AI and Law in 2017: Turning the hype into real world solutions

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UNIVERSITY OF LIVERPOOL

Overview

- The current hype around AI and Law
- Reflections on moving research into useable applications
- Progress following previous calls to action
- Opportunities and challenges on the immediate horizon

The AI and Law party has recently expanded

Brandy Bulawsky, NY Times

The ‘official’ party started in the late 1980s

The 1990s and 2000s cemented the field as an established research area

The 2010s have seen the emergence of the Legal Tech scene with a more commercial focus

2017: The parties are more widespread than ever!

CodeX FutureLaw Conference 2017

April 6, 2017 @ 9:15 am - 5:30 pm

MORE INFO

LEXPO'17 - 8 & 9 MAY 2017

Lexpo will be back on Monday 8 and Tuesday 9 May 2017 with an innovative agenda featuring only the best speakers from all over the world!

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COMPLIMENTARY FOR LAW FIRMS AND CORPORATE LEGAL DEPARTMENTS

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NetLawMedia

BRITISH LEGAL TECHNOLOGY FORUM '18

13th March 2018 - Old Billingsgate • London

AI and Law research is receiving increased media attention

Artificial intelligence 'judge' developed by UCL computer scientists

Software program can weigh up legal evidence and moral questions of right and wrong to predict the outcome of trials

The algorithm examined English language data sets for 584 cases relating to torture and degrading treatment, fair trials and privacy. Photograph: Cultura/Rex/Shutterstock

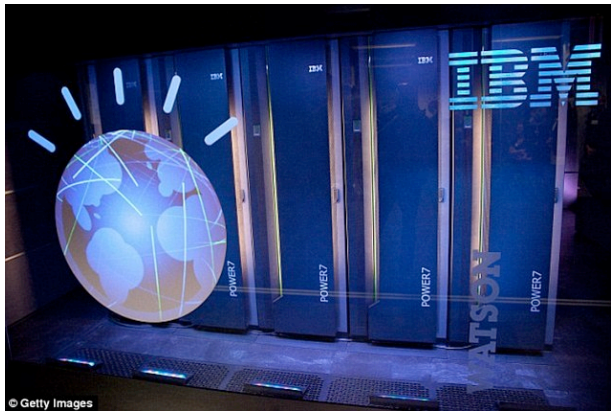
TECHNOLOGY

The New York Times

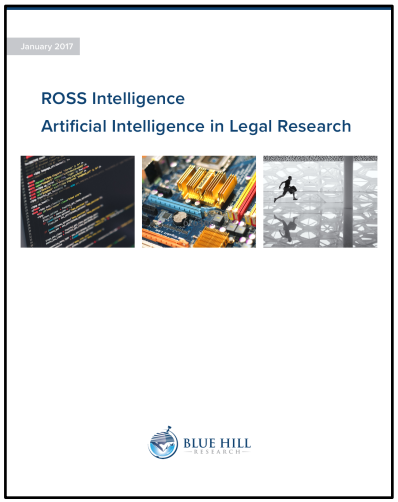
A.I. Is Doing Legal Work. But It Won't Replace Lawyers, Yet.

By STEVE LOHR MARCH 19, 2017

General AI looking to law as an application area



IBM's Watson


January 2017

ROSS Intelligence
Artificial Intelligence in Legal Research

BLUE HILL RESEARCH

AlphaGo

Brainspace™

Commercial products making use of AI are becoming more popular and widespread

kira

NEOTA LOGIC

The list keeps on expanding…

Total number of companies

710

Marketplace companies

159

Document automation companies

183

Practice management companies

128

Legal research companies

53

Legal education companies

34

ODR companies

20

Analytics companies

38

CODEX

The Stanford Center for Legal Informatics

Discover Legal Technology

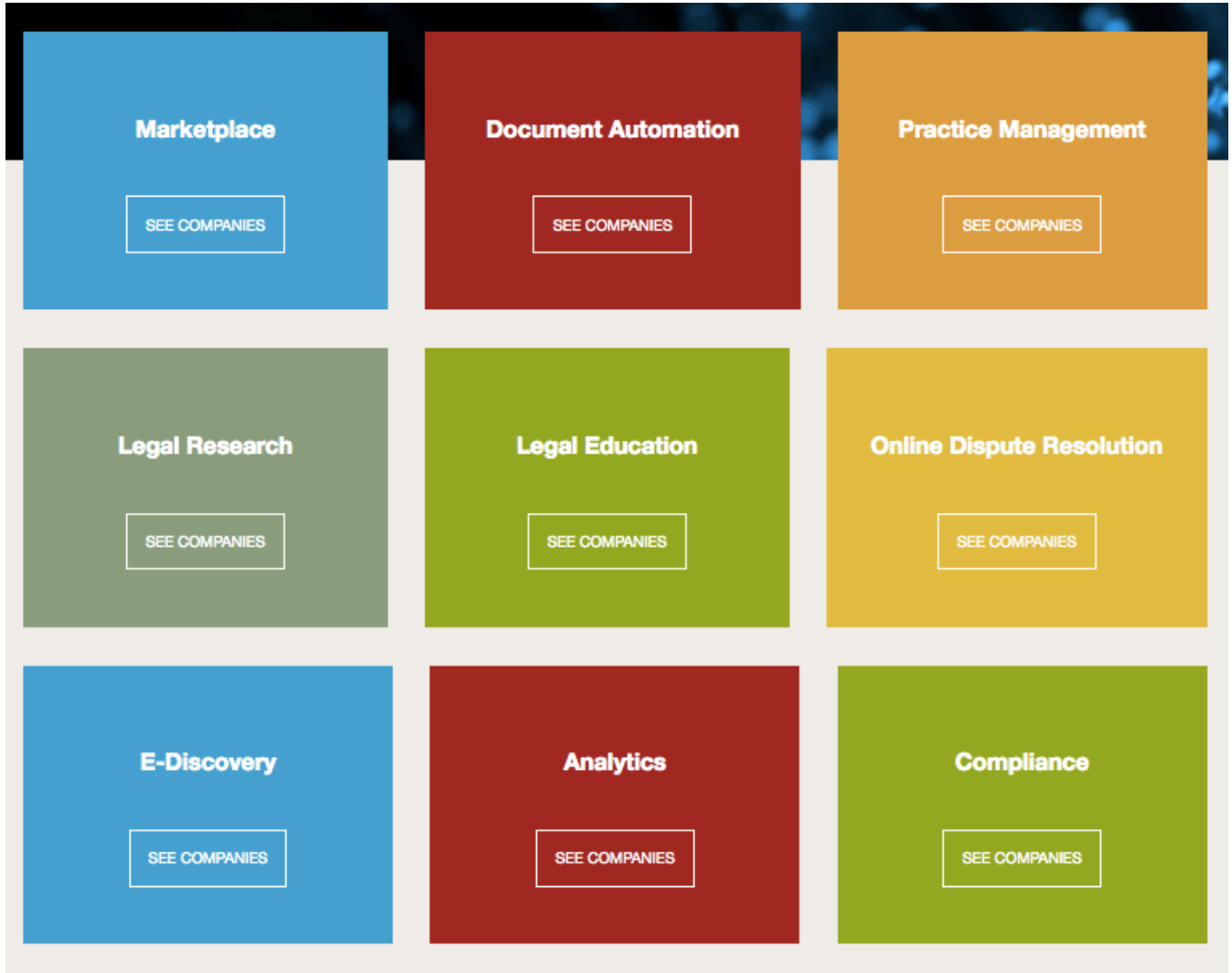
Explore a curated list of 710 companies changing the way legal is done.

