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PUBLIC GOVERNANCE INSTITUTE

‘Artificial Intelligence in the public sector – Hype or hit?’

Joep Crompvoets + Colin Van Noordt

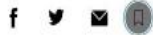
Outline

- Artificial Intelligence
- AI and public sector
- Hype or Hit/Mainstream
- Conclusions

Artificial Intelligence

Can AI Be a Fair Judge in Court? Estonia Thinks So

Estonia plans to use an artificial intelligence program to decide some small-claims cases, part of a push to make government services smarter.



VIDEO STAFF: GETTY IMAGES

Gartner's Top 10 Strategic Predictions for 2017 and Beyond: Surviving the Storm Winds of Digital Disruption

By 2020, the average person will have more conversations with bots than with their spouse. With the rise of Artificial Intelligence (AI) and conversational user interfaces, we are increasingly likely to interact with a bot (and not know it) than ever before. The digital experience has become addictive by entering our lives through smartphones, tablets, virtual personal assistants (VPAs) or the entertainment systems in our homes and cars.

Artificial Intelligence And The End Of Government



Daniel Araya
Contributor
AI
Adviser and Policy Analyst

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TECHNOLOGY

Tesla floats fully self-driving cars as soon as this year. Many are worried about what that will unleash.



By Faiz Siddiqui

July 17, 2019 at 10:16 p.m. EDT

HEALTH

The Robot Will See You Now

IBM's Watson—the same machine that beat Ken Jennings at *Jeopardy!*—is now churning through case histories at Memorial Sloan-Ketterin learning to make diagnoses and treatment recommendations. This is one in a series of developments suggesting that technology may be about to disrupt health care in the same way it has disrupted so many other industries. Are doctors necessary? Just how far might the automation of medicine go?



Science

This article is more than 8 years old

Google a step closer to developing machines with human-like intelligence

Algorithms developed by Google designed to encode thoughts, could lead to computers with 'common sense' within a decade, says leading AI scientist

TECH

More than half of Europeans want to replace lawmakers with AI, study says

PUBLISHED THU, MAY 27 2021 3:17 AM EDT

NEWS TECHNOLOGY

AI learns the art of Diplomacy

Meta's algorithm tackles both language and strategy in a classic board game that involves negotiation

22 NOV 2022 · 10:00 AM · BY MATTHEW HUTSON



REALITY



GOVTECH BIZ

What Will It Take for Government AI to Really Take Off?

Artificial intelligence made few gains during the pandemic, Gartner finds, even as more agencies turn to chatbots. Confusion about the technology and anxiety among government workers are among the main hurdles.

October 06, 2021 • Third Rounder



REFORM PROJECT

Data protection authority overturns controversial AMS algorithm

The data protection authority is canceling the use of the algorithm for evaluating job market opportunities. It needs a legal basis

András Szigetvari August 20, 2020, 6:41 pm 366 posts



Shutterstock

PROMOTING GOVERNMENT ADOPTION OF AI

Overall grade: Approaching expectations



Reason: Policy actions are not sufficiently focused on addressing structural issues that are stalling government adoption of AI including approach and culture; financing; metrics and incentives; procurement; and oversight and review.



Home > Topics > ICT and open data > News >

Search



POLITICOPRO



Artificial intelligence was supposed to transform health care. It hasn't.

Machine learning could improve medicine by analyzing data to improve diagnoses and target cures, but technological, bureaucratic, and regulatory obstacles have slowed progress.

