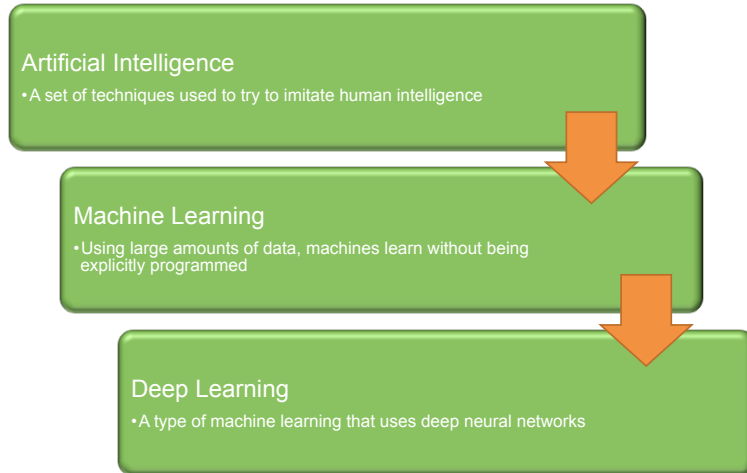
Improvements in Vision



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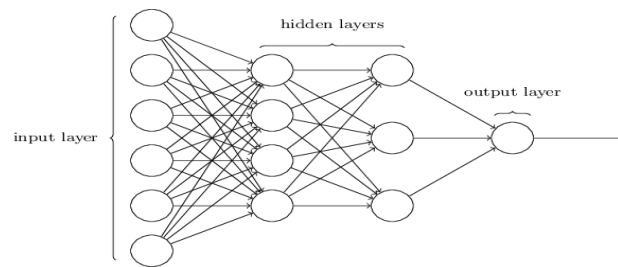
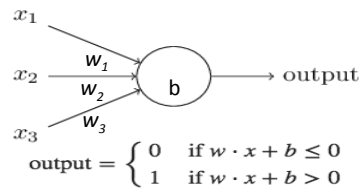
The Second Wave: Machines that learn



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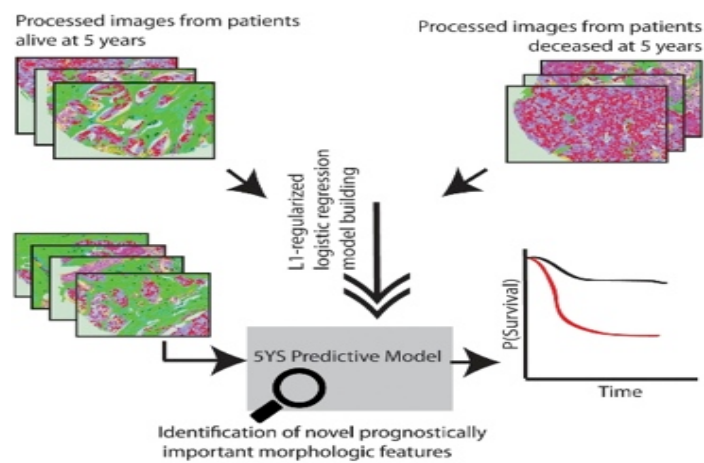
Deep Learning: How Neural Nets Work



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Tagged Data Trains the System



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Applications of the Second Wave

Interacting with physical world

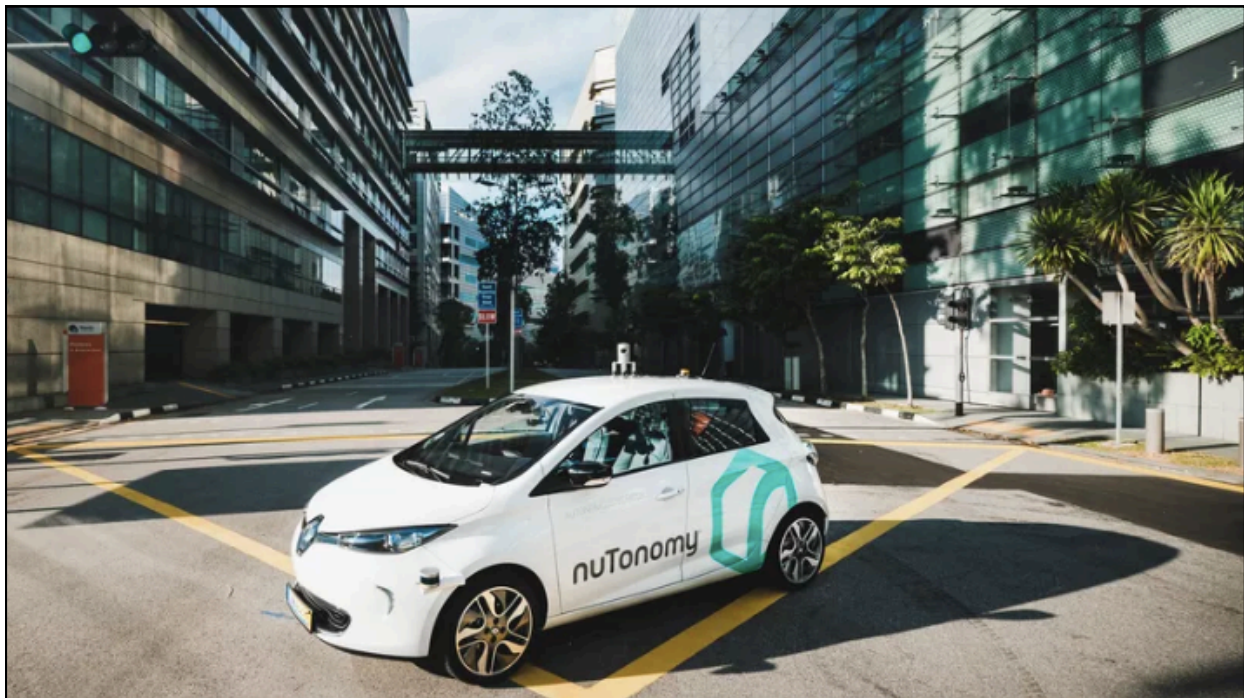
- Vision and other senses
- Fine and gross motor control

