Information and Society-E2
-Introduction-

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Information and Society-E2

- In modern society, we use a variety of information technologies, which have enormous influence on our daily lives, economical activities, industry, public policies, education, etc. In this lecture, **you will acquire a fundamental knowledge of information technology and the interrelation between information, technology and society**.

- We will cover topics on the social impact of ICT and the treatment/management of information in society including information economics, intellectual property, media literacy, social media, etc.

- You will be able to explain the social impact of ICT and treatment/management of information as well as basic issues related to information economy and information society. You will also be able to formulate your **opinions about information technologies, information ethics and their interplay with society**.

About this Lecture

- **Class Time**: Monday, 5th period (16:45 - 18:15)
- **Prerequisites**: Basic knowledge of computing and information technologies is useful
- **Materials**: Access PandA to get the lecture slides (distribution prohibited)
- **Lecture style:** Face-to-face in classroom
- **Course language**: English
- **Office hours**: not specified
  - Contact the instructor if you need to discuss any matter

Evaluation Method

- No paper-based final examination
- The evaluation will be based on your reports for assignments.
  - Types of assignments
    - Five assignments of short answer questions (50%)
      - Each assignment covers 2-4 weeks' lecture contents.
    - Two assignments of essay writings (1,000 English words for each) on specific topics (50%)
  - All the assignments will be published on PandA. Please confirm the assignments and the report deadlines.
  - Students need to submit the reports in English via PandA.

Lecture Plan

- Lecture 01 Introduction
- Lecture 02 Overview of Information Society
- Lecture 03 Information Policy
- Lecture 04 Information Ethics

[Assignment 1: 10pt]

- Lecture 05 Information Education
- Lecture 06 Information Education

[Assignment 2: 10pt] [Essay 1: 25pt]

- Lecture 07 Information Law
- Lecture 08 Information Law

[Assignment 3: 10pt]

- Lecture 09 Information Economy
- Lecture 10 Information Economy
- Lecture 11 Information Economy

[Assignment 4: 10pt] [Essay 2: 25pt]

- Lecture 12 Information Archiving
- Lecture 13 Social Media Analysis, Cloud Computing
- Lecture 14 Crowdsourcing and Human Computation

[Assignment 5: 10pt]

Assignment Example: Short Answer Questions

- A part of questions in Assignment 1
  - Explain the visions of Society 5.0 and Industry 4.0, with illustrative examples, respectively.
  - Define “information ethics” based on your understanding. Then, discuss the potential ethical issues in developing the AI (Artificial Intelligence) technologies.
  - Compare the ICT policies of “e-Japan”, “u-Japan”, and “i-Japan”, and discuss what should be the highest priority of today’s ICT policy of Japan in your own opinion.

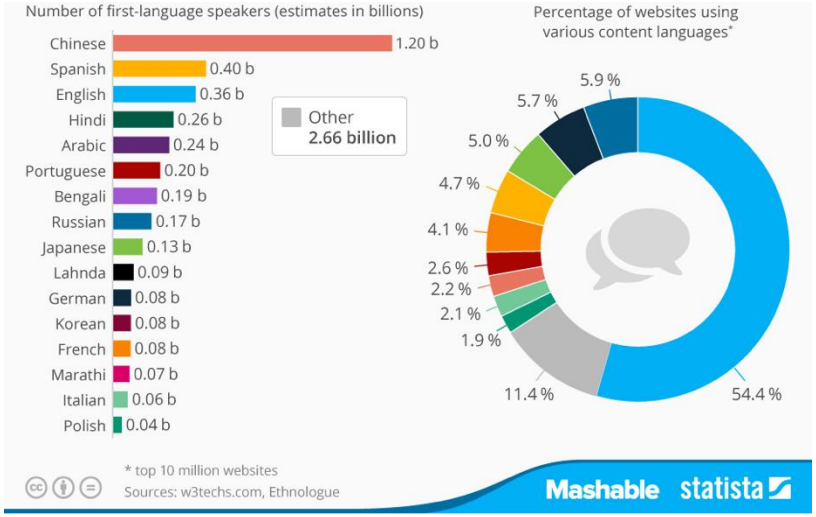
Assignment Example: Essays

- Choose ONE of the following topics and write an essay in no less than 1,000 English words. You can include images or diagrams in your essay if necessary.
  - Propose and discuss new policy for Japanese government to foster effective use of Information and Communications Technologies (ICT). For example, you can focus on elderly users or on single parent households.
  - Discuss the benefits and problems of e-Learning and propose any new strategies or directions for improving the learning effectiveness and the level of engagement of students. For example, you can focus on new strategies in the situation of a pandemic.