SyRI legislation in breach of European Convention on Human Rights

Den Haag, 13 februari 2020

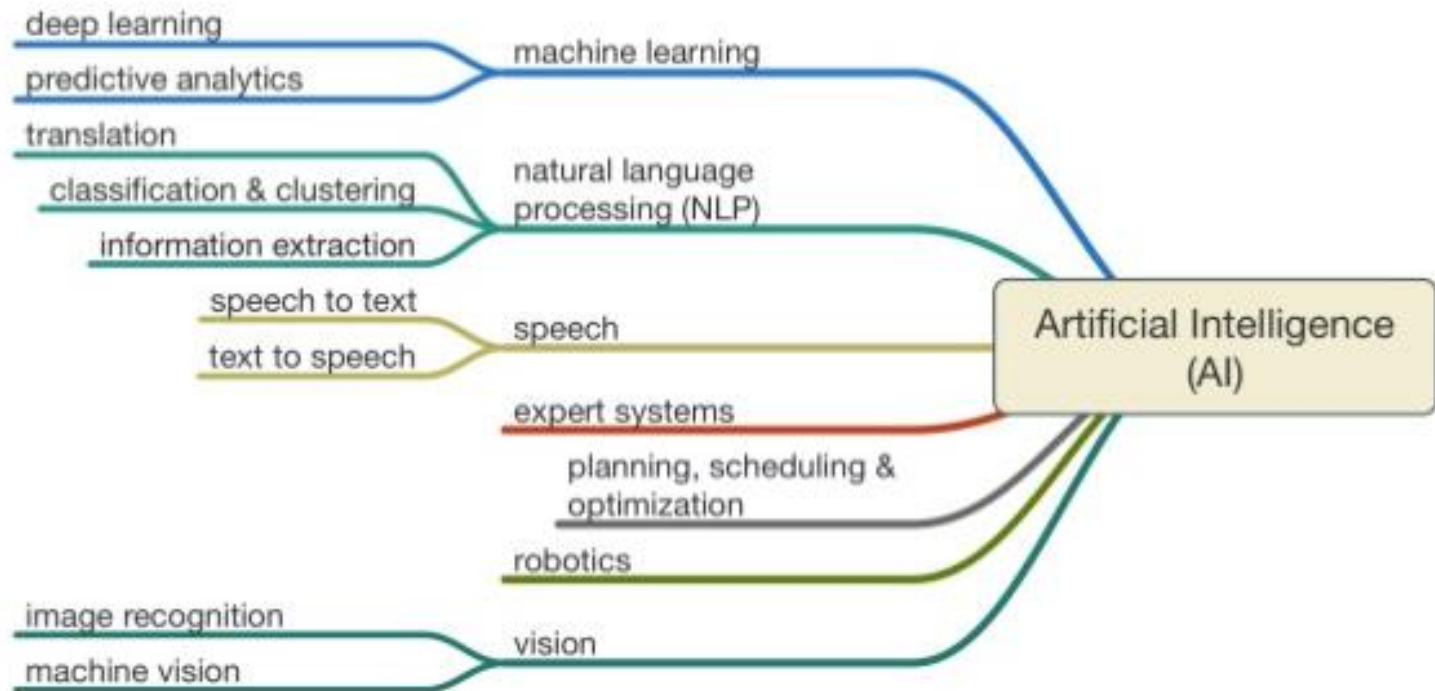
The Hague District Court has delivered a judgment today in a case about the *Systeem Risico Indicatie*, or SyRI. SyRI is a legal instrument used by the Dutch government to detect various forms of fraud, including social benefits, allowances, and taxes fraud. The court has ruled that the legislation regulating the use of SyRI violates higher law. The court has decided that this legislation does not comply with Article 8 of the European Convention on Human Rights (ECHR), which protects the right to respect for private and family life, home and correspondence.

Audit of 9 government algorithms finds 6 do not meet basic requirements

News Item | 18-05-2022 | 10:45

Responsible use of algorithms by government agencies is possible but not always the case in practice. The Netherlands Court of Audit found that 3 out of 9 algorithms it audited met all the basic requirements, the other 6 did not and exposed the government to various risks: from inadequate control over the algorithm's performance and impact to bias, data leaks and unauthorised access.

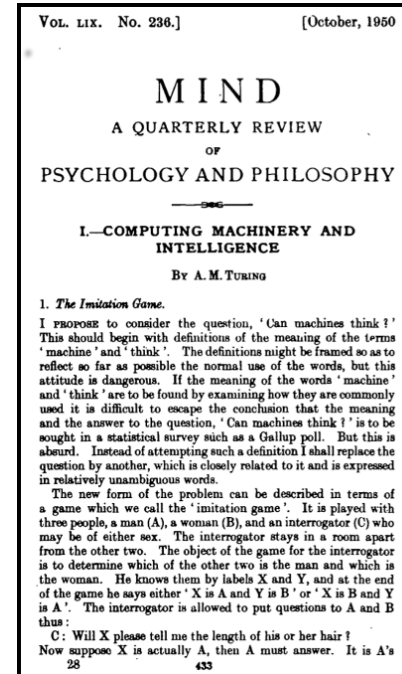
Artificial Intelligence



Artificial Intelligence

Can machines think?
If yes, are we machines?

What is thinking?
What is a machine?



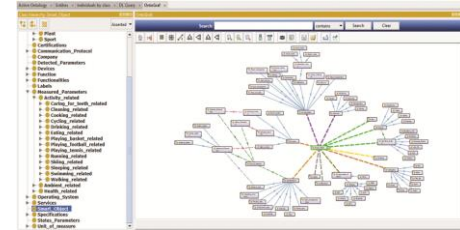
- Exclusively language-based
- Perception, creativity
- Anthropomorphism
- Duality: intelligent human or not
- Searle's Chinese Room argument: does the machine *literally* "understand" Chinese? Or is it merely *simulating* the ability to understand Chinese?

Imitation Game (Alan Turing test):
Using language to decide a thinking machine: an interrogator puts questions and is asked to decide whether the answers come from a human or a machine.