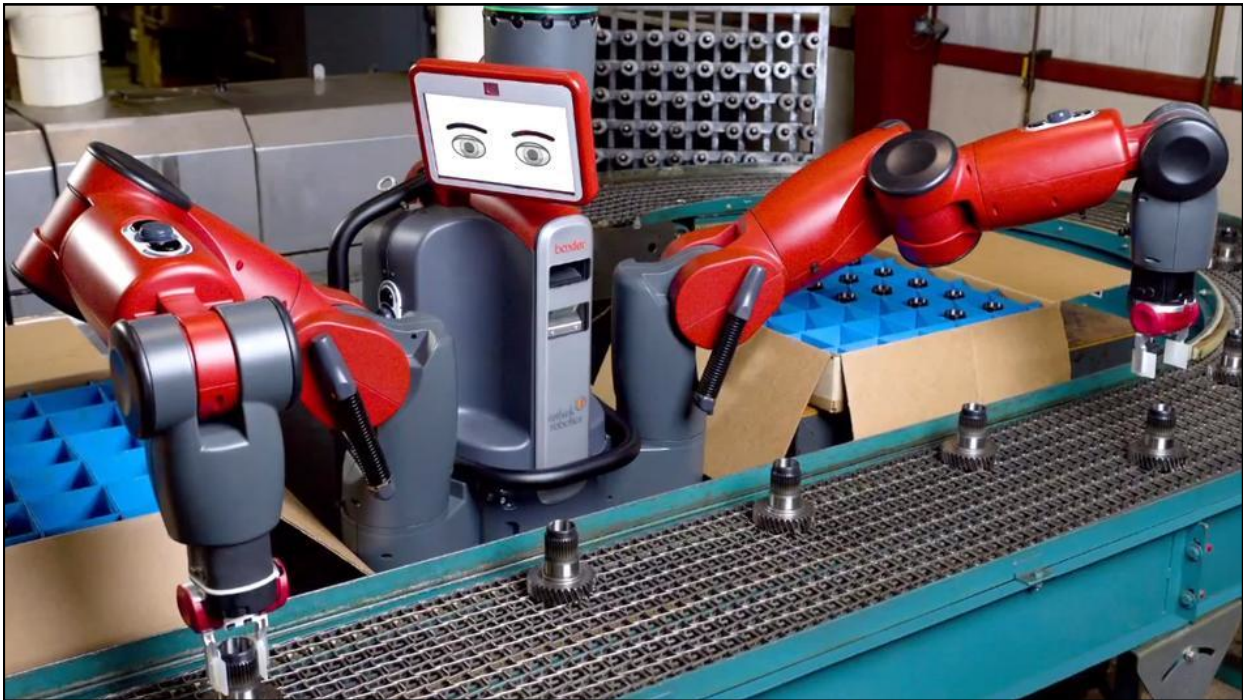
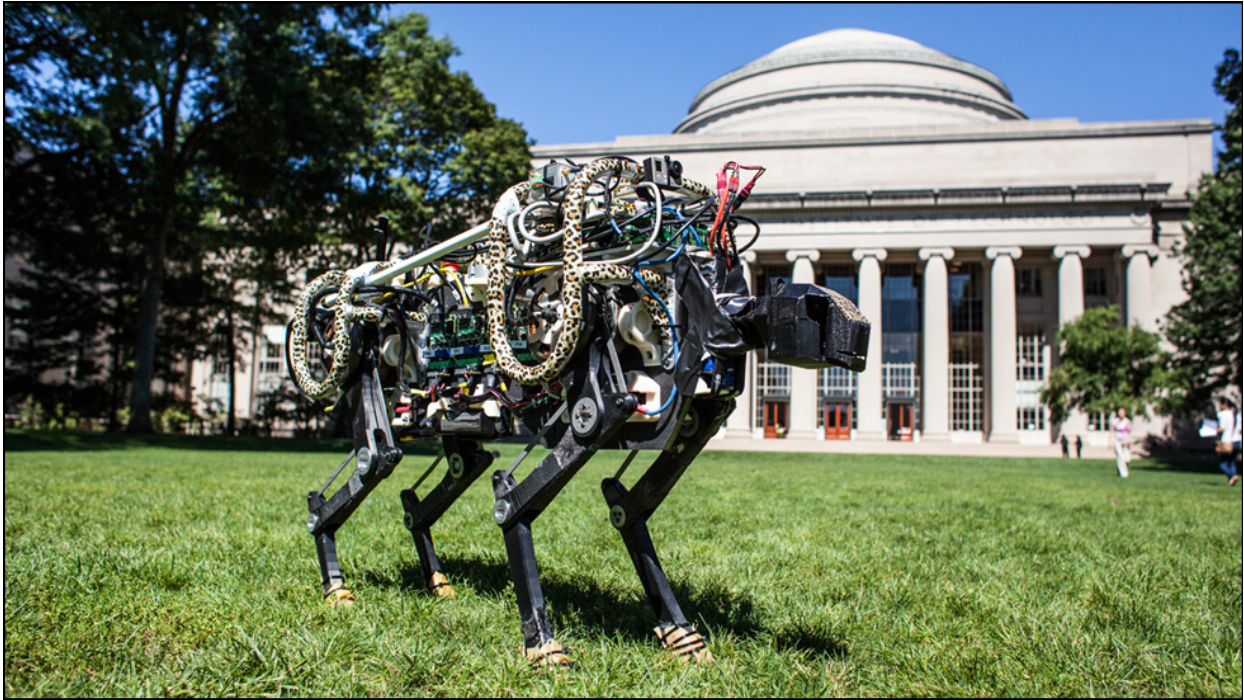
Language

