APIGA 2017

The 4th Industrial Revolution & AI

NIA

AI is eating the world

THE WALL STREET JOURNAL.

ESSAY

Why Software Is Eating The World

By MARC ANDREESSEN

August 20, 2011

More and more major businesses and industries are being run on software and delivered as online services—from movies to agriculture to national defense. Many of the winners are Silicon Valley-style entrepreneurial technology companies that are invading and overturning established industry structures. Over the next 10 years, I expect many more industries to be disrupted by software, with new world-beating Silicon Valley companies doing the disruption in more cases than not.

“We’re going from automobiles to auto-mobility. In large part, that mobility will be fueled by software”

Dieter Zetsche (Chairman of DaimlerChrysler)

Intelligent Machines

Nvidia CEO: Software Is Eating the World, but AI Is Going to Eat Software

Jensen Huang predicts that health care and autos are going to be transformed by artificial intelligence.

by Tom Simonite May 12, 2017

Nvidia CEO Jensen Huang at the company's developer conference in San Jose, California.

AlphaGo Shock

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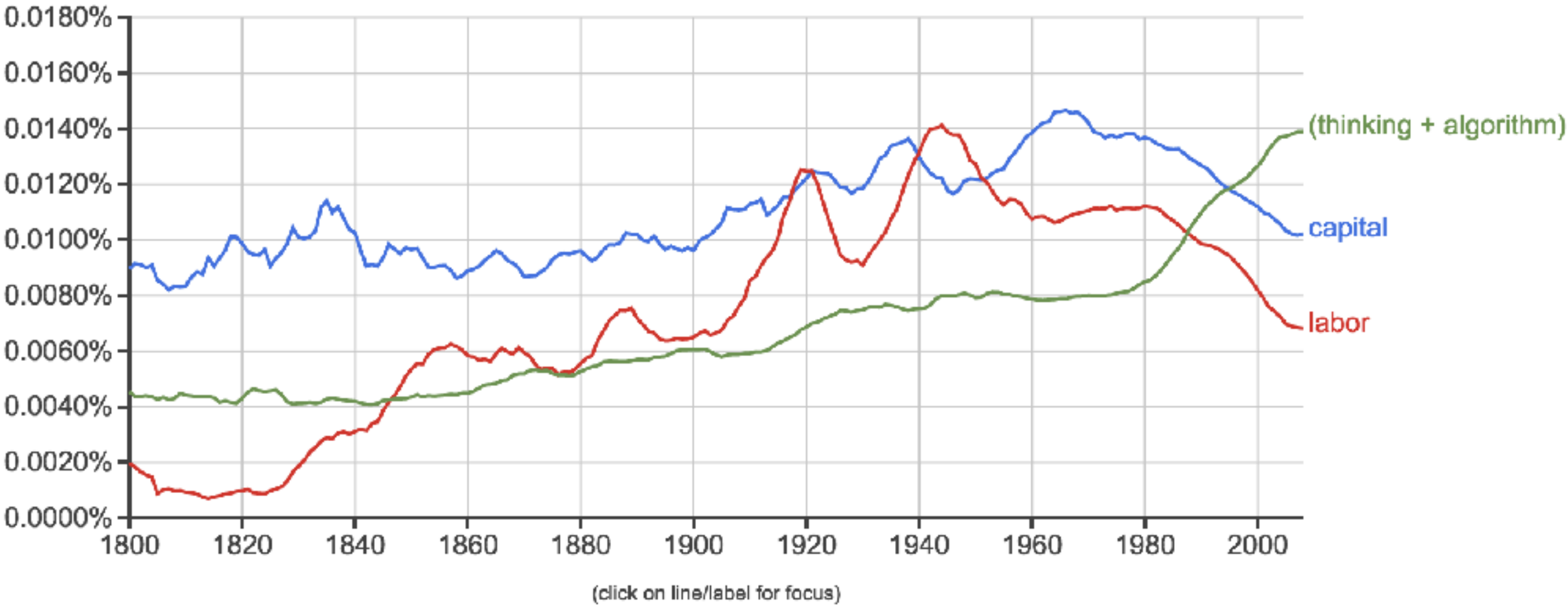
The 4th Industrial Revolution

Coming of the Intelligent Era

- Intelligence is more important than traditional elements such as capital and labor
  - contents regarding intelligence, algorithm, and reasoning have risen sharply since early 1980s



- The coming intelligent society is fundamentally different from its predecessors, the industrial society and the information society
  - Intelligent society aims to "do the right thing", whereas industrial society and information society aim to "do things" and "do things right" respectively
  - data and algorithm are key resources for intelligent society

Industrial Society	Information Society	Intelligent Society
• Do Things	• Do Things Right	• Do the Right Thing
• Product	• Process	• Decision
• Economy of Scale	• Economy of Network	• Economy of Advance
• Power	• Speed	• Accuracy
• Machine + Energy	• Computer + Internet	• Data + Algorithm

A London taxi driver

Mrs. Kim

Who do you think drive better?

Smart by Architecture

Driving is not going to be
a matter of human capabilities any more.
Instead, it is going to depend on traffic data, algorithms,
and smart devices you use.

World Economic Forum, 2016

First industrial revolution : 1760-1840

- railroad, steam engine, mechanical production

Second industrial revolution : late 19c-early 20c

- electricity, assembly line, mass production

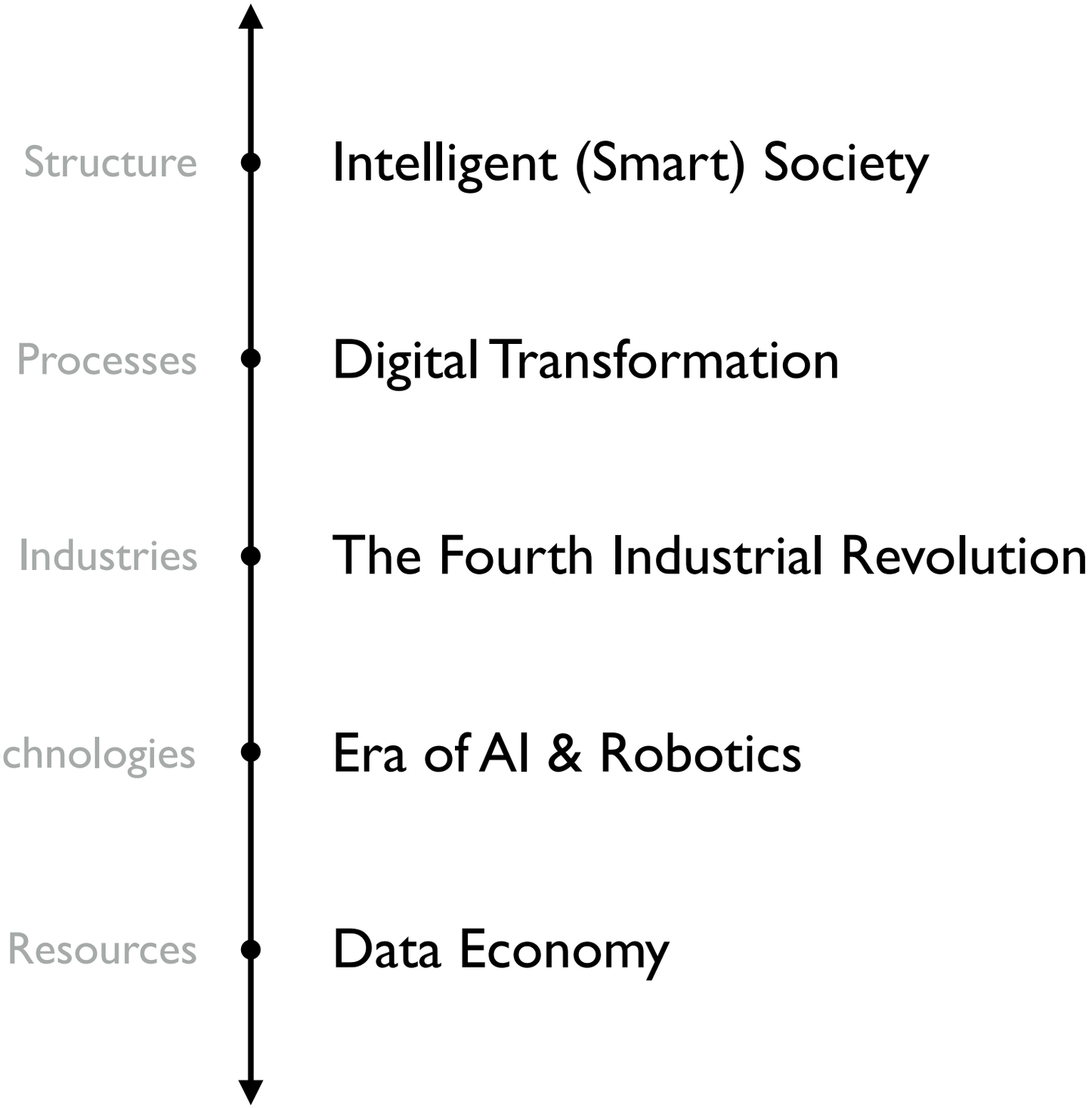
Third industrial revolution : 1960s-1990s

- semiconductor, computer, Internet, automate production

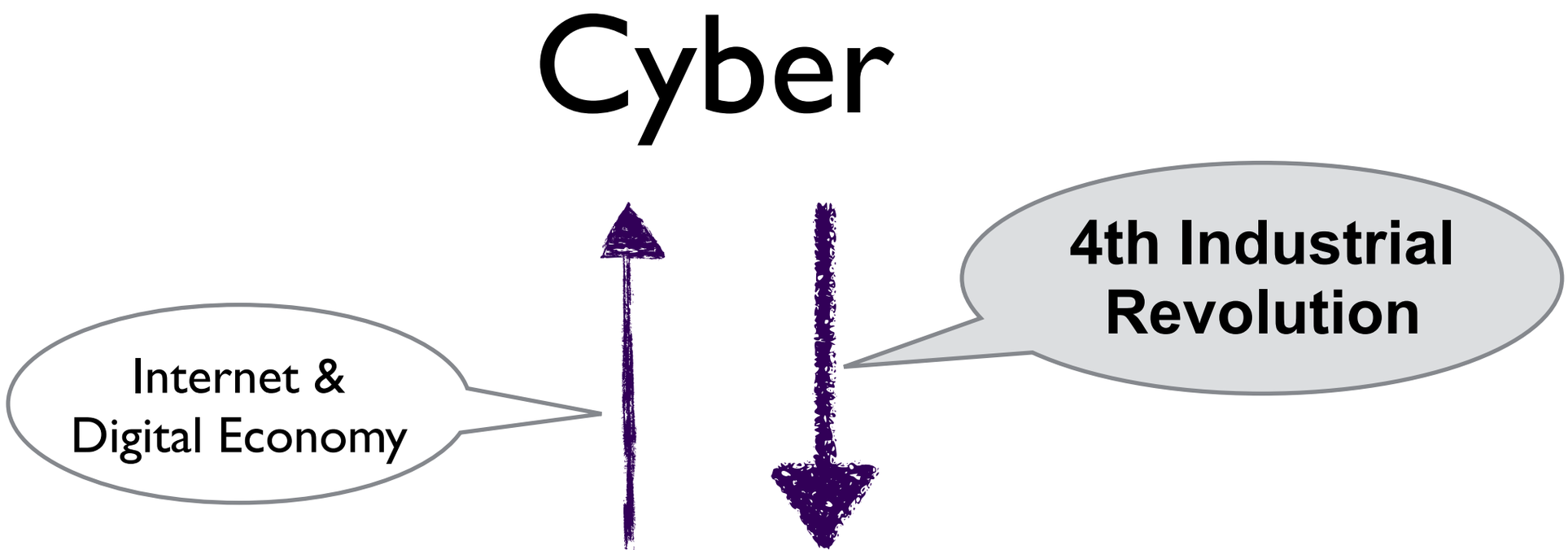
Fourth industrial revolution : now

- fusion of technologies, blurring lines between physical, digital, and biological spheres