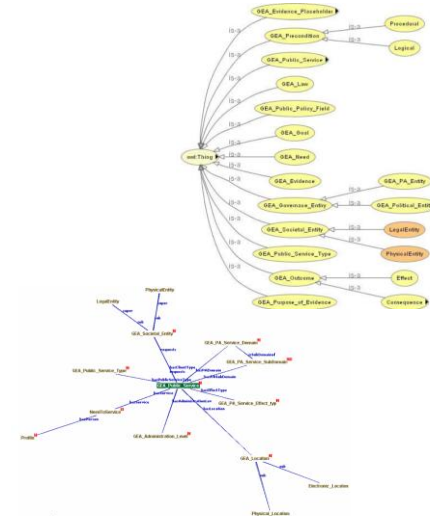


Artificial Intelligence: two schools, a 70-year war

Symbolic AI



- The “symbolists” have sought to build intelligent machines by **coding** in logical rules and representations of the world. Representation and manipulation of symbols is a necessary and sufficient condition for intelligence.
- Symbolic AI attempts to explicitly represent human knowledge in a **declarative** form (i.e. facts/objects and rules/axioms).
- Pros: **glass box, explainability, small data, determinism, human-controlled**
- Cons: **hard-coded, static, low scalability, hard to model the world, need for social agreements, maintenance/updates**
- Examples: Logic (DL, FOL), Ontologies, Semantic Web, Linked Data, Rule-based languages, Data Modelling

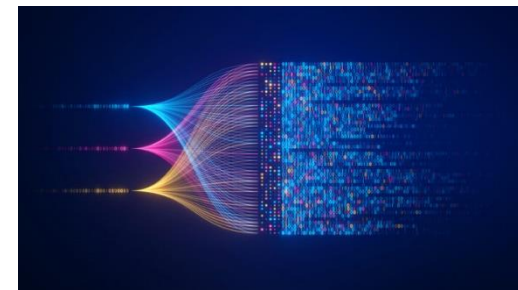
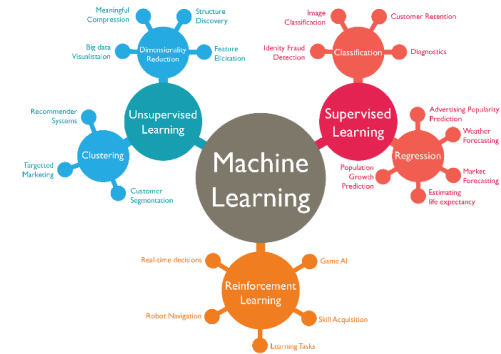
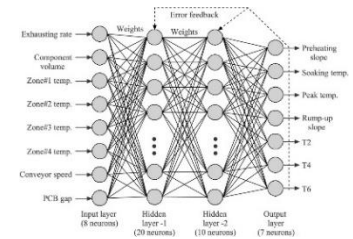


Artificial Intelligence: two schools, a 70-year war

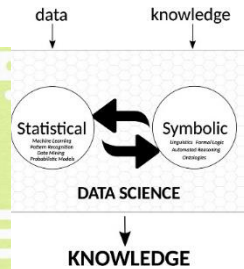
Connectionist* AI

- The “connectionists” sought to **learn of associations from data**. Knowledge emerges by processing data.
- Pros: **learning, scalability, flexibility, adaptability, deals with uncertainty, no human bias**
- Cons: **black box, big data, stochastic/non-deterministic, noisy, data biased**
- ML, information retrieval, pattern recognition, back propagation, genetic algorithms, neural networks and deep learning

* Also known as: subsymbolic, non-symbolic, statistical



Artificial Intelligence: two schools , a 70-year war



Source: Hoehndorf, Robert and Queralt-Rosinach, Núria. "Data Science and Symbolic AI: Synergies, Challenges and Opportunities". 1 Jan. 2017 : 27 – 38.

Neuro-Symbolic AI



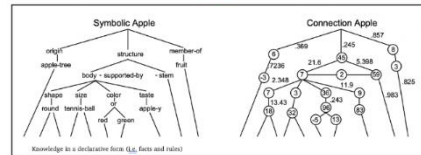
Source: <https://spike.doc.ic.ac.uk/2022/03/23/nsv.html>

Symbolic AI

The systems that fall into this category often involve declarative reasoning, logical inferences, and some flavour of search algorithms that find a solution within the constraints of the specified model.

Connectionist AI (Neural Approach)

DL algorithms, for example, are data-driven, with no symbol or knowledge representation; consequently, it is difficult to be applied to systems that require reasoning and "thinking".



<https://corp.rakuten.co.in/news/neurons-and-symbols-in-medical/>



After ChatGPT...

Symbolic AI - Connectionist AI = 0 - 5 !

Neuro – Symbolic AI:

Efforts to combine the two AI worlds.