- Voice recognition
- Natural language processing
- Creating narratives

Problem Solving

- Answering unstructured questions
- Pattern recognition and classification

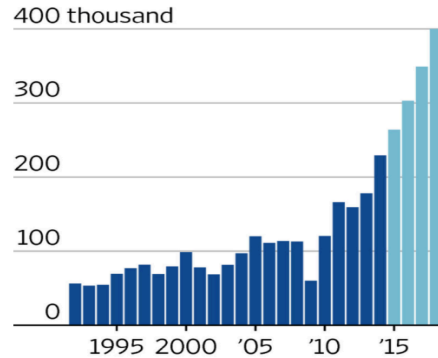




Robots



World-wide industrial robot shipments



Note: 2015 and later are projections.
Source: International Federation of Robotics

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South China Morning Post EDITION: INTERNATIONAL TUE NOV 3, 2015 JOBS EVENTS EDUCATION COURSES

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Building work starts on first all-robot manufacturing plant in China's Dongguan

He Huiheng
huiheng.he@scmp.com

PUBLISHED: Tuesday, 05 May, 2015, 11:41am
UPDATED: Wednesday, 06 May, 2015, 8:23pm

SHARE

Since September, a total of 505 factories across Dongguan have invested 4.2 billion yuan in robots, aiming to replace more than 30,000 workers, according to the Dongguan Economy and Information Technology Bureau.

China's robot makers could see a growing market as traditional manufacturers look to automate their plants. Photo: Reuters

Construction work has begun on the first factory in China's manufacturing hub of Dongguan to use only robots for production, the official Xinhua news agency reported.

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4 Economics professor has solution for China's millions of bachelors: let them share wives, or even ma

5 Beijing invokes immunity for consulate staff over fatal Cebu shooting

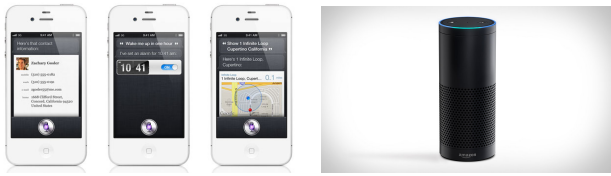
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Writing Articles

The Times beats Street 4Q forecasts


New York Times Co. tops 4Q net income and revenue expectations

AP February 3, 2015 8:48 AM

NEW YORK (AP) — The New York Times Co. (NYSE: NYT) on Tuesday reported fourth-quarter net income of \$34.9 million.

The New York-based company said it had profit of 22 cents per share. Earnings, adjusted for one-time gains and costs, came to 26 cents per share.

The results exceeded Wall Street expectations. The average estimate of analysts surveyed by Zacks Investment Research was for earnings of 23 cents per share.



Related Stories

The newspaper publisher posted revenue of \$444.7 million in the period, also topping Street forecasts. Analysts expected \$437.2 million, according to Zacks.

For the year, the company reported profit of \$33.3 million, or 20 cents per share. Revenue was reported as \$1.59 billion.