Search for a company

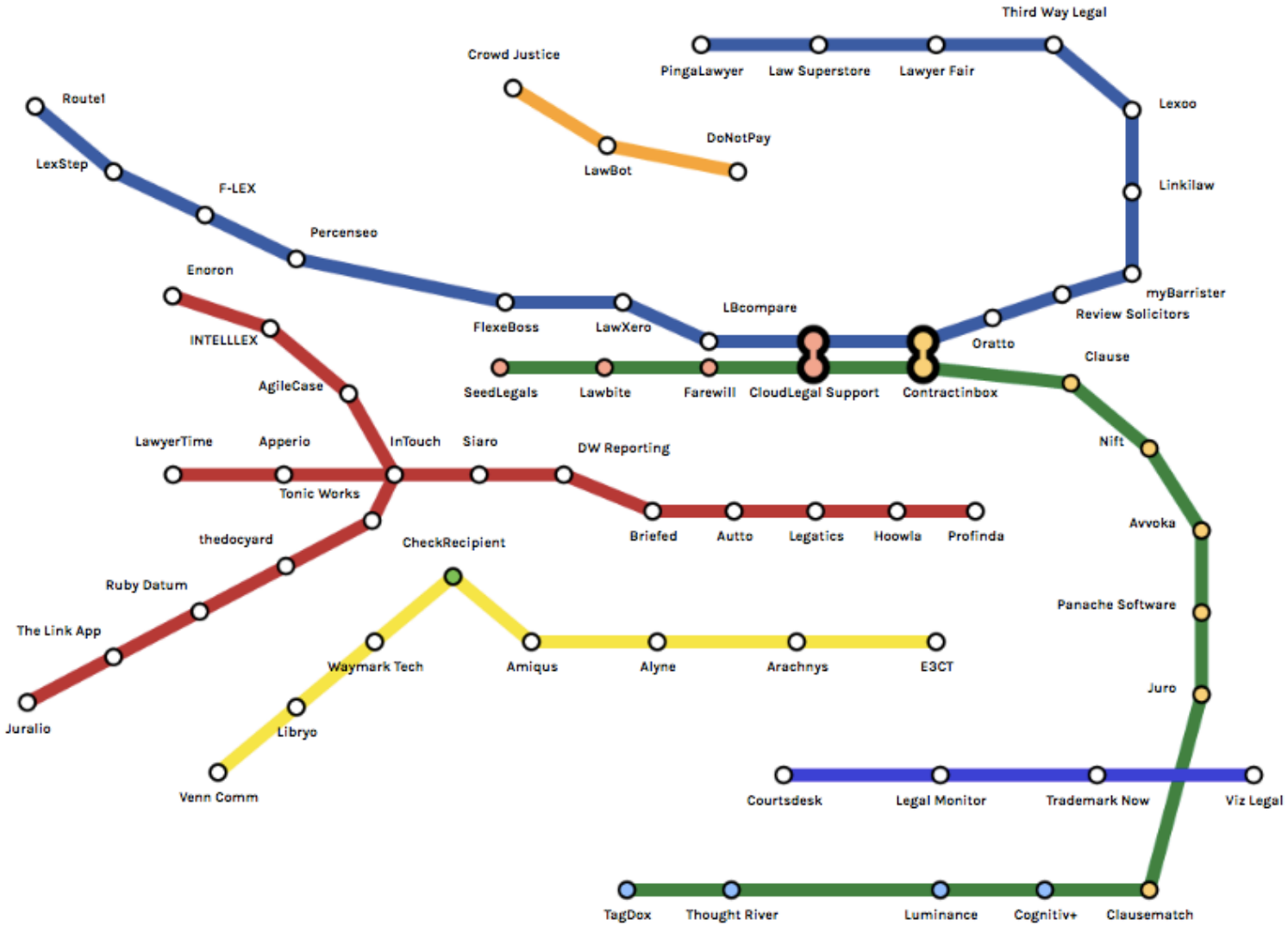
Search

Legal Tech List

Various different aspects are covered by the list



Legal Geek UK start-up map



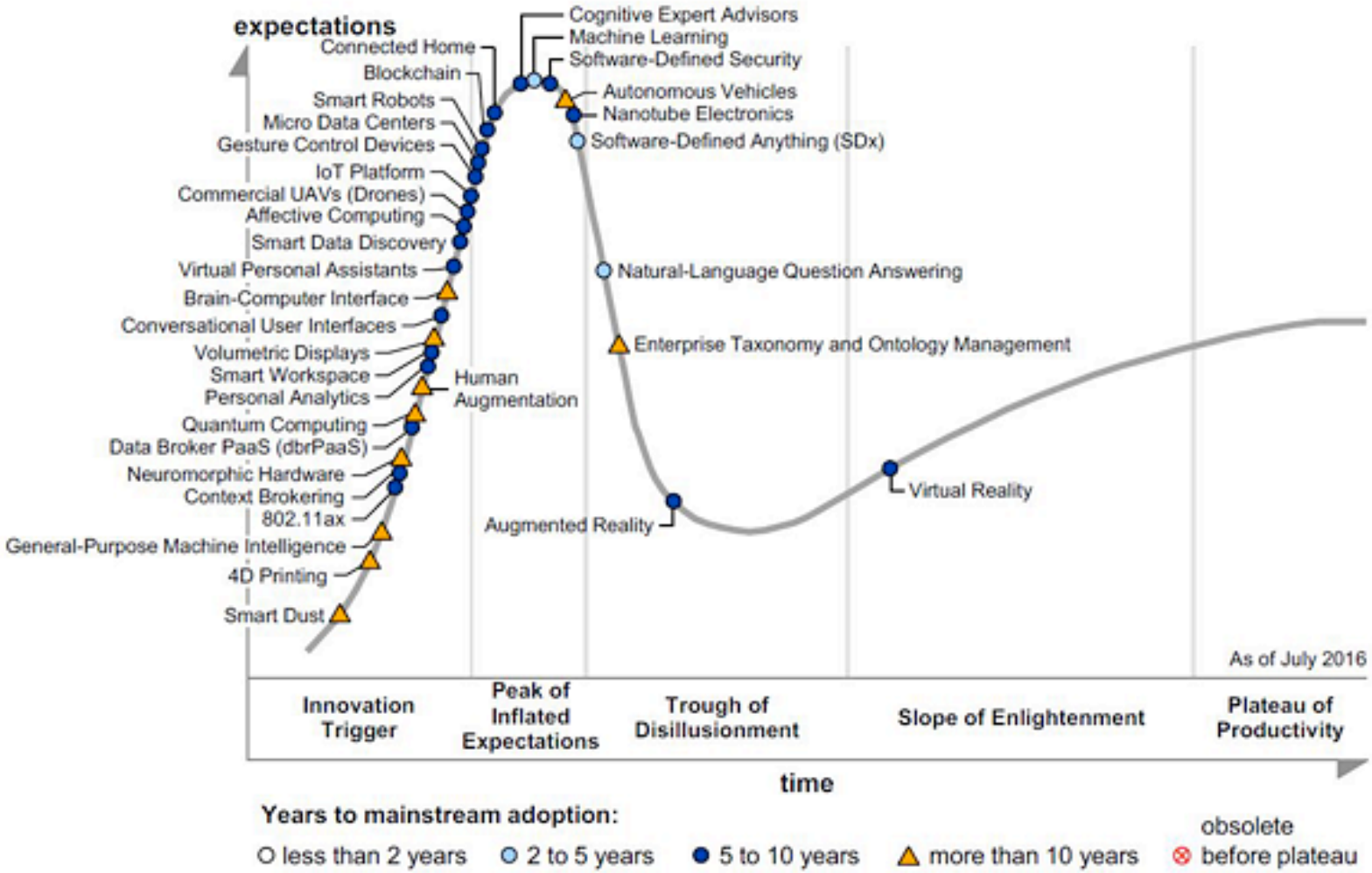
https://www.legalgeek.co/startup-map/

In-house developments in addition to bought in technologies

NEXTLAW Labs

Pinsent Masons

Gartner's 2016 Hype Cycle for Emerging Technologies



Source: Gartner (July 2016)

Demos from past ICAILS

- The number of demonstrations of implemented systems making use of foundational research has seen little increase over the years:
  - 2017: 3 demos
  - 2015: 4 demos
  - 2013: 6 demos

- Yet we have plenty of members working on applied projects

eCODEX | making justice faster.eu

THOMSON REUTERS

Drafting Legislation with Ontology-based Support
DALOS

We have examples from ICAIL moving research from academic into industry