These effort are intensified after the advent of Language Learning Models

ChatGPT and Semantic Web Symbiosis

Kingsley Uyi Idehen · Follow
Published in OpenLink Virtuoso Weblog · 9 min read · Jun 20

30

Blog > **Informational**

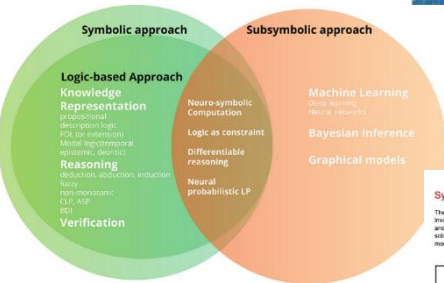
Do Large Language Models Dream of Knowledge Graphs – Impressions from Day 2 At SEMANTiCS 2023

What if ChatGPT is the killer app for the Semantic Web? Why not train LLMs on lexical resources? And how do we tame the genie of LLMs for the healthcare industry? Read our report from Day 2 of SEMANTICS 2023 to find out.

October 13, 2023 · 6 mins. read · Teodora Petkova

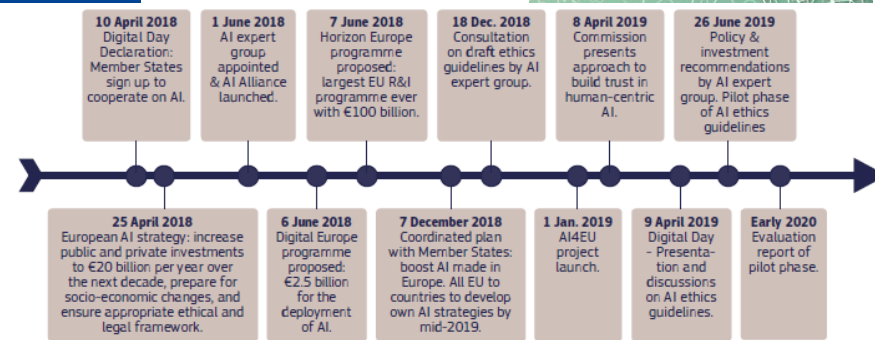
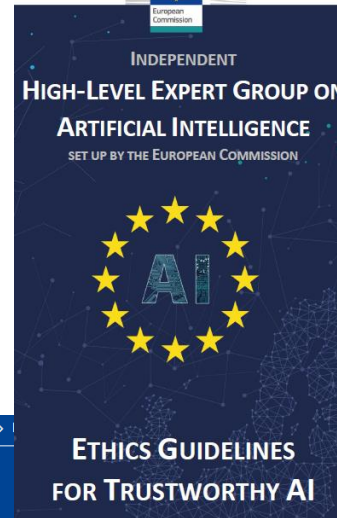


Source: <https://www.analyticsinsight.net/neuro-symbolic-ai-providing-innovation-combination-ais/>



<https://towardsdatascience.com/black-box-and-white-box-models-towards-explainable-ai-172d456fc512>

EC Artificial Intelligence Initiatives



European Commission > Strategy > Digital Single Market > Policies >

Digital Single Market

POLICY

High-Level Expert Group on Artificial Intelligence

European Commission > Strategy > Digital Single Market > News >

Digital Single Market

DIGIBYTE | 10 April 2018

EU Member States sign up to cooperate on Artificial Intelligence

European Commission > Strategy > Digital Single Market >

European Commission > Knowledge for policy > AI Watch

Knowledge for policy

KNOWLEDGE SERVICE

AI Watch

Monitor the development, uptake and impact of Artificial Intelligence for Europe

Digital Single Market

LAW | 7 December 2018

Coordinated Plan on Artificial Intelligence

European Commission > Strategy > Digital Single Market > Reports and studies >

Digital Single Market

REPORT / STUDY | 26 June 2019

Policy and investment recommendations for trustworthy Artificial Intelligence

European Commission > Strategy > Digital Single Market > Laws >

Digital Single Market

LAW | 25 April 2018

Communication Artificial Intelligence for Europe

Artificial Intelligence



‘Artificial intelligence system’ (AI system) means software that is developed with one or more of the techniques and approaches listed in Annex I and can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with

