Human-centric AI challenges and opportunities

Sabrina Kirrane, 27.01.2020

AMLD – AI & Policy track

Setting the Scene
About me

Access Policies

Normative Multi-Agent Systems

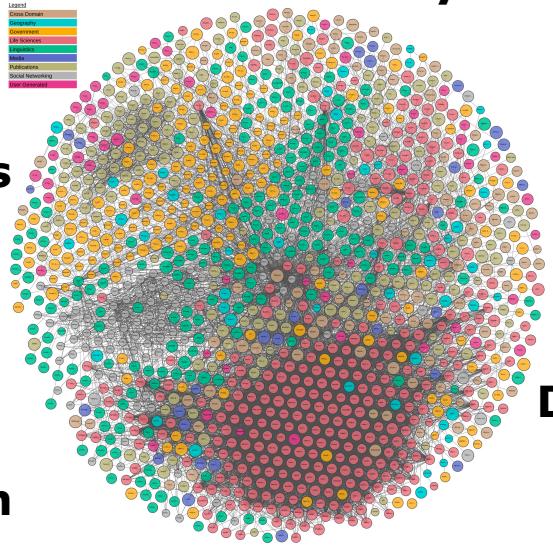
Consent Policies

Intelligent Agents

Licenses

Cyber Physical Social Systems

Regulatory Constraints



Linked Open Data Cloud https://lod-cloud.net/

Encryption

Blockchain

Privacy

Decentralisation

Enforcement

Data Science

Administration

Artificial Intelligence

Transparency

Big Data

Compliance

Web Standards

The World Wide Web

Information Management: A Proposal

Tim Berners-Lee, CERN

March 1989, May 1990

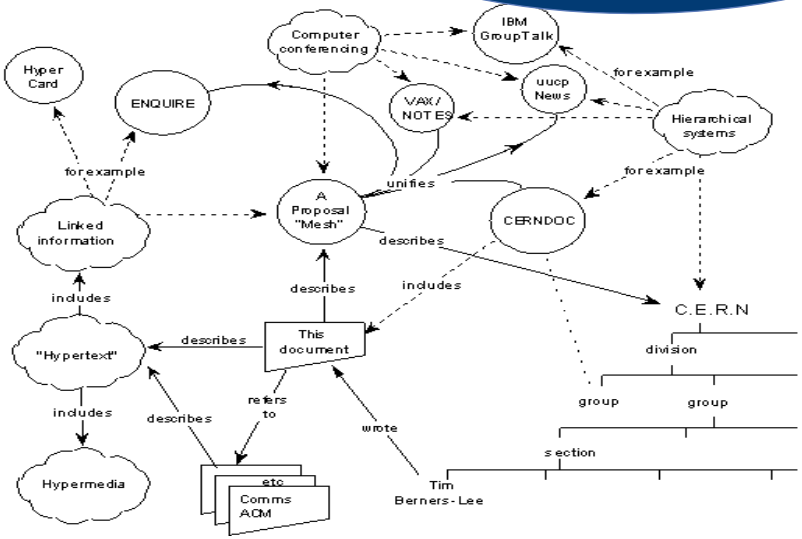
This proposal concerns the management of general information about accelerators and experiments at CERN. It discusses the problems of loss of information about complex evolving systems and derives a solution based on a distributed hypertext system.

Overview

Many of the discussions of the future at CERN and the LHC era end with the question - "Yes, but how will we ever keep track of such a large project?" This proposal provides an answer to such questions. Firstly, it discusses the problem of information access at CERN. Then, it introduces the idea of linked information systems, and compares them with less flexible ways of finding information.

