

Technology and Taxation – setting the scene

Professor Dr. Peter Fettke
Saarland University and German Research Center for Artificial Intelligence (DFKI)

Conference “VAT in the Digital Age”

European Commission, DG Taxation and Customs Union

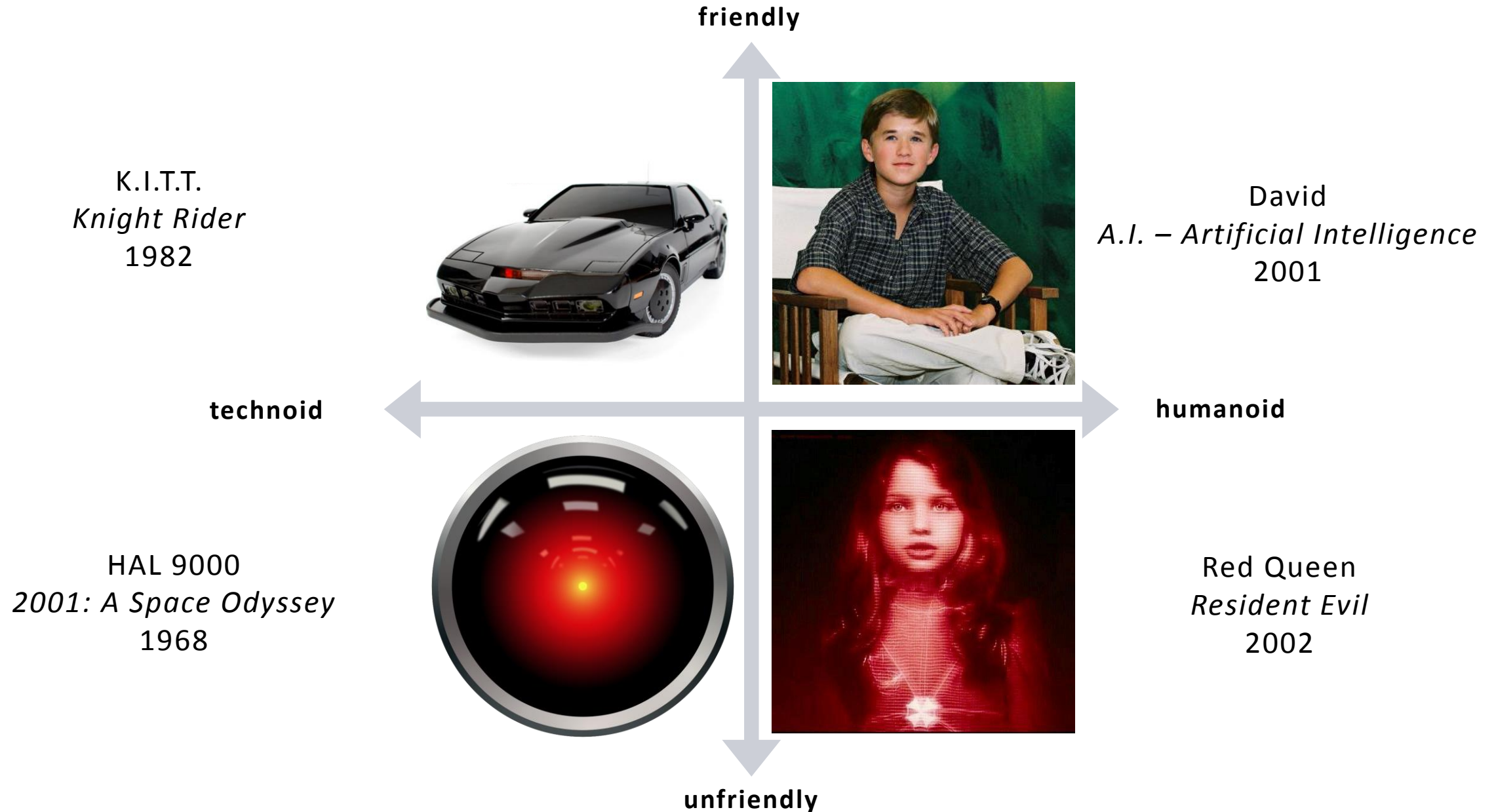
Brussels, Belgium, 6 December 2019



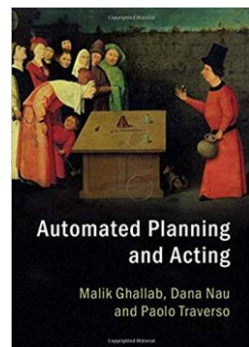
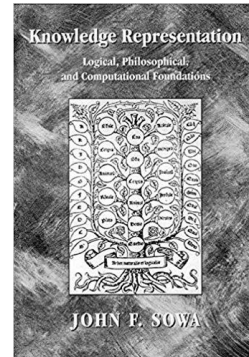
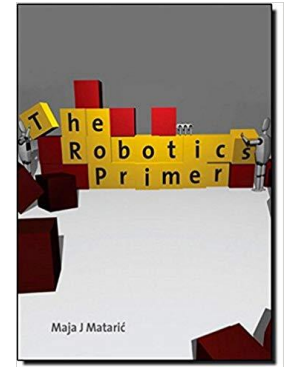
