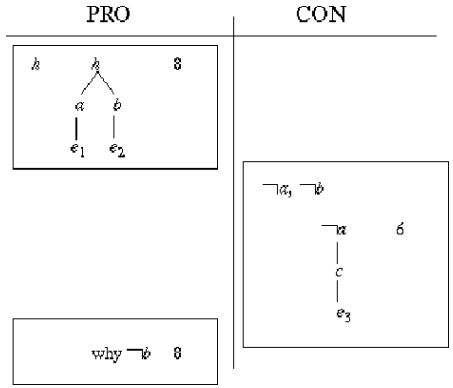
AI and Law:

some thoughts on argument+precedent, analytics+privacy

Ronald P. Loui / CivicFeed

For March 12, 2019 Oberlin College Visit

Argument based on defeasible reasons



- We bully freshmen into (if p then q) = (q v !p)
- We lie about this
- There are alternative ways to axiomatize conditionals
  - e.g., counterfactuals + possible-worlds
- Maybe the real action is in the meta-language
  - What can you construct? Not how does it constrain?
  - Process vs semantics; input/output vs representation; knowing vs meaning

Defeasible reasons

- is-reason-for(p, q)
  - Like prob(p, q, k)
    - where p, q are sentences in L
  - See Kyburg (who cites Carnap)
- We say p >– q
- But also p ^ r >– !q
- Why? Because most reasons are defeasible!

My doctoral thesis

Is-reason is in the Meta-L

prob is in the Meta-L

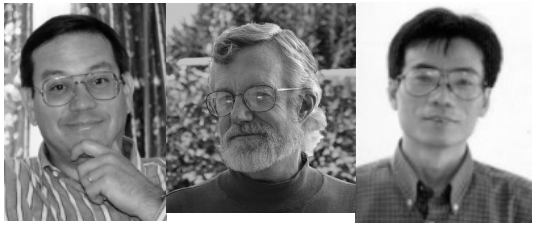
Thesis advisor

Vienna Circle

Arguments from reasons

- An argument is a chain of reasons
  - like a proof, but it matters what counter-arguments there are
  - it's just a tree, usually
- A dialectic is a set of arguments that counter each other
  - it's just a tree of trees, often
- Phan Minh Dung
  - is considered the canonical Abstract Argumentation System currently
  - Many conferences in Europe each year
  - see also Doyle, Pollock

First doctoral student



On the acceptability of arguments and its fundamental role in nonmonotonic reasoning, logic programming and n-person games

PM **Dung** - Artificial intelligence, 1995 - Elsevier

The purpose of this paper is to study the fundamental mechanism, humans use in argumentation, and to explore ways to implement this mechanism on computers. We do so by first developing a theory for argumentation whose central notion is the acceptability of …

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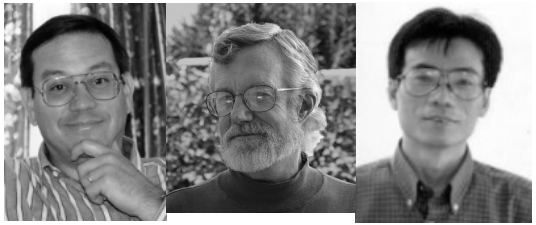

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Decision = 3130
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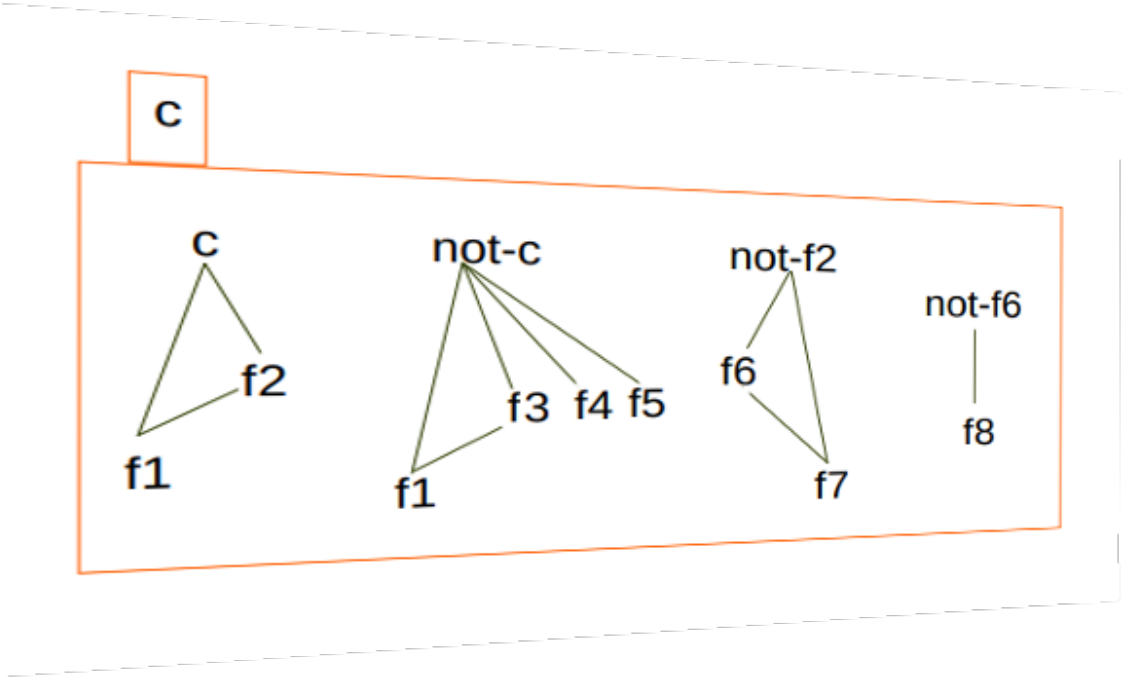
NatD = 2625
Modal = 2351 or 3530
Events = 2196
CLP = 2138
Probabilistic = 1643
Dynamic = 1592
ILP = 1255
Deontic = 1229

Specificity and Analogy

- If (p >– q) and (p ^ r >– !q)
  - p ^ r is more specific
  - so it defeats/dominates
- Like
  - prob(q | p) vs prob(q | p^r)
- Most useful in analogies
  - Arguably q, as in case1, which shares p
  - Arguably !q, as in case2, which shares both p and r

Formal model of precedent in Law

- Because these args are not orderable by specificity
- A judicial decision that c produces a “rule of the case”
  - Even when f6, f7,
  - Decide c when f1 and f8
  - Even when f3, f4, f5 too



Arguments for milestones (2017)

- Argument in AI done deal
- EU work on argument+decision
- Life is not a lottery (economists lie!), but plans are extensible paths
- Paths are connected by arguments
  - Sufficient probability
  - Professional standard of care
  - Commitments to mitigate risks
- New place for probability in risk management?

$$\mathrm{E}\left[u\left(x\right)\right]=\sum_{i=1}^{n}u\left(x_i\right)p_i$$

Against Narrow Optimization and Short Horizons: An Argument-based, Path Planning, and Variable Multiattribute Model for Decision and Risk

Ronald P. Loui
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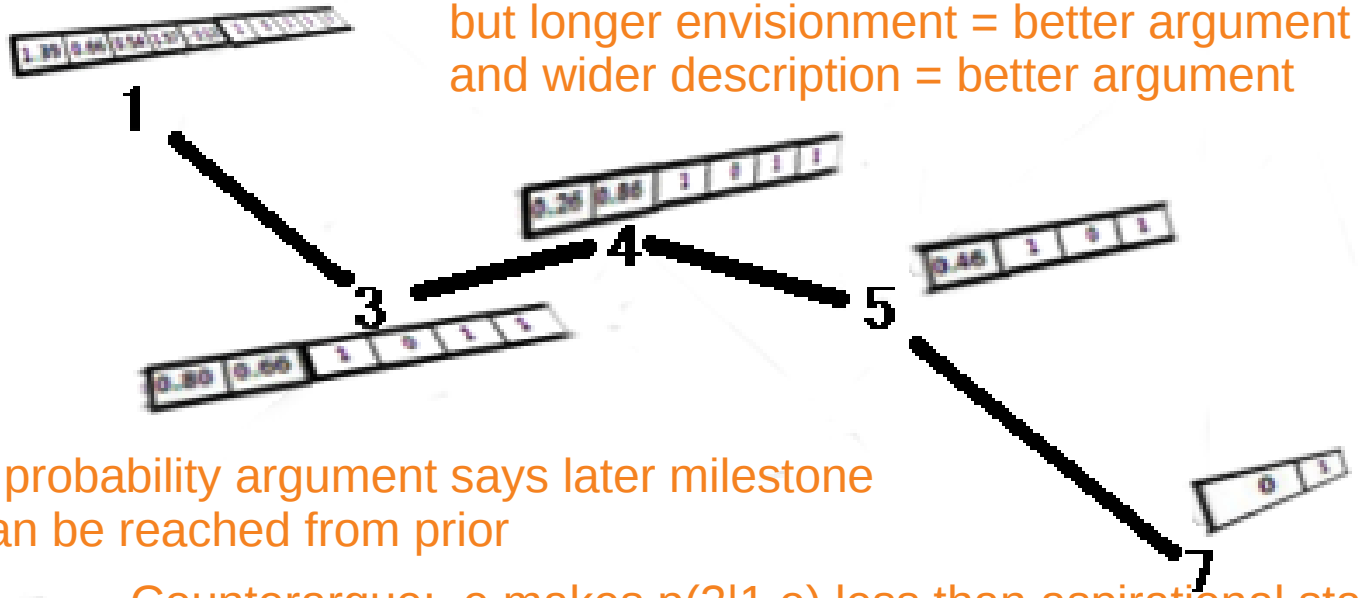
Abstract

This paper proposes a mathematical approach to analysis of decision and risk that makes use of the constructive argument logics that have become commonplace recently in artificial intelligence.