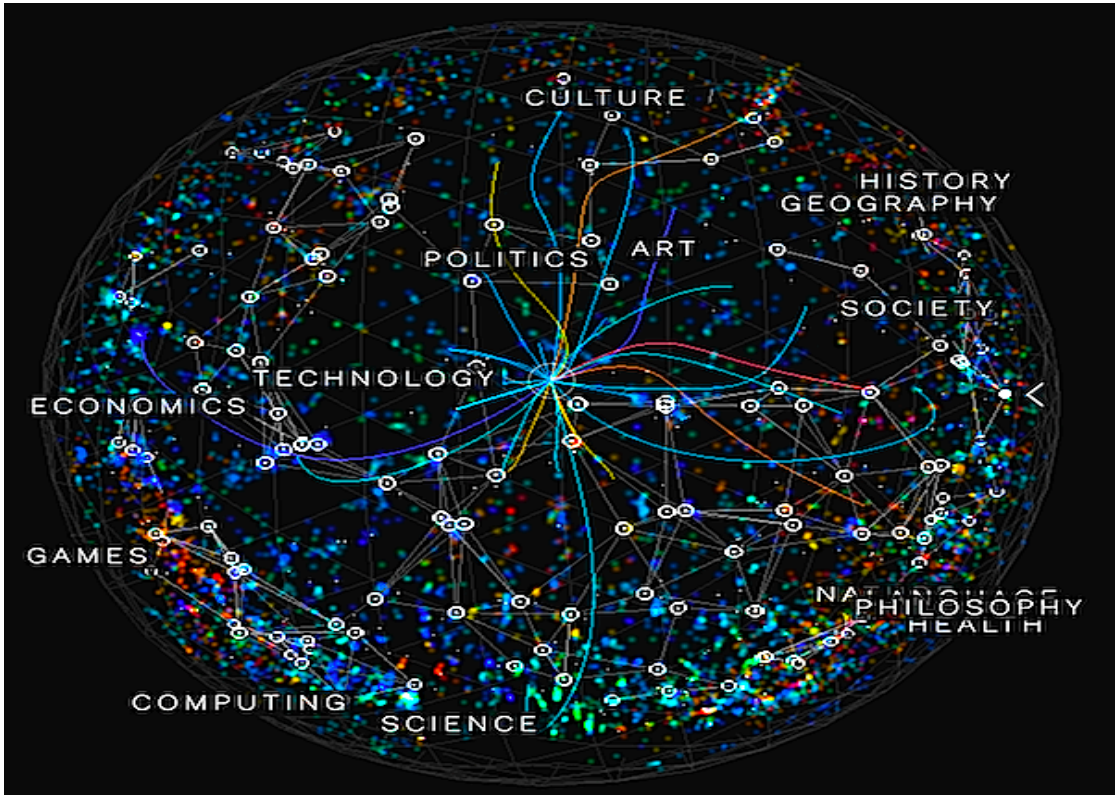
It then summarises my short experience with non-linear text systems known as "hypertext", describes what CERN needs from such a system, and what industry may provide. Finally, it suggests steps we should take to involve ourselves with hypertext now, so that individually and collectively we may understand what we are creating.