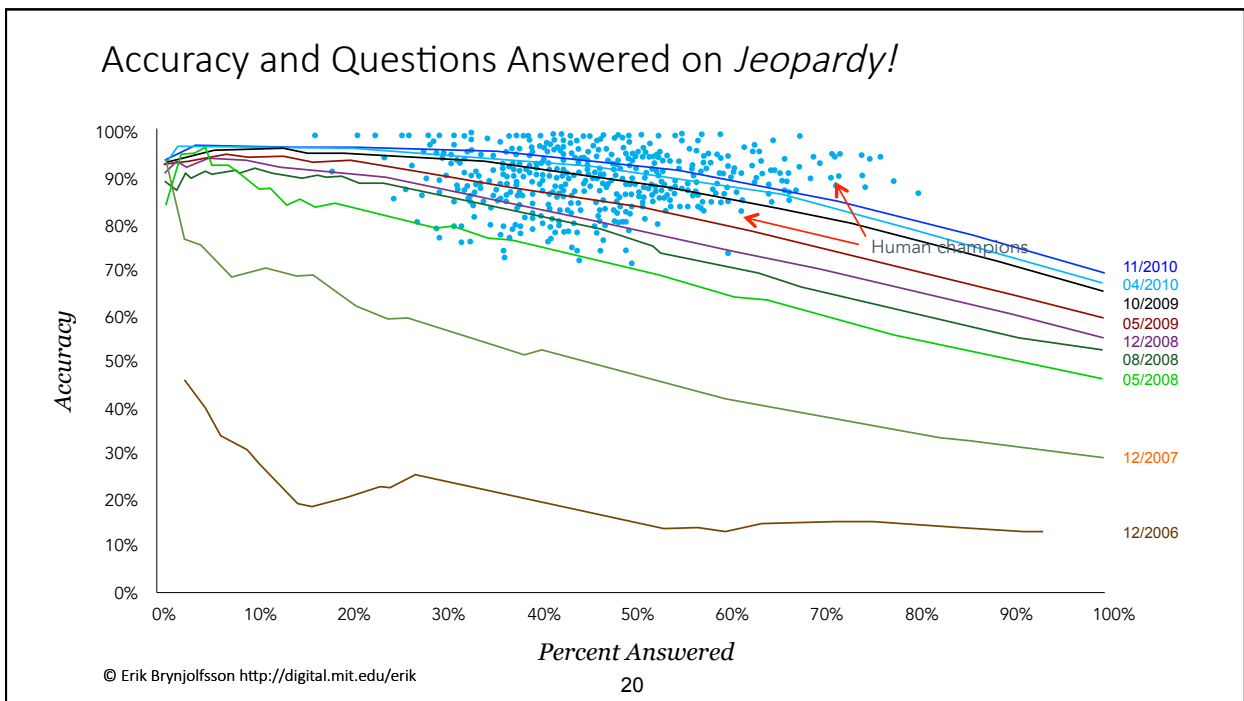
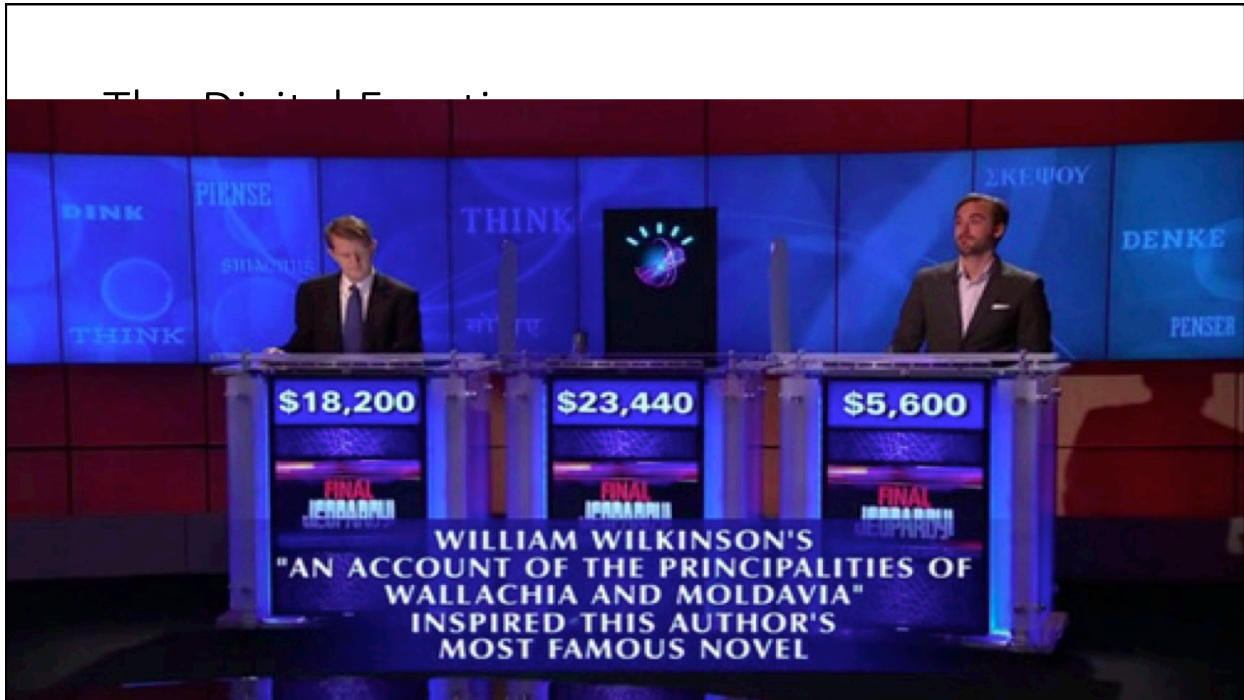
The Times shares have dropped 3.5 percent since the beginning of the year. The stock has declined roughly 10 percent in the last 12 months.