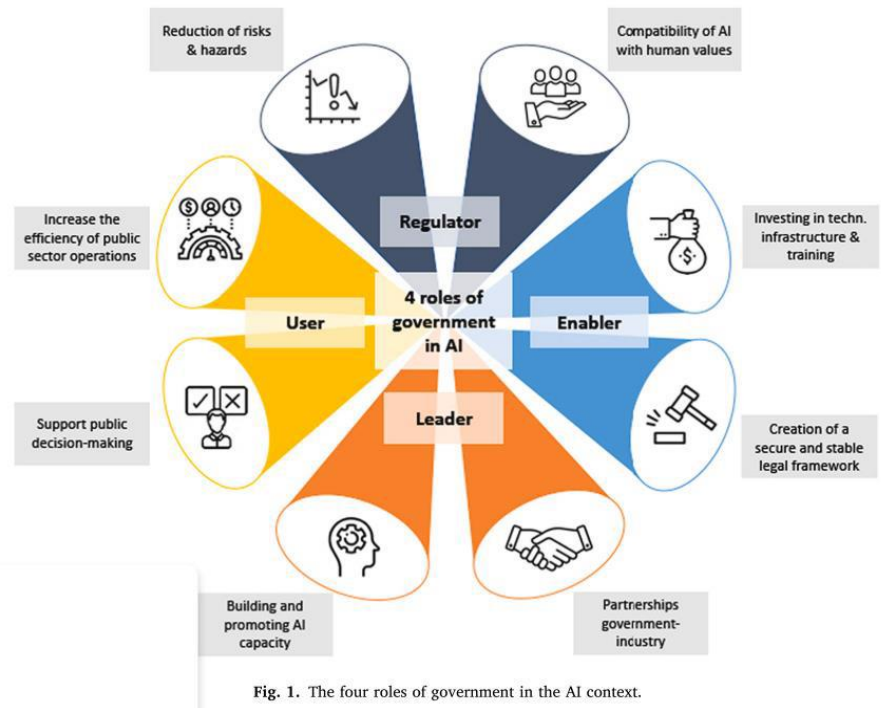
Annex I

- (a) Machine learning approaches, including supervised, unsupervised and reinforcement learning, using a wide variety of methods including deep learning;
- (b) Logic- and knowledge-based approaches, including knowledge representation, inductive (logic) programming, knowledge bases, inference and deductive engines, (symbolic) reasoning and expert systems;
- (c) Statistical approaches, Bayesian estimation, search and optimization methods.

AI and Public Sector

Role(s) of Governments in AI

- Governments are a vital player in the AI Society
- Debate usually does not focus on the role of government as a user
- Important difference
 - Governance of AI
 - Governance with AI

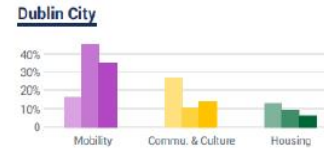


Improving policy making

AI to improve various stages of policy making

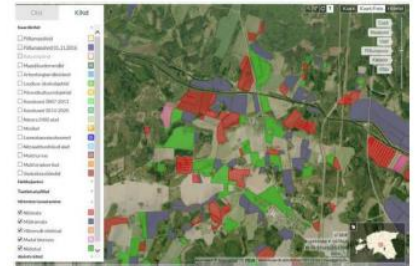
- Detecting social issues more quickly
- Estimate potential effects of policy options
- Improve and fasten decision making
- Monitor ongoing implementation of policy
- Evaluate existing policy
- Include citizens in policymaking

Make public policy more data-driven, and thus more effective, efficient and legitimate



Mobility dominated the civic conversation due to #VeloCity2019 and very proactive cyclists. The council's affordable Housing scheme stood out for Dubliners, as well as Community, which was higher in May due to the European elections.

The Dublin Beat analyses citizen tweets



SATIKAS to detect mowed grass of farmers, Estonia



CitizenLab to analyse citizen input



Object Detection, Amsterdam

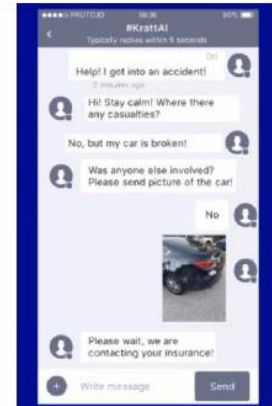
Improving public service delivery

AI could be used to deliver public services to businesses and citizens

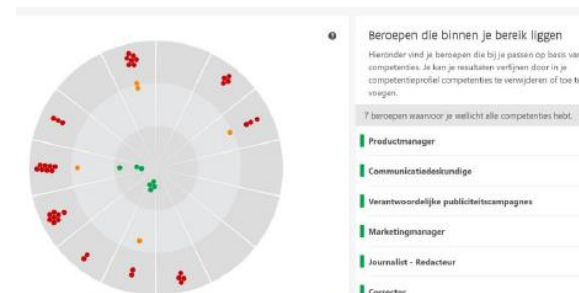
- Enhance information delivery about government services
- Improve public services to citizens and businesses, through personalization
- Automate redundant processes and reducing on-site meetings
- Develop completely new services through AI
- Reduce corruption and improve trust in public service delivery
- Empower civil servants through decision support tools



Misty II to assist the elderly in Barcelona



BüroKratt AI, Estonian Government



JobBereik to assist in reskilling, VDAB, Belgium

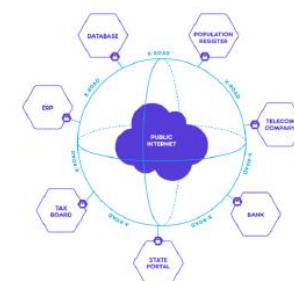
Improving internal management

AI to improve internal management operations

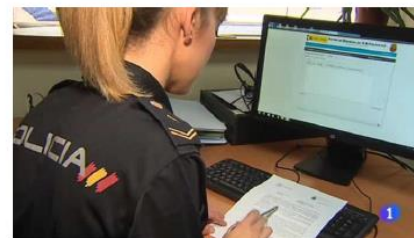
- Improve recruitment services
- More efficient allocation of human resources
- Improved financial management
- Strengthen cybersecurity
- Predictive maintenance
- Modernize public procurement processes
- Improve detection of fraud