INFORMATION POLICY AND ETHICS

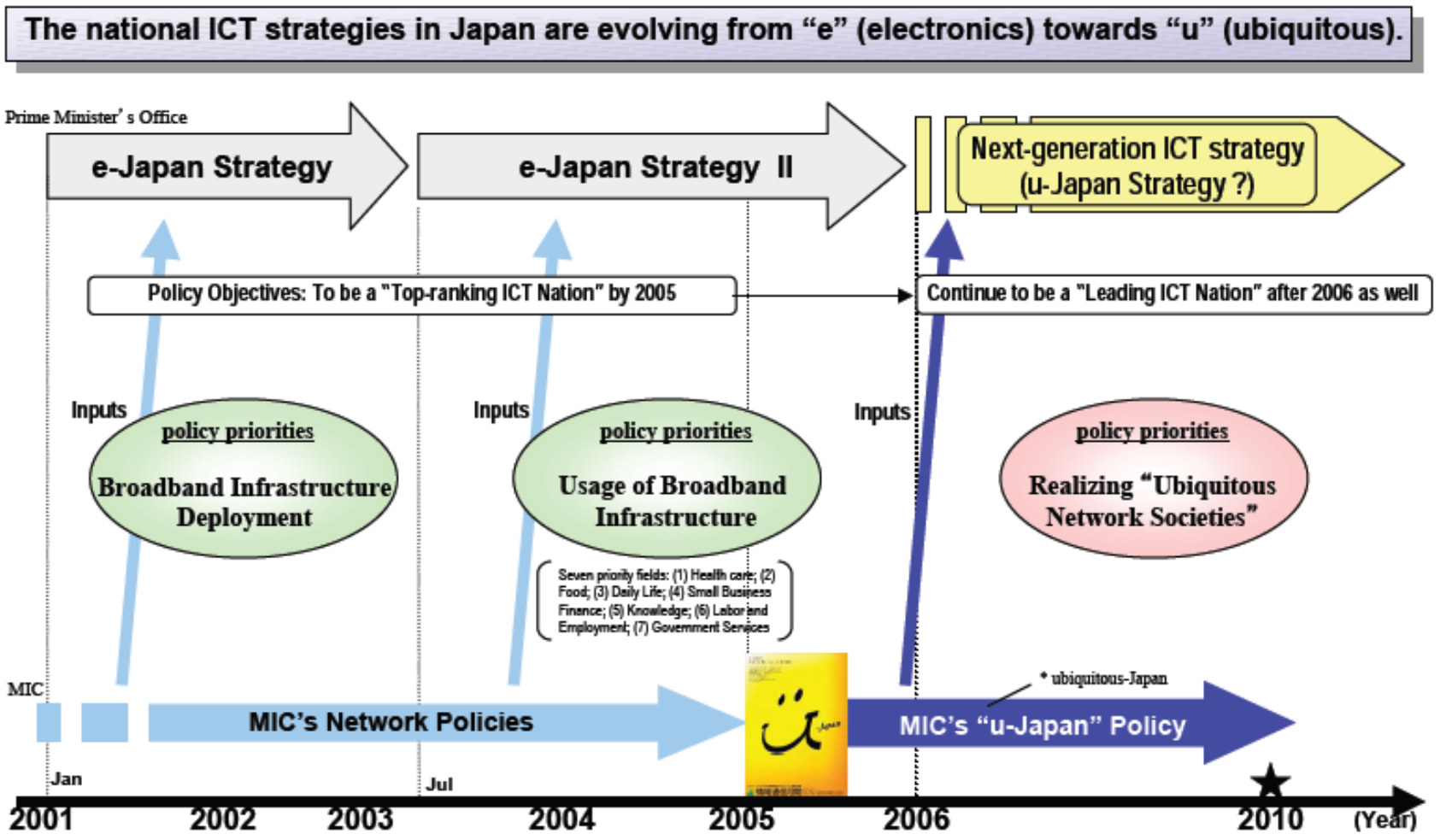
Information Policy and Ethics

- ICT infrastructure
- Japan's ICT policy
- Ethical issues of ICT
- Information security and cyber crimes



Japan ICT Strategies (2001-2010)

Backgrounds: National ICT Strategies in Japan



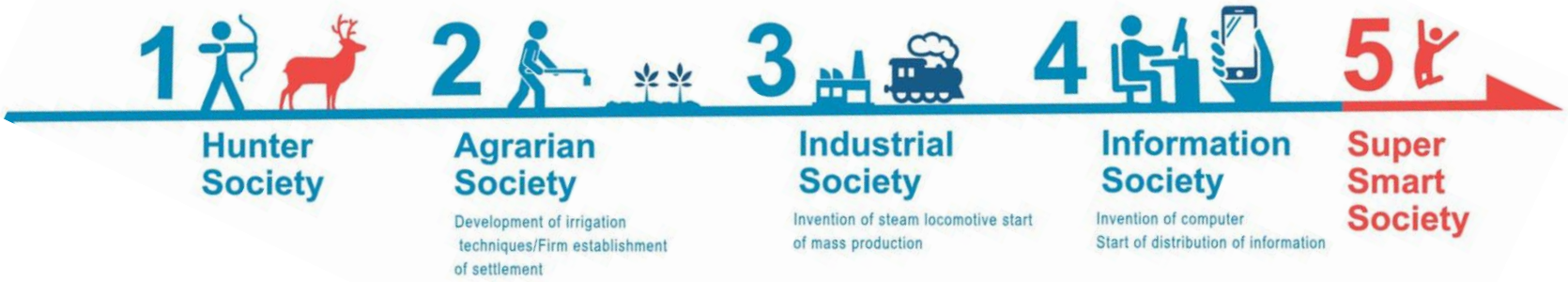
http://www.itu.int/osg/spu/ni/ubiquitous/Presentations/5_imagawa_japan.pdf

New Vision: 2013-

- Declaration to be the world's most advanced IT nation (http://japan.kantei.go.jp/policy/it/2013/0614_declaration.pdf)
  - ICT as a prime growth driver for Japan's economy
  - Success to be measured by key performance indicators
  - Attention shifting to new forms of ICT:
    - Open data, IoT, Big data, AI
  - Revision of the new vision
    - Created on June 14, 2013
    - Revised on June 24, 2014
    - Revised on June 30, 2015
    - Revised on May 20, 2016

Society 5.0

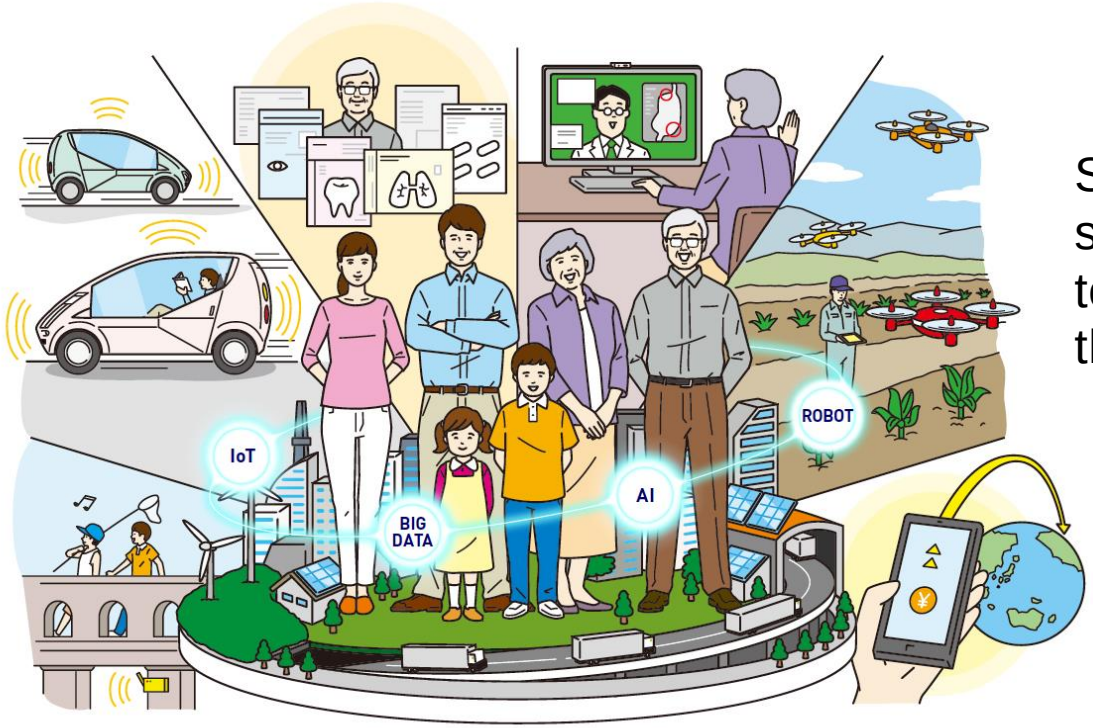
Society 5.0 is the vision for the next stage in the evolution of human society, following its previous stages as a hunter-gatherer society (Society 1.0), agrarian society (Society 2.0), industrial society (Society 3.0), and information society (Society 4.0).



It was initially proposed by Keidanren (経団連, Japan Business Federation) and incorporated in the 5th Science and Technology Basic Plan (2016-2021) in Japan as a concept for the future society to which we should aspire.
Thus Keidanren has collaborated with various stakeholders including the government, academia and so on to develop a new social model.

https://www.keidanrensdgs-world.com/society-5-0-jp

Vision of Society 5.0



Society 5.0, as a super-smart society. Japan will take the lead to realize this vision ahead of the rest of the world.