- ICAIL 1991: “Legislative knowledge base systems for public administration: some practical issues”

- SoftLaw → Haley Systems → RuleBurst → Oracle

Applying computational argumentation in law – a personal story

- The starting point: ICAIL 2003
  - "Towards a computational account of persuasion in law" by K. Greenwood, T. Bench-Capon and P. McBurney

- Presented an account of reasoning with legal cases contextualised within a general theory of persuasion in practical reasoning
  - Drew on work from legal case-based reasoning, informal logic, dialogues and computational models of argument

Justifying an Action

- Practical Reasoning Argumentation Scheme:
  - In the current circumstances R
  - I should do action A
  - To produce new circumstances S
  - Which will realise a goal G
  - Which promotes Value V

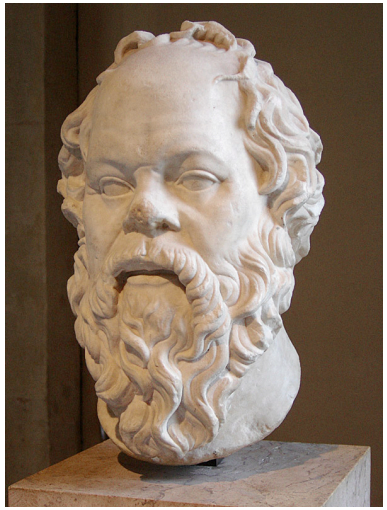
The value explains why G is a goal, and is my reason to perform A