In 1989
Tim Berners Lee
invented the World
Wide Web



1989 The original proposal for the Web
https://www.w3.org/History/1989/proposal.html

The World Wide Web
As a disturbed data source

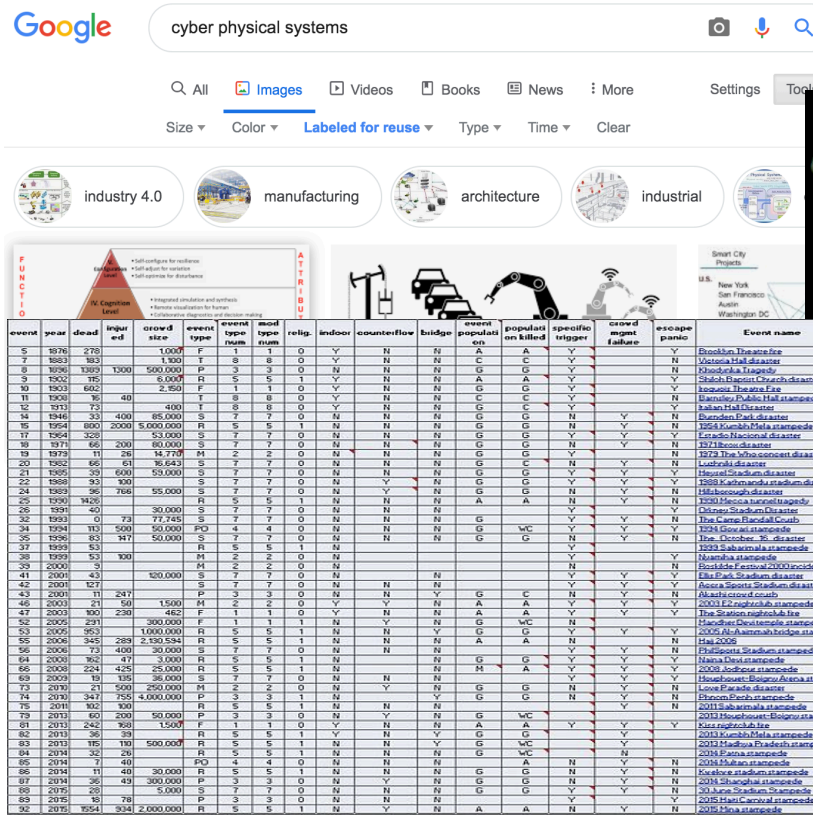


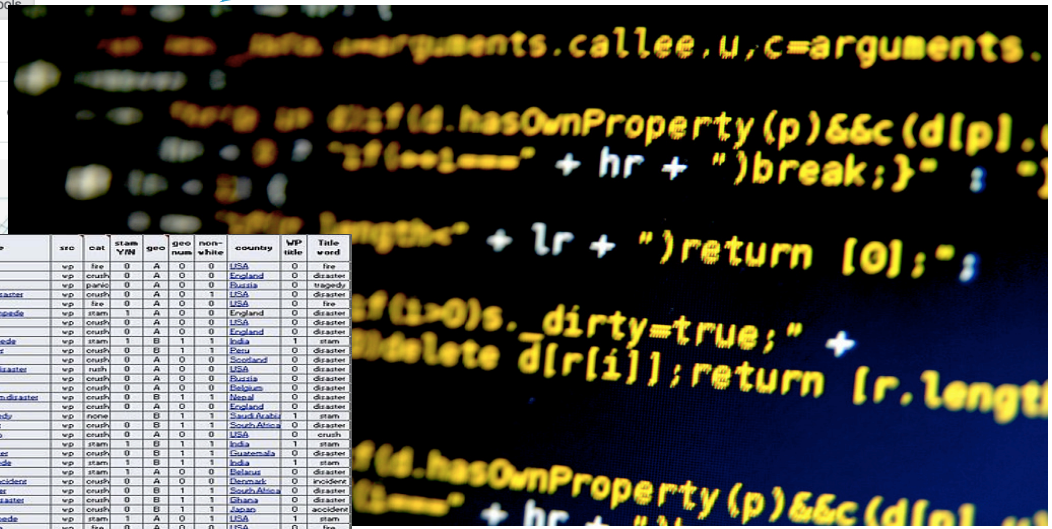
https://commons.wikimedia.org/wiki/File:WikiVerse_at_WM_NYC_WikiWednesday.png

30 years later the Web has become indispensible!