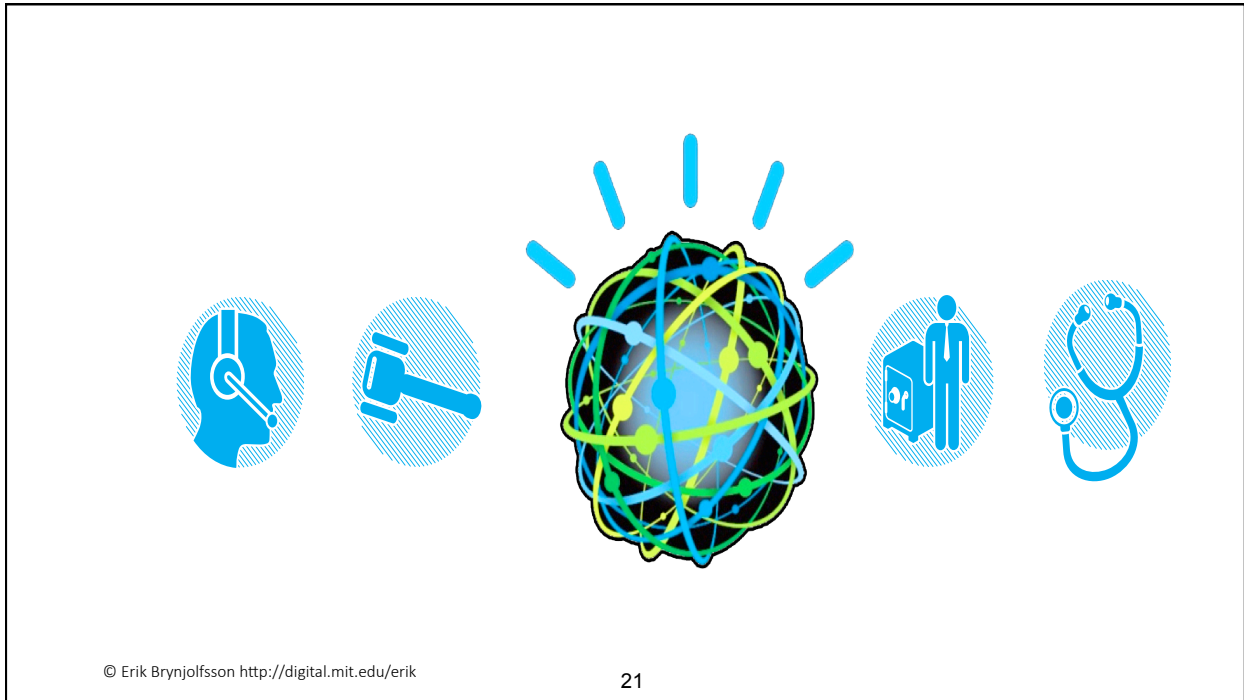
This story was generated by Automated Insights (<http://automatedinsights.com/ap>) using data from Zacks Investment Research. Access a Zacks stock report on NYT at <http://www.zacks.com/ap/NYT>

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The New York Times **Science**

SMARTER THAN YOU THINK
Armies of Expensive Lawyers, Replaced by Cheaper Software

Ramin Rahimian for The New York Times

"People get bored, people get headaches. Computers don't," said Bill Herr, a lawyer who used to work for a chemical company.

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Machines Gauging Your Star Potential Automate HR Hiring

By Aki Ito - Oct 11, 2013 12:01 AM ET

    80 COMMENTS + QUEUE  

They can drive cars, win Jeopardy and find your soon-to-be favorite song. Machines are also learning to decipher the most human qualities about you -- and help businesses predict your potential to be their next star employee.

A handful of technology companies from [Knack.it Corp.](#) to Evolv Inc. are doing just that, developing video games and online questionnaires that measure personality attributes in a job applicant. Based on patterns of how a company's best performers responded in these assessments, the software estimates a candidate's suitability to be everything from a warehouse worker to an investment bank analyst.

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What does this mean for the economy?

