

Technology and Taxation - setting the scene

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Conference "VAT in the Digital Age"

European Commission, DG Taxation and Customs Union

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Al as a plot of Hollywood blockbusters





friendly

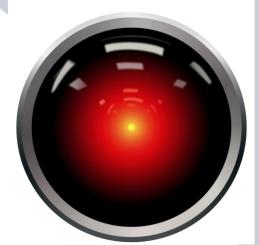




David

A.I. – Artificial Intelligence
2001

technoid



ciliota



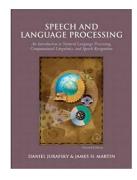
HAL 9000 2001: A Space Odyssey 1968

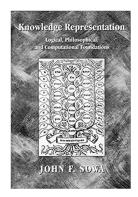


Red Queen Resident Evil 2002

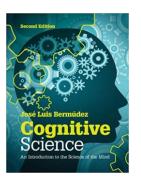
Al as an academic discipline

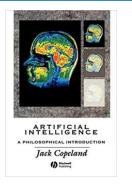


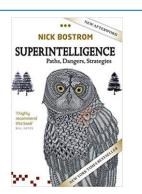




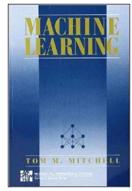


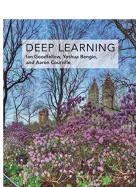




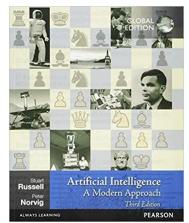


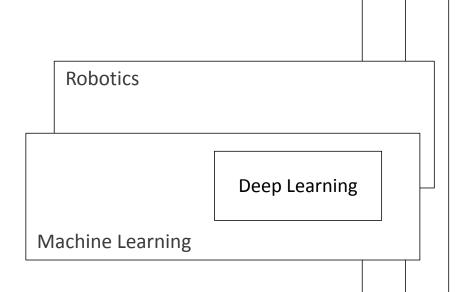










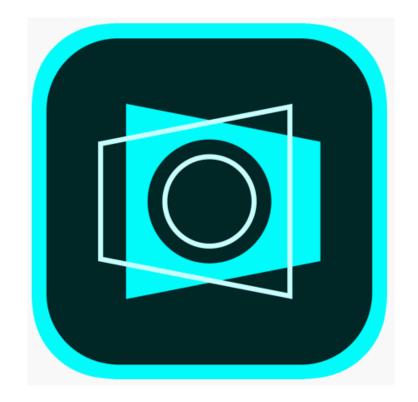


Al as state of the art and <u>a</u>vantgarde <u>i</u>nformatics (Dilemma of Al: "As soon as it works, no one calls it Al anymore ..."*)







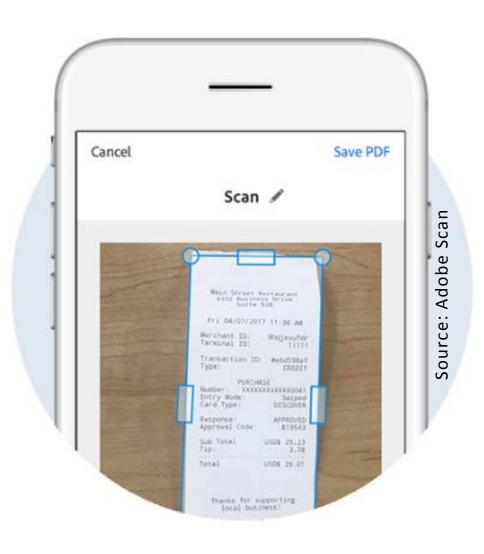




* John McCarthy (1927-2011), one founding father of Al

Al as state of the art: the example of document scanning and information extraction