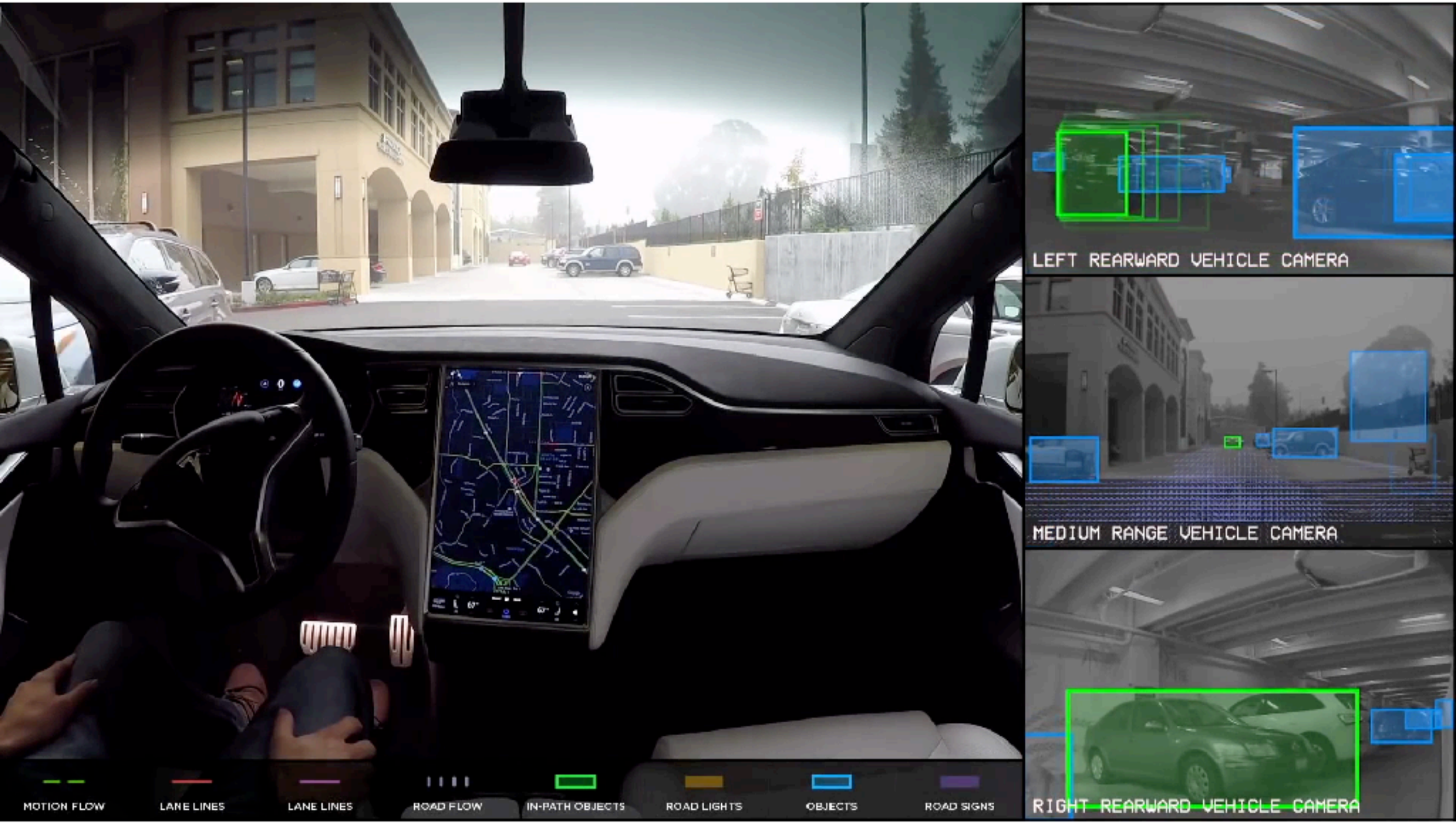
Concepts about Current Paradigm Shifts



CPS & the 4th Industrial Revolution



google translator

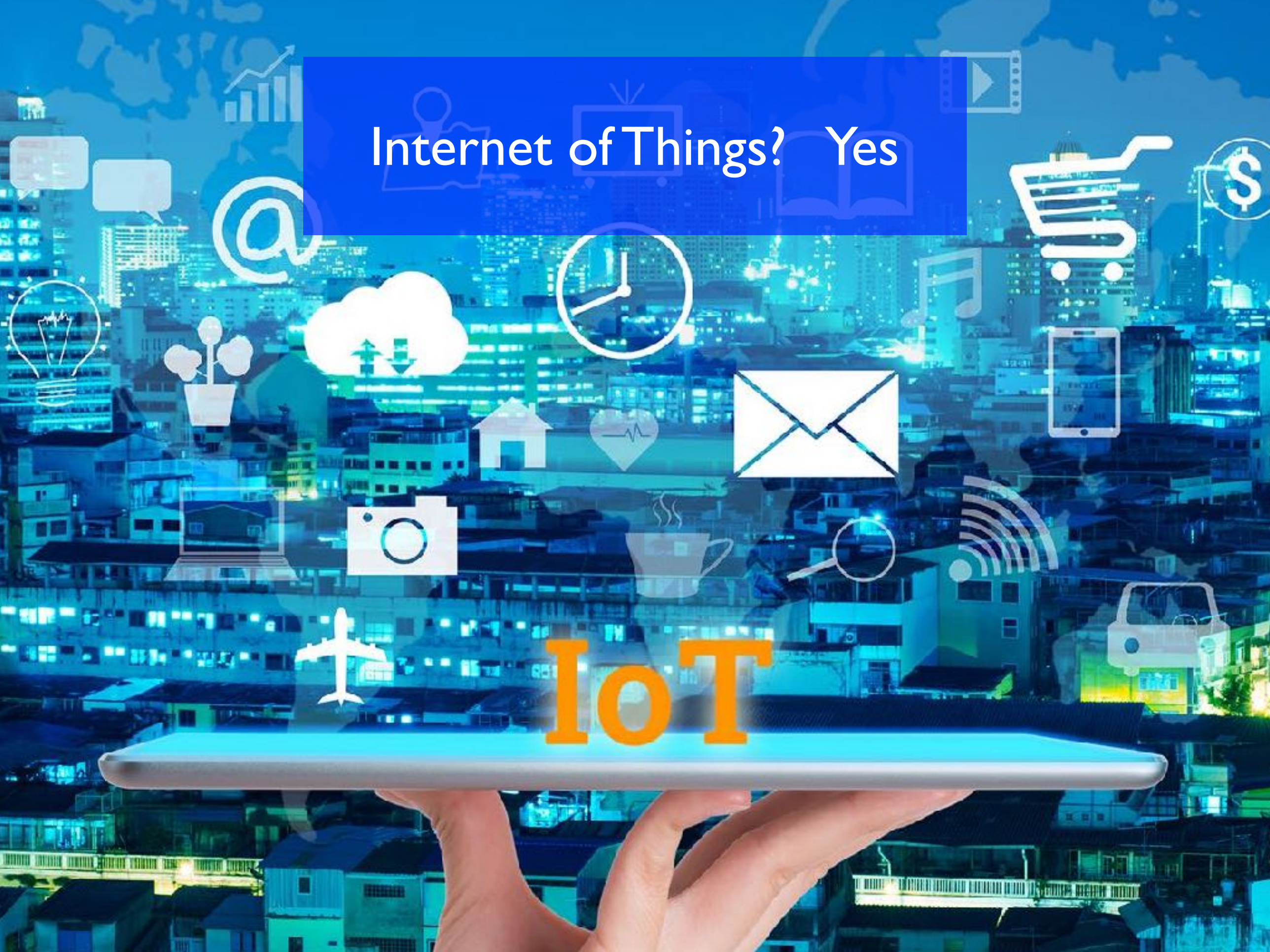


Tesla Autopilot

DARPA's ALIAS

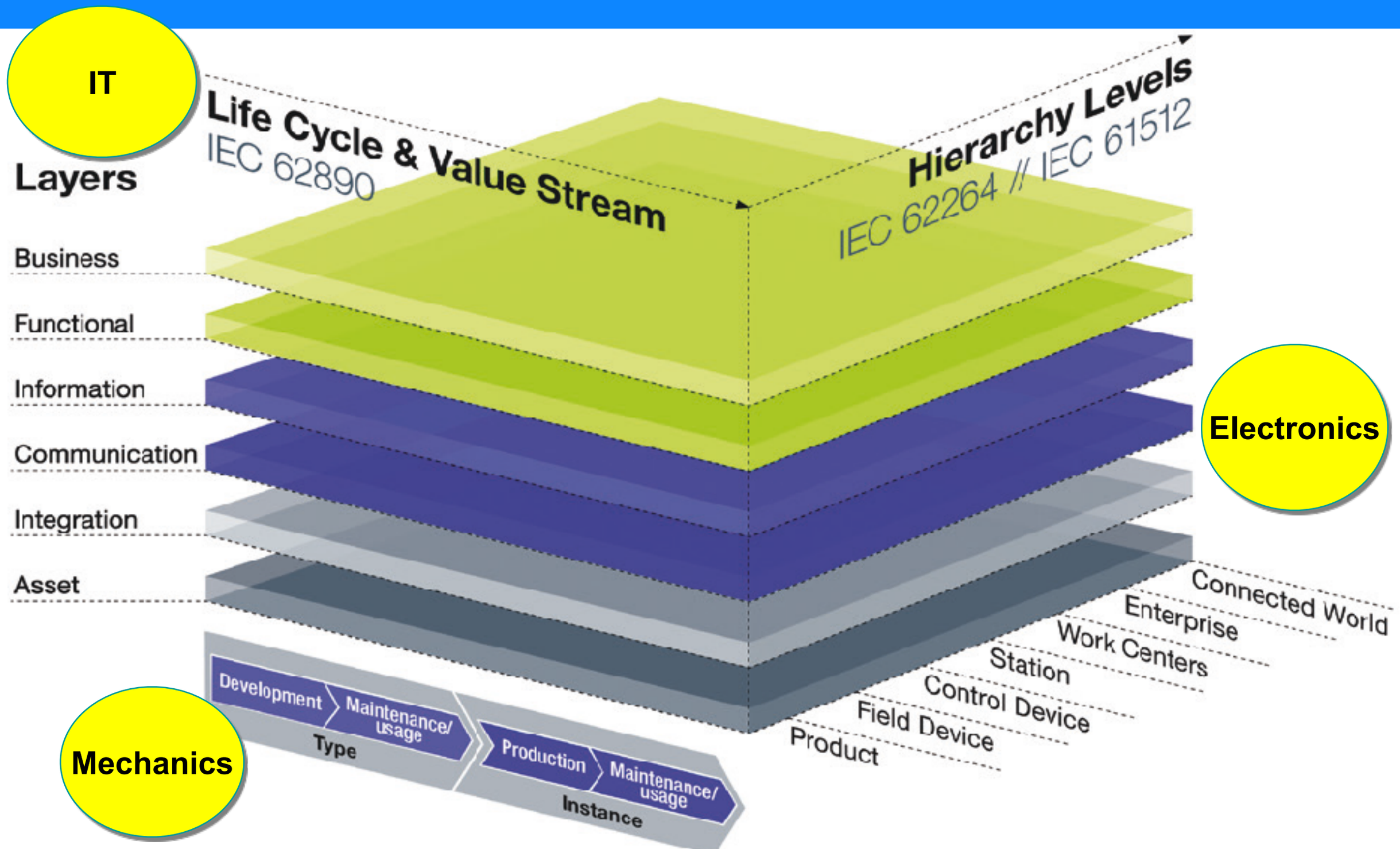
Automation? Sure!