Tengai interviewing job applicants, Sweden



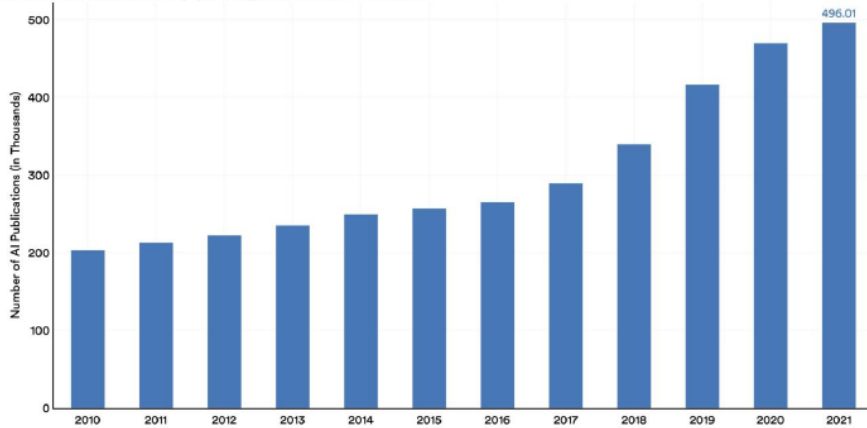
AI to detect anomalies in X-Road, Estonia



VeriPol to detect false police reports, Spain

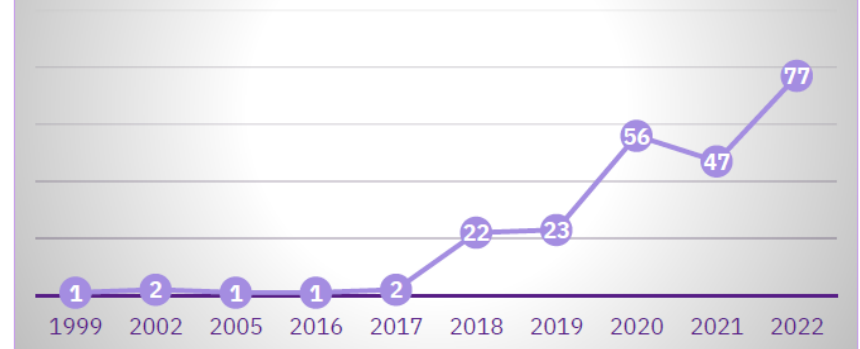
We still know very little on AI in Government

Number of AI Publications in the World, 2010–21
Source: Center for Security and Emerging Technology, 2022 | Chart: 2023 AI Index Report



5 million AI publications in 2021

Research on Artificial Intelligence in Digital Government Research



Almost none in digital government (0.00464%)

Challenges of AI Adoption in government

- Still in a stage of infancy

The use of new innovations, such as ICT, is not straightforward in government

- Technological implementation challenges
- Legal challenges
- Ethical Challenges
- Societal challenges
- Data-related challenges
- Public procurement
- Awareness challenges

Availability of technology on the market does not mean that government organisations adopt it easily (or at all)

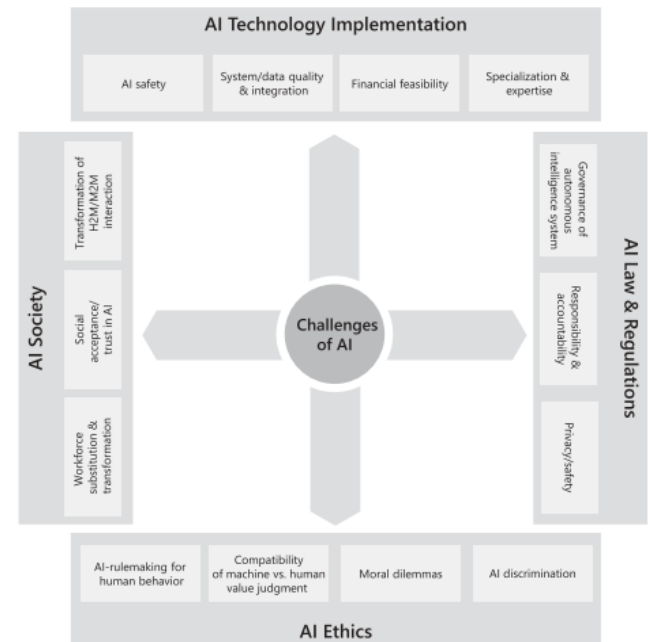


Figure 1. Four-AI-challenges model.

Four-AI-challenges mode, in: Wirtz, B. W., Weyerer, J. C., & Geyer, C. (2019).