Instead of requiring an idealized, expected utility analysis of alternatives, in this paper, arguments appraise the desirability, comprehensiveness, and acceptability of incompletely described projections of the future. Instead of a qualitative risk management assessment process, threats and mitigations are represented numerically, but appraised with arguments, especially probability arguments and mitigation arguments, not averages. Arguments are given for or against the adequacy of commitments. Instead of using logic to derive the properties of acts that transform situations, *e.g.*, to construct goal-satisfying plans, in this paper, dialectical burdens are placed on demonstrating to a standard that investments and response policies will attain each milestone on a proposed trajectory. Trajectories are extensible and valuations are multi-attribute with varying completeness as knowledge permits. Superior trajectory specificity will be related to superior argument specificity.

Arguments for Milestones (2017)

Naturally more is assertible about earlier milestones
but longer envisionment = better argument
and wider description = better argument



A probability argument says later milestone
can be reached from prior

Counterargue: e makes p(3|1,e) less than aspirational standard

Reinstate: c makes p(3|1,e,c) again sufficient

AI and Law
(my 1992-2012)

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A Design for Reasoning with Policies, Precedents, and Rationales

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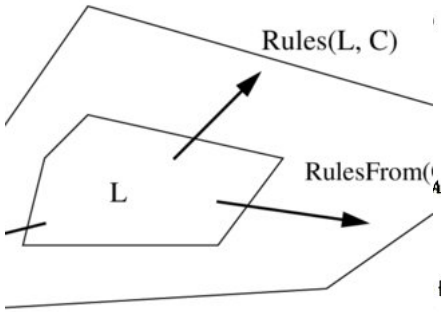

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An s-rationale.

1. pro: arg_1 = <{ b >-- a }, b! ∴ a> "a because of b."

{ arg_1 }; dec_1 = pro.

2. con: "your argument really involves d and e: a achieves e; b is an instance of d."

2.1. $s\text{-}rat_1$(b >-- a) = <{ d >-- e }, b! (d or not-b)! (a or not-e)! ∴ a> "this is the real form of your argument."

2.2. Attack < b >-- a, arg_1 >

2.3. arg_2 = <{ d & f >-- not-e }, d! f! ∴ not-c> "in light of this, my argument for not-e is a counterargument."

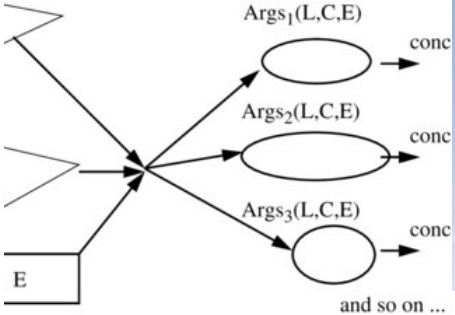
$ArgRec_2$ = { arg_1rev, arg_2 }; dec_2 = none.

where

arg_1rev = subst(arg_1, b >-- a , $s\text{-}rat_1$(b >-- a))

Here, arg_2 defeats arg_1rev because it is more specific. But arg_2 does not defeat arg_1 on specificity.

3. pro: arg_3 = < { d & f & g >-- e },



Rationales and Argument Moves

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(Received 16 May 1994)

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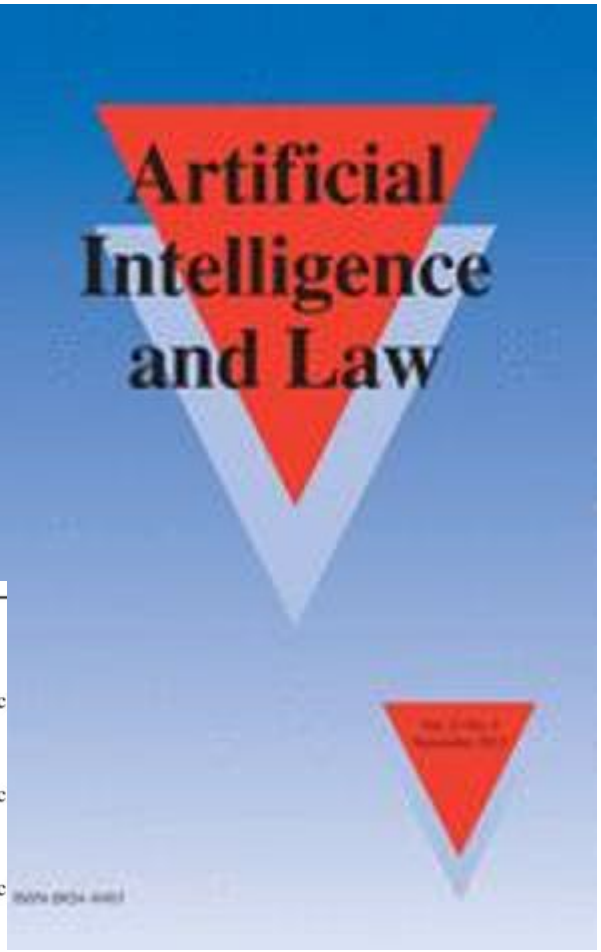

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Key words. rationale, ratio legis, ratio decidendi, principle, purpose, dialectic, procedure, argument, rule, policy, backing, defeasible reasoning, case-based reasoning, logic.

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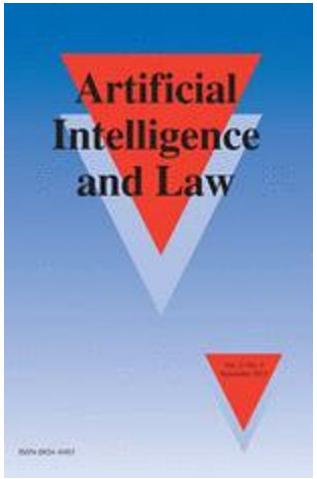

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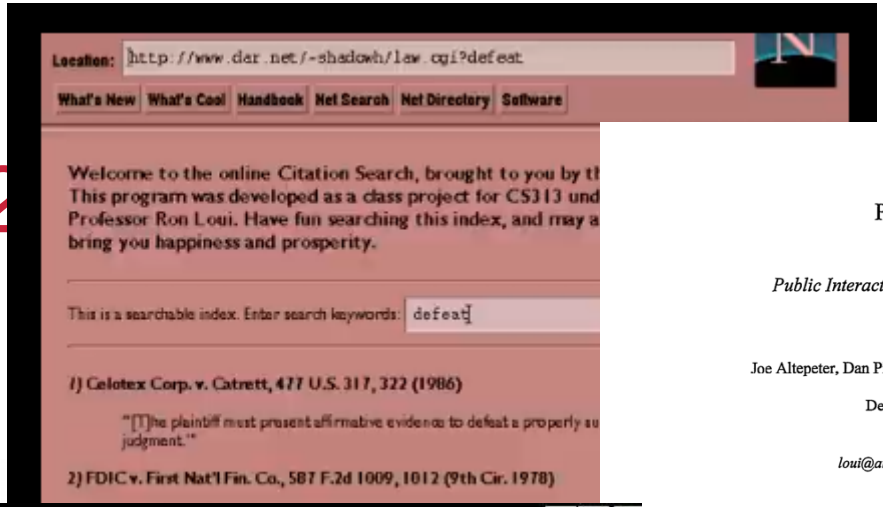

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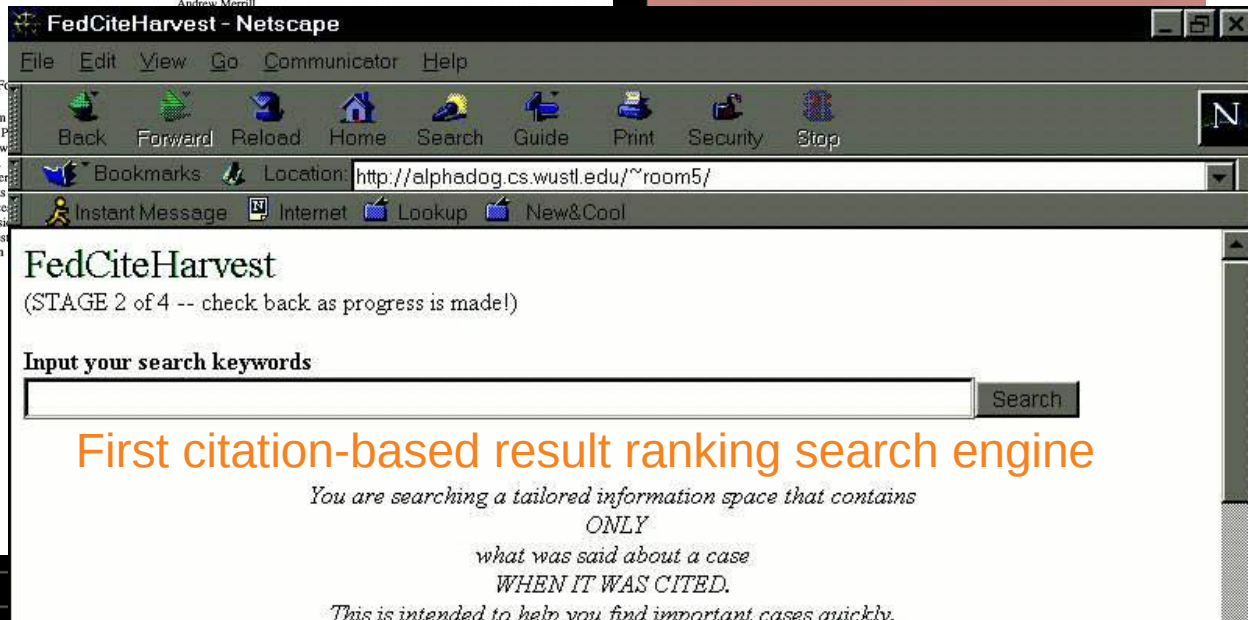

Room 5

We are currently building a website which provides a mechanism for studying a broad community's willingness to perform structured legal argumentation.[i]

Visitors to the website are permitted to make moves in an argument game.[ii] Their moves are entered in a format that structures the disputation. The disputes are taken from recently decided U.S. Supreme Court cases.[iii] Visitors can argue either pro-petitioner or pro-respondent. They can change the current opinion in a Room 5[iv] case by giving an argument that meets the burdens of the side they are assisting. The tokens of the game are generated largely by the visitors to the site.