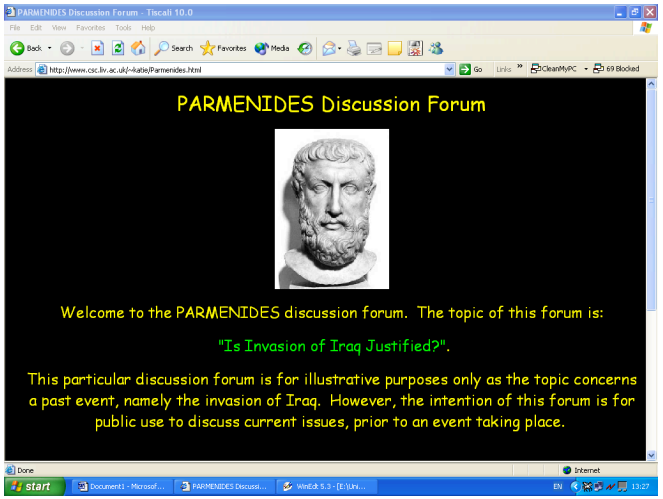
- Associated with argumentation schemes are critical questions that are used to probe assumptions and exceptions of arguments

- Instantiating the scheme and CQs gives rise to a range of competing arguments on a topic of debate

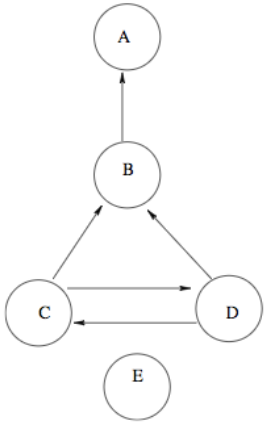
First Application - 2005

- A general theory of persuasion in legal argument was developed
- And an implementation of this: the Parmenides tool
  - Aim was to address the emerging needs of e-democracy
  - The tool allowed structured argument over a proposed course of action, without requiring knowledge of the underlying argumentation theory
  - Envisaged use of the tool by government or policy focus groups to justify policy proposals





Back to the theory - 2007

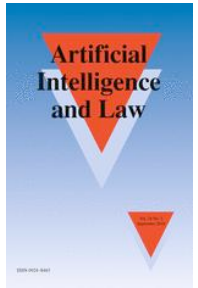


- In the argumentation community, work was developing on argumentation schemes and the potential for moving from “real world” arguments to “abstract” arguments

- JURIX 2007: “Arguments, Values and Baseballs: Representation of Popov v. Hayashi” by A. Wyner, T. Bench-Capon and K. Atkinson

- Provided a detailed example of representation and reasoning about legal cases through the use of argument schemes, argumentation frameworks and their evaluation

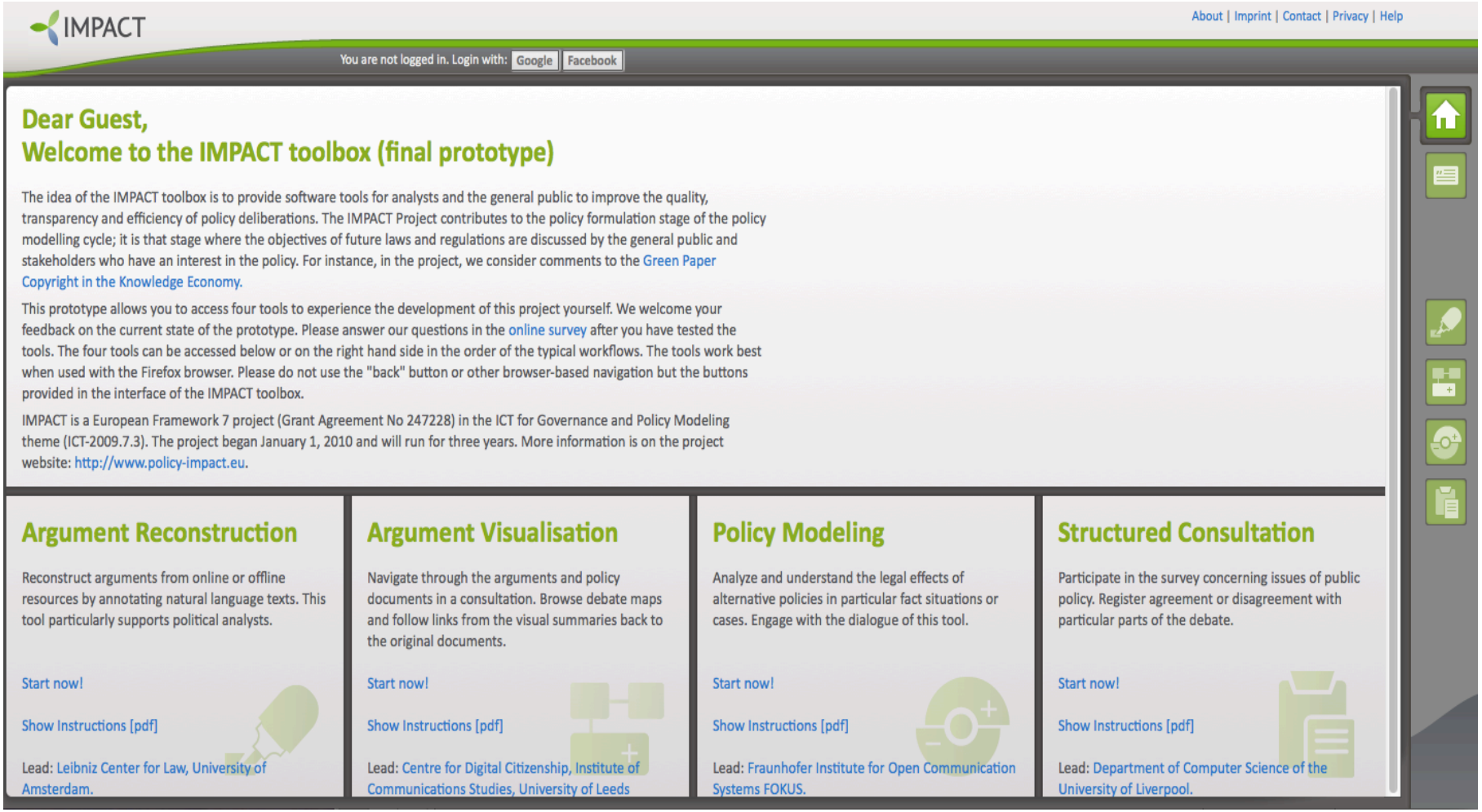
- Followed up with a special issue of AI and Law journal on “Modelling Legal Cases” acomparing and contrasting different approaches to modelling the same case



