Finnish #AI Competences

Timo Seppälä

Artificial Intelligence Research Projects

2018 – Tools for Artificial Intelligence Discussion
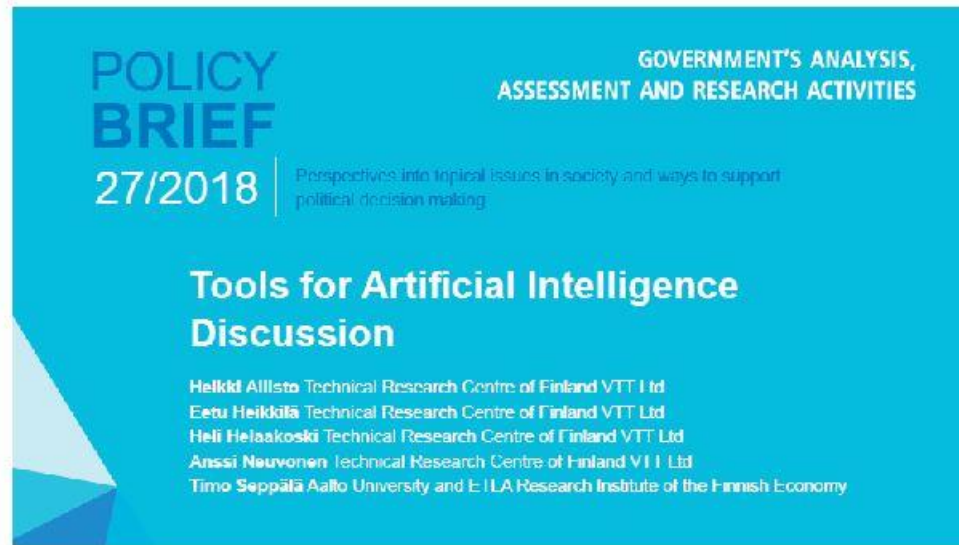
https://tietokayttoon.fi/julkaisu?pubid=28204

2019 –   Finnish AI Competences and How to Make Them Stronger

https://tietokayttoon.fi/julkaisu?pubid=29903

Definition: Artificial Intelligence

GOVERNMENT'S ANALYSIS, ASSESSMENT AND RESEARCH ACTIVITIES

POLICY BRIEF 27/2018 | Perspectives into topical issues in society and ways to support political decision making

Tools for Artificial Intelligence Discussion

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Eetu Heikkilä Technical Research Centre of Finland VTT Ltd
Heli Helaakoski Technical Research Centre of Finland VTT Ltd
Anssi Neuvonen Technical Research Centre of Finland VTT Ltd
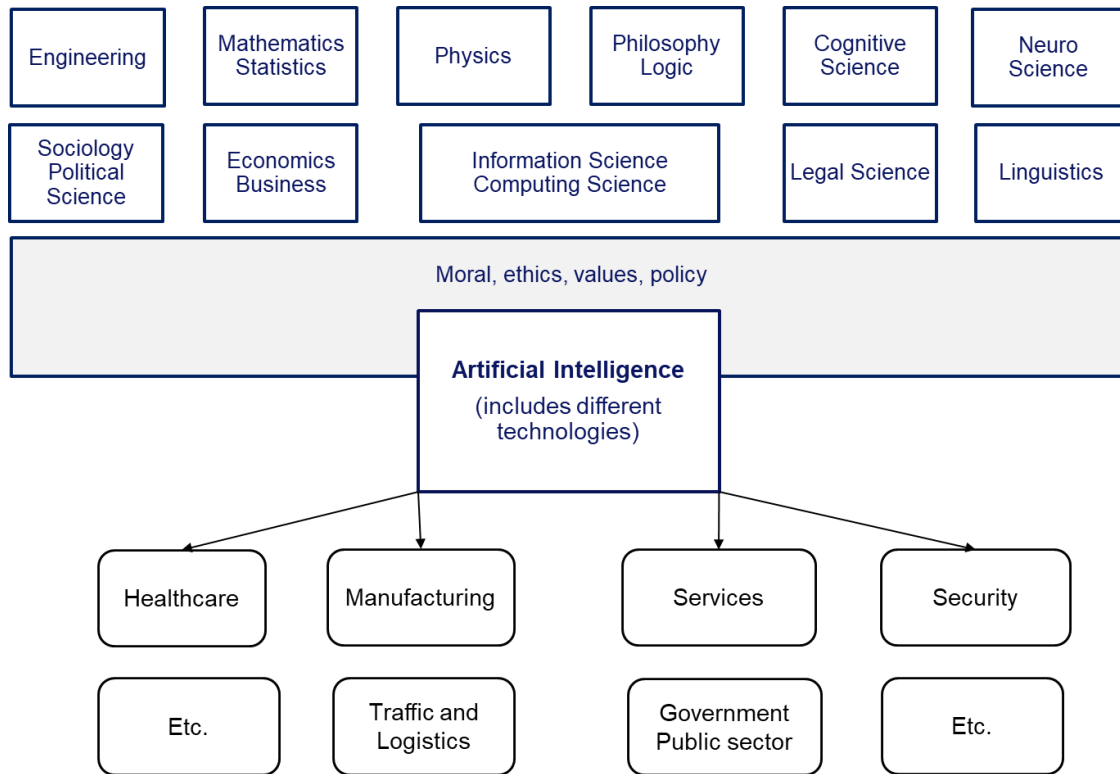Timo Seppälä Aalto University and ETLA Research Institute of the Finnish Economy