We aim at creating a society where we can resolve various social challenges by incorporating the innovations of the fourth industrial revolution (e.g. IoT, big data, artificial intelligence (AI), robot, and the sharing economy) into every industry and social life. By doing so the society of the future will be one in which new values and services are created continuously, making people's lives more conformable and sustainable.

http://japan.go.jp/abenomics/_userdata/abenomics/pdf/society_5.0.p

Information and Ethics:

The Moral Machine Experiment in MIT

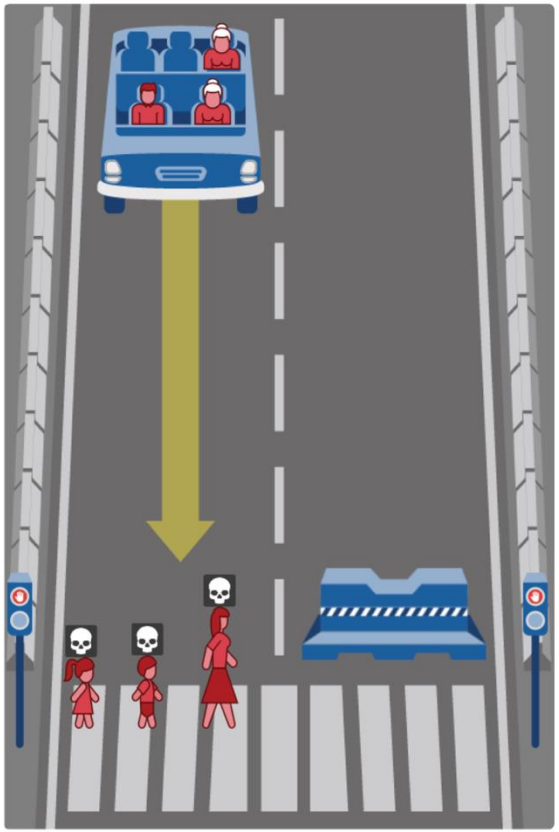
What should the self-driving car do?

In this case, the self-driving car with sudden brake failure will continue ahead and drive through a pedestrian crossing ahead. This will result in ...

Dead:

- 1 girl
- 1 boy
- 1 woman

Note that the affected pedestrians are flouting the law by crossing on the red signal.



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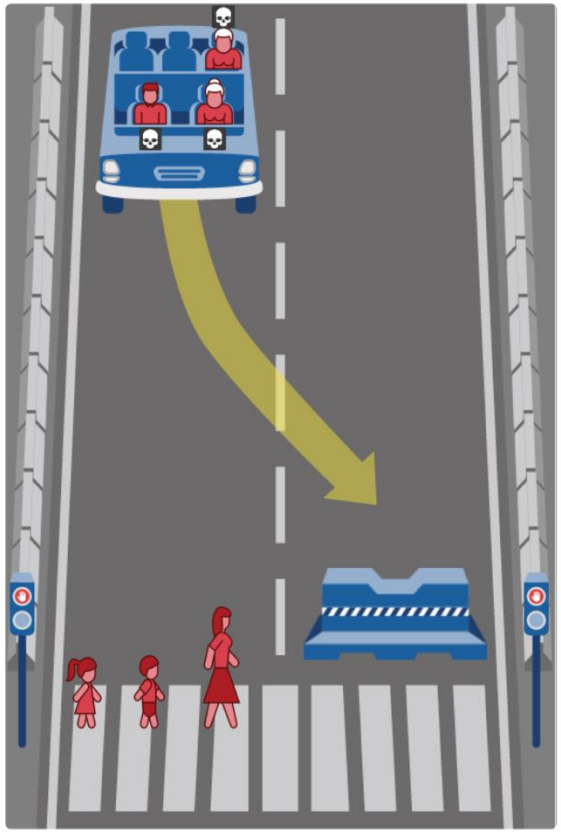

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3 / 13

In this case, the self-driving car with sudden brake failure will swerve and crash into a concrete barrier. This will result in ...

Dead:

- 2 elderly women
- 1 man

Awad, E., Dsouza, S., Kim, R. *et al.* The Moral Machine experiment. *Nature* **563,** 59–64 (2018). https://doi.org/10.1038/s41586-018-0637-6

https://www.moralmachine.net

INFORMATION AND EDUCATION

Information and Education

- E-learning
- OpenCourseWare (OCW) and MOOC
- Information literacy
- Etc.

MOOC

- Massive Open Online Course: courses created using web technologies that allow teachers and educators constructing virtual classrooms
- Typical MOOCs: a series of lessons for thousands of students
  - In addition: quizzes, weekly auto-graded assignments, and discussion forums

OCWs	MOOCs
Static character	Dynamic character
Always can be accessed	Can be accessed when course is open
No student assessment	Have student assessment
No accreditation	Have accreditation
Individual	Often collaborative
Usually provided by higher education institutions	Provided by companies or by higher education institutions

Differences of OCWs and MOOCs

edX (MOOC of Kyoto University)

edX Courses Programs & Degrees Schools & Partners edX for Business Sign In Register

Back to schools and partners

KyotoUx

Free online courses from Kyoto University

Founded in 1897, Kyoto University is acknowledged as one of the most accomplished research-oriented universities in Asia. The validity of that reputation is testified by the accolades conferred on our alumni researchers, most notably eight Nobel Prize laureates who undertook vital research during their time at the university. In addition to those awards, several other Kyoto University faculty members have received respected accolades, including two Fields Medalists and one recipient of the Gauss Prize.

Visit the KyotoUx Facebook page for more information.

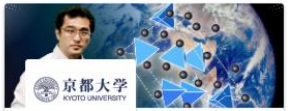
Kyoto University MOOCs

Browse free online courses in a variety of subjects. Kyoto University courses found below can be audited free or students can choose to receive a verified certificate for a small fee. Select a course to learn more.

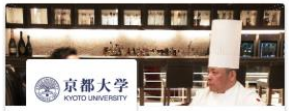
Courses

The Chemistry of Life
KyotoUx
Course

Stochastic Processes: Data Analysis and Computer Simulation
KyotoUx
Course

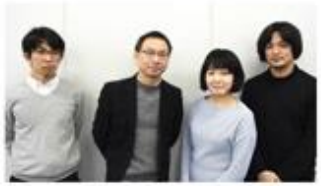


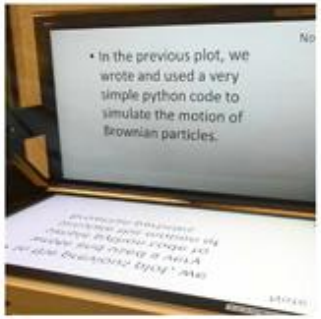
Introduction to Geochemistry
KyotoUx
Course