Back to Applications – 2010-2013

- IMPACT: Integrated Method for Policy Making Using Argument Modelling and Computer Assisted Text Analysis
  - EU FP7 project between Universities of Amsterdam, Leeds and Liverpool; Fraunhofer FOKUS; User Interface Design GmbH; and, Zebralog GmbH
  - Aim: develop and integrate formal, computational models of policy and arguments about policy, to facilitate deliberations about policy [...] … models used to develop and evaluate innovative prototype tools for supporting open, inclusive and transparent deliberations about public policy

IMPACT Argumentation Toolbox



Back to the theory again - 2014

- Recent proliferation of theoretical work from the computational models of argument community
  - How to make use of this in real world applications?

COMMA

- JURIX 2014: "Abstract dialectical frameworks for legal reasoning" by L. Al-Abdulkarim, K. Atkinson and T. Bench-Capon
  - Use ADFs as a framework for reasoning about legal cases

- Media attention on the field of AI continues to grow, and much more interest shown in research on AI and Law
  - Innovate UK fund a project between the University of Liverpool and Riverview Law to investigate automated reasoning techniques from AI to create a new service line for the company

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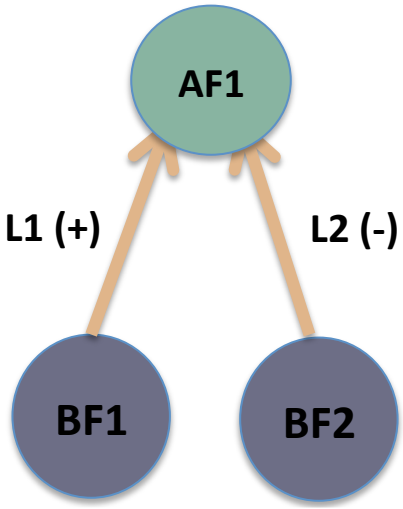
Innovate UK

Riverview LAW
Legal input. Business output.

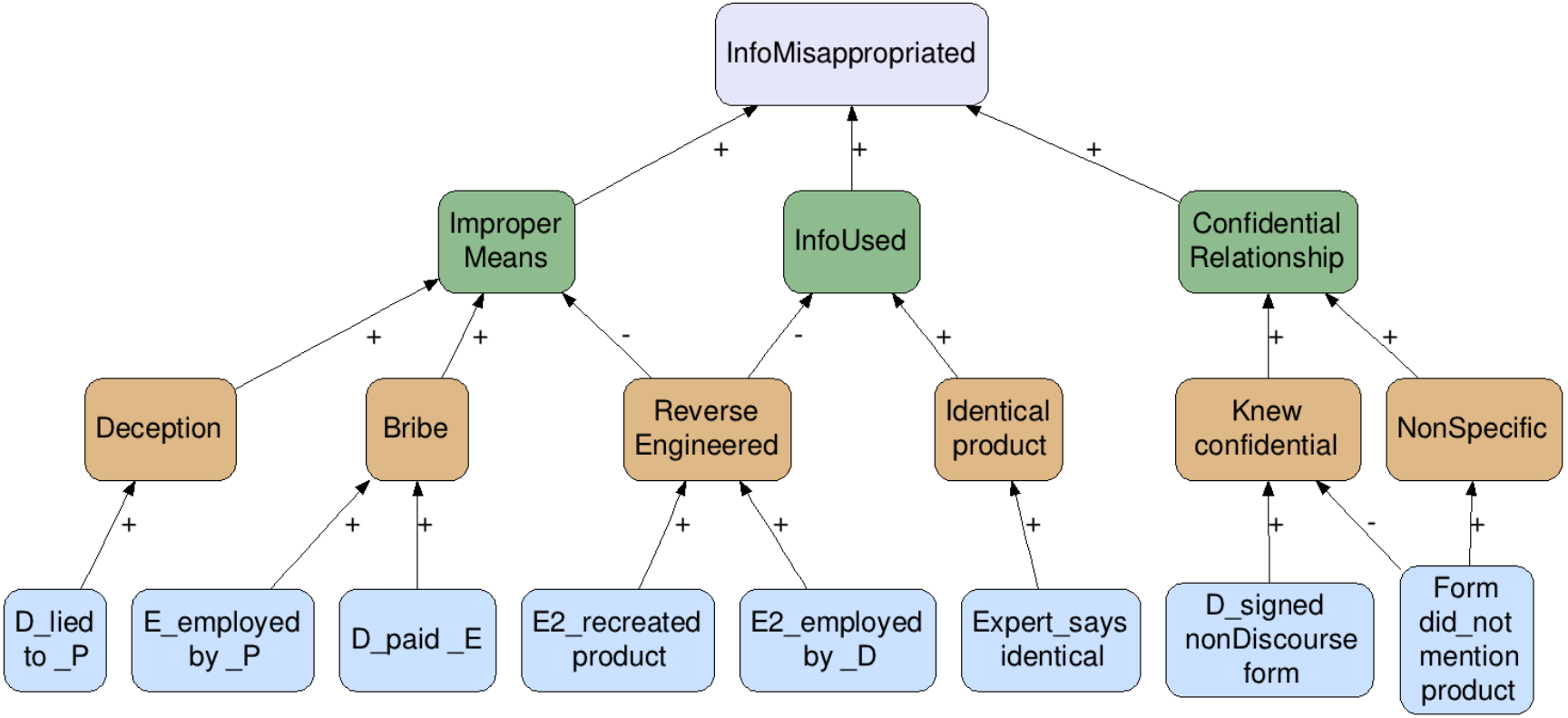
Application based on a methodology for reasoning about legal cases - 2016