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Good News, but Also Challenges

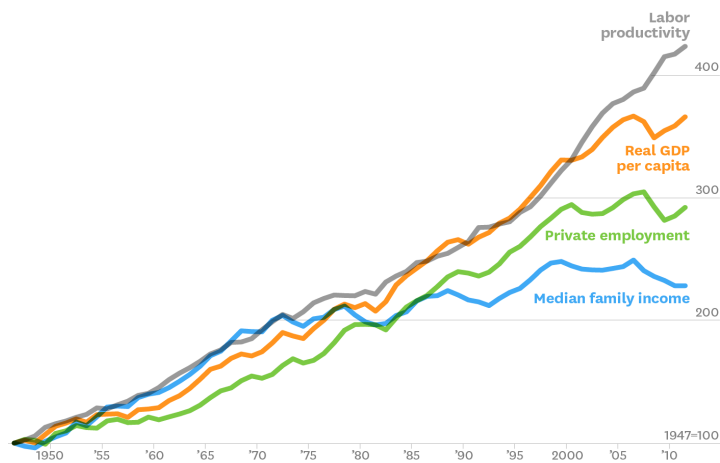


Digital progress makes the economic pie bigger. But there is no economic law that everyone, or even most people, will benefit.

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The Great Decoupling

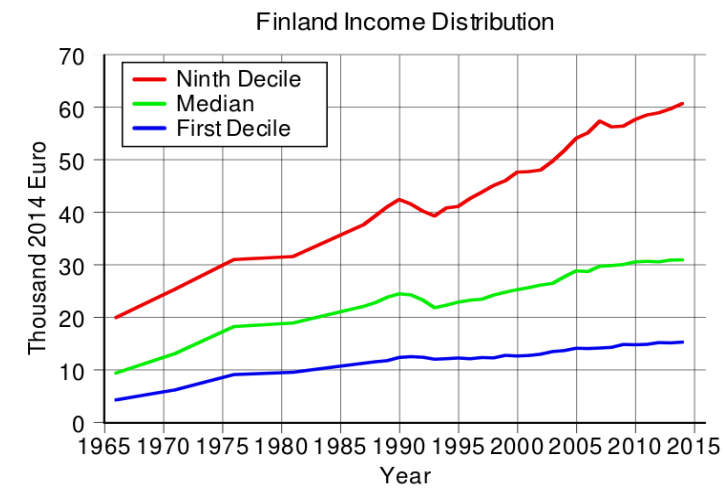


SOURCE: FEDERAL RESERVE BANK OF ST. LOUIS; ERIK BRYNJOLFSSON AND ANDREW MCAFEE FROM "THE GREAT DECOUPLING," JUNE 2015 © HBR.ORG

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Median Income in Finland



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Three Sets of Winners and Losers

1. High Skilled vs. Low & Mid Skilled Workers
2. Capital vs. Labor
3. Superstars vs. Everyone Else

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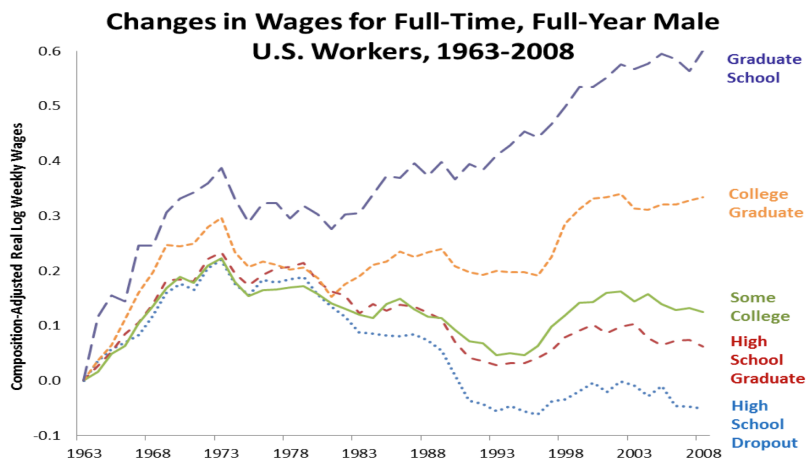
High Skilled vs. Low & Mid Skilled Workers



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Skill Disparities



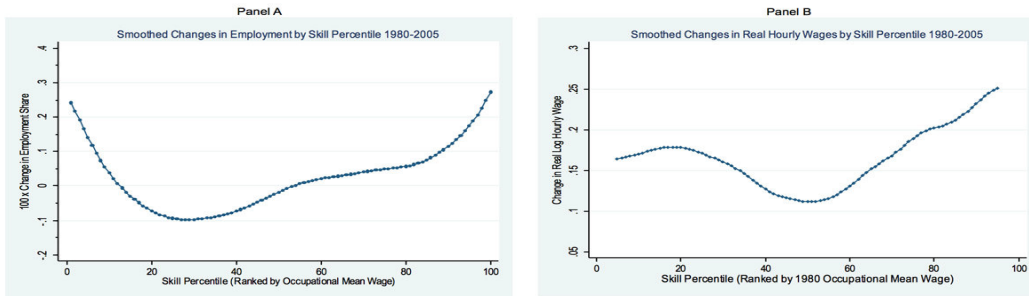
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Source: Acemoglu and Autor