Internet of Things? Yes



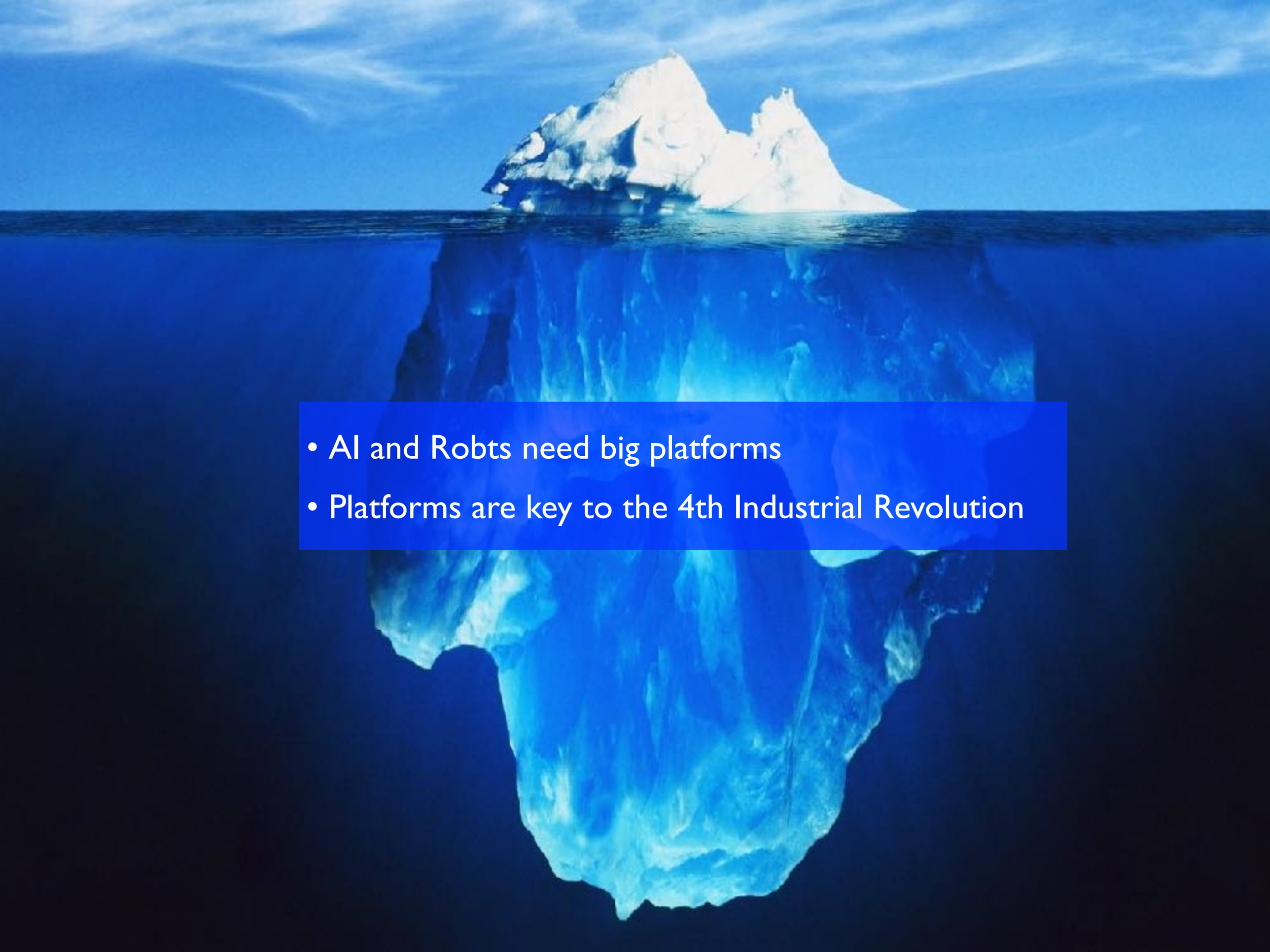
but, Platform is key!

Industry 4.0 Platforms



RAMI(Das **R**eferenz**A**rchitectur**M**odell **I**ndustrie 4.0)

Source : KDI


• AI and Robts need big platforms
• Platforms are key to the 4th Industrial Revolution

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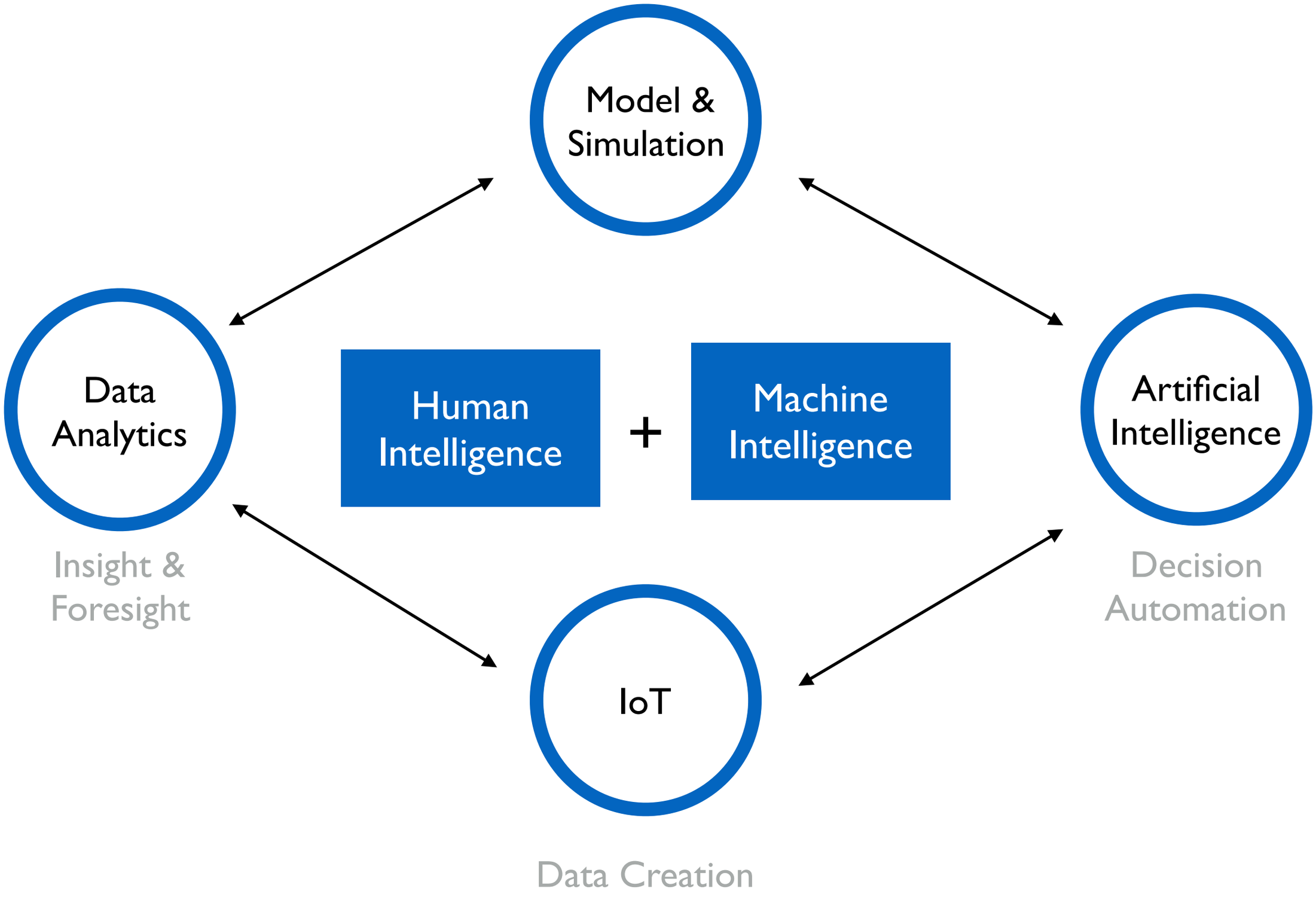
Artificial Intelligence

Structure of Intelligent Technologies



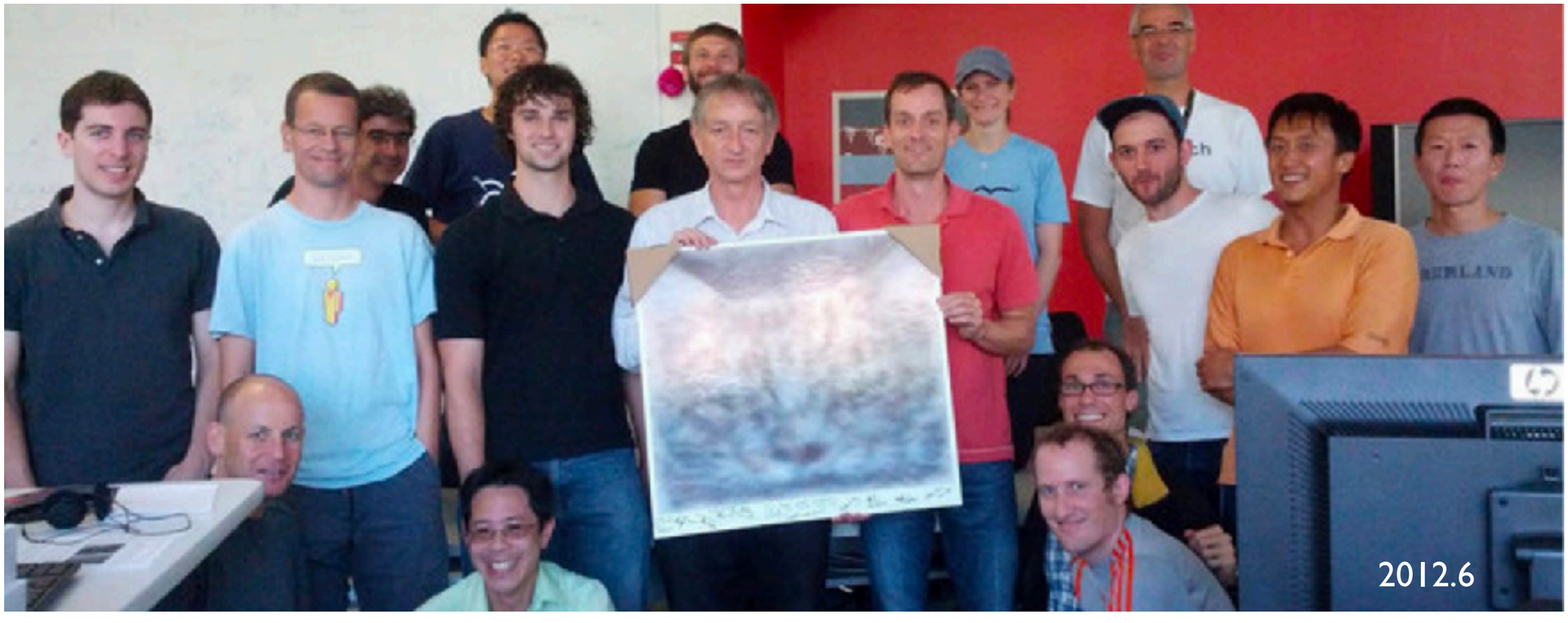
Intelligent?

Ishikawa Watanabe Lab, 2012

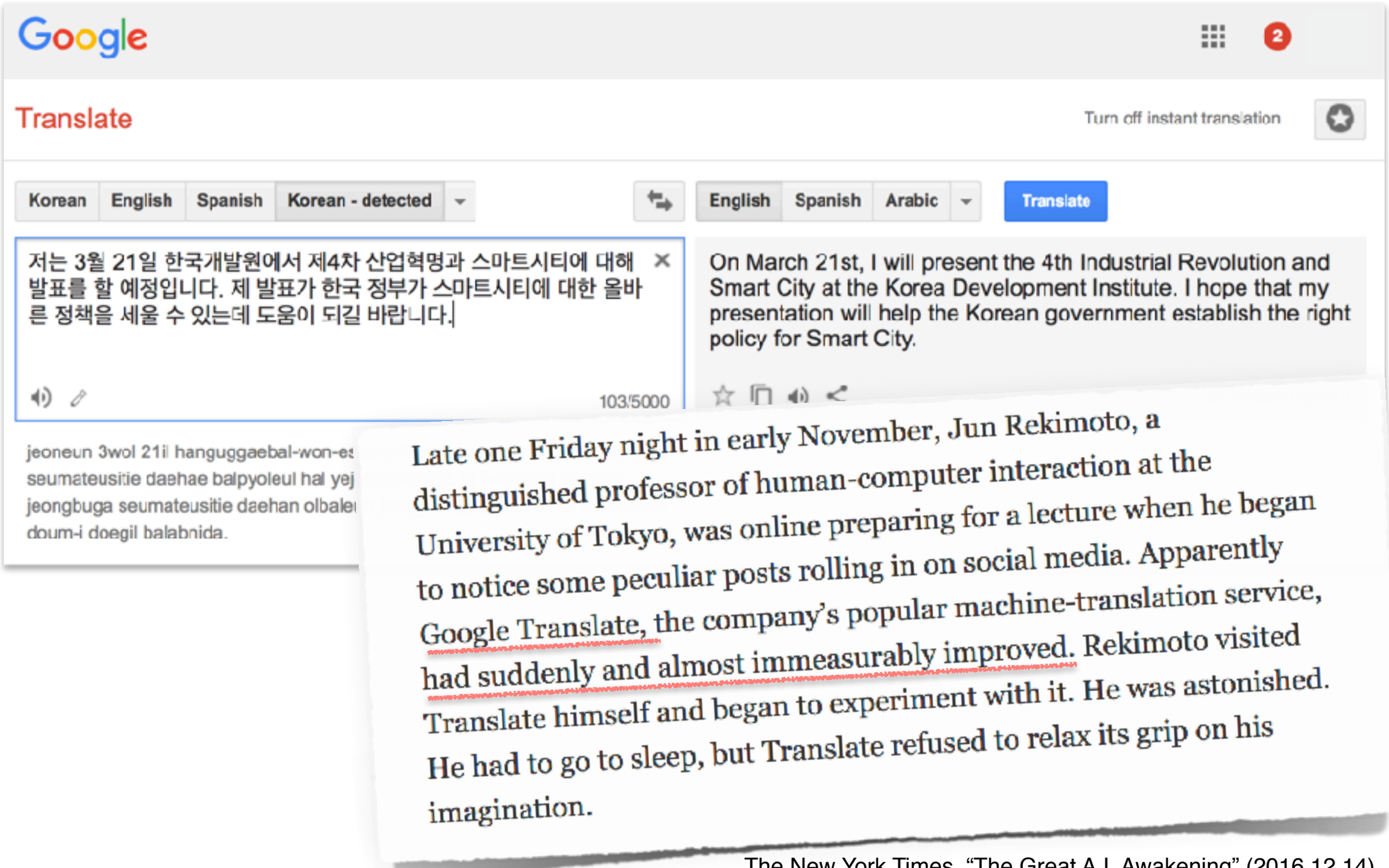
Artificial Intelligence has suddenly leapfrogged

"Nobody taught a computer about a cat.