- ANGELIC: ADF for kNowledGe Encapsulation of Legal Information from Cases
- A methodology for capturing knowledge of a legal domain, which is then used for deciding cases
  - Knowledge captured as an Abstract Dialectical Framework
  - Implementation in Prolog

- Aim was to make use of well defined theory of abstract argumentation and show how it can be instantiated with real world problems
  - A key aspect is the local acceptance conditions



Sample ADF of info captured in the program



Headline results from Angelic Evaluations

- 3 domains used for evaluation
  1. 32 cases in the domain of US trade secrets
  2. 5 cases concerning wild animals
  3. 10 cases concerning the US automobile exception to the Fourth Amendment

- Results
  1. 31 out of 32 cases decided correctly
  2. 5 out of 5 cases decided correctly
  3. 9 out of 10 cases decided correctly

  And each decision is accompanied by an explicit justification.

Latest developments on Angelic

- The approach has been tested on cases familiar to the AI and Law community

- Next steps: evaluate on current cases
- To do this, have developed a tool to enable the move towards useable application: Angelic Environment
  - See the environment at the demo session later today!

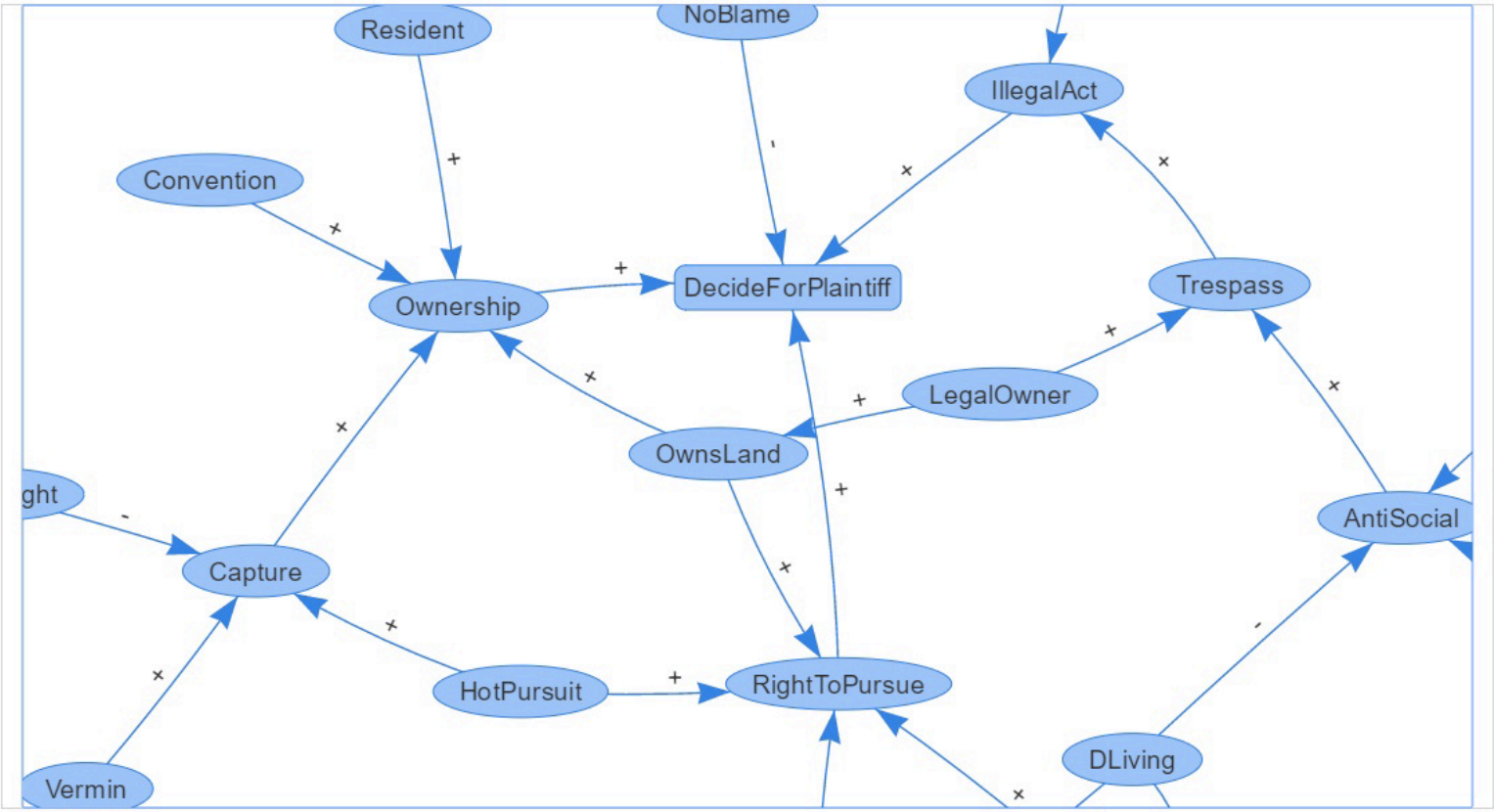
- The methodology is being applied to a new 'real world' domain as part of a collaborative project with law firm Weightmans