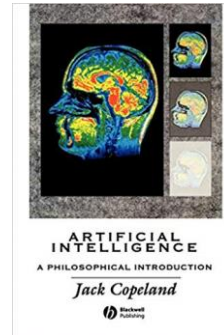
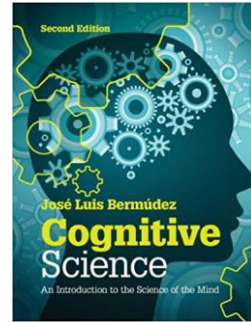
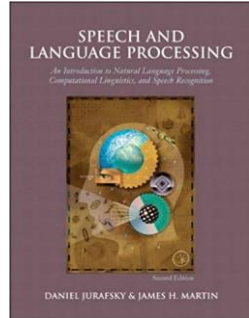
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AI as a plot of Hollywood blockbusters



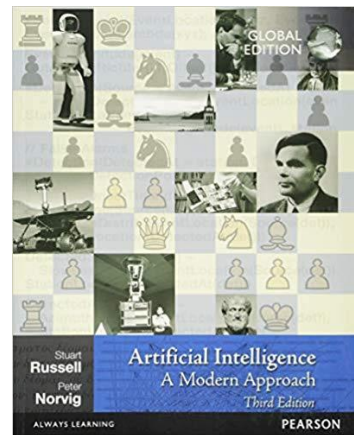
AI as an academic discipline



Super-AI

General AI

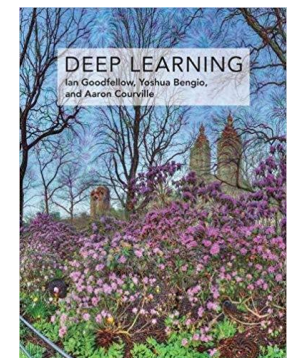
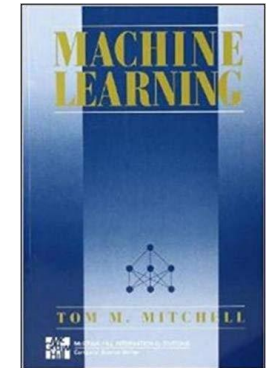
Narrow AI