Room 5 supports datamining and computer-mediated communication. It is based loosely on a minimal theory of argument and defeat. The project's ambitions are however, non-technical. They are:

1. *To identify a community of web-users willing to play semi-formal legal argument games*;

2. *To gauge the willingness of such users to be subject to the constraints of various formats, gauge their general understanding of constructions permitted, and determine the practical limits of a few formats' expressiveness*;

3. *To permit a community of non-naive contributors to construct an ontology for U.S. federal law and a database of semi-structured arguments*. The ambition here is

[i] This work was supported by NSF 9503476 (information technology and organizations) and NSF 9415573 (undergraduate research). Jeff Norman can be reached at Foley and Lardner, s. 3300 One IBM Plaza 330 North Wabash Avenue, Chicago, IL 60611. Mark Foltz can be reached at the MIT AI Laboratory, 545 Technology Square, Cambridge, MA 02139.

[ii] Argument games are well-recognized as useful theories. Prominent examples for this community are *Wff'n'Proof* of Allen, Bench-Capon's explanation-inducing dialogue games, *An Argument Game* from one of the authors (http://cs.wustl.edu/~kang/game.html), Gordon's *Pleadings Game*, and Lodder and Herczog's *DiaLaw*. Models that are not explicitly games but essentially are games include Nitta et al's *HELIC-II*, and Aleven and Ashley's *CATO*.

[iii] Pending Supreme Court cases are the real targets for Room 5 disputes precisely because of the interest that members of a broad community might have in arguing them. However, the existing work at this time has been only with past cases.

[iv] "Room 5, Washington, D.C." is the mailing address of the U.S. Supreme Court.

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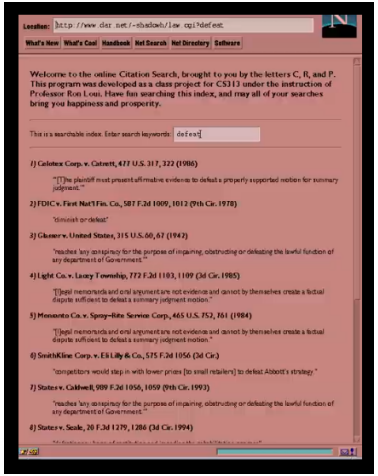

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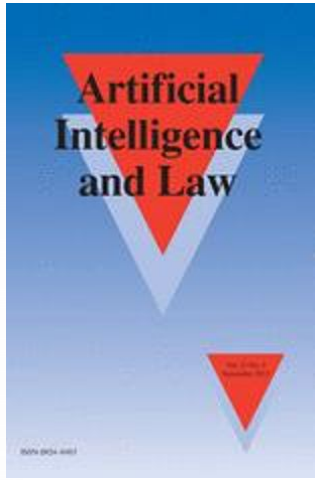

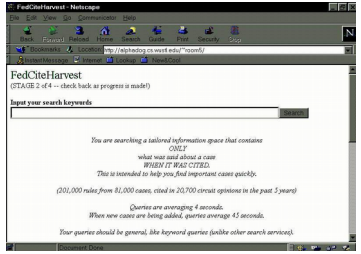

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AI and Law (my 1992-2012)

A Design for Reasoning with Policies, Precedents, and Rationales

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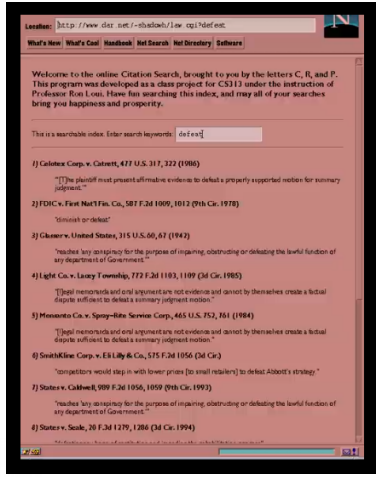

Progress on Room 5

A Testbed for Public Interactive Semi-Formal Legal Argumentation

Ronald P. Loui
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Room 5

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Visitors to the website are permitted to make moves in an argument game.[2] Their moves are entered in a format that structures the disputation. The disputes are taken from recently decided U.S. Supreme Court cases.[3] Visitors can argue either pro-petitioner or pro-respondent. They can change the current opinion in a Room 5[4] case by giving an argument that meets the burdens of the side they are assisting. The tokens of the game are generated largely by the visitors to the site.

Room 5 supports diminishing and computer-mediated communication. It is based loosely on a relational theory of argument and defeat. The project's ambitions are however, non-technical. They are.

1. *To identify a community of web-users willing to play semi-formal legal argument games;*
2. *To gauge the willingness of such users to be subject to the constraints of various formats, gauge their general understanding of constructions permitted, and determine the practical limits of a few formats' expressiveness;*
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[1] This work was supported by NSF 9502474 (information technology and organizations) and NSF 9453375 (undergraduate research). Jeff Norman can be reached at Foley and Lardner, s. 3300 One IBM Plaza 330 North Wabash Avenue, Chicago, IL 60611. Mark Foltz can be reached at the MIT AI Laboratory, 545 Technology Square, Cambridge, MA 02139.

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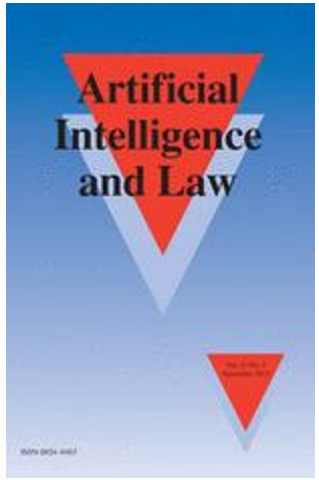

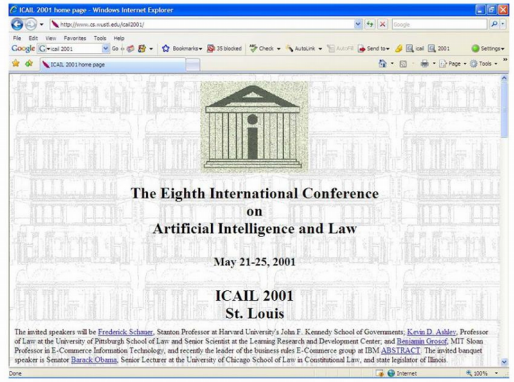
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Rationales and Argument Moves

R. P. LOUI
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JEFF NORMAN
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(Received 16 May 1994)

Abstract. We discuss five kinds of representations of rationales and provide a formal account of how they can alter disputation. The formal model of disputation is derived from recent work in argument. The five kinds of rationales are compression rationales, which can be represented without assuming domain-knowledge (such as utilities) beyond that normally required for argument. The principal thesis is that such rationales can be analyzed in a framework of argument not too different from what AI already has. The result is a formal understanding of rationales, a partial taxonomy, and a foundation for computer programs that represent and reason with rationales.

The five kinds of rationales are as follows: (c)ompression and (s)pecialization, which yield rules, and (d)isputation, which yields a decision. These are modeled as potentially changing the focus of the dispute. Then there are (f)it, a rationale for rules, and (r)esolution, a rationale for decisions. These cannot be modeled as simply; they force disputation to a meta-level, at least temporarily.

The paper first discusses each kind of rationale in the abstract. Then it produces a model of dispute in which the simpler rationales can be analyzed. Formal examples are given. The model is augmented to allow analysis of the more difficult rationales. Examples are again given. The discussion is not intended to be strictly mathematical; rather, it aims to use formal methods to illuminate and provide framework for future interpretation and implementation.

Key words. rationale, ratio legis, ratio decidendi, principle, purpose, dialectic, procedure, argument, rule, policy, backing, defeasible reasoning, case-based reasoning, logic.

I. Rationale.

In disputation, claims are supported by arguments, which refer to rules, cases, and evidence. Sometimes, the rationales of rules and the rationales of decisions in cases appear in disputation as well.