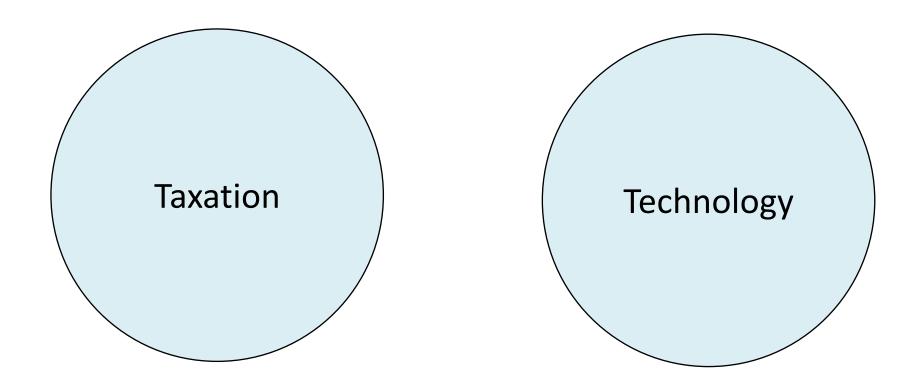


- scan corrections (clipping, rotations, distortions, shadows)
- recognition of document type
- transformation of photo pixels to digital text
- extract relevant information (business cards, invoices etc.)
- plausibility checks (spelling, anomalies etc.)

Two perspectives on taxation and technology



Taxation of automation



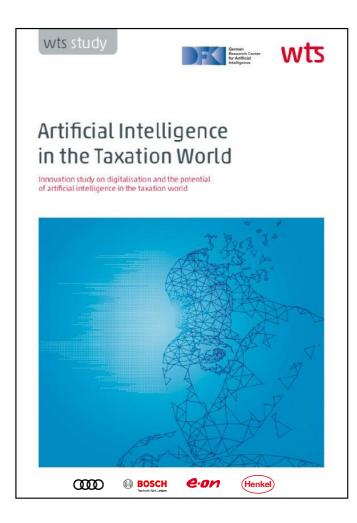
Automation of taxation

(my perspective)

WTS-DFKI-Study: Al in the Taxation World (2017)







Machine learning

- → Classification
- → Clustering
- → Reinforcement learning
- → Decision trees
- → Regression analysis
- → Decision trees
- → Logistic regression
- → Support Vector Machines
- → Deep learning
- → Autoencoder
- → Feature extraction



Process mining

- → Process identification
- → Process prediction
- → Anomaly detection
- → Business model optimisation
- → Process diagnosis
- → Process analysis
- → Process optimisation
- → Process adaptation
- → Conformance testing



Information extraction

- → Sentiment analysis
- → Trend analysis
- → Data mining
- → Optical character recognition (OCR)
- → Correlation analysis
- → Argumentation mining



Knowledge management

- → Organisational memory
- → Semantic technologies and ontologies
- → Context identification
- → Case based reasoning
- → Knowledge-based document analysis
- → Knowledge graph
- → Expert systems
- → Semantic desktop
- → Data mining



Speech processing

- → Speech recognition
- → Speech generation
- → Speech synthesis
- → Speech comprehension
- → Text mining
- → Machine translation
- → Q & A systems