Robotics

Deep Learning

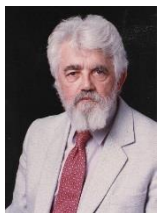
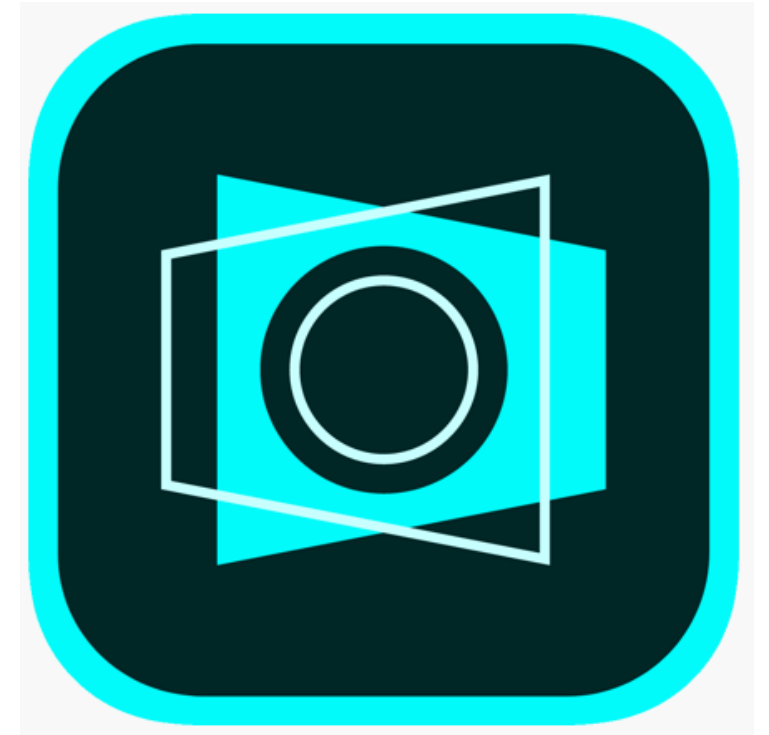
Machine Learning



AI as state of the art and avantgarde informatics (Dilemma of AI: „As soon as it works, no one calls it AI anymore ...“*)



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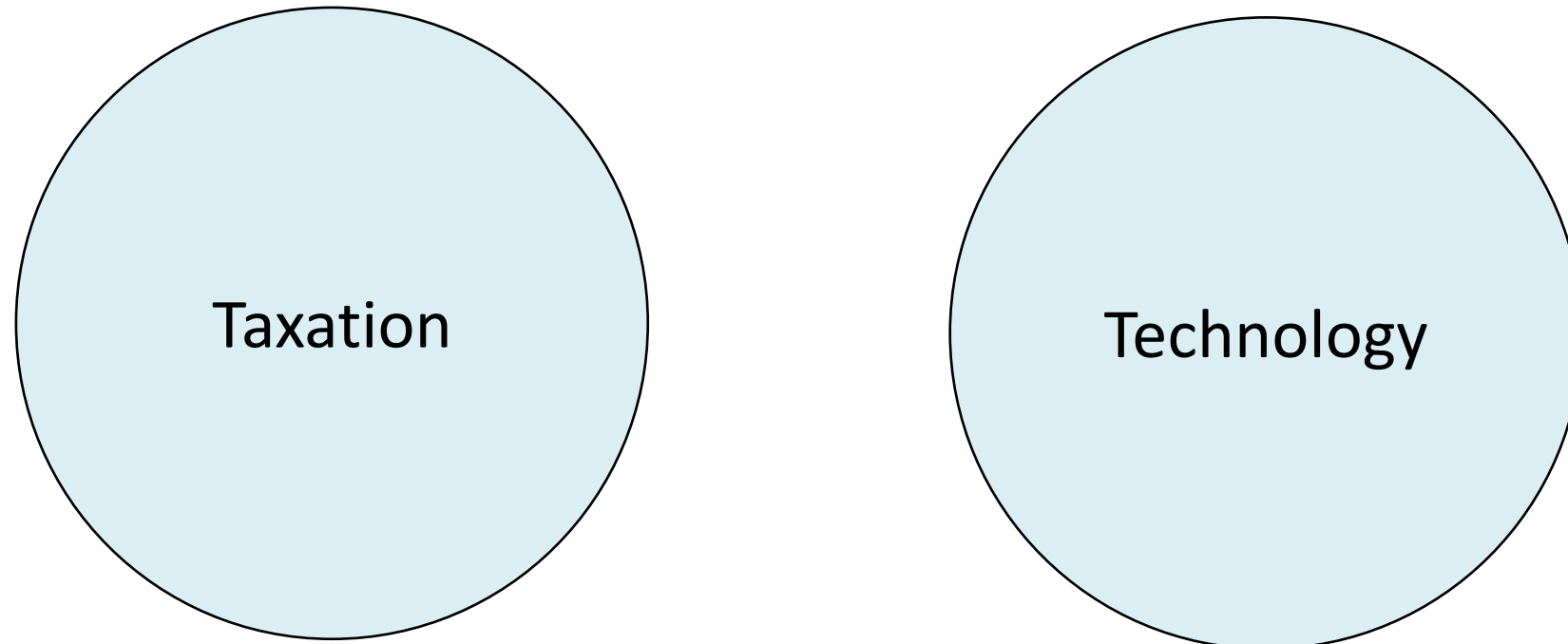
* John McCarthy (1927-2011), one founding father of AI