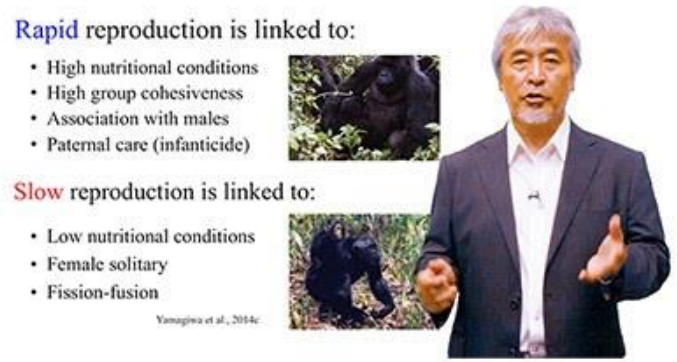


Culture of Services: Paradox of Customer Relations
KyotoUx
Course

edX (MOOC of Kyoto University)

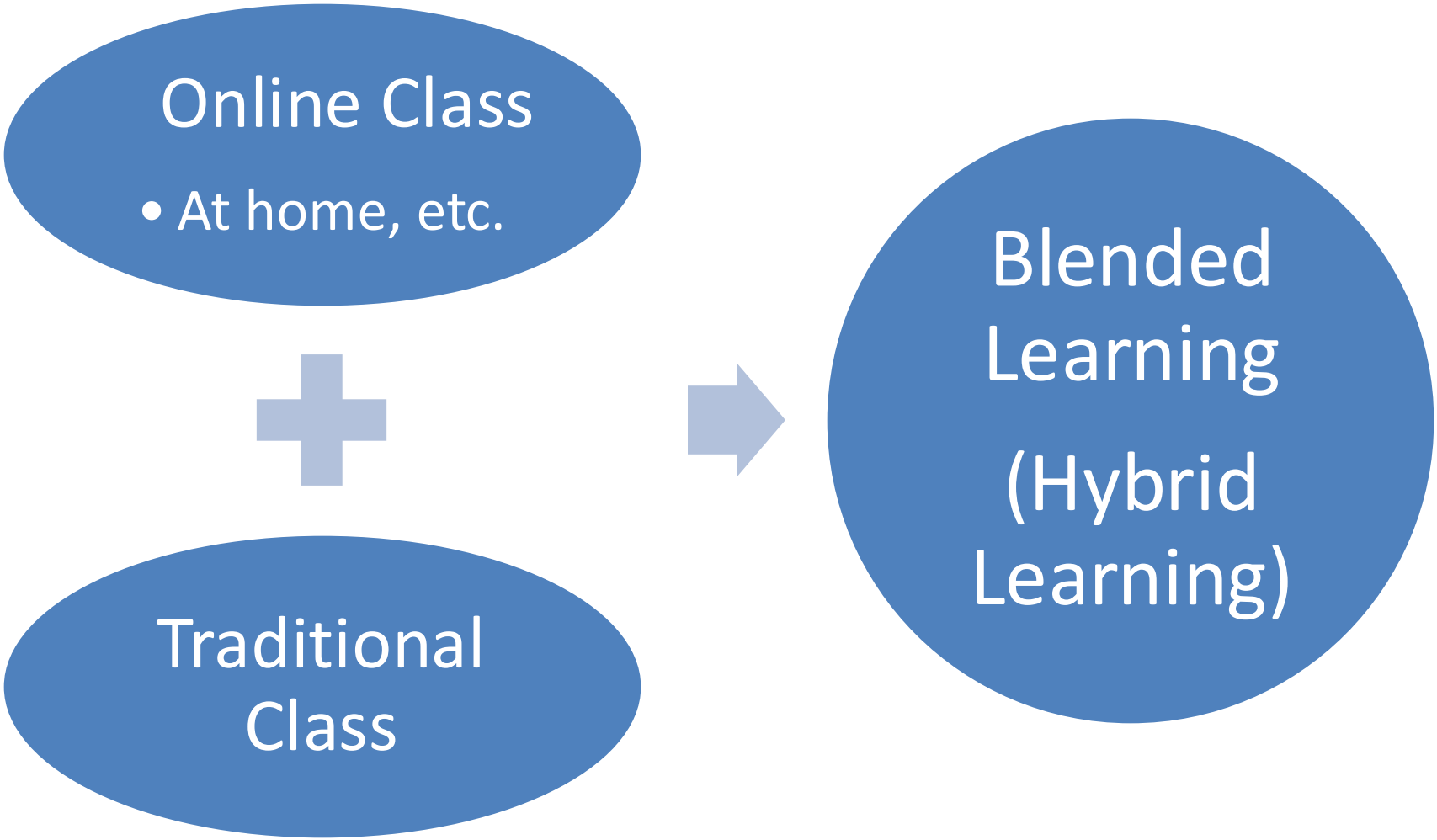






http://www.kyoto-u.ac.jp/ja/mm/jitsuha/170330_2.html

Blended Learning (ブレンド型学習)



Information Literacy

- “The set of skills needed to find, retrieve, analyze, and use information” (ACRL, 2006)

- “To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.” (American Library Association, 1989)

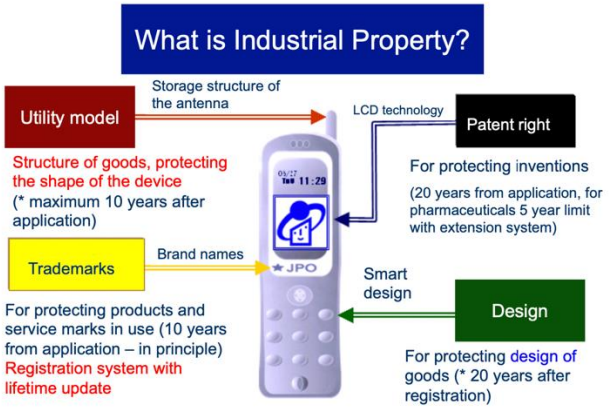
- Please also pay attention that the definitions of information literacy in USA and in Japan are slightly difference. You can compare them by yourself by referring to the Wikipedia pages.
  - https://en.wikipedia.org/wiki/Information_literacy
  - https://ja.wikipedia.org/wiki/情報リテラシー

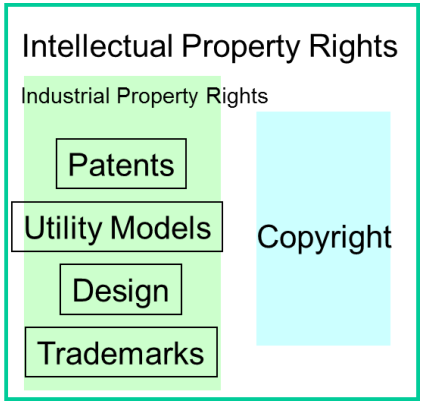
INFORMATION AND LAW

Information and Law

- Intellectual property rights and patents, university and patents
- Copyrights
- Personal information protection
- Etc.