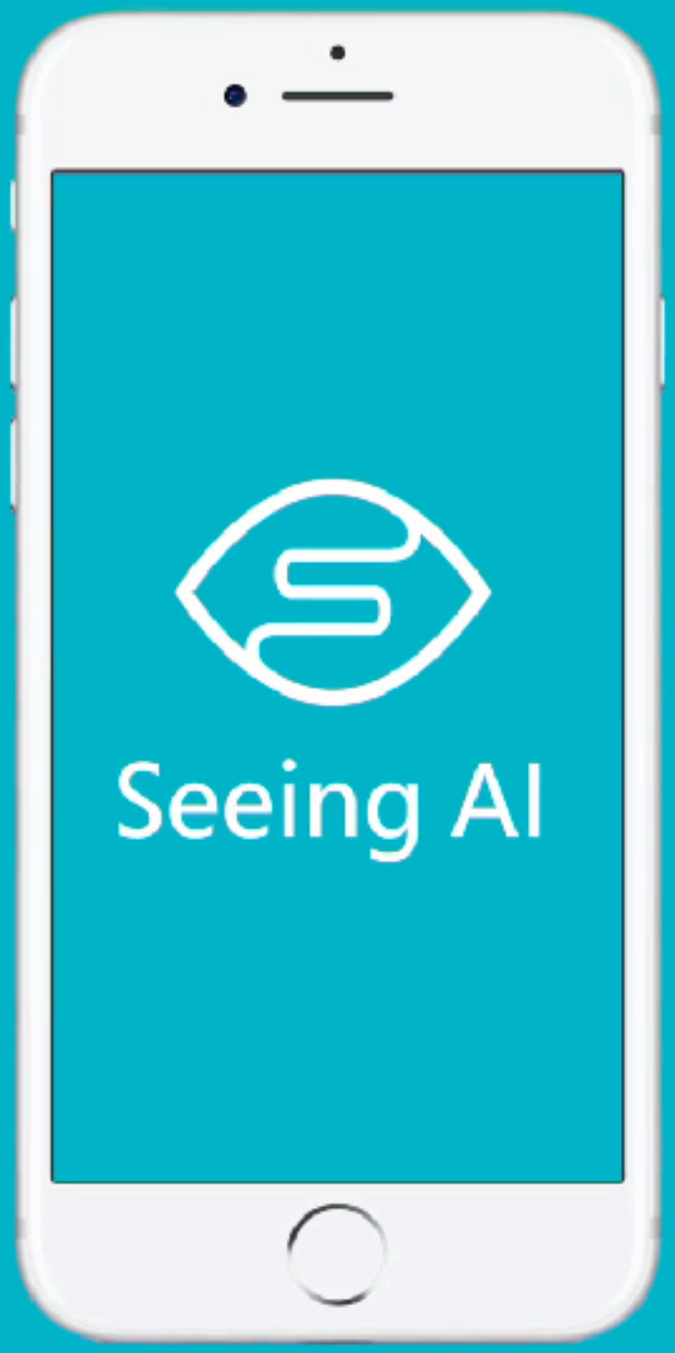
However, a computer figured out what is a cat once we provided lots, lots of data about cat"

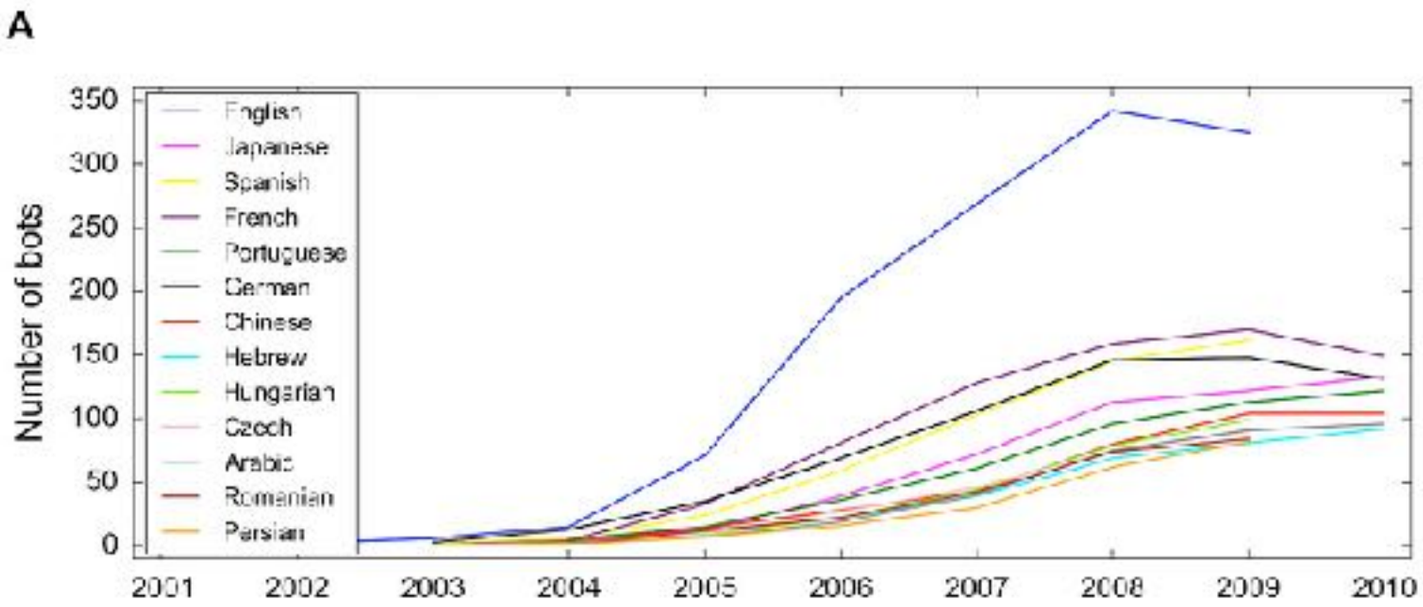


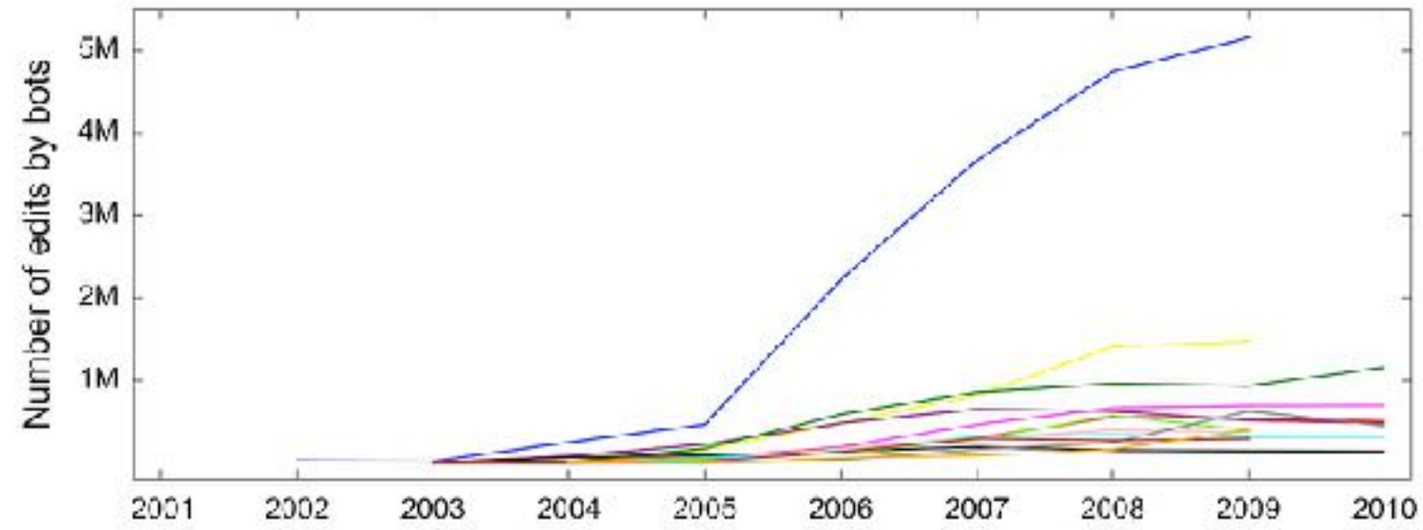
Google Translate (after Nov 2016)

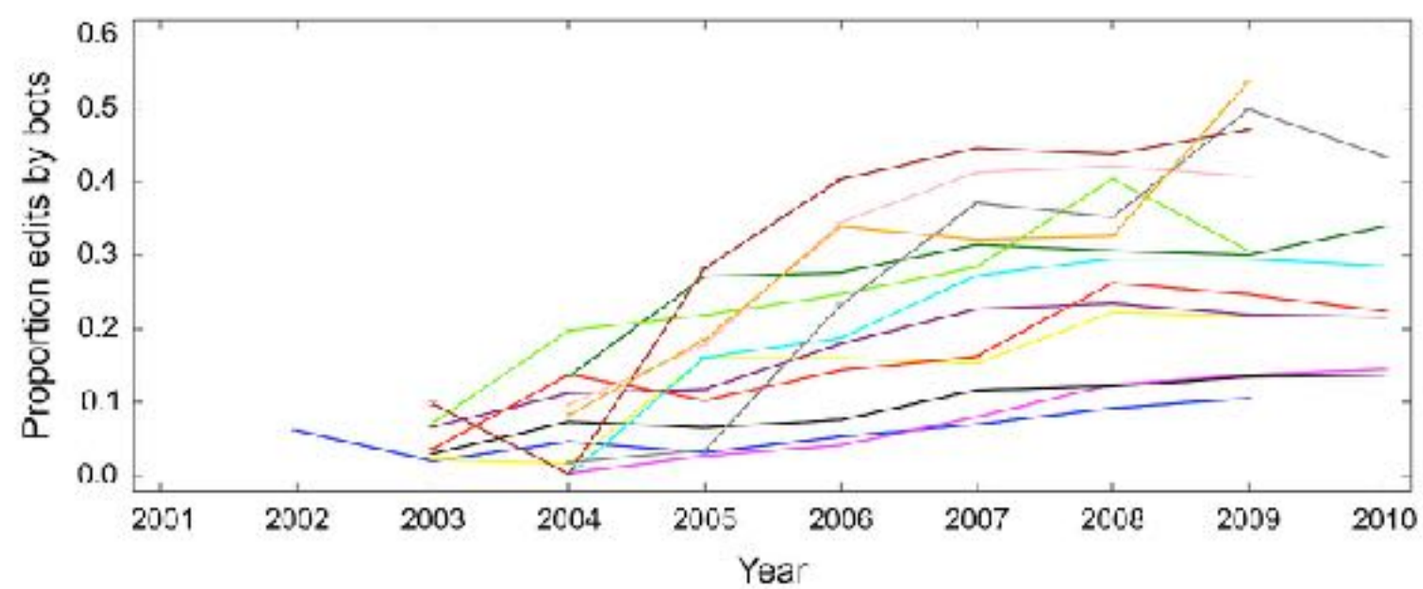


The New York Times, "The Great A.I. Awakening" (2016.12.14)