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

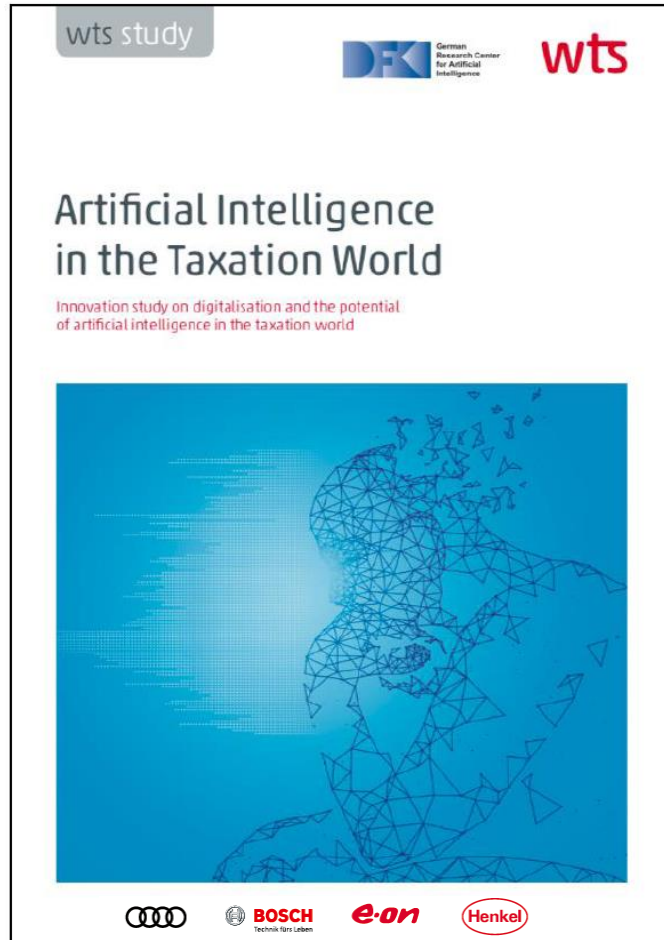


- scan corrections (clipping, rotations, distortions, shadows)
- recognition of document type
- transformation of photo pixels to digital text
- extract relevant information (business cards, invoices etc.)
- plausibility checks (spelling, anomalies etc.)