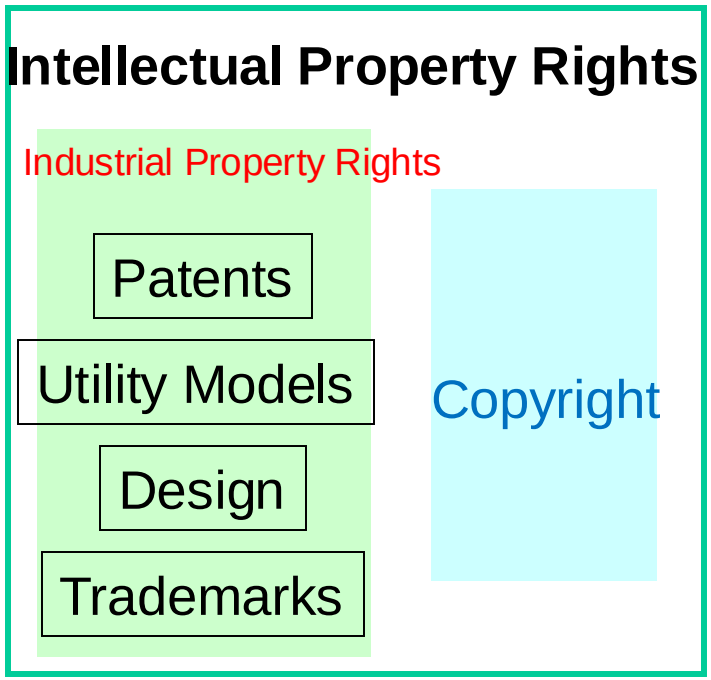
•Can be implemented industrially?	Industrial usability, usefulness
•Is it is new or not?	Novelty
•Could it have been thought of simply?	Non-obviousness, progressivity
•Has it been previously applied for?	Previously applied principle
•Is it not an anti-social invention?	Sociability ?
•Are the contents of the invention adequately explained in the specifications document?	Feasibility





Intellectual Property Rights

Intangible Property Rights that occur through intellectual activities



Copyright: rights that automatically occur to protect cultural, artistic or academic works

Patents and utility models: protecting technological inventions and proposals

Design: protecting industrial designs

Trademarks: protecting the name and marks of products and services

What is Industrial Property?

Utility model

Storage structure of the antenna

Structure of goods, protecting the shape of the device
(* maximum 10 years after application)

Patent right

LCD technology

For protecting inventions

(20 years from application, for pharmaceuticals 5 year limit with extension system)

Trademarks

Brand names

For protecting products and service marks in use (10 years from application – in principle)
Registration system with lifetime update

Smart design

Design

For protecting design of goods (* 20 years after registration)

( ) contains the period of rights for Industrial property in Japan

Comparison of Rights

	Patent	Utility model	Design	Trademark	Copyright
Authorities concerned	Patent Office	Patent Office	Patent Office	Patent Office	Agency for Cultural Affairs
Necessity of registration	Register at patent office	Register at Patent Office	Register at Patent Office	Register at Patent Office	Not necessary
For protection	Invention (invent a product or method)	Device (limited to invention of goods)	Design of an article	Name of product or services, mark	Copyrighted work
Examination on the merits	Yes	None (unexamined registration system)	Yes	Yes	None (because the right automatically occurs)
Period of rights	20 years from application	10 years from application	20 years from registration	10 years from registration (can be renewed)	50 years after the death of the author (changed to 70 years in 2004)
Maintenance fees	Necessary	Necessary	Necessary	Necessary	Not necessary (because right automatically renews, **registration not necessary**)

Discussion:
Artificial Intelligence and Copyright

The Next Rembrandt is a computer-generated 3-D–printed painting developed by a facial-recognition algorithm that scanned data from 346 known paintings by the Dutch painter in a process lasting 18 months. The portrait consists of 148 million pixels and is based on 168,263 fragments from Rembrandt's works stored in a purpose-built database. The project was sponsored by the Dutch banking group ING, in collaboration with Microsoft, J.Walter Thompson marketing consultancy, and advisors from TU Delft, The Mauritshuis and the Rembrandt House Museum.

Read: http://www.wipo.int/wipo_magazine/en/2017/05/article_0003.html

Personal Information Protection
EU General Data Protection Regulation (GDPR)

A new era for data protection in the EU

What changes after May 2018

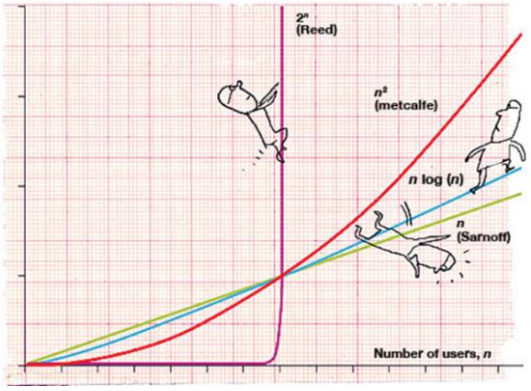
MORE TRANSPARENCY	
TODAY	**TOMORROW**
The user might not be informed when his/her data is transferred outside the EU	Businesses will need to **clearly inform** the user **about** such **transfers**
Sometimes businesses collect and process personal data for different purposes than for the reason initially announced without informing the user about it	Businesses will be able to collect and process data only for a **well-defined purpose**. They will have to inform the user about new purposes for processing
Businesses use algorithms to make decisions about the user based on his/her personal data (e.g. when applying for a loan); the user is often unaware about this	Businesses will have to **inform** the user **whether the decision is automated** and give him/her a possibility to contest it

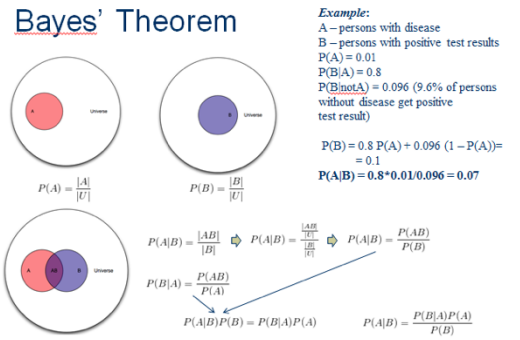
http://europa.eu/dataprotection

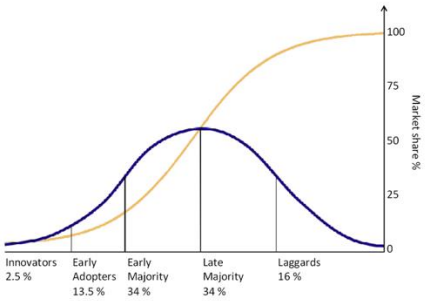
INFORMATION AND ECONOMY

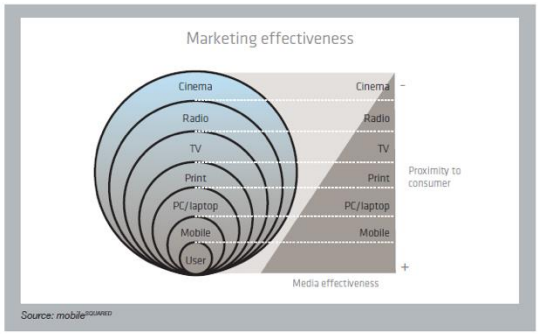
Information and Economy

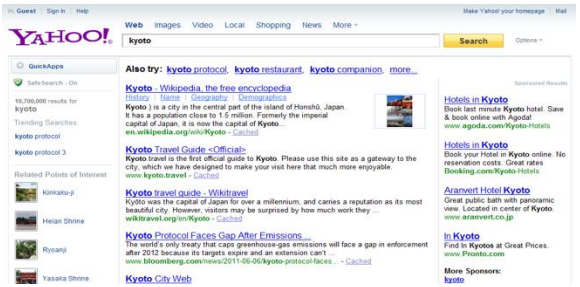
- Impact of Internet on economy
- Externality, network externality
- Consumer search theory
- Information asymmetry
- Online advertising