"Artificial Intelligence enables machines, software, systems and services to act reasonably according to their task and situation."

ETLA

Defining contemporary #AI

| Engineering | Mathematics Statistics | Physics | Philosophy Logic | Cognitive Science | Neuro Science |

| Sociology Political Science | Economics Business | Information Science Computing Science | Legal Science | Linguistics |

Moral, ethics, values, policy

Artificial Intelligence
(includes different technologies)

Healthcare — Manufacturing — Services — Security

Etc. — Traffic and Logistics — Government Public sector — Etc.

Over 16.000 academic articles studied...

Defining contemporary #AI

1. Data analytics
2. Sensing and situation awareness
3. Natural language and cognition
4. Human interaction
5. Problem-solving and computational creativity
6. Machine learning
7. System-level architecture, dynamics and complexity
8. Computational environment of AI; platforms and services; ecosystems
9. Robotics and machine autonomy – physical dimension of AI
10. Ethics, morals, regulation and legislation

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Defining contemporary #AI

1. Data
2. Computing capacity
3. Algorithms
4. Machine Learning
5. Deep Learning
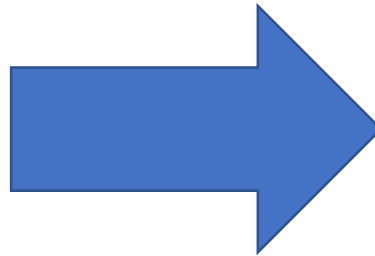
- Narrow AI Applications
  - Narrow AI Applications are synthesizing information by "Parroting".
- We are trying to solve problems that have a high tolerance for error.
- These technologies are only part of the larger challenge of building intelligent machines and system of systems
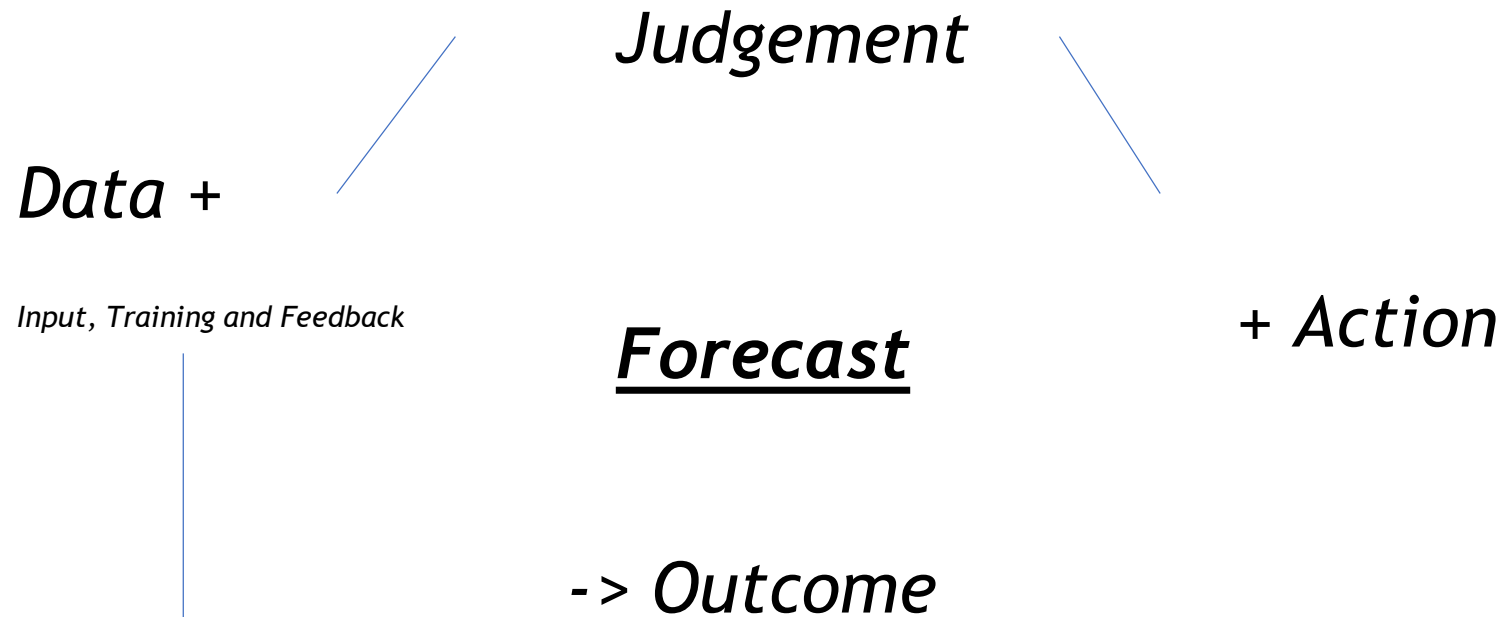
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Defining contemporary #AI

"<u>Learning</u> in the context of Machine Learning and Deep Learning does not ultimately mean that the systems have learned anything particularly conceptually rich about the data that they have seen and used."

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Defining Augmented Intelligence (narrow AI applications

Decision Making =