Seeing AI







No. of bots at the Wikipedia

WIRED

The Three Breakthroughs That Have Finally Unleashed AI on the World

BUSINESS | CULTURE | DESIGN | GEAR | SCIENCE

KEVIN KELLY 10.27.14 6:30 AM

SH

UNLEASHED AI ON THE WORLD

TWEET

COMMENT 199

EMAIL

Reasons behind such Sudden Progress

1. Cheap parallel computation

Thinking is an inherently parallel process, billions of neurons firing simultaneously to create synchronous waves

2. Big Data

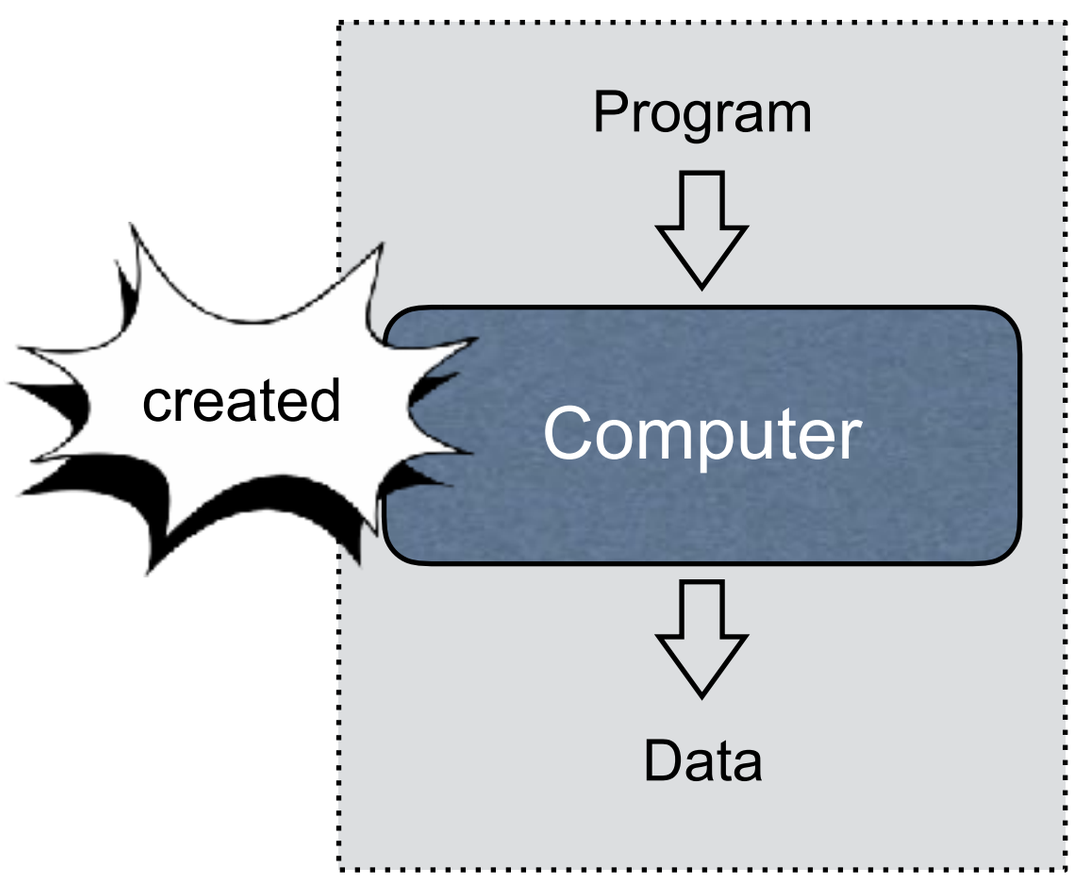
Every intelligence has to be taught. A human brain, which is genetically primed to categorize things, still needs to see a

3. Better algorithms

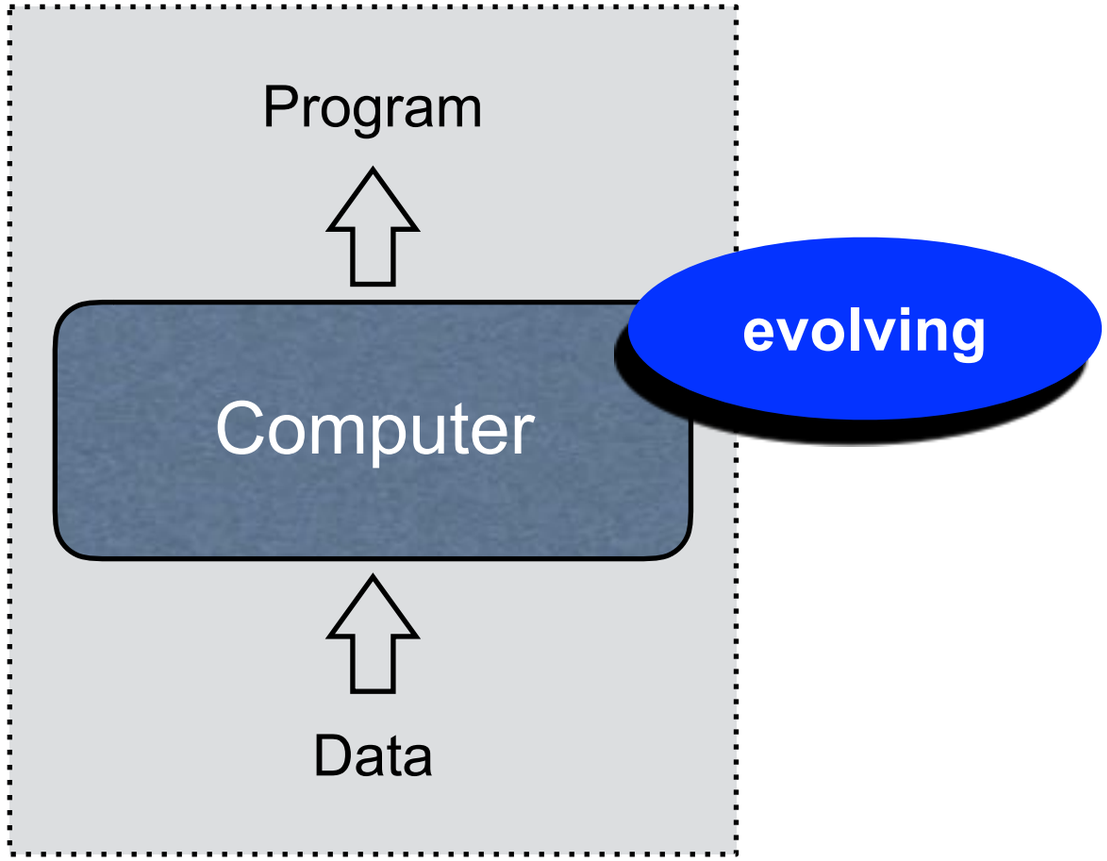
Digital neural nets were invented in the 1950s, but it took decades for computer scientists to learn how to tame the