GDP, Profits, Investment

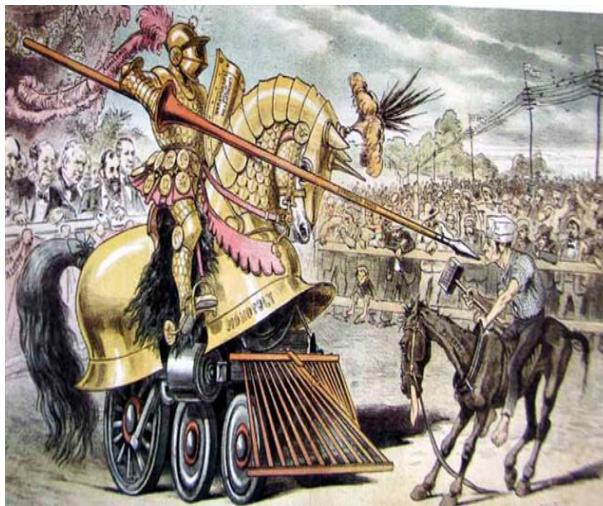
Mid-wage workers have been hit hardest in both employment and wages



Source: Autor and Dorn, MIT Working paper, 2013

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Capital vs. Labor



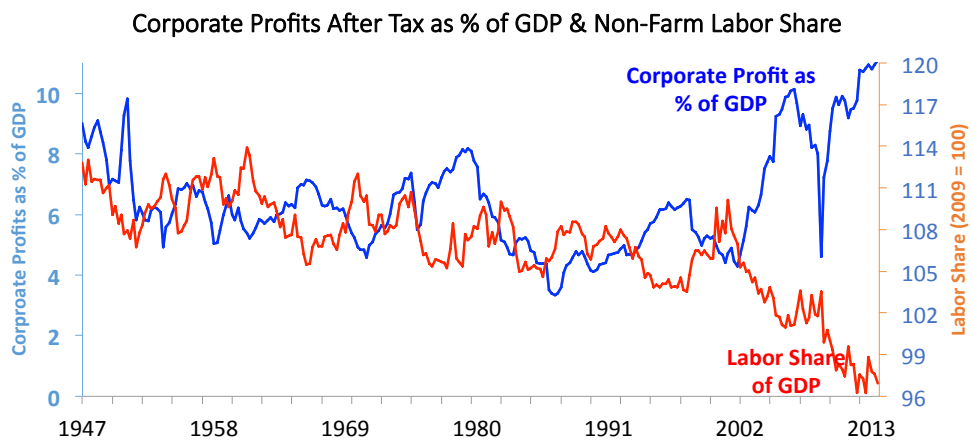
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When there's no other dude in the car, the cost of taking an Uber anywhere becomes cheaper than owning a vehicle.

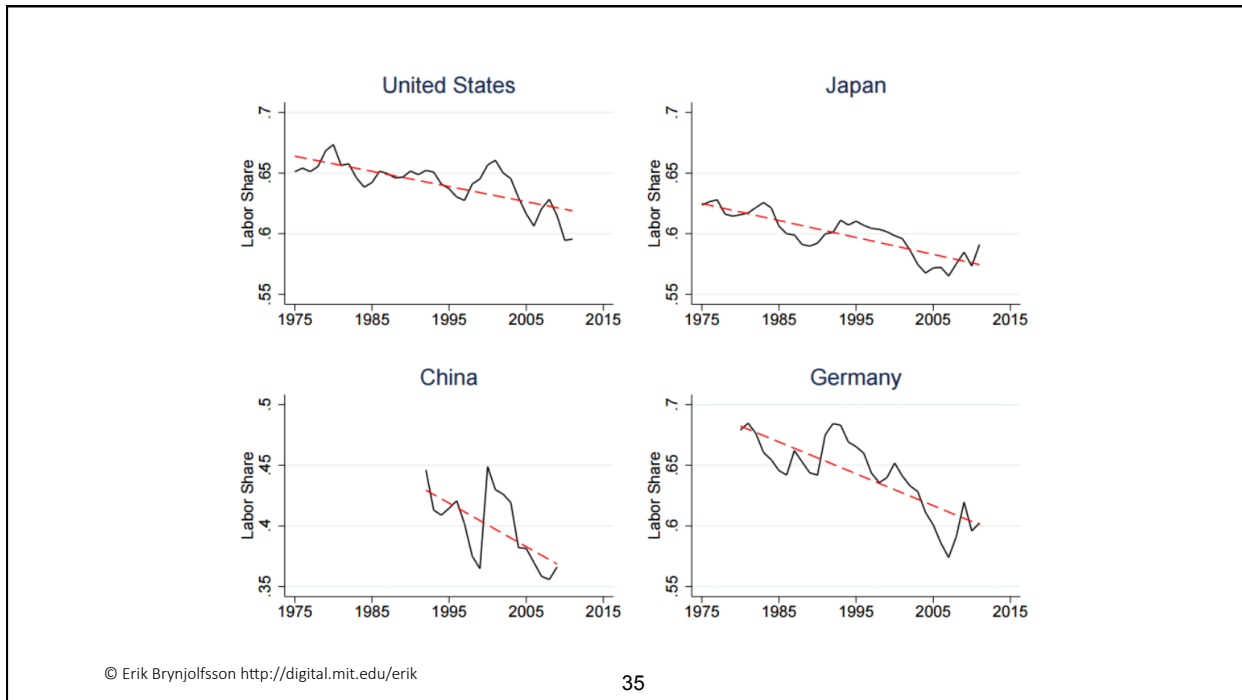
-- Travis Kalanick CEO, Uber

Capital vs. Labor



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New World Order

Labor, Capital, and Ideas in the Power Law Economy

By Erik Brynjolfsson, Andrew McAfee, and Michael Spence

FROM OUR JULY/AUGUST 2014 ISSUE

The image shows a group of humanoid robots in a laboratory or workshop environment. The robots are constructed from various materials, including metal, plastic, and wiring. One robot in the foreground has a sign that reads "H&S Robots". The background is slightly blurred, showing other robots and laboratory equipment.