Judgement

Data +

Input, Training and Feedback

Forecast

+ Action

-> Outcome

ETLA

Contemporary #AI have faced reproducibility crisis

- Many of the results from different AI experiments are not easily replicated.

- Unpublished codes and a sensitivity to training conditions have made it difficult for AI researchers to reproduce many key results.

- That is leading to a new conscientiousness about research methods and publication protocols

ETLA

We should not be pinning our hopes only to Machine and Deep Learning

"The Machine-Reading Systems that draw on genuine cemprehension."

ETLA

Finnish #AI Competences

Sub-field	Research [1]	Higher education (course offering)	Companies and public sector
Data analytics	1.32	In almost all universities	In broad use, several tech and service providers; it is also in use in the public sector
Sensing and situation awareness	1.24	In several	Used by a few tech providers
Natural language and cognition	1.36	In a few institutions Finnish language processing in Turku and Helsinki Universities	In early stages, a few tech companies Finnish language processing developed in a few companies, Finnish "AI Accelerator" started a focus group
Human interaction	1.2	In several	Few companies, but a couple of them are quite successful
Problem solving and computational creativity	1.34	In several	Very few companies
Machine learning	1.29	In several	Use growing, several companies
Systems level architecture, dynamics and complexity	1.2	In only one	Observed in the public sector
Computational environment of AI; platforms and services; ecosystems	1.18	In several	Widely used, tech and service providers. Also core tech development in international tech companies.
Robotics and machine autonomy – physical dimension of AI	1.19	In several	Broadly used in industry.
Ethics, morals, regulation and legislation	1.87 (NB! The number of publications is very small)	In a few	Growing interest, government and public sector activated.

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