Reasons behind such Sudden Progress

Past : Input from the top down

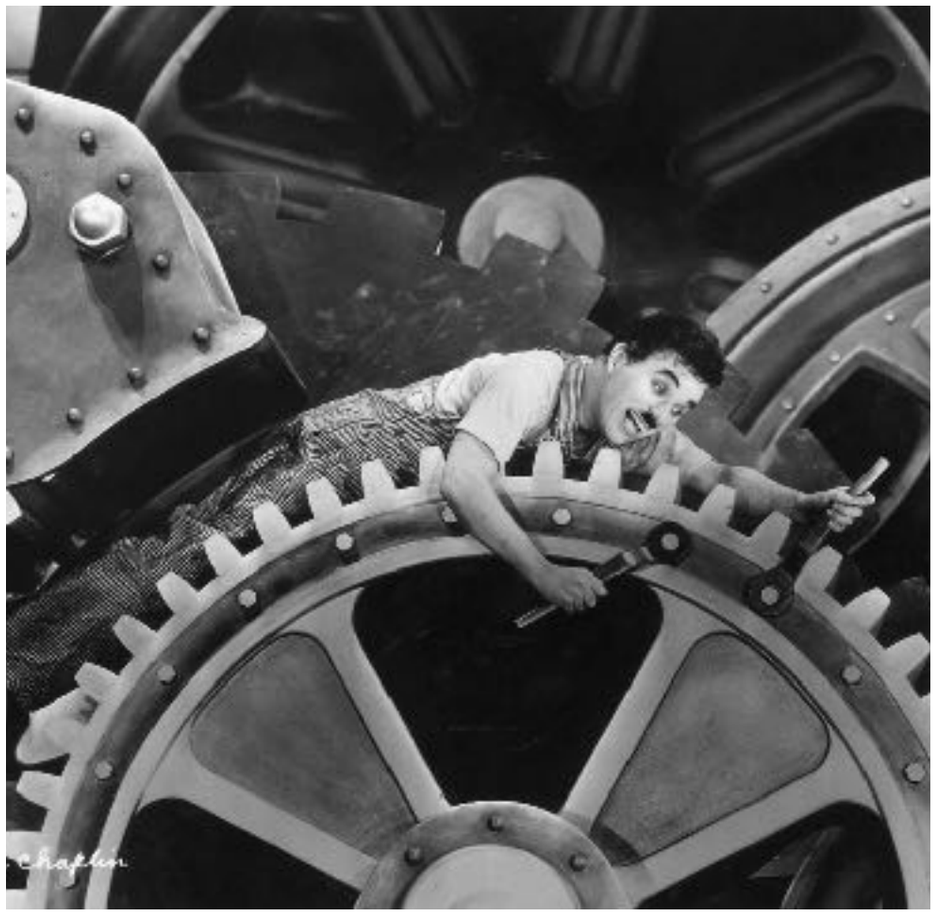


Now : Input from the bottom up

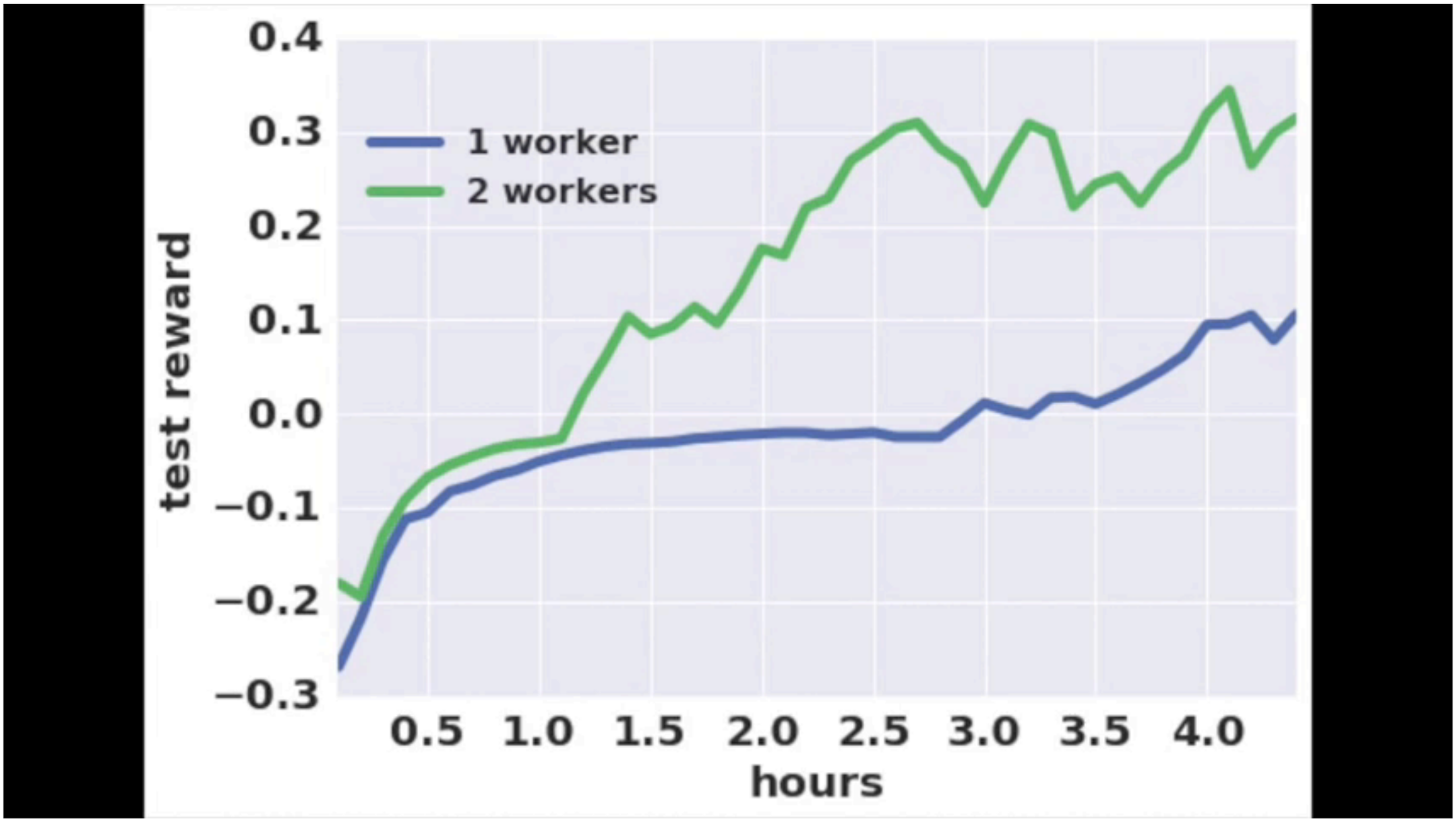


Human vs AI

Machine-like Human vs Human-like Machine



Real Power of AI

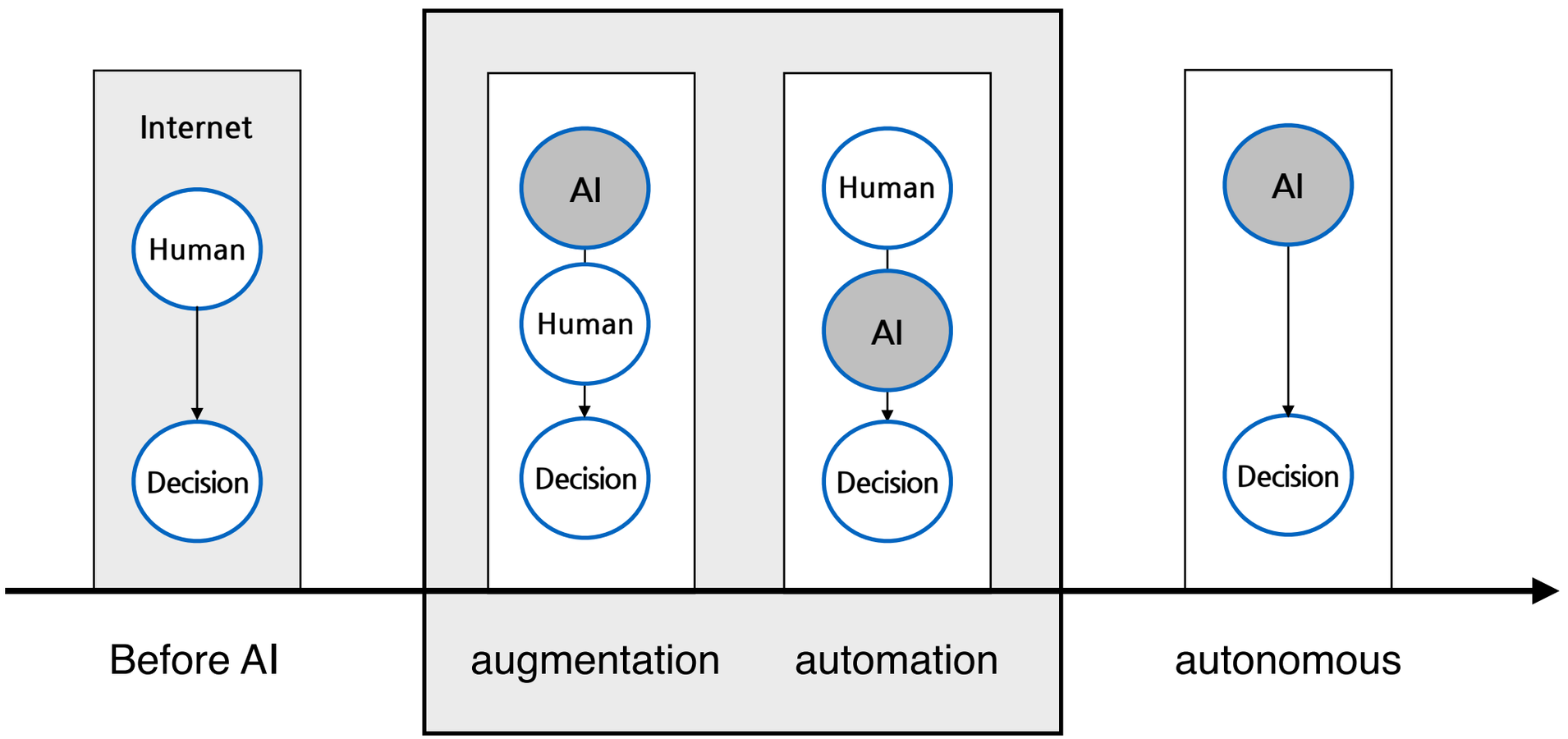


Artificial Intelligence

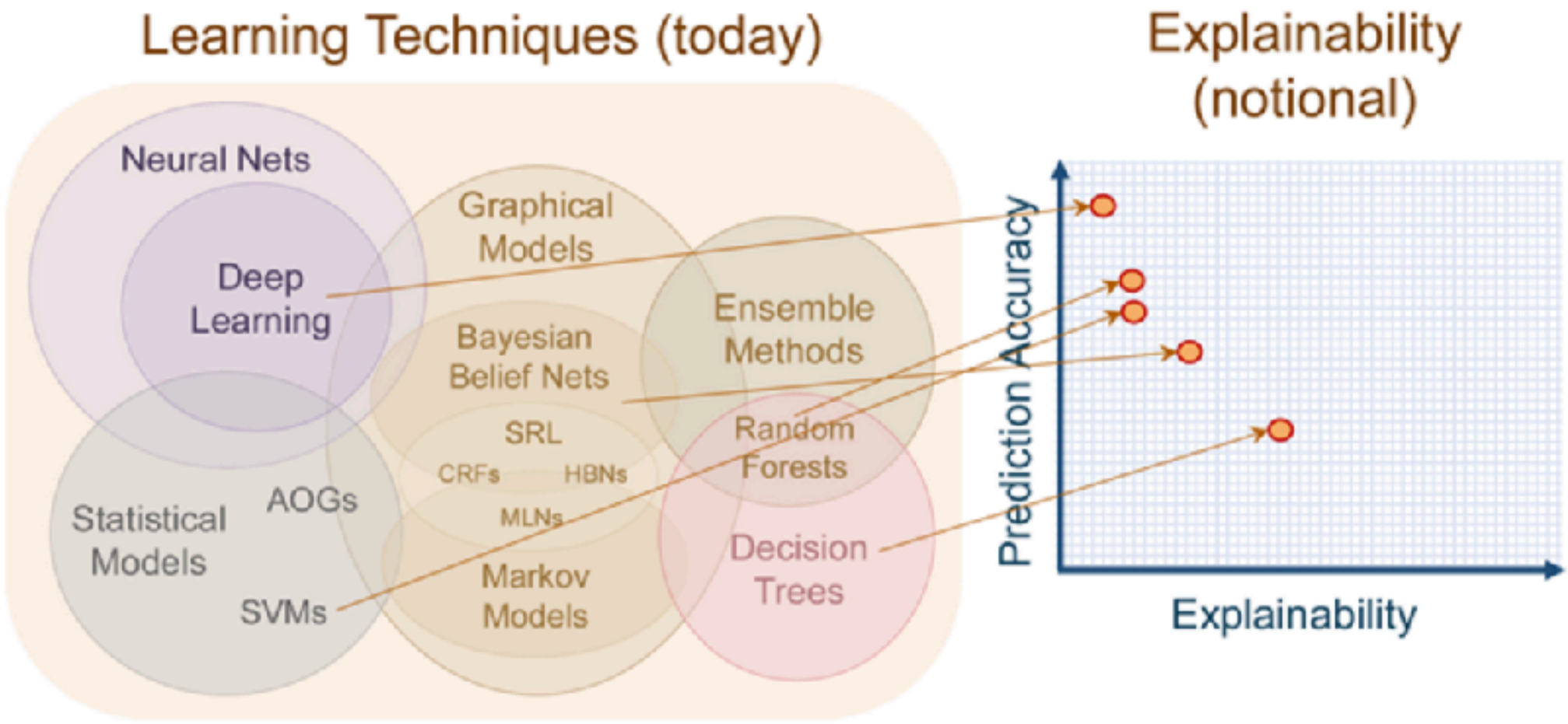
vs

Intelligence Augmentation

Human-AI Relationships



- In order to make better prediction, it is necessary to use human insights and data analytics together
  - Experts engagement is important because AI and data analytics provides accurate prediction, but no or little explanation



http://nautil.us/issue/40/learning/is-artificial-intelligence-permanently-inscrutable

Machine Learning-Gen (123 Companies)

Machine Learning-App (260 Companies)

Computer Vision-Gen (106 Companies)

Computer Vision-App (83 Companies)

Smart Robots (65 Companies)

Virtual Personal Assistants (92 Companies)

Artificial Intelligence

Contact

info@venturescanner.com

to see all 957 companies

NLP-Speech Recog. (78 Companies)

NLP-General (154 Companies)

Speech to Speech Trans. (15 Companies)

Context Aware Comp. (28 Companies)

Gesture Control (33 Companies)

Recommendation Eng. (60 Companies)

Video Content Recog. (14 Companies)

Venture Scanner

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Smart City

First Generation Smart City

Digital City of Amsterdam

Second Generation

Songdo, Incheon

Third Generation

Case of Yinchuan, China

Third Generation

Case of Seoul

Seoul

has been selected as a Smart City model case by ITU

THE CITY OF COLUMBUS
ANDREW J. GINTHER, MAYOR

SMART COLUMBUS

NIA

Fourth Generation

Columbus, USA

- Smart Columbus Home
- Projects
- Priorities
- Communities
- Partners
- Vendors
- Connect
- Blog
- Newsroom

Smart Columbus has a vision that starts with the reinvention of mobility, which will lead us to a future beyond what anyone has yet imagined.