AI and Law (my 1992-2012

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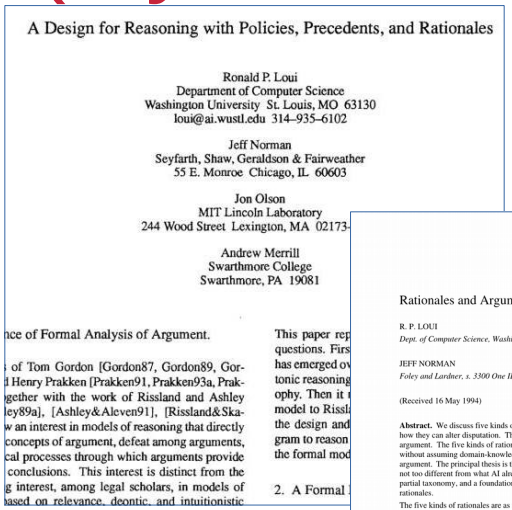

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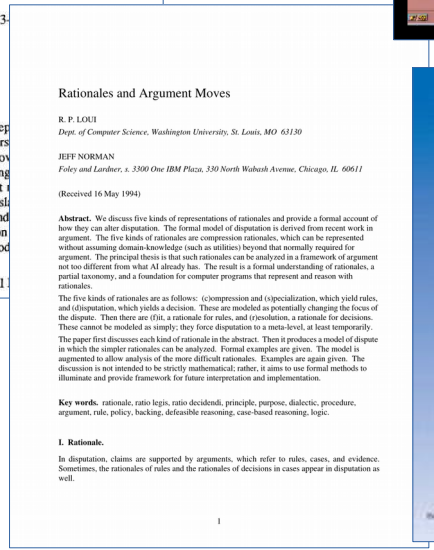

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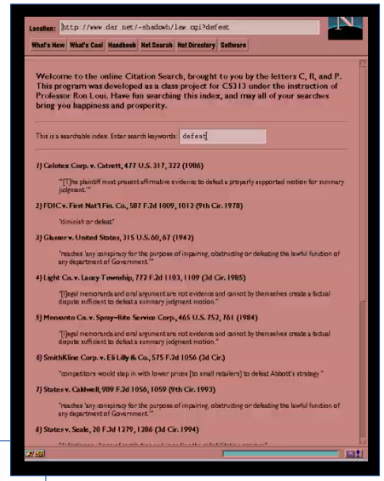

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1) **Celotex Corp. v. Catrett, 477 U.S. 317, 322 (1986)**

"[T]he plaintiff must present affirmative evidence to defeat a properly supported motion for summary judgment."

2) FDIC v. First Nat'l Fin. Co., 587 F.2d 1009, 1012 (9th Cir. 1978)

"diminish or defeat."

3) Glasser v. United States, 315 U.S. 60, 67 (1942)

"reaches 'any conspiracy for the purpose of impairing, obstructing or defeating the lawful function of any department of Government.'"

4) Light Co. v. Lucky Township, 772 F.2d 1103, 1109 (3d Cir. 1985)

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5) Monsanto Co. v. Spray-Rite Service Corp., 465 U.S. 752, 761 (1984)

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6) SmithKline Corp. v. Eli Lilly & Co., 575 F.2d 1056 (3d Cir.)

"competitors would step in with lower prices [to small retailers] to defeat Abbott's strategy."

7) States v. Caldwell, 989 F.2d 1056, 1059 (9th Cir. 1993)

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8) States v. Seale, 20 F.3d 1279, 1286 (3d Cir. 1994)

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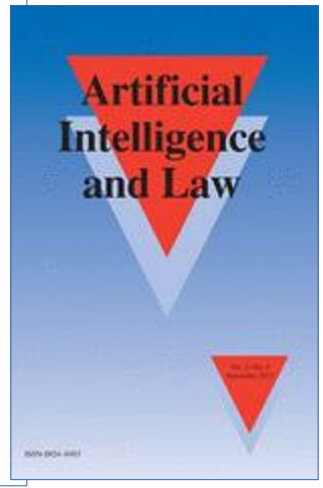

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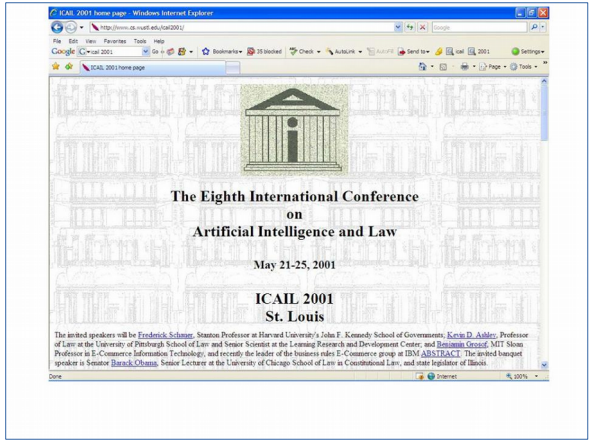

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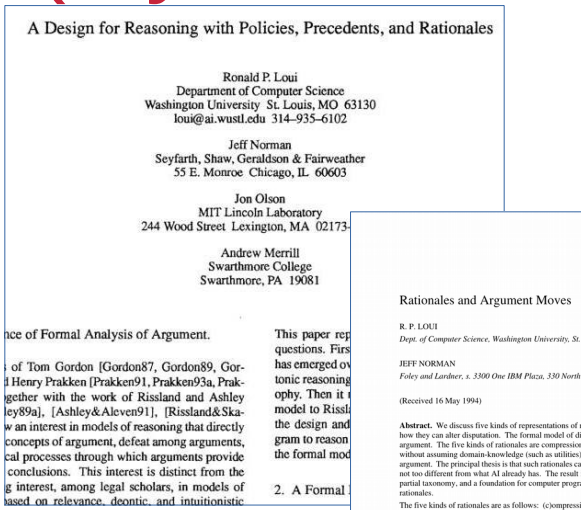

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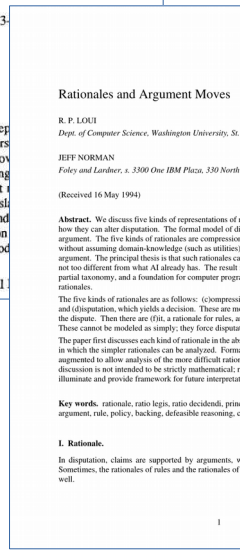

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Key words. rationale, ratio legis, ratio decidendi, prin
argument, rule, policy, backing, defeasible reasoning, c

I. Rationale.

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well.

1

Noname manuscript No.
(will be inserted by the editor)

A History of AI and Law in 50 papers:
25 Years of the International Conference on AI and Law

Trevor Bench-Capon · Michal Araszkiewicz · Kevin Ashley · Katie Atkinson · Floris Bex · Filipe Borges · Daniele Bourcier · Paul Bourgine · Jack G. Conrad · Enrico Francesconi · Thomas F. Gordon · Guido Governatori · Jochen L. Leidner · David D. Lewis · Ronald P. Loui · L. Thorne McCarty · Henry Prakken · Frank Schilder · Erich Schweighofer · Paul Thompson · Alex Tyrrell · Bart Verheij · Douglas N. Walton · Adam Z. Wyner

the date of receipt and acceptance should be inserted later

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HART'S CRITICS ON DEFEASIBLE CONCEPTS AND ASCRIPTIVISM

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Abstract

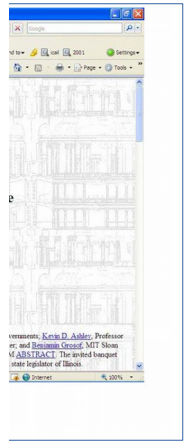
Hart's "Ascription of Responsibility and Rights" is where we find perhaps the first clear pronouncement of defeasibility and the technical introduction of the term. The paper has been criticised, disavowed, and never quite fully redeemed. Its lurid history is now being used as an excuse for dismissing the importance of defeasibility.

Quite to the contrary, Hart's introduction of defeasibility has uniformly been regarded as the most agreeable part of the paper. The critics' wish that defeasibility could be better expounded along the lines of a Wittgensteinian game-theoretic semantics has largely been fulfilled.

Even the most contentious part of the paper, Hart's claim that the ascription of acts implies responsibility, is not as mistaken as some have taken it to be.

The paper remains a paragon of clarity in the important and active scholarly area that crosses legal reasoning, language, and logic.

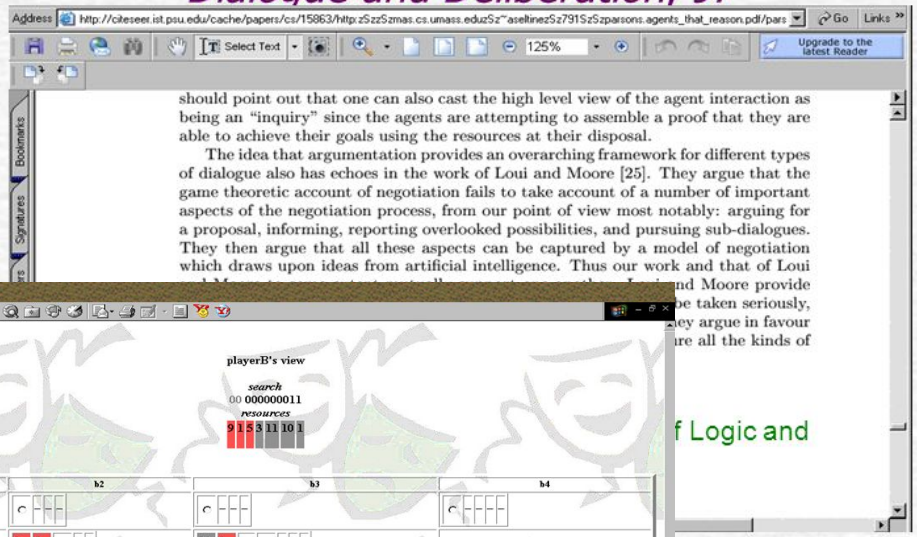
Precis given at the Fifth Intl. Conf. on AI and Law, Washington D.C., May 1995