Contracts & Terms of Use
The compliance challenge

- There are many resources without any terms of us
- We need compliance tools





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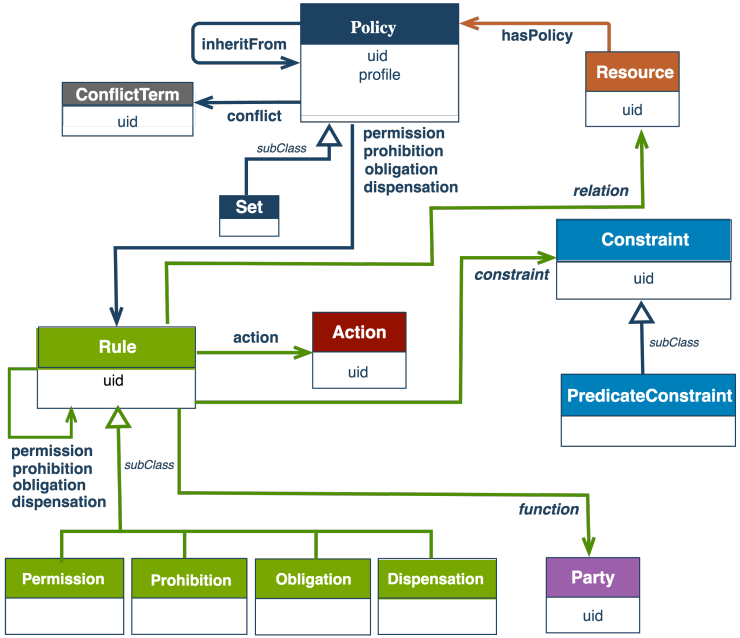
https://en.wikipedia.org/wiki/File:Data_for_2015_stampede_analysis.jpg

Policies for constraint representation
The interoperability challenge



- Modeling regulatory obligations using an adaption of the Open Digital Rights Language
- Automated compliance checking for business policies

Draft Specification

ODRL Regulatory Compliance Profile
version 0.1

Unofficial Draft 29 May 2019

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*ODRL policy modelling and compliance checking, Marina De Vos, Sabrina Kirrane, Julian Padget and Ken Satoh, Proceedings of the **3rd International Joint Conference on Rules and Reasoning** (RuleML+RR 2019)*

A third ‘AI Winter’
The explainabiliy challenge

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Explainable AI should help us avoid a third 'AI winter'

AI researchers are worried that GDPR will limit availability of training data, but there's an upside too, says Gary Richardson

MOST READ


5 things women in tech want to see at an event


5 reasons we still need events for women in tech


Why self-care is especially important for women in tech


Huawei CEO Ren Zhengfei admits US sanctions will cut revenues by $30bn


UK Government unveils security standard for surveillance cameras

Gary Richardson – MD of Emerging Tech at 6point6 a technology consultancy with strong expertise in digital transformation, emerging technology and cyber security

- The AI winters of the 1970s and 1990s, which saw research funding slashed and interest in AI wane, were the result of unreaslistic expectations and a failure to scale.
- A third AI winter could be caused by **inadequacies and biases** in the AI algorithms leading to negative impacts on the whole of society.
- **Bias simply does not build value in business**, particularly with regards to important decisions like access to credit and healthcare or increasing diversity through recruitment.

https://www.computing.co.uk/ctg/opinion/3073390/explainable-ai-should-help-us-avoid-a-third-ai-winter