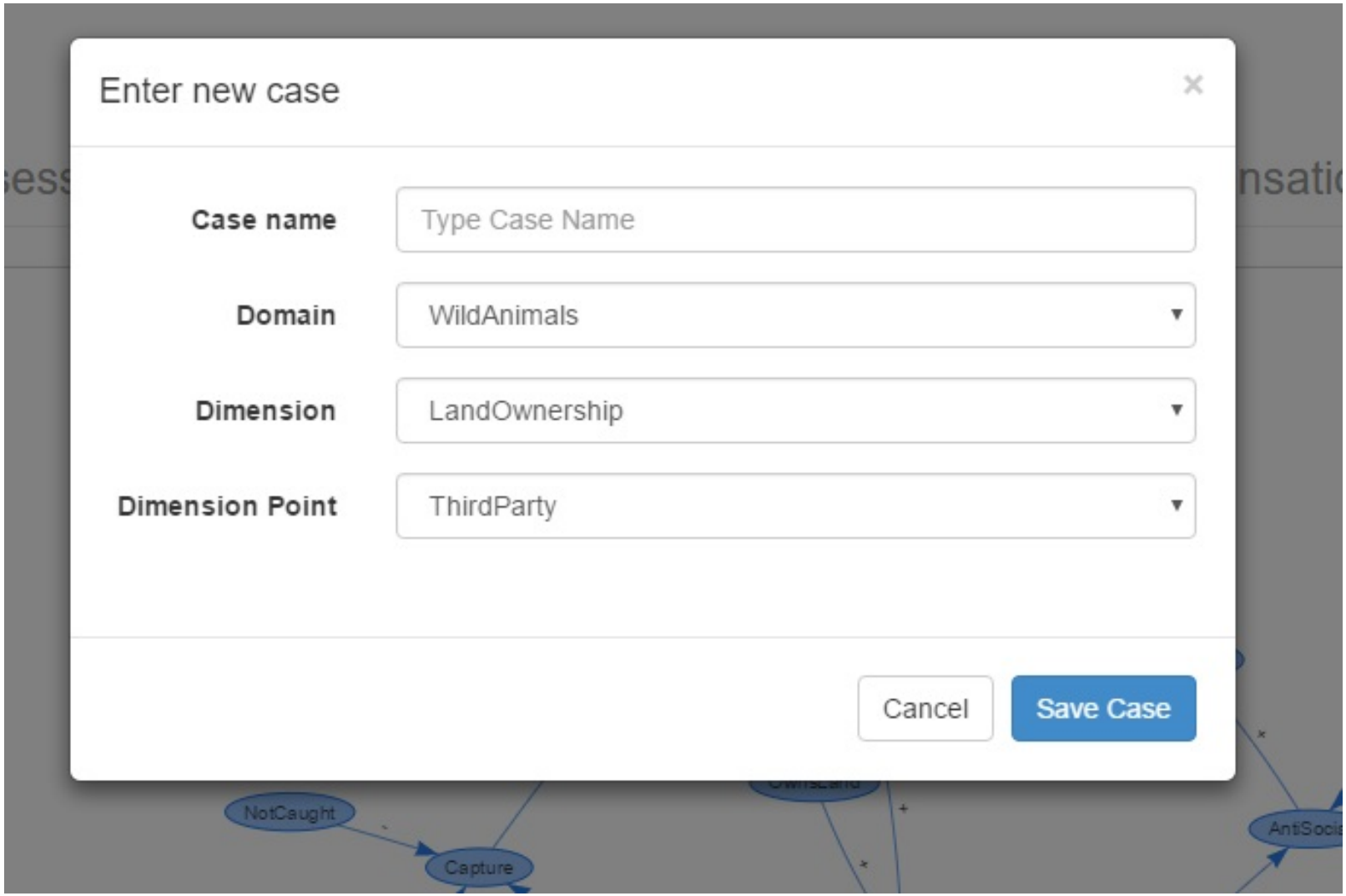
- The front-end of the tool is being driven by the user requirements in terms of the data that needs to be entered and the order in which data is solicited

WildAnimals

When does a pursuer gain possession of the quarry? When does interference require compensation?

- Enter Case Facts
- Visualise Domain
- Additional Information
- Generate Knowledge Base
- Compute Case Generation




Enter new case
Case name
Type Case Name
Domain
WildAnimals
Dimension
LandOwnership
Dimension Point
ThirdParty
Cancel
Save Case
NotCaught
Capture

Lessons Learnt

- The current work just described has its roots in research started in 2003
  - We know that it can take a long time for research to mature and be developed into useable end applications
- Task-driven applications remain highly important, particularly given the current hunger from law firms to invest in AI
- The problem is that it is hard to start with the end users' requirements when researchers are starting by answering interesting theoretical questions
- Flexibility is needed when selling your wares

Are these lessons changing over time?