Taxation of automation



Automation of taxation (my perspective)



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

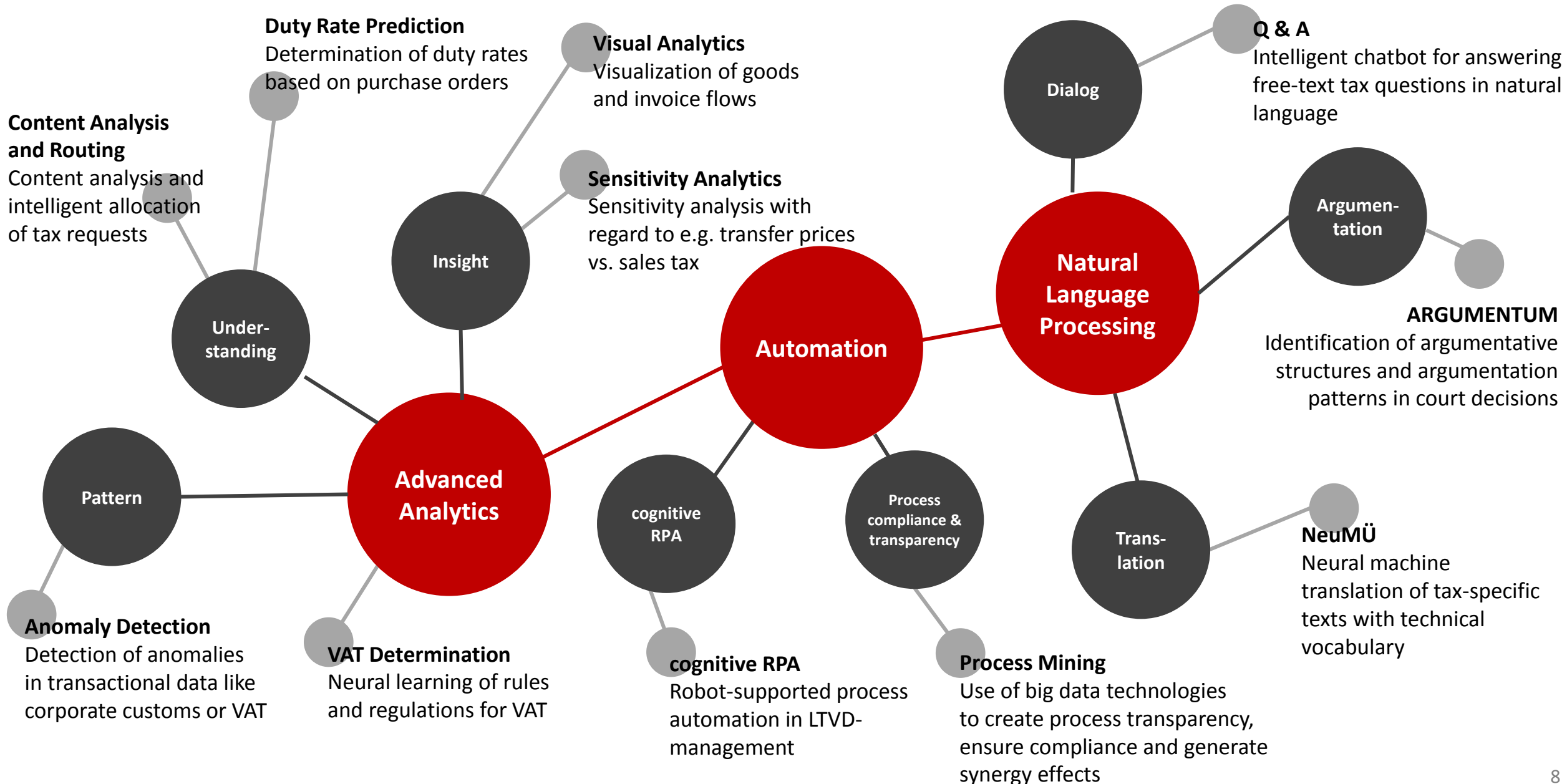
- Speech recognition
- Speech generation
- Speech synthesis
- Speech comprehension
- Text mining
- Machine translation
- Q & A systems