Things (industrial society) vs. Information (information society)

Things

- Seller loses thing
- Manufacturing costs
- Things wear out
- Things exist in a location

Information

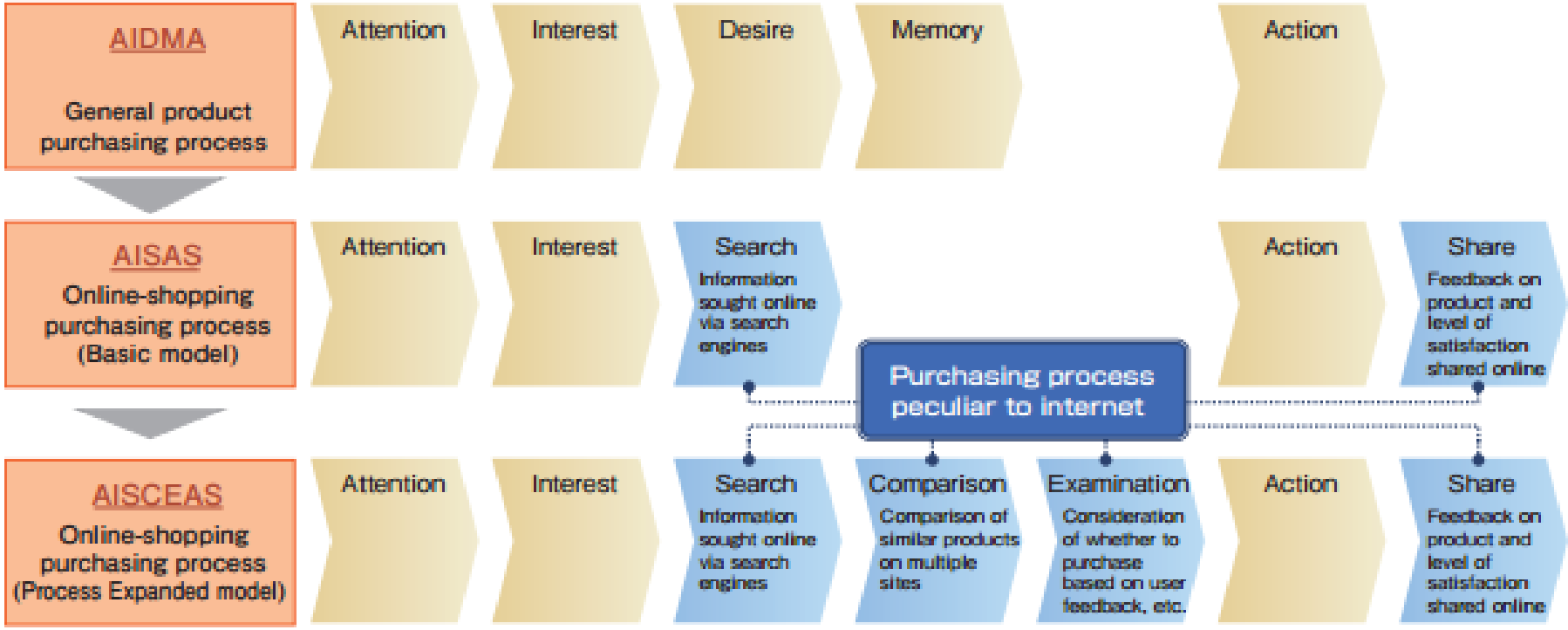
- Seller retains information
- Free copies – near zero marginal cost(*)
- Never wears out (but can become obsolete)
- Everywhere and nowhere

* Marginal cost: cost of producing one more unit of a good.

Network Externality

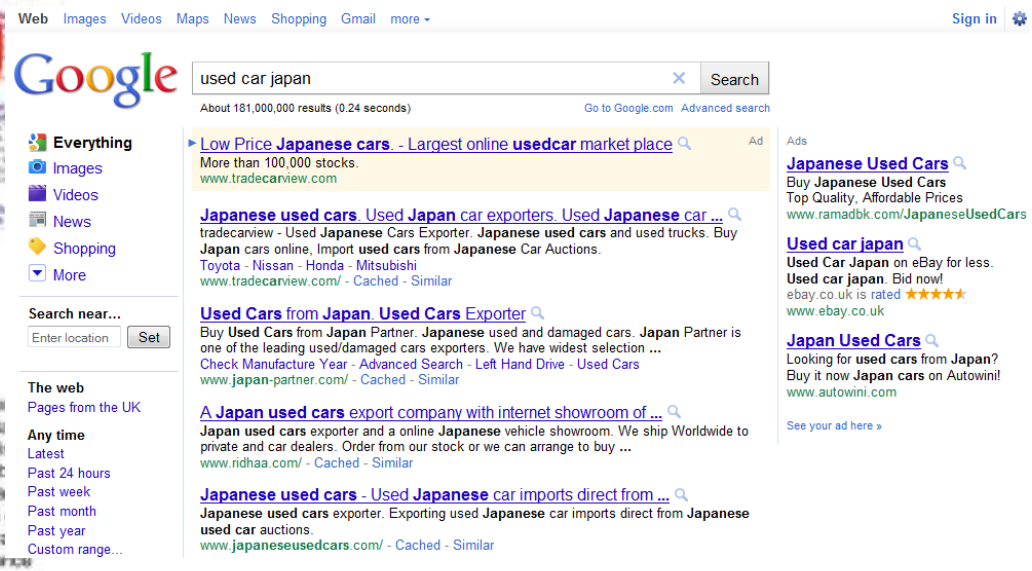
- **Change of product value occurs due to factors other than ones of products and services. It occurs due to the number of users, e.g.:**
  - fundamental value of a mobile phone rests not in quality of the handset, but is determined by the total number of people that can be called using that mobile phone
  - increase in the number of participants in stock exchange → higher liquidity, lower transaction costs
  - Windows OS is popular as it is well supported (compatible with lots of hardware and software). It is actually well supported because it is popular (positive feedback)
- Traditional concept: "*when a good becomes scarce its price should increase*" does not work in case of a network good
- **Direct Effect of Network Externality**
  - Metcalfe's Law
    - Network effect rapidly increases with the growth of network
    - Total network value for all users is proportional to n^2 for n users

Online Shopping Changes Purchasing Process



(Source) Ministry of Internal Affairs and Communications "Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens' Lifestyles and the Social Environment" (2011)