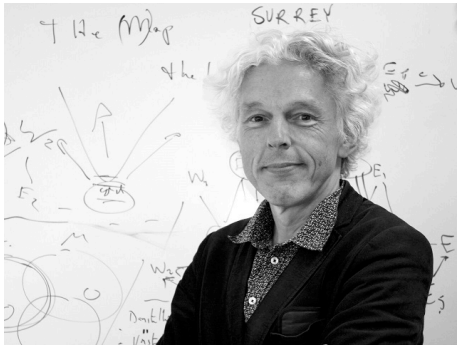
- Reflections from Past Presidents of IAAIL

Jack G. Conrad (2015)

- IAAIL should learn from, and partner with, industry whilst acknowledging our roots

Radboud Winkels (2013): The Research Paradox

- The kind of research needed by society and in practice seems to correlate negatively with our research endeavors
  - Our research pursues "legally interesting" problems instead of practically interesting ones



Reflections from Past Presidents of IAAIL

Thomas Gordon (2007)

- Focus first on providing solutions for private companies with deep pockets and a willingness to innovate

L. Karl Branting (2005):

- ICAIL has successes to celebrate, but is less successful at standards, repositories, shared evaluation criteria
- Still less successful at embodying key research results
  - Commercial development largely *independent* of AI & law literature
  - Contrast speech understanding, data mining, planning, question answering, or robotics

Progress on past Presidents' calls to action

- Branting (2005)
  - Develop techniques that are usable by commercial developers
    - Some success stories, but many techniques remain in the academic literature
  - Develop corpora and data repositories
    - IAAIL dataset resource currently thin
  - Let disinterested domain experts judge models
    - Pockets of progress

- Gordon (2007)
  - Focus first on providing solutions for private companies with deep pockets and a willingness to innovate
    - Now plenty of examples of the commercial sector showing a willingness to innovate

Progress on past Presidents' calls to action

- Winkels (2013)
- How to address the research paradox?
  - Design an AI & Law Challenge …
    - Predict future developments
    - Argumentation game of humans vs. machine
    - Solve the story interpretation challenge
      - 2017 Competition on Legal Information Extraction/Entailment

COLIEE-2017 Workshop: June 12, 2017
COLIEE-2017 Live Competition: June 13, 2017
London, UK

- Conrad (2015)
  - Acknowledge our roots … while embracing new developments
  - Invite greater participation from industrial players, incl. start-ups
  - Consider other engagements beyond ICAIL
  - Consider new collaborations, new partnerships

The tent has widened in 2017

- 2017 saw a record number of submissions to the main track of the conference
  - 103 papers submitted
  - Cover established and new topics, inc. workshops

- We also have a record number of participants
  - 281 people registered across the week
  - (The previous record was 2015 with 180 participants)

1st ICAIL Workshop on AI and Legal Practice

- "…aims to bridge the gap between legal professionals and AI & Law researchers"

- 95 people registered for this workshop alone

- Topics discussed include
  - Developing a shared language, fixing the piping before thinking about the magic, IP issues, lack of shared datasets, competition driving hype, lack of open source software, the need to be task focused, lack of collective thought …

Questions for the community to consider

- We now have large corporate competitors
  - Can and should we compete with them?
  - Yes - plenty of problems remain unsolved; new techniques emerge from academia; focused collaborative projects can be fruitful

- Differentiation in the LegalTech space
  - Blue sky research from AI and Law can be a differentiator

- Engage with AI-hungry commercial parties
  - Be task-focused and therefore flexible

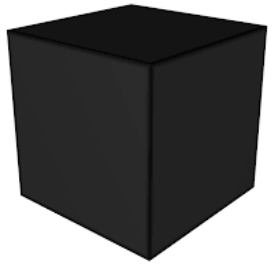
- The need to engage on the wider issues around AI and Law solutions (ethics, correctness, the legal implications!)

www.wired.com
4 April 2017

COURTS ARE USING AI TO SENTENCE CRIMINALS. THAT MUST STOP NOW

Issues in addition to solving the task based problems

- Law firms want systems that can provide explicit justifications for automated decisions
  - Black boxes are not acceptable



- Legal implications of the legal AI systems
  - Do predictions satisfy 'correct' legal reasoning?
- Is society ready to allow AI systems to make legal decisions?
  - Wider issue of reliability of human decision making vs machine decision making

External factors

- Funding bodies' increased focus on pathways to impact accelerating collaborations with industry
  - Law firms take note!

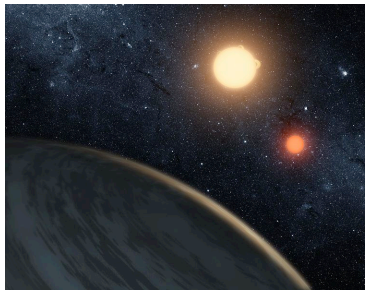
REF2014
Research Excellence Framework

- Government initiatives are becoming more tech focused
  - The online courts in the UK
  - "Our principal recommendation is that HM Courts & Tribunals Service … should establish a new, Internet-based court service, known as HM Online Court"

ONLINE DISPUTE RESOLUTION
FOR LOW VALUE CIVIL CLAIMS
Online Dispute Resolution Advisory Group

- Tech giants with resource and/or support for collaborative projects

IBM Debating Technologies



Final Thoughts

Samantha Cameron: Instagram

- In 2017 opportunities are abound for research from AI and Law to have a real impact on industry

- Plenty of law firms are interested in hearing about what our research can offer
  - Commercial providers of AI tools are doing an excellent job of engaging with law firms (and now law schools!)
  - We should continue joining the dots between the stakeholders

- The popularity of ICAIL 2017 needs to be used as a springboard for the development and deployment of the community's research results
  - (And we will still have our interesting problems to work on)

Acknowledgements

- Thanks to the following colleagues with whom I have collaborated on work in AI and Law mentioned in this talk
  - Latifa Al-Abdulkarim, Trevor Bench-Capon, Danushka Bollegala, Frans Coenen, Tom Gordon, Ann Macintosh, Peter McBurney, Henry Prakken, Tom van Engers, Radboud Winkels, Adam Wyner

- Innovate UK fund Knowledge Transfer Partnership (KTP) projects with Riverview Law and Fletchers Solicitors

- Thanks also to Weightmans with whom the University of Liverpool is also collaborating

Riverview LAW
Legal input. Business output.

Weightmans

Innovate UK

FLETCHERSSOLICITORS