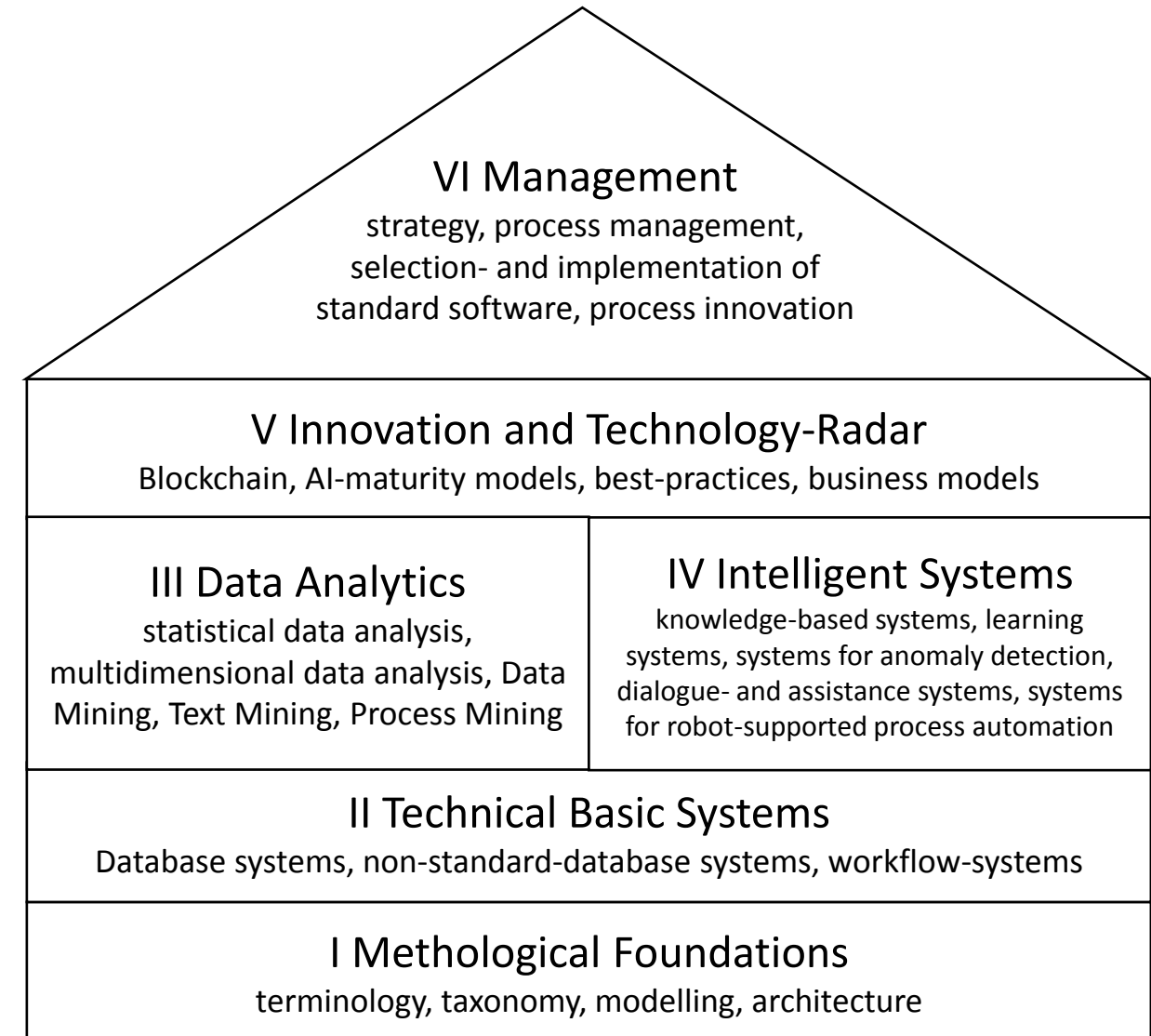
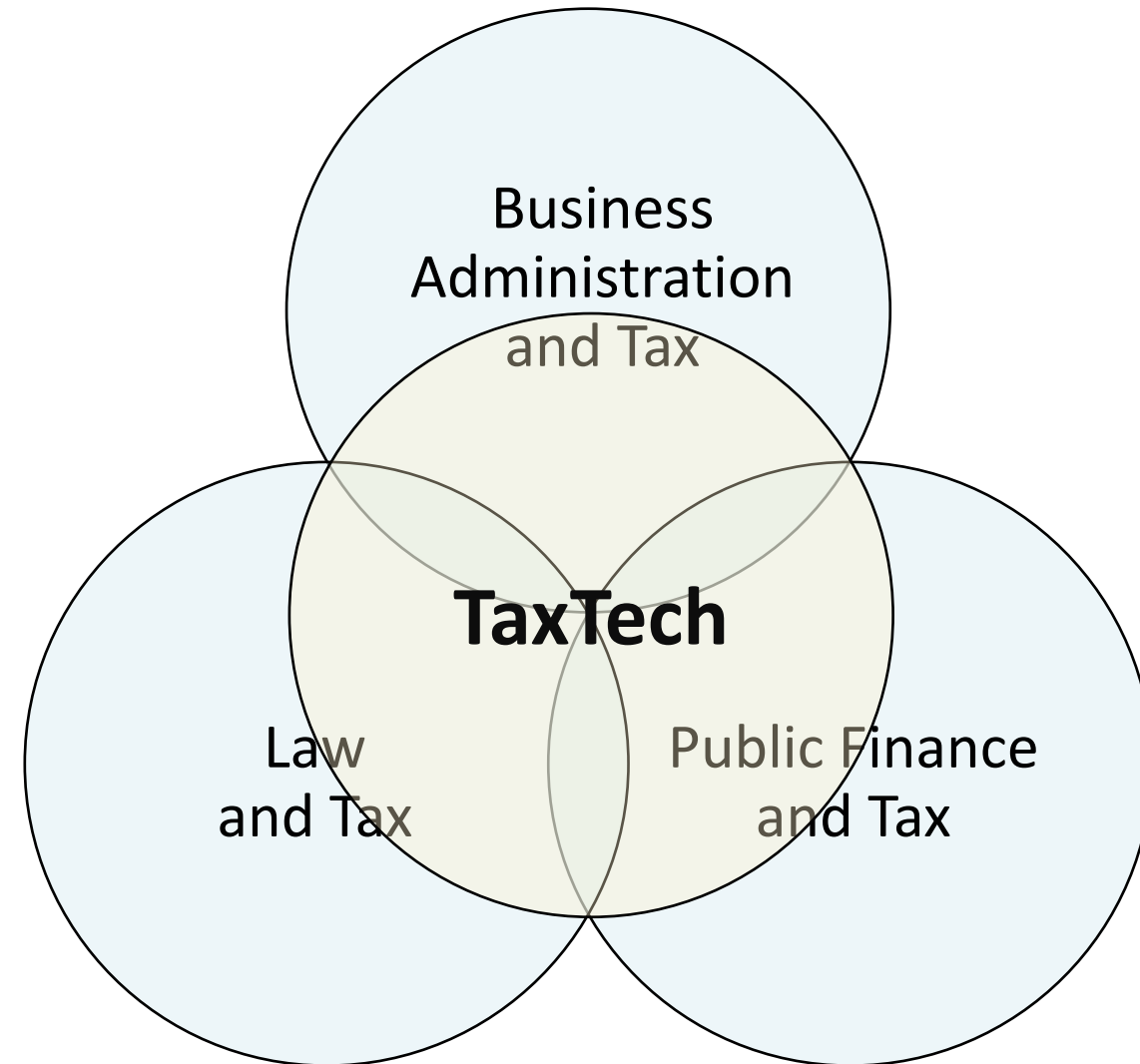


Multimodal systems

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







Thank you for your attention!

Contact

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