Online Advertising



Search Advertising

Behavioral Targeting Advertising

Uncertainty in Economic Decisions

- Uncertainty in economic decisions
- Many examples
  - E.g. buying a house
  - E.g. deciding whether to work for a large company with a fewer chances of advancement or for a start-up with less security but more opportunities for advancement

Asymmetric Information

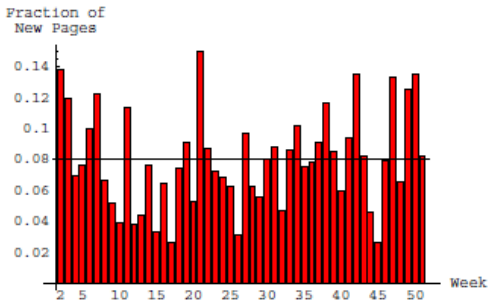
- **Public Information** vs. **Private Information**
  - Information relating to a specific matter is referred to as public information if it is shared by the entire economy (all market agents), and private information if it is in the possession of a specific agent

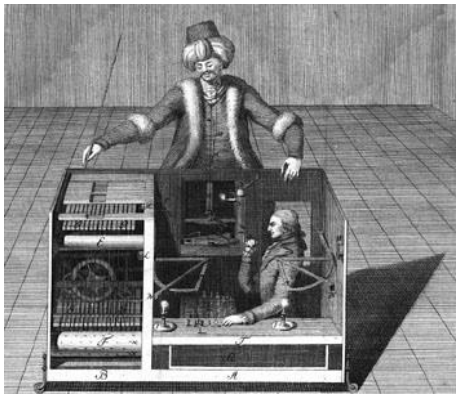
- **Asymmetric Information**
  - **Asymmetric information** is used to describe the *condition of information disparity where one agent is in possession of more information on a specific matter than other agents*
  - Examples: sellers vs. buyers, employees vs. employers, business managers vs. business owners, etc.
    - Sellers vs. buyers: e.g., electricians, plumbers, restaurant owners, dealers of rare stamps/coins

OTHER TOPICS RELATED TO INFORMATION SOCIETY

Other Topics

- Information archiving
- Social media analysis
- Cloud computing
- Crowdsourcing and Human computation

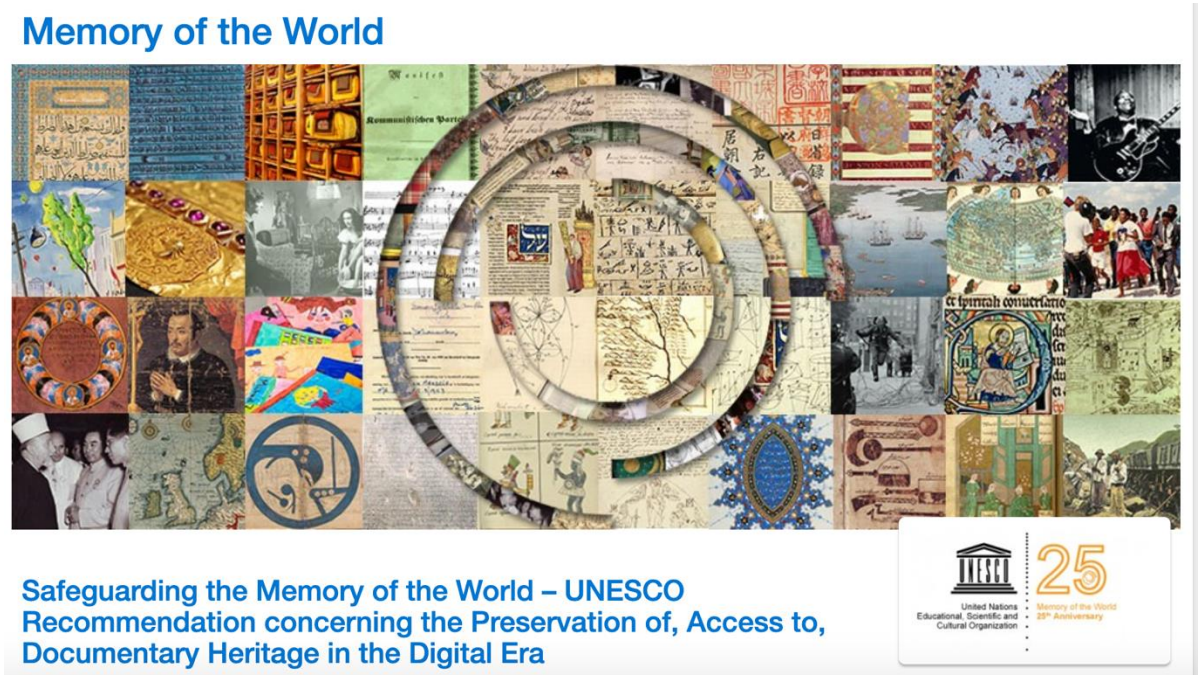




Digital Information Heritage

- UNESCO recognizes digital information as a heritage for future generations and acknowledges that this digital heritage is at risk of being lost

  UNESCO, 'Charter on the Preservation of Digital Heritage', 2009, https://unesdoc.unesco.org/ark:/48223/pf0000179529.page=2



https://en.unesco.org/programme/mow/recommendation-documentary-heritage

Archives and Digital Archives

Archives

- Recorded historical materials, recorded documents
- Facility for storing these records

Purpose of digital archives

- Prevent damage and deterioration of materials
- Preservation of original materials
- Provision of materials beyond time and geographical limitations
- Enable searching/browsing of the materials crossing temporal/spatial borders

Social Media Sites/Services

- **Social Networking & Microblogs**
  Facebook, MySpace, Friendster, RenRen, Twitter, Weibo
- **Video Sharing**
  Youtube, Youku
- **Photo Sharing**
  Pinterest, Flickr
- **Consumer Reviews**
  Amazon, Taobao