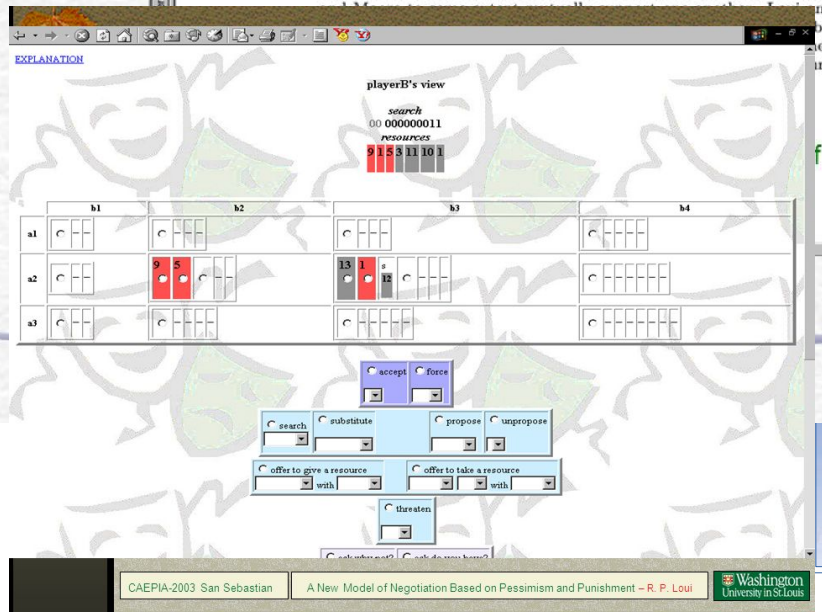


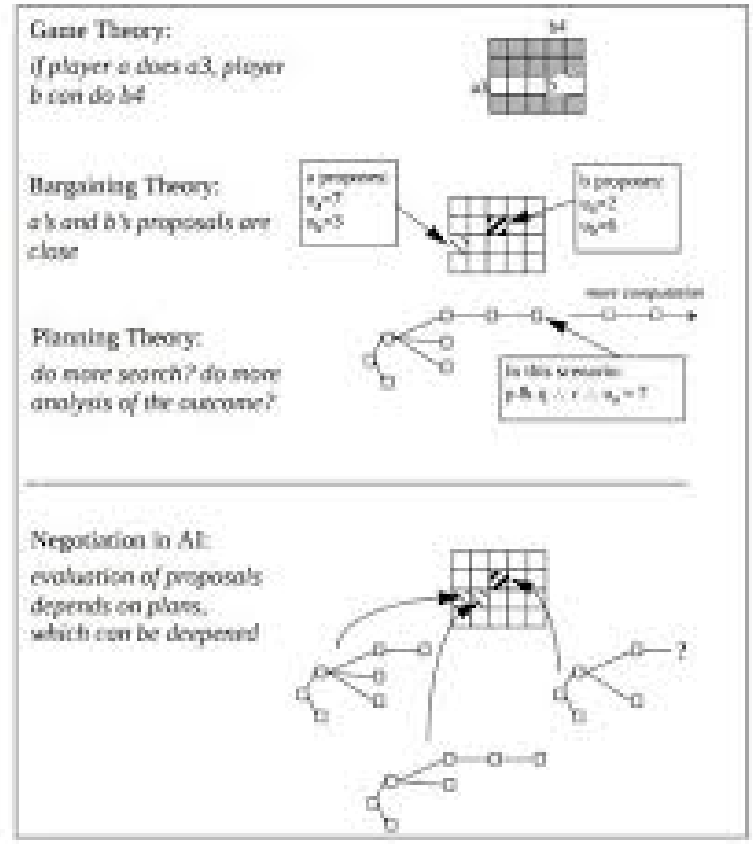
AI Model of Negotiation:

Diana Moore's B.Sc. Thesis,

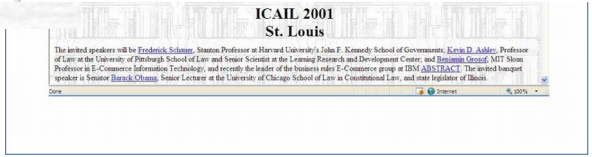
Dialogue and Deliberation, 97







Loui



Book Title
Book Editors
IOS Press, 2003

Game Mechanisms & Procedural Fairness

Moshe Looks [a,1] and Ronald P. Loui [a]
[a] *Dept. of Computer Science, Washington University in St. Louis*

The main paper to which this abstract refers models procedural fairness and procedural justice, crucial concepts in the design and appraisal of social interaction [1]. Argumentation systems in particular owe the quality of their inferences to the quality of the procedure that produces them. We are interested in both games that can be justified without reference to substantive social purposes, such as tournaments, and games that are fair, even if they are formally asymmetric, because they are appropriate to their social purposes, such as litigation and prosecution games.

A mathematical theory of procedural fairness has eluded theorists (much informal discussion in this regard has centered around the work of Rawls [2]). Such a theory would give formal standing to devices such as anonymization through chance and turn-swapping, equality of opportunity, symmetry of rules, and exchangeable asymmetries. It would understand the fundamental role of fair procedure: to construct justifiable ex post asymmetries that could not be justified except by reference to the procedure that produced them. Such a procedure begins with a justifiable ex ante position, and constructs its outcome on serendipity of play and chance, under an independently justifiable regimen.

We have developed a preliminary formal framework for exploring some mathematical properties of procedural fairness. The framework encompasses deterministic and stochastic games and player strategies, and contains formal devices for recursively composing complex games from simple components, including devices concerned with modifying/introducing procedural fairness properties. We also define allocation games as a special case, and may then invoke familiar game-theoretic concepts. Consider

$$jkp^{+}(m_0, m_1 \in \{Jan, Ken, Po\}) = \begin{cases} jkp^{+} & \text{if } m_0 = m_1 \\ 0 & \text{if } (m_0, m_1) \in wins \\ 1 & \text{otherwise,} \end{cases} \quad (1)$$

a partial definition of *Jan-Ken-Po* (Rock-Paper-Scissors).

Chance mechanisms, in the form stochastic outcomes or symmetrical moves, may substitute for arbitrary choices and introduce fairness. For example, one may define, with our framework, a generic device for transforming a deterministic, asymmetrical game (such as chess), into a stochastic, symmetrical game (i.e., by flipping a coin to determine the assignment of player roles). Chance may also be

Dynamics of Rule Revision and Strategy Revision in Legislative Games

Moshe Looks
Ronald P. Loui
Barry Cynamon
Washington University in St. Louis, USA

A Mathematical Comment on the Fundamental Difference between Legal Theory Formation and Scientific Theory Formation

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Abstract. This paper attempts to provide a mathematical formulation of the legal theory formation problem and a comparison to the scientific theory formation problem. This is intended to be both an original contribution to AI and Law, and a presentation of the problem to the philosophy of science community. In conclusion, some remarks are made about the shallowness of today's models in machine learning and knowledge discovery compared to the legitimate models in AI and law and philosophy of science.

This paper originates from a discussion with Henry Kyburg and John Pollock beside a tree at Tresider Union over a decade ago. I must also thank Thorne McCarty, Jeff Norman, Mark Mittleman, Ana Maguitman, Carlos Chesñevar, Fernando Tohmé, and Guillermo Simari's research group in Bahía Blanca, where we first discussed elision. This paper is dedicated to my intellectual paternity, from my teacher Henry Kyburg and his teacher, Ernest Nagel, who were concerned with the logic of science, to Nagel's advisor, Morris Cohen, who wrote on logic and law.

1 Introduction

Legal theory formation is no more restricted to law than scientific theory formation is restricted to science.

Scientific theory formation is a general kind of induction, which, as described and formalized by philosophers of science in the second half of the 20th Century, refers to a pattern of reasoning that may occur in everyday statistical

APA Newsletters
NEWSLETTER ON PHILOSOPHY AND COMPUTERS

Number 2 Spring 2013

FROM THE EDITOR, Peter Boltuc

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Terry Horgan
"The Real Moral of the Chinese Room: Understanding Requires Understanding Phenomenology"

Riccardo Manzotti
"Will a Machine Ever Be Conscious?"

Roxanne Marie Kurtz
"My Avatar, My Choice! How Might We Make a Strong Case for the Special Moral Status of Avatars?"

Sidey Myoo
"A Philosophy of the Web"

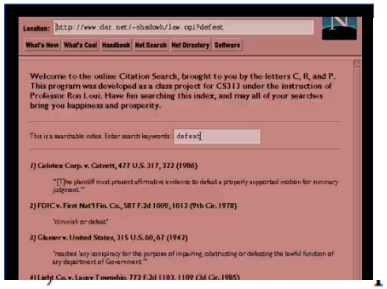
Ronald Loui
"Paths to Defeasibility: Reply to Schauer on Hart"

Colin Allen, Jaimie Murdock, Cameron Buckner, and Robert Rose
"Computational Philosophy and the Examined Text: A Tale of Two Encyclopedias"

Federico Gobbo
"What We Can Learn from the Failure of the Singularity"

AI and Law (my 1992-2012)

A Design for Reasoning with Policies, Precedents, and Rationales



spective, the entire corpus juris looks like one big default rule — something that continues to apply in the absence of new instructions to the contrary.

Far from tying the legislature's hands, looking to the entire corpus juris actually frees them. A sensible Congress can enact a conspiracy statute ahead of time, to avoid having to consider the problem anew for each separate criminal prohibition — just as it avoids having to reconsider, say, the rules on witness tampering,[103] speedy trials,[104] or the

---

[100] Carlos Iván Chesñevar et al., *Logical Models of Argument*, 32 ACM COMPUTING SURVEYS 337, 338 (2000).

[101] *See* H.L.A. Hart, *The Ascription of Responsibility and Rights*, *in* ESSAYS ON LOGIC AND LANGUAGE 145, 147–48 (Antony Flew ed., 1951); Neil MacCormick, *Defeasibility in Law and Logic*, *in* INFORMATICS AND THE FOUNDATIONS OF LEGAL REASONING 99, 103 (Zenon Bankowski et al. eds., 1995); Stephen E. Sachs, *Constitutional Backdrops*, 80 GEO. WASH. L. REV. 1813, 1838–40 (2012).