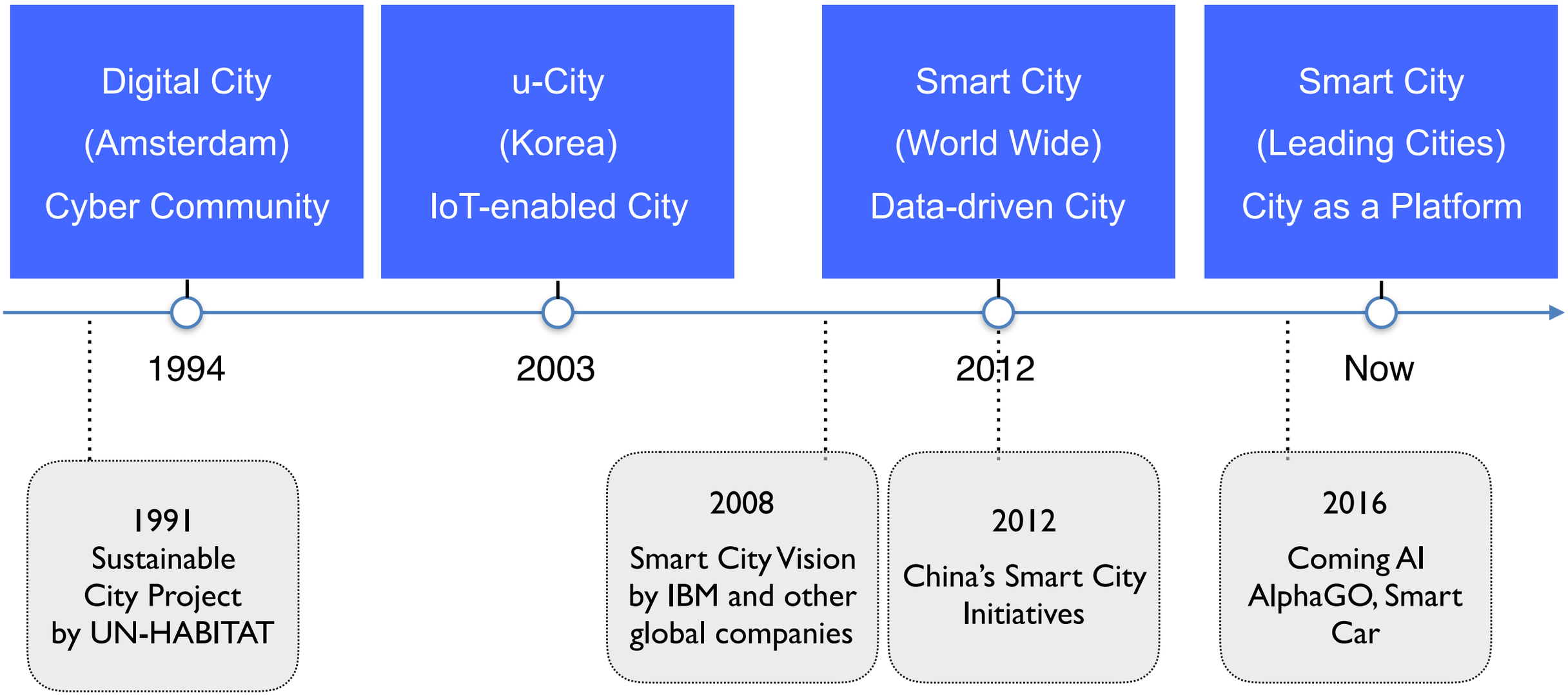
Columbus competed against 77 cities nationwide to win the Smart City Challenge in 2016. With $40 million from the U.S. Department of Transportation and $10 million from Vulcan, Inc., a Paul G. Allen Company, we won a very important job. To:

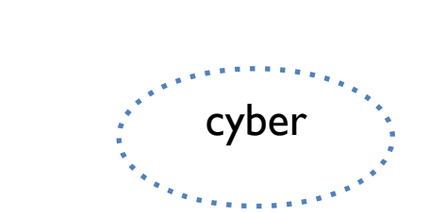
- Improve people's quality of life
- Drive growth in the economy
- Provide better access to jobs and ladders of opportunity
- Become a world-class logistics leader
- Foster sustainability

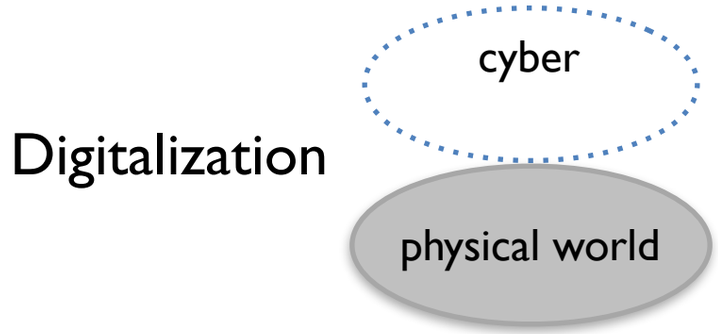
"Transportation is not just about roads, transit and ride sharing. It's about how people access opportunity. And how they live." – Mayor Andrew J. Ginther