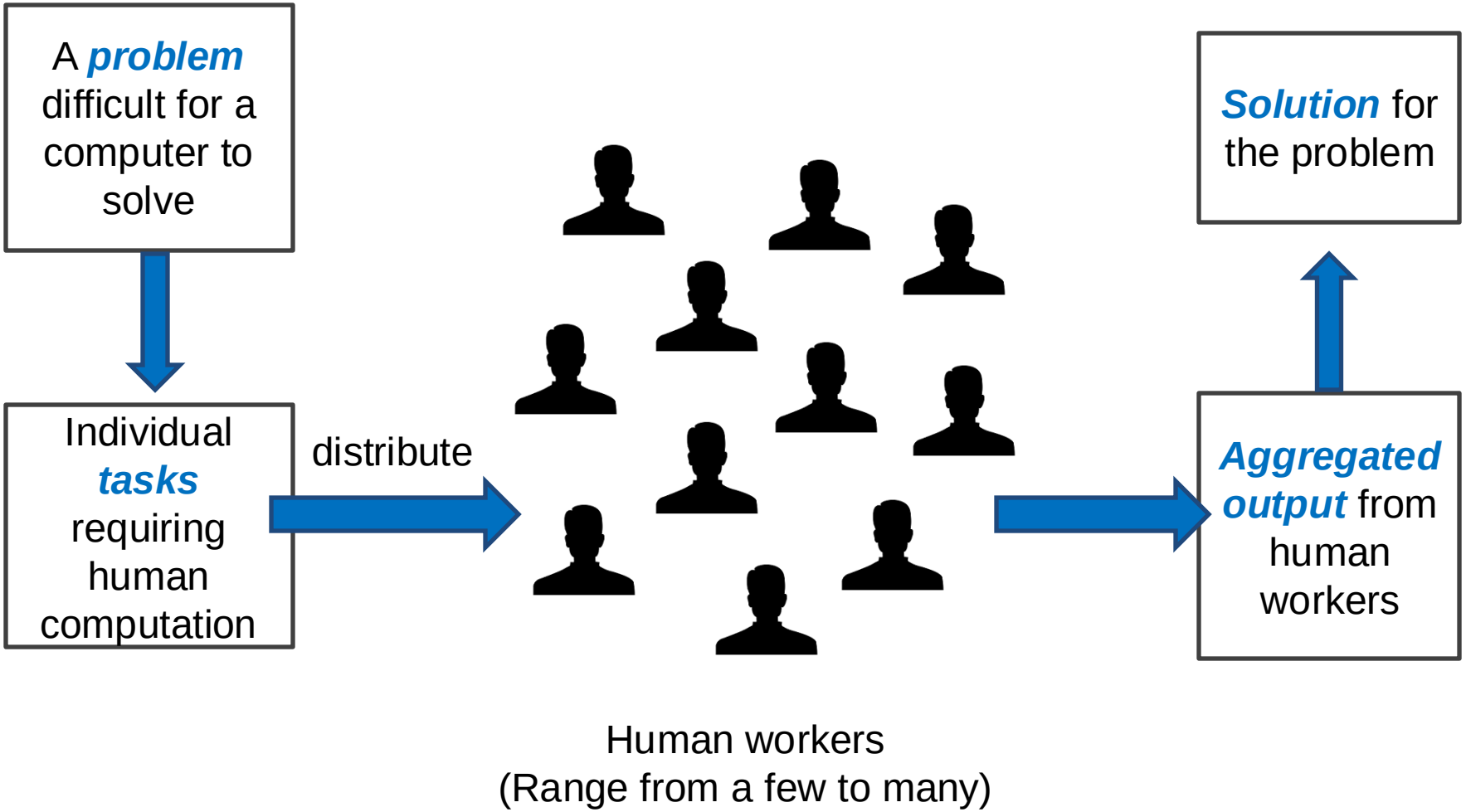
- **Others**: Wikipedia, Foursquare, Openrice, …

Social Media Analysis

- Social media involve current affairs, people's opinions and feelings, reviews of consumer products, services, etc.
- A new channel for us to understand human behaviour, user preferences and reactions, trends and problems, etc.
- **Social Media Analysis**: summarize and extract information from a large amount of data collected in a social media service, using statistical and mathematical techniques and algorithms

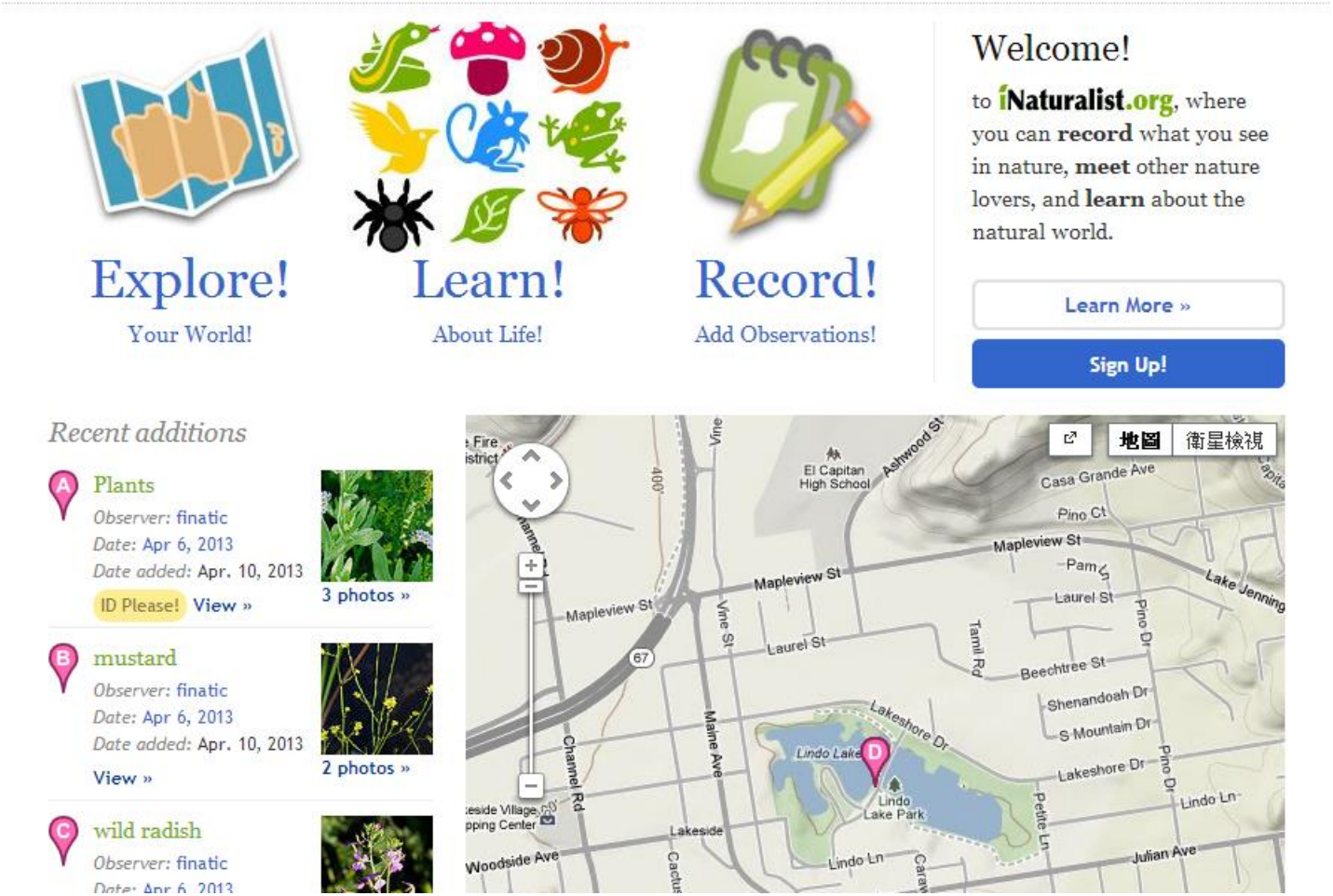
Human Computation

What does a human computation system look like?



Human Computation and Citizen Science

- iNaturalist (http://www.inaturalist.org/)



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