VOLUME 130 FEBRUARY 2017 NUMBER 4

HARVARD LAW REVIEW

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ARTICLE

THE LAW OF INTERPRETATION

William Baude & Stephen E. Sachs

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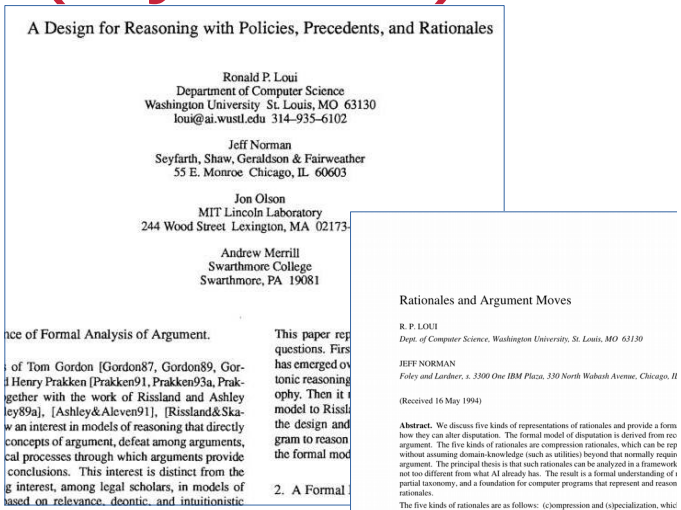
AI and Law (my 2016)



A Design for Reasoning with Policies, Precedents, and Rationales

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nce of Formal Analysis of Argument.

of Tom Gordon [Gordon87, Gordon89, Gor-
d Henry Prakken [Prakken91, Prakken93a, Prak-
gether with the work of Rissland and Ashley
ley89a], [Ashley&Aleven91], [Rissland&Ska-
w an interest in models of reasoning that directly
concepts of argument, defeat among arguments,
cal processes through which arguments provide
conclusions. This interest is distinct from the
g interest, among legal scholars, in models of
based on relevance, deontic, and intuitionistic

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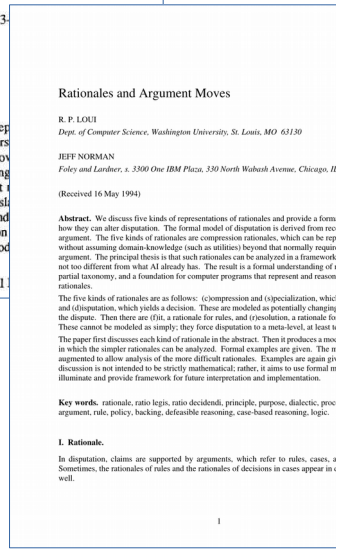
2. A Formal



Rationales and Argument Moves

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(Received 16 May 1994)

Abstract. We discuss five kinds of representations of rationales and provide a form
how they can alter disputation. The formal model of disputation is derived from rec
argument. The five kinds of rationales are compression rationales, which can be rep
without assuming domain-knowledge (such as utilities) beyond that normally requir
argument. The principal thesis is that such rationales can be analyzed in a framework
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rationales.

The five kinds of rationales are as follows: (c)ompression and (s)pecialization, whic
and (d)isputation, which yields a decision. These are modeled as potentially changin
the dispute. Then there are (f)it, a rationale for rules, and (r)esolution, a rationale fo
These cannot be modeled as simply; they force disputation to a meta-level, at least

The paper first discusses each kind of rationale in the abstract. Then it produces a mo
in which the simpler rationales can be analyzed. Formal examples are given. The
augmented to allow analysis of the more difficult rationales. Examples are again gi
discussion is not intended to be strictly mathematical; rather, it aims to use formal
illuminate and provide framework for future interpretation and implementation.

Key words. rationale, ratio legis, ratio decidendi, principle, purpose, dialectic, proc
argument, rule, policy, backing, defeasible reasoning, case-based reasoning, logic.

I. Rationale.

In disputation, claims are supported by arguments, which refer to rules, cases, a
Sometimes, the rationales of rules and the rationales of decisions in cases appear in
well.

1

Automatic Comparison of Contracts u[redacted] Extraction Likely Legal Terminology from EUL

Ronald P. LOUI[a,1] and Fatmah ALANAZI[b]
[a,b]*University of Illinois Springfield*
USA

Abstract. This work looks at the possibility of using automatic legal term extraction from contracts as a basis for automatic similarity comparison. A heuristic based on patterns of [redacted] tagging, is developed and discussed [redacted] methods. End User Licensing Agreements (EULAs) examples are given.

Keywords. Ontology, term extraction, automatic analysis of text, contracts, information retrieval, [redacted] EULA, filtering, machine learning, lexicon, features, knowledge discovery, datamining, [redacted] features

1. Introduction

Legal Terminology Extractor

D/R bias for terms ~ *bipartisan* in legislation

[R] bipartisan majority [R] bipartisan manner [R] bipartisan basis [R] bipartisan budget [R] bipartisan budget act [R] bipartisan management [R] bipartisan effort [R] bipartisan efforts [R] bipartisan task [R] bipartisan task force [R] members of bipartisan teams [R] bipartisan teams representing [R] bipartisan agreement _____ [Q] bipartisan group [Q] bipartisan congressional trade priorities _____ [D] bipartisan commission [D] bipartisan committee [D] bipartisan consensus [D] bipartisan fashion [D] bipartisan legislation [D] bipartisan missouri ethics commission [D] bipartisan missouri [D] bipartisan support [D] bipartisan team [D] bipartisan teams [D] bipartisan trade promotion authority act [D] bipartisan trade [D] bipartisan vote [D] appoint bipartisan teams [D] bipartisan pair of supervisors [D] bipartisan campaign reform act [D] bipartisan pair [D] bipartisan campaign

Technical Terminology Extractor

“precision medicine” “medicine by targeting”
“digital printing”
“managing treatment” “health tracker”

Were Top Gaining Phrases
in 2010-2015 Patent Search Results

A Clustering of 2015 Patents

- 1. continuous capacitor health monitoring and power supply system
- 2. systems methods and computer program products for monitoring the behavior health and/or characteristics of an animal
- 3. systems and devices for emergency tracking and health monitoring
- 4. method and system for real time visualization of individual health condition on a mobile device

IEEE Big Data Competition Winners

IEEE BHI 2017 Big Data Analytics

Tied 2nd place:

Jinlong Ji, Xuhui Chen, and Pan Li, Case Western Reserve University

2nd place:

Hanyu Jiang, Peking University

Winner Professional Category:

Ronald P. Loui

Plausible Deniability for ISP Log and Browser Suggestion Obfuscation with a Phrase Extractor on Potentially Open Text

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***Abstract*—We revisit the issue of maintaining a reasonable amount of privacy for browser users when logs are at risk of being sold and profiles are at risk of being viewed under embarrassing circumstances. A URL that generates dynamic calls in javascript is designed so users have plausible deniability when items show up in profiles, recommendations, or suggested text completions. Three design features are notable: (1) the use of open seed text and an unrestricted user-customizable list of URLs provided externally by the user, and not logged, so broad claims of origination are possible; (2) the use of an AI/NLP part-of-speech informed phrase extractor to generate queries that cluster semantically; (3) the use of a generative grammar of search-term sequences, or dialogues, to produce more realistic searches. An algorithmic technique is employed to assist in**

with advertiser profiling, google profiles, and government surveillance by intelligence agencies. The aim was thus covering, or obfuscating, the user's behavior. TRACKMENOT's version 1 started with a URL that could be visited, that would generate fairly random queries. But websites could respond with programming on the client side of the browser that would send information about how the queries were generated. Information could include mouse and click dynamics, where a human and simple *window.open()* method would clearly differ. The user thus had to be simulated. Version 2 of TRACKMENOT required the user to install a browser extension.

Polluting a user profile and logs at a vendor web site is different from providing a user some deniability at the ISP and

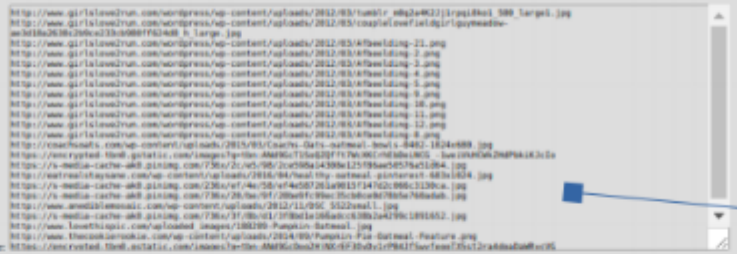
MYCONCEALER

- A free obfuscation service (while we can) at UIS from the Tech Brainstorming Club.
- We generate URLs and search queries for you so ISP's can't know things about you with certainty.
- Our aim is to provide web users deniability with ease, transparency, and trust, but not perfect hiding.
- This can be run from any platform, maybe once or twice a day, like showering.
- Simply accept responsibility and click on the submit button below. If everything looks ok, click on the start button. If you want to customize, use the shaded boxes.
- Please realize that you use this tool at your own risk and we do not provide any claims of effectiveness. This is an unsecured test version for study and research. We cannot be responsible for effects on reputation, relations with ISPs or web service provi user profiles or logs, subsequent usability or convenience of use of sites or devices, unintended congestion, or the effects of the URL submission. You must read the warnings at the end of the FAQ and accept all responsibility for use, releasing us from liabi