AI – Hype or Hit/Mainstream

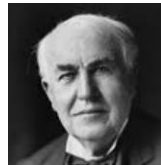
Hype

- Derived from hyperbole
- Promotion consisting of exaggerated claims
- Promoting image above the actual quality of the product/technology
- A situation in which something is advertised and discussed a lot in order to attract everyone's interest
- A strategy of using extreme publicity (in Marketing)

Sources: Cambridge English dictionary, Wikipedia

Innovations make bold promises

“Books will soon be obsolete in the public schools. Scholars will be instructed through the eye. ... Our school system will be completely changed inside of ten years.”



Thomas Edison - 1913

“In from three to eight years we will have a machine with the general intelligence of an average human being. I mean a machine that will be able to read Shakespeare, grease a car, play office politics, tell a joke, have a fight. At that point the machine will begin to educate itself with fantastic speed. In a few months it will be at genius level and a few months after that its powers will be incalculable.”



Marvin Minsky - 1970

How do you discern the hype from what's viable?

Mainstream -> Hit

- Acceptation
- Known and realistic expectations
- Balanced attention
- Application by numerous stakeholders
- Known and proven benefits

mainstream

Hype versus Hit

Criteria

- Expectations
- Attention
- Involvement of stakeholders
- Benefits

Hype versus Hit/Mainstream

Criteria	Hype	Mainstream
Expectations	Unrealistic	Realistic
Attention	Strong increase	Balanced
Involvement stakeholders	Few	Numerous
Benefits	High, not proven	Proven

Proposition 'AI Expectation'

Are the expectations of AI

1. Unrealistic
2. Partly realistic
3. Realistic

Proposition 'Attention of AI'

Does the attention of AI show:

1. A strong increase
2. A decrease
3. A balance

Proposition 'Involvement of stakeholders'

Stakeholders of AI are:

1. A few
2. A specific group
3. Numerous

Proposition 'Benefits of AI'

Benefits of AI are:

1. Exaggerated
2. Slightly exaggerated
3. Proven

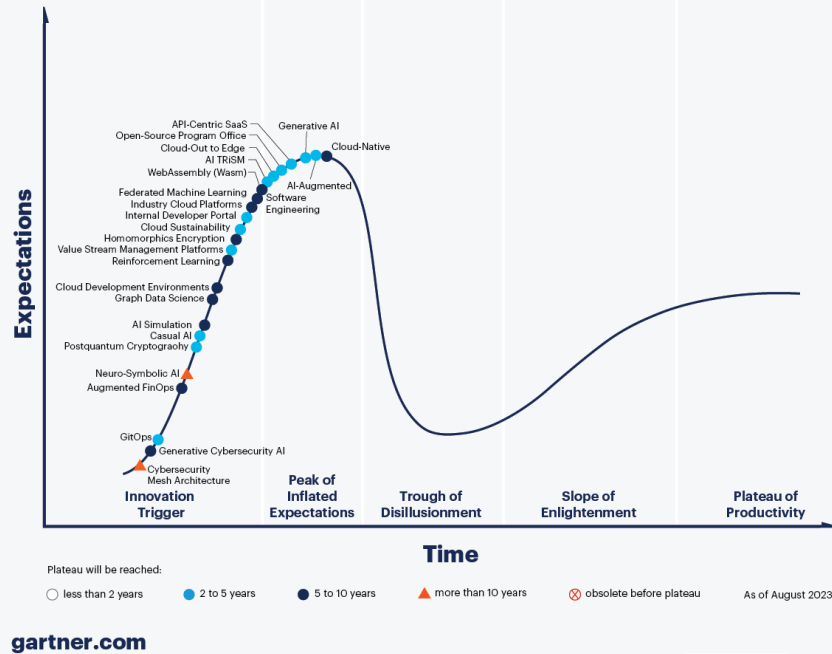
Hype versus Mainstream

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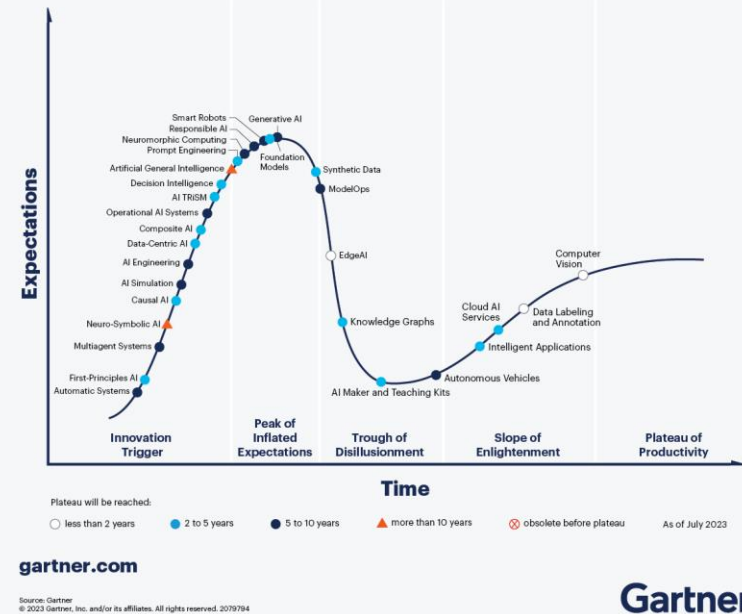
Conclusion: AI is (just over) the hype