Multimodal systems

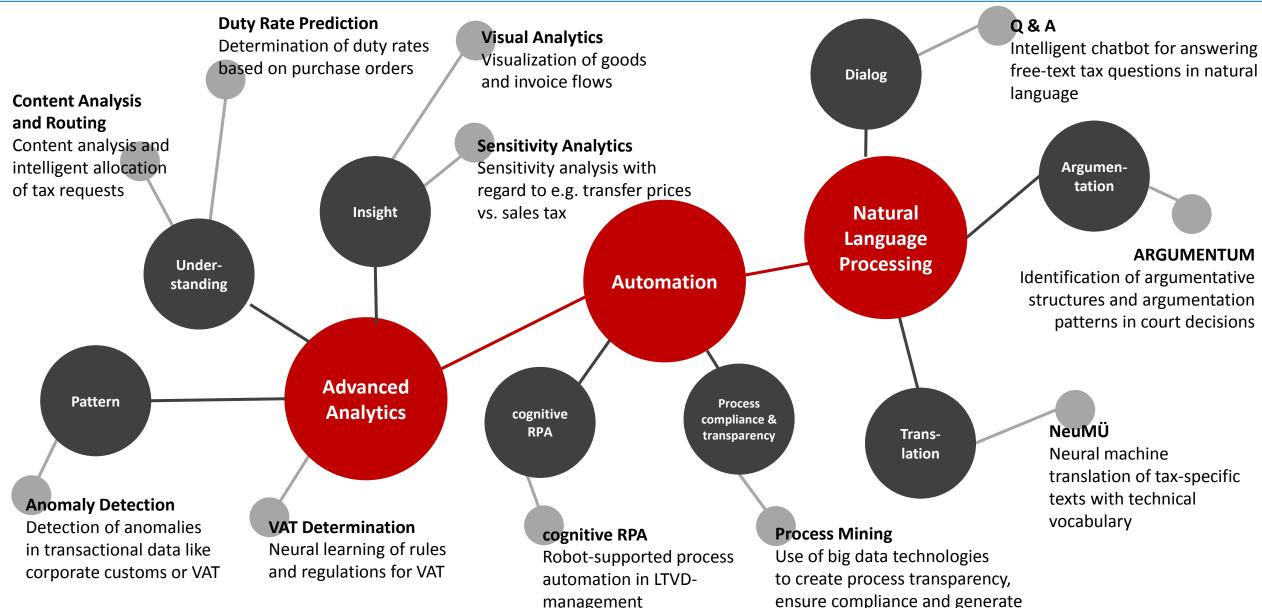
- → Adaptive user interfaces
- → Intelligent user interfaces
- → Multilingual systems
- → Assistance systems
- → Recommendation systems
- → Dialogue systems
- → Personalisation



Developed prototypes at DFKI





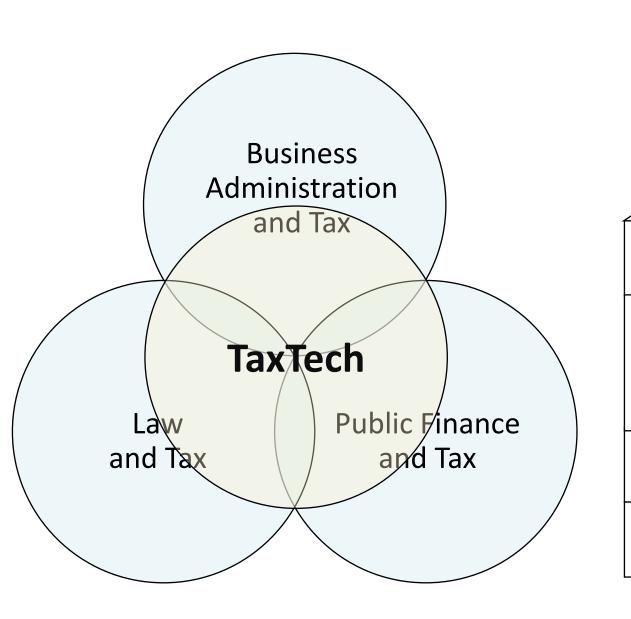


management

synergy effects

TaxTech – The fourth discipline of taxation and the TaxTech-House of the digital tax function





VI Management

strategy, process management, selection- and implementation of standard software, process innovation

V Innovation and Technology-Radar

Blockchain, Al-maturity models, best-practices, business models

III Data Analytics

statistical data analysis, multidimensional data analysis, Data Mining, Text Mining, Process Mining

IV Intelligent Systems

knowledge-based systems, learning systems, systems for anomaly detection, dialogue- and assistance systems, systems for robot-supported process automation

II Technical Basic Systems

Database systems, non-standard-database systems, workflow-systems

I Methological Foundations

terminology, taxonomy, modelling, architecture