Explainable AI
The human centricity challenge

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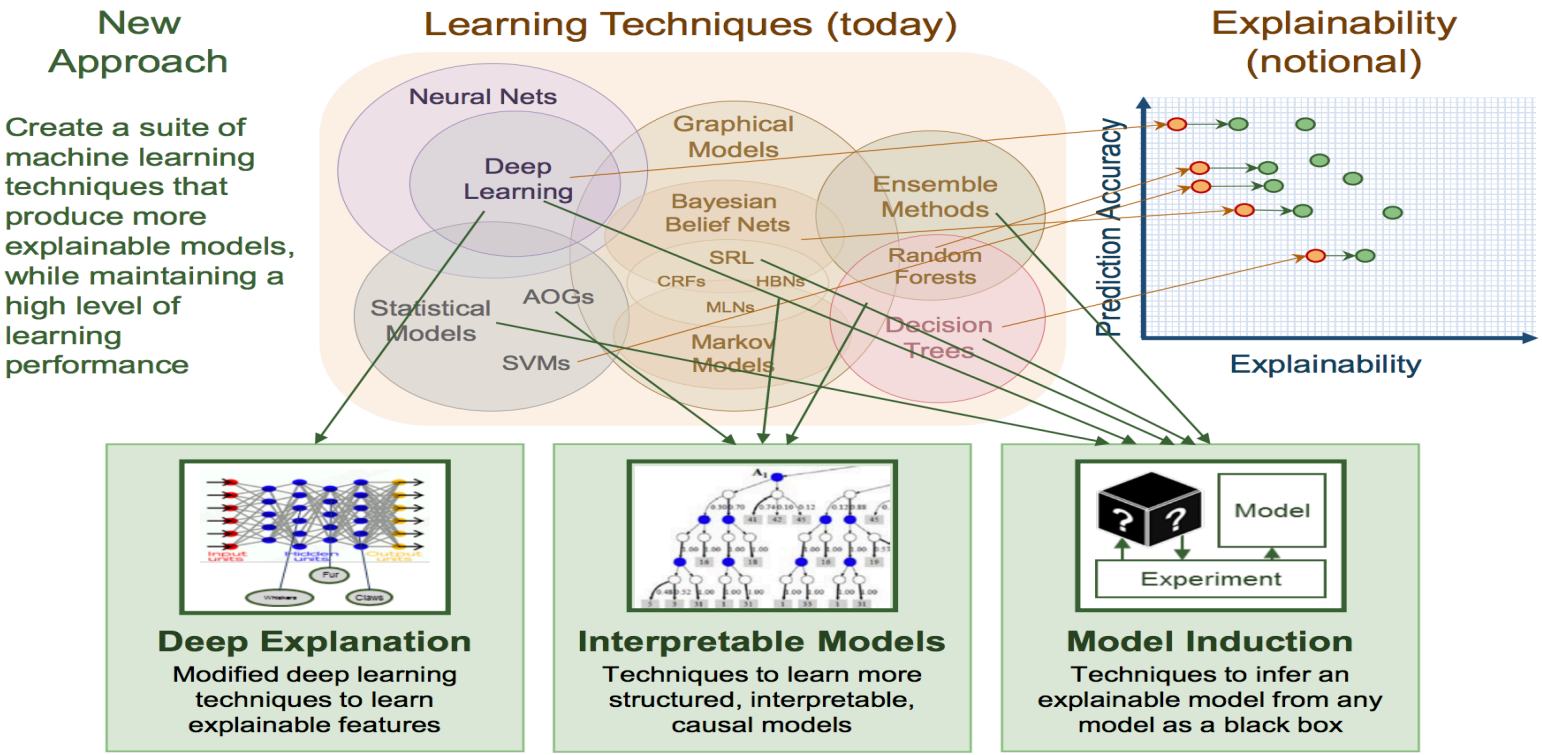
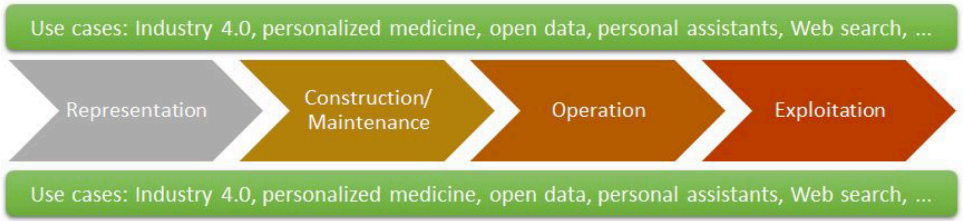
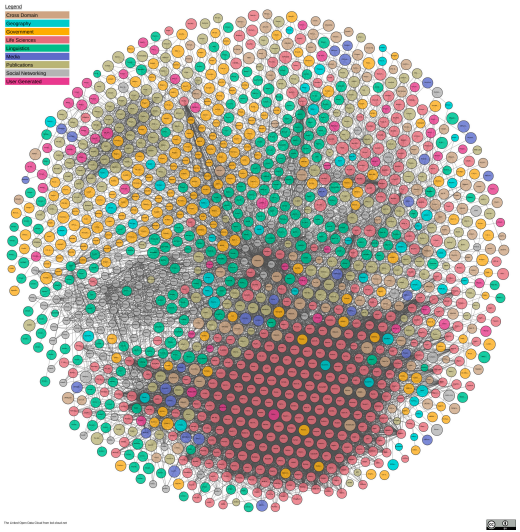


https://www.cc.gatech.edu/~alanwags/DLAI2016/(Gunning)%20IJCAI-16%20DLAI%20WS.pdf

