Toward AI Network Society
AI Evolution and Human Evolution
Refer to Social, Economic, Educational Issue

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I believe
over the next decade...
intelligence will become ambient... made possible by an ever-growing network of connected devices, incredible computing capacity from the cloud, insights from big data, and intelligence from machine learning.

Satya Nadella CEO, Microsoft

Source: Microsoft, 2016
The Artificial Intelligence Technology Strategy Council
Japan Perspective

Cabinet Office
Gov. of Japan
The Artificial Intelligence Technology Strategy Council

• Based on instructions issued by the Prime Minister in “Public-Private Dialogue towards Investment for the Future” in April 2016, the national government established the “Artificial Intelligence Technology Strategy Council”.

• In March 2017, the Council formulated “Industrialization Roadmap Projected by Fusion of AI and other related Technologies (Industrialization Roadmap)”.

Artificial Intelligence (AI) Development Phases

**Phase 1**
- Utilization and application of data-driven AI developed in various domains
- Utilization of AI and data will increase together with new seeds of growth in related service industries.
- Image recognition
- Natural language processing
- Voice recognition/synthesis
- Prediction

**Phase 2**
- Public use of AI and data developed across various domains
- Public use of AI and data is developed and new industries, such as service industries, will expand.
- New value creation (Virtuous cycle)
- Approx. 2025～2030

**Phase 3**
- Ecosystem is built by connecting multiplying domains
- An ecosystem is established as various multiplying domains are connected and merged.
- Approx. 2020

- *The duration of each phase is not indicated because the current situation and future development differs depending on the field.*

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**Artificial intelligence as a service (AIaaS)**

- **Phase 1**
  - Factory
  - Hospital
  - Call center
  - Agriculture
  - Truck, Drone

- **Phase 2**
  - Complex application services
  - Services

- **Phase 3**
  - Multipurpose services
  - Complex application services
  - Services

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Note: The concept of AlaaS is borderless and developed across fields.
Council of Science and Technology and Innovation

Society 5.0

- Cyber-Physical Service
- Based on Cloud and AI
- Intelligence will become ambient.

Source: Prof. M. Kitsuregawa, 2010
AI Network Society
and Co-evolution of Human Being

The Conference toward AI Network Society
Ministry of Internal Affair and Communication
Gov. of Japan
The Conference toward AI Network Society

**Purpose**

Studying social, economic, ethical, and legal issues toward promoting AI networking, including:

- preparing a draft used for international discussions for formulating AI R&D Guidelines
- assessing impact and risks of AI networking in each of sectors in society

**Structure**

- Chaired by Dr. Osamu SUDOH (Professor, University of Tokyo)
- Experts from industry, academia, private sectors
  - with observers from gov’t agencies, national research institutes, industry group
1. **Networked AI Systems would function** independently via the Internet or other information and communications networks *without being linked with other AI Systems*.

2. Networks of plural Networked AI Systems would be formed where plural **Networked AI Systems are linked and mutually cooperate**.

3. **Humans’ latent capabilities would be augmented by the Networked AI Systems including sensors or actuators** as their components through linking with humans’ bodies or brains.

4. **Humans and Networked AI Systems live symbiotically** and coordinate seamlessly in all kinds of situations in humans’ societies.
Studies on AI Networking

Conference on Networking among AIs

- Jan 2016 -
- Interim Report
- Report 2016
- G7 ICT Ministers’ Meeting (Apr. 2016)

Conference toward AI Network Society

- Oct 2016 -
- International Forum toward AI Network Society (Tokyo, Mar. 2017)
- Call for Public Comment
- Report 2017 with Draft AI R&D GUIDELINES (Jul 2017)
- G7 ICT Ministers’ Meeting (Turin, Sep. 2017)
The Conference assessed the impact (mainly benefits) and risks of AI networking, based on scenarios assuming specific use scenes (use cases).

**Preliminary Assessment**


**Assessment by Use Field** (from the viewpoint of AI system users)

[Public] **Town development**, Public governance, Crisis management
[Individuals] **Health**, Transportation, Living, Education/learning, Work, Property, Hobbies/entertainments
[Industry] **Products**, Money

*Assessment is conducted on three areas underlined so far.*
Prof. Christopher Pissarides (LSE), a famous economist and a Nobel laureate in 2010, advocated the introduction of basic income as becoming a solution to inequality caused by the emergence of robots and artificial intelligence (AI) besides globalization.

He talked. Basic income is an easy way to respond to the basic needs of human life, and social services such as medical insurance and education can be offered through the market.

Forbes, Sep. 8th 2017
Dr. Grady Booch (IBM) talked about at TED

- We are on an incredible journey of coevolution with our machines. The humans we are today are not the humans we will be then.
- How shall I best organize society when the need for human labor diminishes?
- The opportunities to use computing to advance the human experience are within our reach, here and now, and we are just beginning.
Across the science and engineering enterprise, boundaries are increasingly difficult to distinguish between and among disciplines, especially information technology, nanotechnology, and many areas embracing biocomplexity, the complexity of life itself.

But it is true also for the social sciences in this new era of “Big Data”, when computational capacity reaches beyond imagination.

The most exciting areas are in these fuzzy connections between disciplines where knowledge in one field answers questions in another field.
Sudoh’s Proposal on the higher education using AI or Machine Learning

- **Fundamental Education**
  - Epistemology
  - Ontology
  - Logical Thinking

- **Education on Mathematical Research Approach**
  - Machine Learning Algorithms
    Linear Regression, Logistic Regression, Support Vector Machine (SVM), Neural Networks, Naïve Bayes, Decision Trees, K-means nearest neighbor, K-Means Clustering, Component Analysis, Monte Carlo, non-Euclidean Geometry, Deep Learning, etc.

- **Project-based Active Learning using AI**
  Adapting the Project-based Active Learning using AI, we have to learn the serious problems, and should analyze and predict the future world. And we will construct the better lives and better societies.
Merci / Thank you for your attentions.

Draft AI R&D Guidelines

(English) http://www.soumu.go.jp/main_content/000507517.pdf