Gartner Hype Cycle

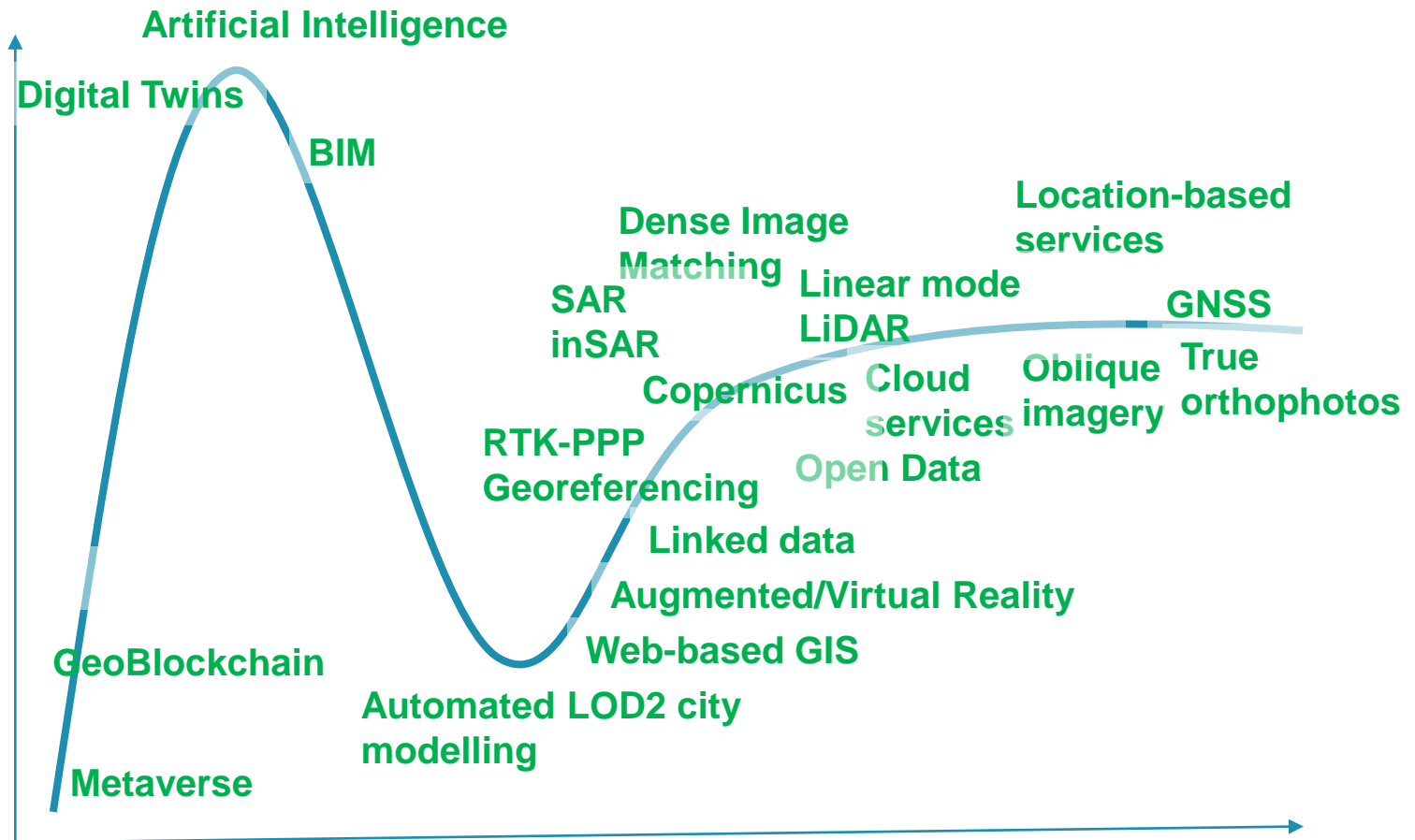
Hype Cycle for Emerging Technologies, 2023



Hype Cycle for Artificial Intelligence, 2023



Geospatial Hype Cycle – EuroSDR, 2022



Concluding reflections

AI is (just over) the Hype

AI is hopefully becoming a hit/mainstream

Need to think carefully about how you use AI (and to be aware that AI is NOT a silver bullet)

It would be wise not to expect miracles and radical changes of AI

AI is a tool/technology and should not be a goal on its own

If you 'torture' AI long enough they will confess to anything