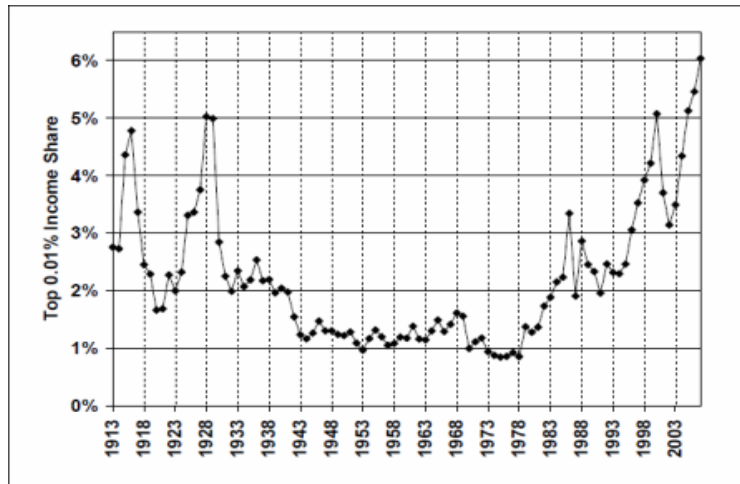
Superstars vs. Everyone Else



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Superstars



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Source: Piketty, 2014

Will the second wave be an extrapolation of the first wave?

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Our View

“Digital technologies change rapidly, but organizations and skills aren’t keeping pace. As a result, millions of people are being left behind.”

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BASIC INCOME SEMINAR TURKU

IN-DEPTH VIEW TO FINNISH, SWEDISH AND ICELANDIC BASIC INCOME SOLUTIONS

Ville-Veikko Pulkka / The Finnish Social Insurance Institute KELA
From idea to experiment. Notes on the Finnish basic income experiment.

Albert Svan / Pirate Party of Iceland
Basic income possibilities - based on informal studies from Iceland.

Christian Engström / Pirate Party of Sweden
Basic Income - A Concrete and Calculated Proposal.

+ Workshop by Basic Income Earth Network Finland
Universal Basic Income for enhancing of Nordic cooperation.

25.8.2016 / Workshop 2pm. / Seminar 3pm.

Vanha Raatihuone (Old City Hall),
Vanha Suurtori 3, Turku, Finland.
further info @ vs.piraattipuolue.fi/bist2016

SCHEDULE

14.00 Workshop
15.00 Opening speech
15.15 Ville-Veikko Pulkka
16.00 Albert Svan
16.45 Christian Engström
17.30 Jouko Hemmi, Workshop results.

#BIST2016

Seminar is free and open for all. Presentations will be conducted in english and recorded on video to be shared over internet. Please use registration form at seminar's webpage, so we have enough coffee & snacks prepared for everyone.

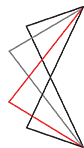
The New Grand Challenge

- Digital technologies will continue to accelerate.
 - Our skills, organizations and institutions are lagging.
 - Business as usual won't solve this problem.
- *We need to reinvent our economy and society to keep up with accelerating technology*

Some Open Questions

1. **What tasks, occupations and industries will be most affected in the second wave?**
 - What are the ultimate limits of this approach?
2. **What are implications for the economy and society?**
 - Productivity, growth, inequality, work and leisure
3. **What policies should we consider?**
 - Maximize the benefits and opportunity
 - Minimize the harm and risks
4. *What kind of society do we ultimately want?*

INCLUSIVE INNOVATION COMPETITION



MIT IDE
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Celebrating organizations that create economic opportunity in the digital era.

The MIT Initiative on the Digital Economy (IDE) is proud to present the Inclusive Innovation Competition (IIC), an awards program identifying and celebrating organizations that are inventing a more inclusive, productive, and sustainable future for all. The IIC grants **one million dollars** in prizes to organizations that are reshaping the future of work for people at the middle and base of our economy.

JUN 1 REGISTRATION DEADLINE

JUN 15 APPLICATION DEADLINE AND COMPETITION CLOSE

SEP 27 WINNERS ANNOUNCED AND CELEBRATED IN PARTNERSHIP WITH MIT SOLVE AT BOSTON'S HUBweek.

We are pleased to welcome the following IIC applicant organizations to our Showcase during the IDE conference

Economic Includers, HourVoice, Mission Asset Fund, Tispr, BraveNew, LaunchCode, Querium

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To learn more, visit:

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