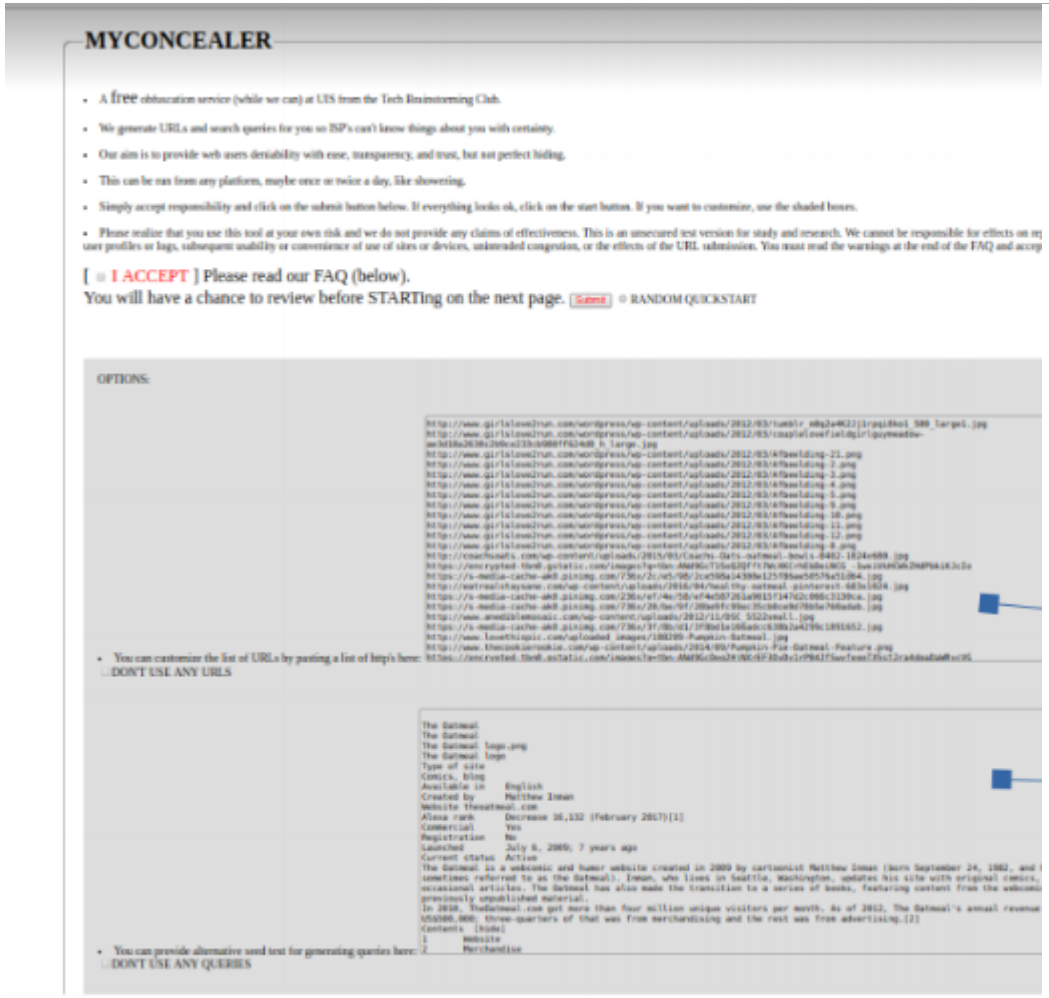
[▫ I ACCEPT] Please read our FAQ (below).
You will have a chance to review before STARTing on the next page. Submit ○ RANDOM QUICKSTART

OPTIONS:

- You can customize the list of URLs by pasting a list of http's here:
  ▫ DON'T USE ANY URLS



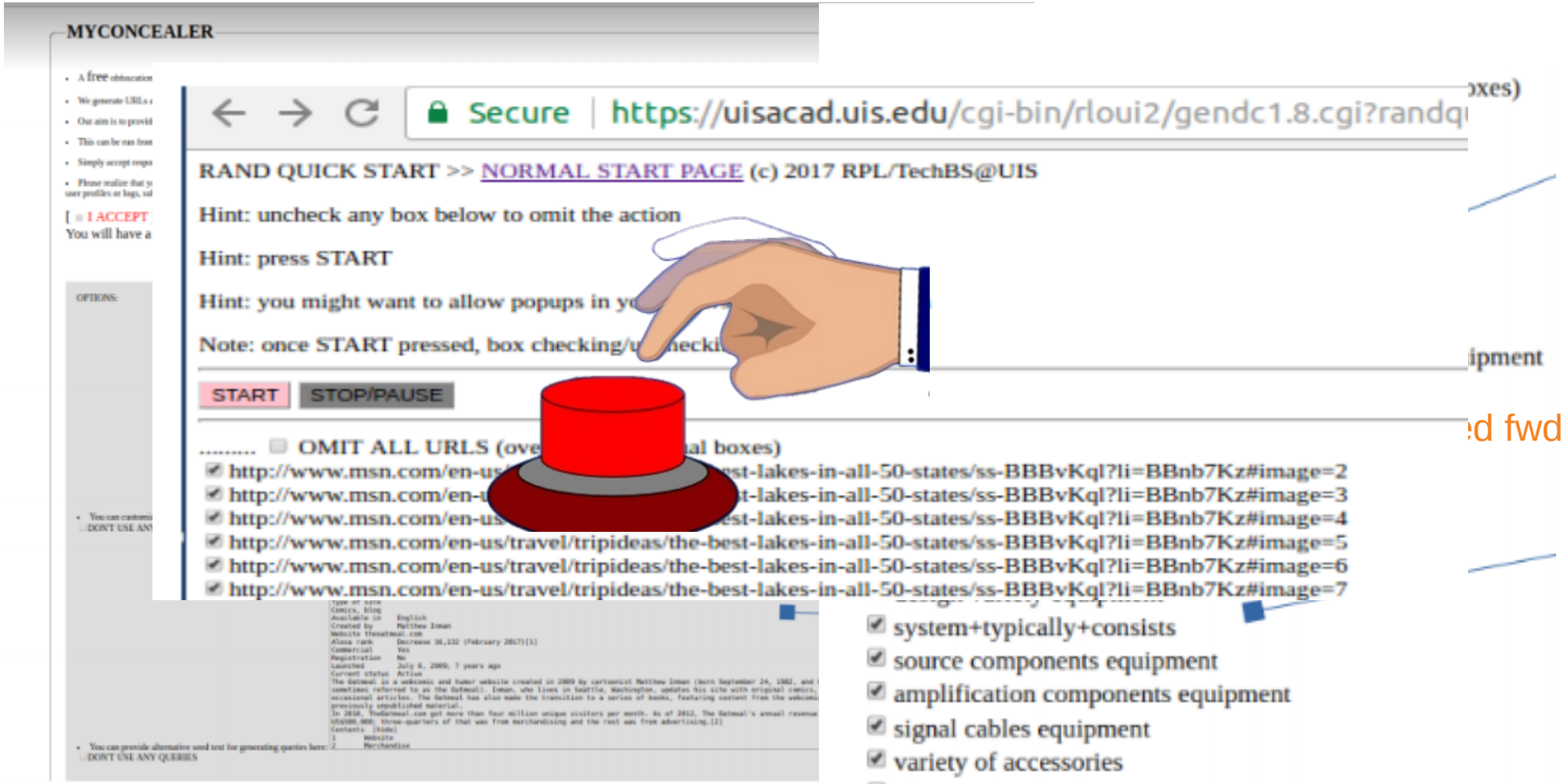
- You can provide alternative seed text for generating queries here:
  ▫ DON'T USE ANY QUERIES



OMIT ALL QUERIES (overrides individual boxes)

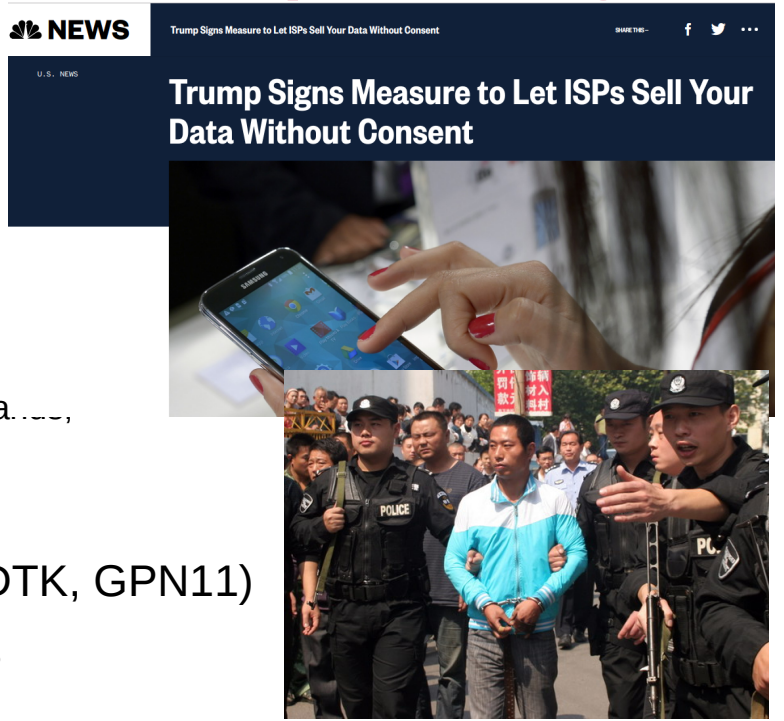
- audiophile values
- production process
- musical performance
- best-regarded recording
- recording and playback
- playback+systems
- playback equipment
- high-end components include turntables playback equipment
- digital-to-analog converters playback equipment
- equalization devices
- preamplifiers and amplifiers
- solid-state and vacuum
- electrostatic speakers equipment
- playback components
- design variety equipment
- system+typically+consists
- source components equipment
- amplification components equipment
- signal cables equipment
- variety of accessories