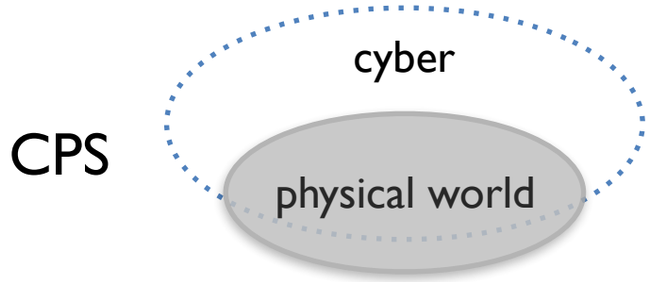
TWEET THIS

Development of Smart City









Internet

Sensor + Internet

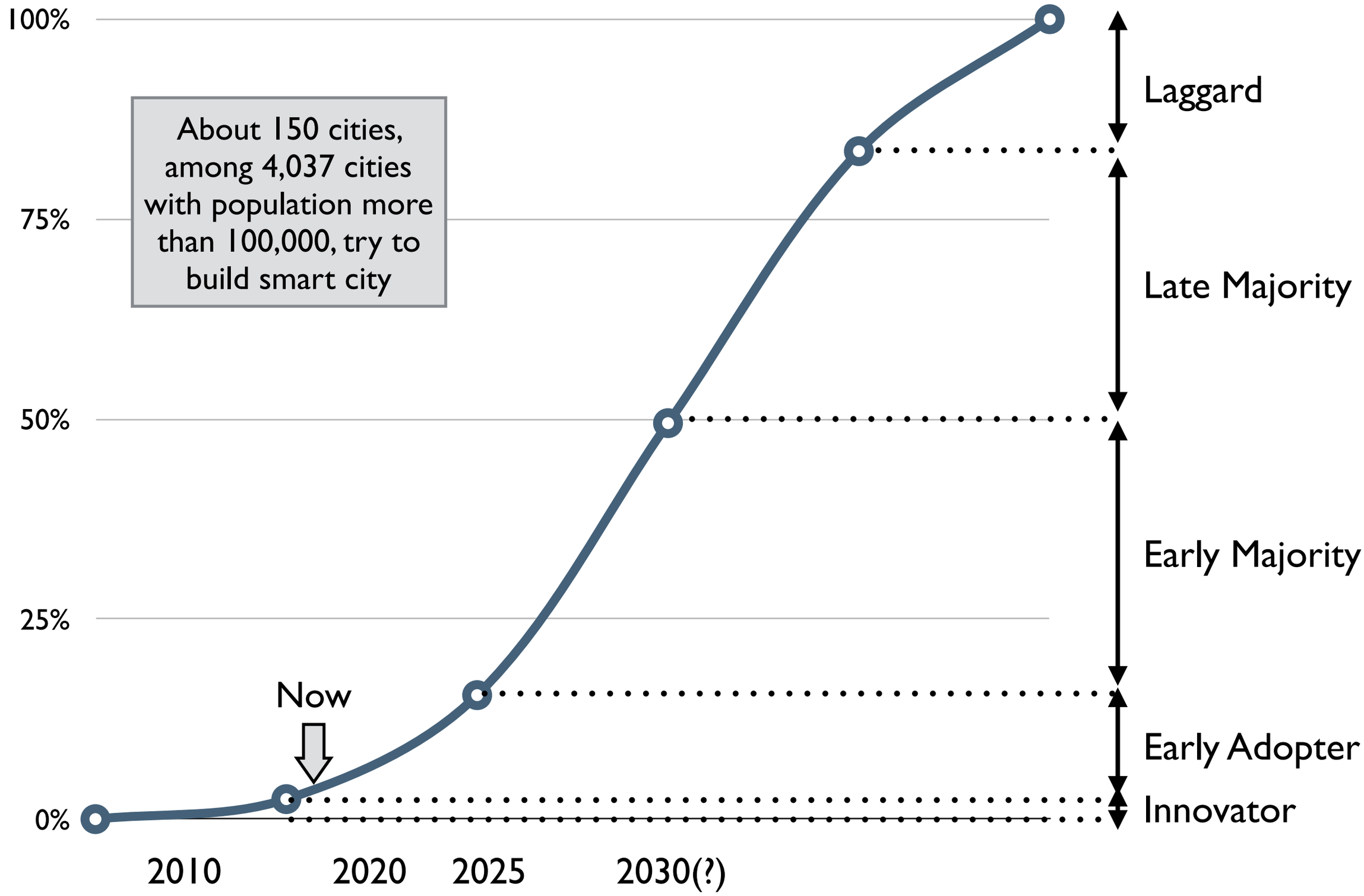
Sensor + Internet

Big Data +

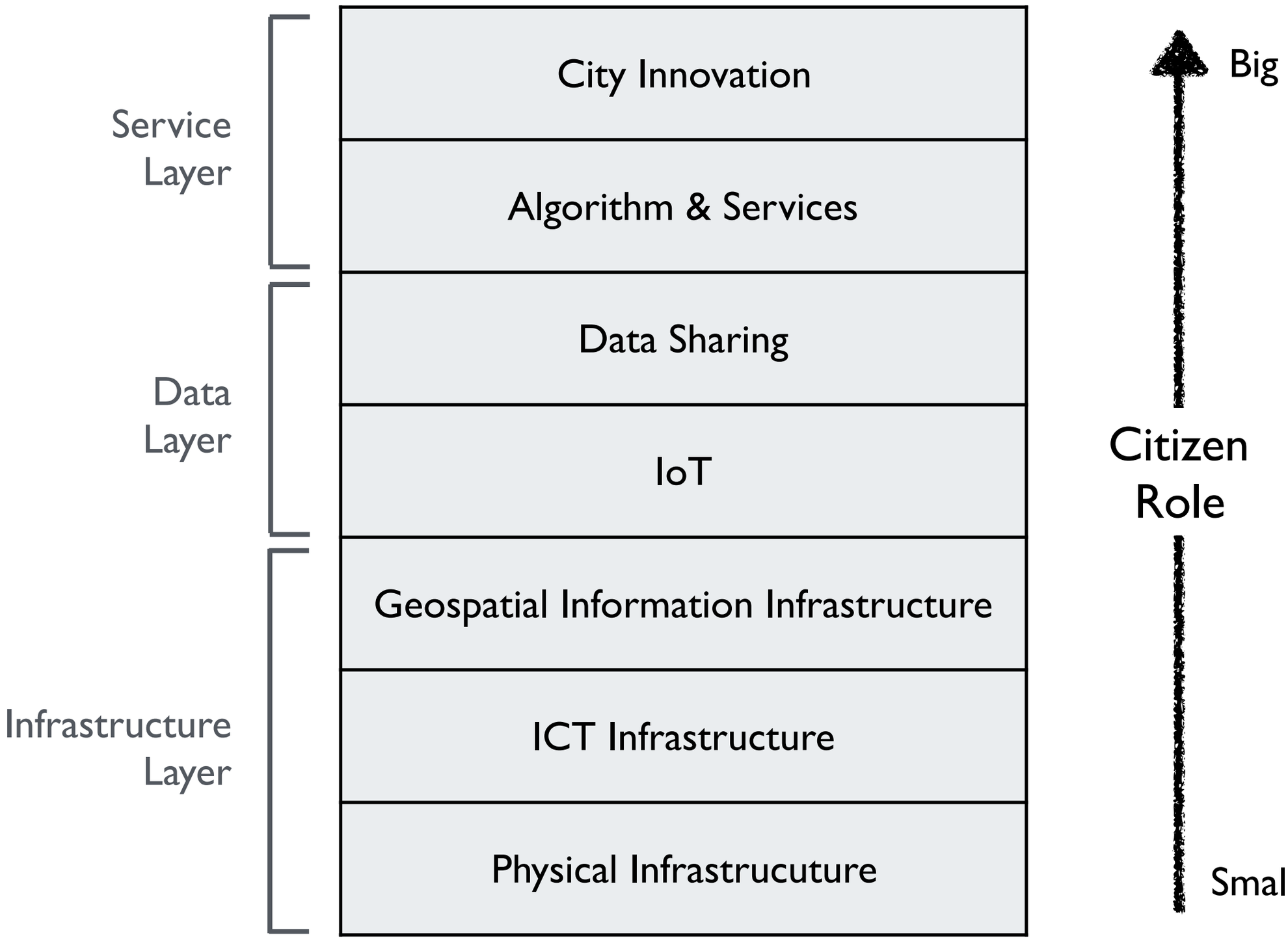
AI + Big Data +

Sensor + Internet

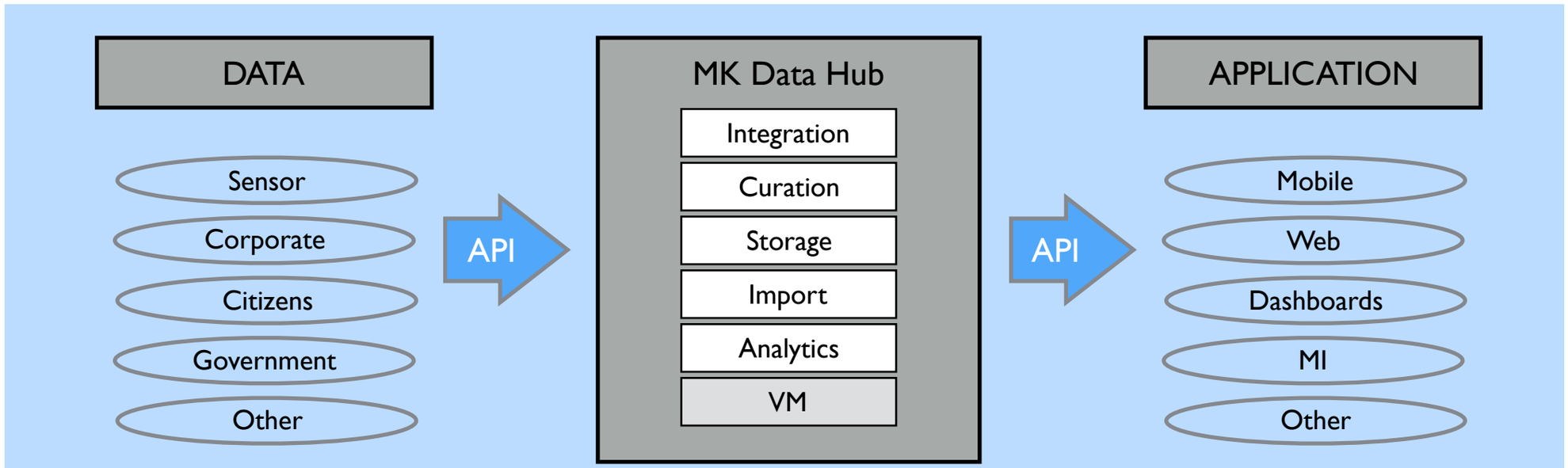
Digital City (Amsterdam) Cyber Community	u-City (Korea) IoT-enabled City	Smart City (World Wide) Data-driven City	Smart City (Leading Cities) City as a Platform
1994	2003	2012	Now


100%
75%
50%
25%
0%
About 150 cities, among 4,037 cities with population more than 100,000, try to build smart city
Now
2010
2020
2025
2030(?)
Laggard
Late Majority
Early Majority
Early Adopter
Innovator

Smart City Platform



Innovating Data Sharing : Milton Keynes



June 2016

Best Academic & Business Research Project

June 2016

Most Innovative Catalyst - Commercial in Smart X

December 2015

(Highly Commended)

Information Technology – IOT Data Hub

December 2015

Business IT Innovation of the Year

November 2015

October 2015

June 2015

June 2015

New Approach to Smart City Platform

Data Hub + Standard API

enable to use data for smart city services from a variety of sources and with different formats

have API of different cities standardized

NIA

Government 3.0

Gov3.0

- Data-driven Government
- Open Government
- Whole-of-Government
- People-Centric Service

버스 확대 운행

을지로1가
Eulji-ro 1(il)-ga

신촌로터리
Sinchon Rotary
세종대로사거리
Sejong-daero 4-ro

안국동사거리
Anguk-dong Jct

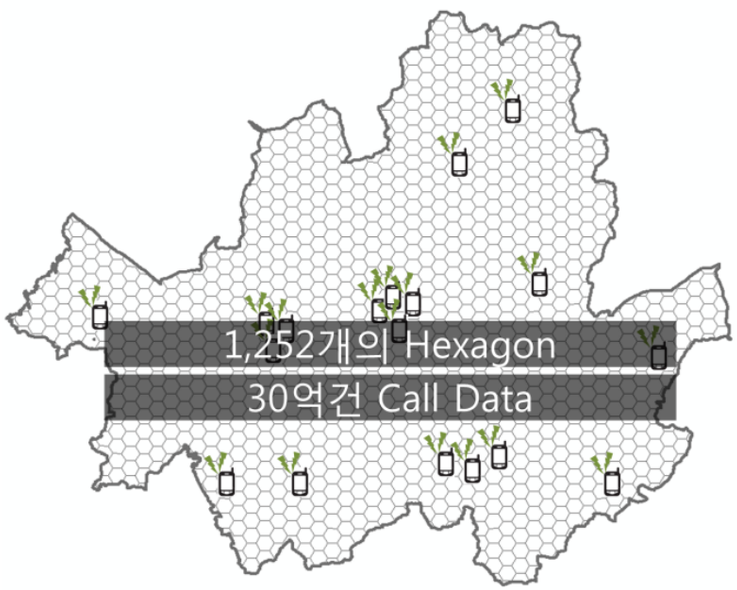
N26
심야버스
망우
사거리
↔
방화동

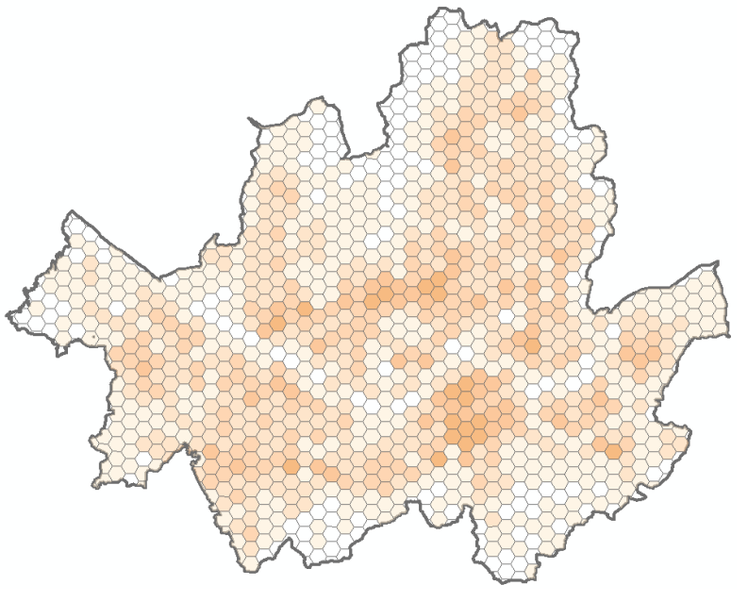
N26

《N26번 심야올빼미버스 개통》

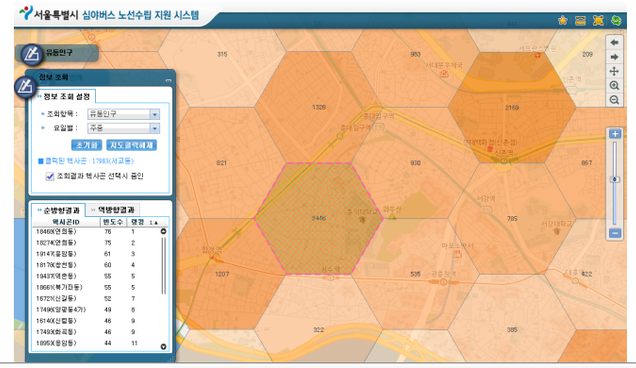
서울 74
사 9522

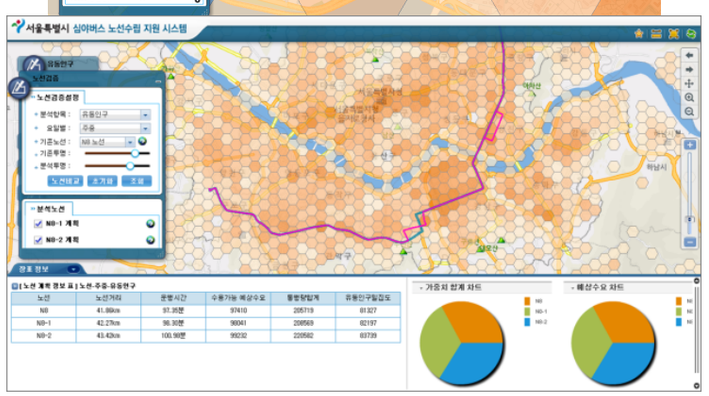
Midnight-bus lines were designed based on big data analysis



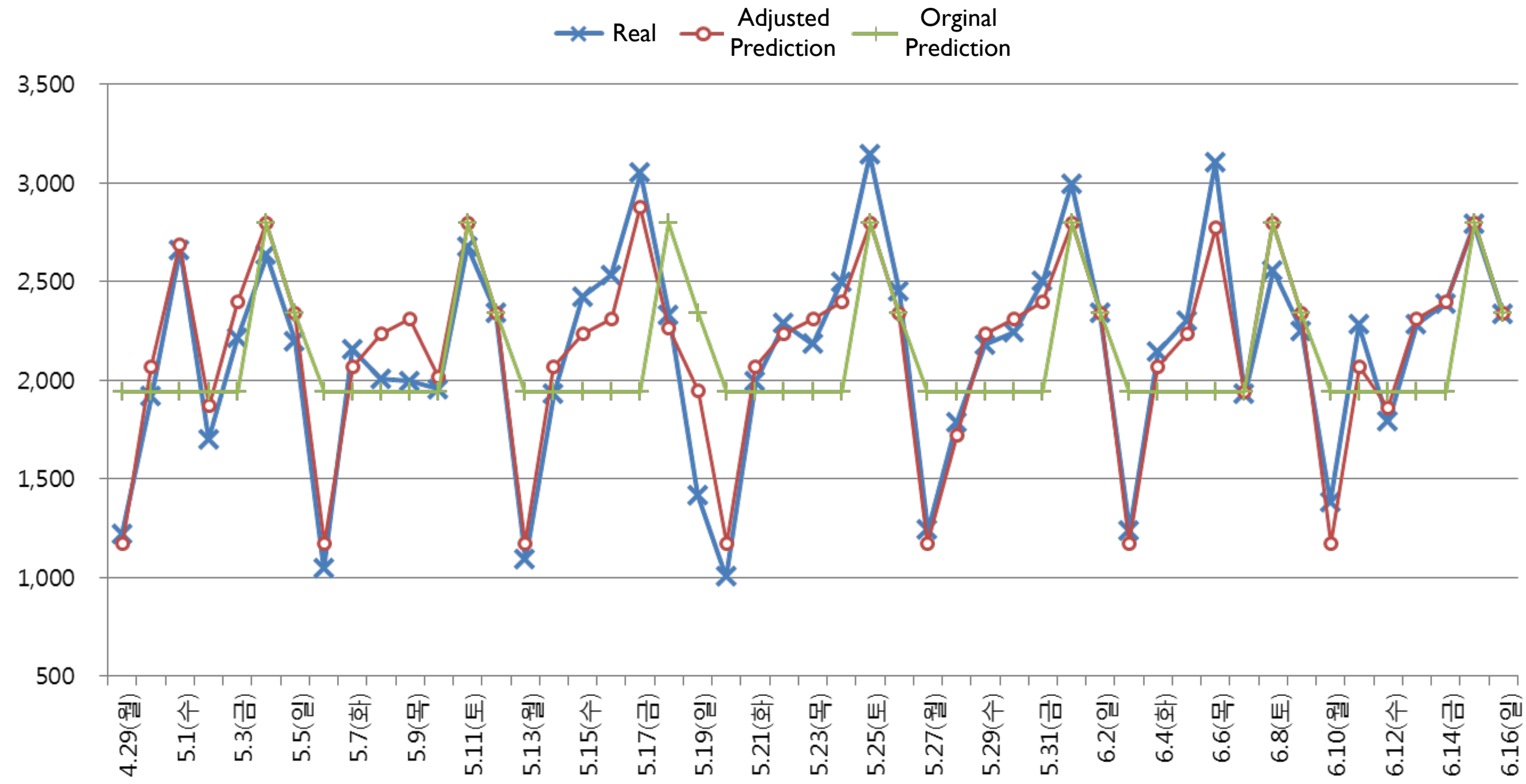


Analyse 3 billion Call Data





Accuracy of Midnight-Bus Passenger Prediction



Korea

	Gov 1.0 (e-government)	Gov 2.0 (platform government)	Gov 3.0 (smart government)
concept	government that works well	government that opens to people	government that thinks
goal	process innovation (how-to-do internal)	governance innovation (how-to-do external)	policy innovation (what-to-do)
resource	IT system	web & app	data

NIA

Thank you!

감사합니다.

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js.goodworld@gmail.com