Policies & Knowledge Graphs
Towards Responsible & Explainable AI



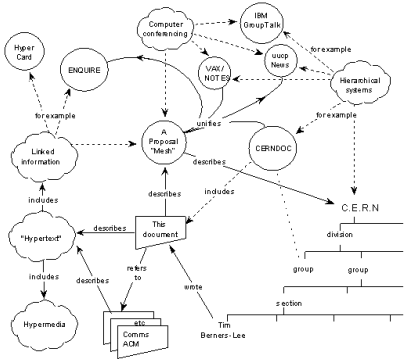


Linked Open Data Cloud https://lod-cloud.net/

- Knowledge aware machine learning
- Constraint aware reasoning and querying
- Using Knowledge graphs for explainability

*This work is funded under the **Marie Skłodowska-Curie Innovative Training Networks** Knowledge Graphs at Scale project:*

Policies & Knowledge Graphs
Towards Responsible & Explainable AI

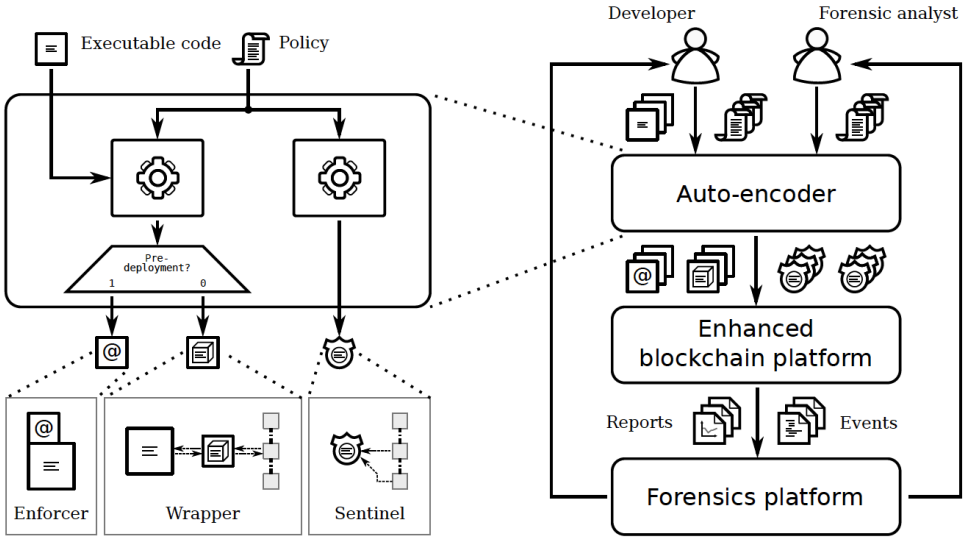


The original proposal for the Web
https://www.w3.org/History/1989/proposal.html

Apple's 1987 Knowledge Navigator
https://commons.wikimedia.org/wiki/File:Knowledge_Navigator.jpg

- Modeling goals and constraints
- Supporting negotiation and explanations
- Algorithm transparency & trust
- Usage control lower down in the technology stack

Policies & Knowledge Graphs
Towards Responsible & Explainable AI



- Constraint representation
- Syntactic and semantic function annotation
- Enforcement and conformance checking
- Forensic architecture and protocols

Collaborators:
- Claudio Di Ciccio, Sapienza Università di Roma, Italy
- Ruben Verborgh & Anastasia Dimou UGent-imec, Belgium

Human-centric AI
Challenges & Opportunities

- Privacy is only the tip of the iceberg, from a usage control perspective we also need to consider other **regulations, licenses, social norms, cultural differences**
- There are **cognitive limitations** in terms of understanding how data is / will be used
- There is a need for standards, however **standardisation is difficult**
- Ensuring such systems are **comply with usage constraints** is a crucial to success (i.e., all usage policies are adhered to and the system as a whole works as expected)
- We need to embrace **distributed and decentralised systems**, which complicates things further

Thank you / contact details

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