Equipment carried fwd


MYCONCEALER
Secure | https://uisacad.uis.edu/cgi-bin/rloui2/gendc1.8.cgi?randq
RAND QUICK START >> NORMAL START PAGE (c) 2017 RPL/TechBS@UIS
Hint: uncheck any box below to omit the action
Hint: press START
START
STOP/PAUSE
OMIT ALL URLS
http://www.msn.com/en-us/travel/tripideas/the-best-lakes-in-all-50-states/ss-BBBvKql?li=BBnb7Kz#image=2
http://www.msn.com/en-us/travel/tripideas/the-best-lakes-in-all-50-states/ss-BBBvKql?li=BBnb7Kz#image=3
http://www.msn.com/en-us/travel/tripideas/the-best-lakes-in-all-50-states/ss-BBBvKql?li=BBnb7Kz#image=4
http://www.msn.com/en-us/travel/tripideas/the-best-lakes-in-all-50-states/ss-BBBvKql?li=BBnb7Kz#image=5
http://www.msn.com/en-us/travel/tripideas/the-best-lakes-in-all-50-states/ss-BBBvKql?li=BBnb7Kz#image=6
http://www.msn.com/en-us/travel/tripideas/the-best-lakes-in-all-50-states/ss-BBBvKql?li=BBnb7Kz#image=7
system+typically+consists
source components equipment
amplification components equipment
signal cables equipment
variety of accessories

Profile / browser-suggestion privacy

- Generate fake searches / Inject noise / Hide signal
  - Like NYU TRACKMENOT v1
    - They went to browser plugin to simulate haptics in v2
    - To hide from Google, Chinese govt
    - !! *the simpler problem is the bigger problem* !!
    - We add term extractor for defense against clustering
    - We add search dialog grammar including typos, years, qualifiers, shortha…,
    - We add timing**
- Compare data masking, steganography, code obfuscation
- Plausibly deniable encryption “wrong” idea (DEFCON14 PDTK, GPN11)
- False positives particularly disruptive of deductive analytics



**algorithmic timing permits subtraction of noise given logs, with pattern matching, but does not permit the production without them

Does it work?

- Ronald Loui

  March 2 at 12:25 AM ·

  ha ha i last ran my disinform-isp/youtube program over a year ago, and fb apparently just bought their crap data about me and fed me this. yeah, hockey fights, cheese making, and relocating to memphis videos. you think you know me, fb?

- Hockey Fights shared a link.

  1 min ·

  YOUTUBE.COM

  Zdeno Chara fights Evander Kane 2/26/19

  Zdeno Chara fights Evander Kane after a high hit, on February 26, 2019.

The Atlantic Popular Latest Sections Magazine M

TECHNOLOGY

The Future of Privacy Is Plausible Deniability

In a hackable world where neither the NSA nor Sony Pictures nor John Podesta could safeguard their private communications, the surest way to keep data secure may be surrounding it with decoys.

CONOR FRIEDERSDORF OCT 28, 2016

Constructing plausible innocuous pseudo queries to protect user query intention

Z Wu, J Shi, C Lu, E Chen, G Xu, G Li, S Xie… - Information Sciences, 2015 - Elsevier

Users of web search engines are increasingly worried that their query activities may expose what topics they are interested in, and in turn, compromise their privacy. It would be desirable for a search engine to protect the true query intention for users without …

☆ 99 Cited by 10 Related articles All 4 versions

Intent-aware Query Obfuscation for Privacy Protection in Personalized Web Search

WU Ahmad, KW Chang, H Wang - The 41st International ACM SIGIR …, 2018 - dl.acm.org

Modern web search engines exploit users' search history to personalize search results, with a goal of improving their service utility on a per-user basis. But it is this very dimension that leads to the risk of privacy infringement and raises serious public concerns. In this work, we …

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Providing privacy through plausibly **deniable search**

M Murugesan, C Clifton - Proceedings of the 2009 SIAM International …, 2009 - SIAM

Query-based web **search** is an integral part of many people's daily activities. Most do r realize that their **search** history can be used to identify them (and their interests). In Ju 2006, AOL released an anonymized **search** query log of some 600K randomly selecte

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OB-PWS: Obfuscation-based private web search

E Balsa, C Troncoso, C Diaz - 2012 IEEE Symposium on …, 2012 - ieeexplore.ieee.org

Obfuscation-based private web search (OB-PWS) solutions allow users to search for information in the Internet while concealing their interests. The basic privacy mechanism OB-PWS is the automatic generation of dummy queries that are sent to the search engi

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Privacy can mean many things

- K-anonymity
  - Who had the CABG
- Unlinkability
  - Whose facebook account?
- Unobservability
  - End-to-end encryption (detectable but not observable)
- Differential privacy
  - What can be additionally learned by adding someone to a dataset?
- Etc.
- CS has been focused on the complex problems, but !! *the simple one is more important* !!

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Mainly works at this, but also meta-knowledge like sharing a fb account or device

GDPR: Pseudonymized data

- To pseudonymise a data set, the “additional information” [to re-identify] must be “kept separately and subject to technical and organisational measures to ensure non-attribution to an identified or identifiable person.”
- Pseudonymous data still allows for some form of re-identification (even indirect and remote), while anonymous data cannot be re-identified.
- Both pseudonymisation and anonymization are encouraged in the GDPR

https://gdpr.report/news/2017/11/07/data-masking-anonymisation-pseudonymisation/

- Scrambling letters, key-based hashing/encrypting, blurring (generalization)

Our Values

- TM: Rights frameworks in the brick and mortar world should be imported into the digital world

  The Reality of U.S. Privacy Law: Does It Exist?
  Cloudflare Published on Oct 18, 2018
  https://www.youtube.com/watch?v=9BtxkgD4cVo

- One analog right is not to be known precisely
- Or with the presumption of precision

- Things were largely ok w.r.t. actual harms (cf. Posner) until FB knows/claims-to-know too much!

US Sector-Based Approach?

- EG: “there are some benefits to optimizing the privacy rules in particular contexts”
- They don’t agree, but I agree with both!
- Loui-Quick-Lodder: “for user-profiling in non-scientific/non-medical sectors, persons should enjoy the right to imprecision AT + DURING STORAGE”
  - One kind of deniability
  - One kind of inference moderation
  - Compare “right to be forgotten”
  - Compare non-discrimination laws
  - Compare canine search, high precision/infrared video into homes

Former CS TA

PhD opponent

Compared to GDPR

GDPR	PROPOSAL FOR US
General	*Ad Sectors/User-Profiling on User-Data*
Perfect table, Hide cells	Some perfect rows, somef fake rows, cols, cells
Require key to dehash/decrypt	Requires AI+stats+human to denoise
BUT keys can be stolen w/o knowing	BUT generates false positives
Needs to be obscured start to finish	Noise can be added at will, post facto
Requires user trust, compliance audit	Can be user-generated w/o trust
Increases read/write time	Increases bandwidth/storage/write time
Recommended	*Required*

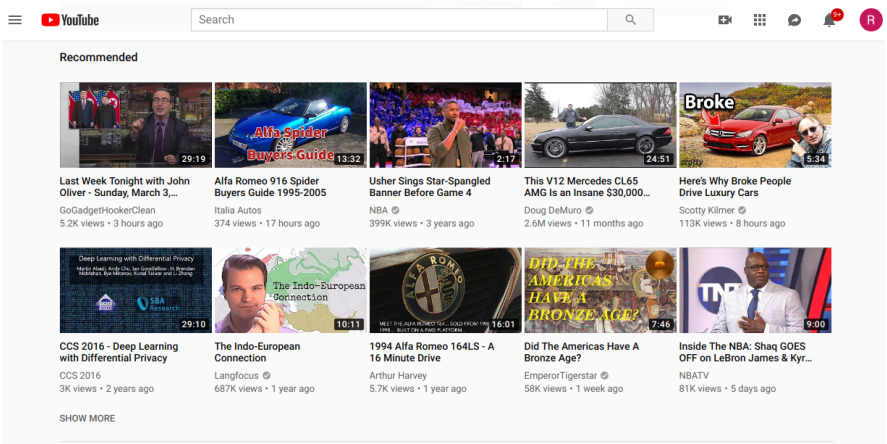
Why?

- Why should user-profiling for suggestions (esp. ads or targeted messaging) have the *license* to
  - Store (where it can be stolen, hacked)
  - Precise + HighDef + Reviewable + Learnable + Conjoinable + Complete + Consistent
  - Highly infallible (prob > 1-e)
  - Incorrigible
  - Persistent (prob(t) ~ prob(t+1))
  - Perfectly attributable/linkable

  data for *this* purpose?

Why?

- Is the quest for perfection even economically sensible?
  - Is it real epistemological precision
    - Or simply wishful thinking
    - And harmful allegation/promulgation
  - What cost false positives in the ad world?
  - Even in law enforcement, awareness of fallibility is a good thing:
    - cf. 3-hop SNA for NSA = tons of false positives



- “In an arms race between AI on the user side and AI on the analytics side, probably enough doubt could be retained for deniability. … [S]uch a race can be avoided simply by deliberately reducing precision, unilaterally, by those who do user profiling analytics.”

- “They could achieve this simply by adding about 33% fairly random suggestions whenever they make suggestions from a user profile, i.e., by being deliberately less accurate. No doubt reduced accuracy would also reduce some of their costs, because 70% good enough, which is [yet] very helpful, is cheap compared to near perfection, which helps no one.”

  (from my *Plausible Deniability for ISP Log and Browser Suggestion Obfuscation* 2017)

- If they won’t do it willingly, we can pass a law.

Comments?