David Tolpin

Contact info

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Objective

Applied researcher — a position in a research team where I conduct theoretical research and apply it to practical innovations.

Research Interests

Artificial Intelligence, probabilistic reasoning, bayesian statistics, decision-making under uncertainty, problem-solving search.

Education

Ben-Gurion University of the Negev (2009 – 2013)

Ph.D. Thesis: "Rational Metareasoning in Problem-Solving Search"

2012 - Friedman research excellence award.

Ben Gurion University of the Negev (2007 – 2009)

M.Sc. in Computer Science. Thesis: "Limited Rationality Approach to Optimization under Uncertainty".

Moscow State Technical University

M.Sc. in Applied Mechanics. Thesis: "A Model for Chaotic Behavior in Deep Drilling".

Employment

2014 – current

University of Oxford – Post-Doctoral Researcher.

- Probabilistic Programming — developed Anglican, a probabilistic programming system capable of solving real-world inference problems.
- Approximate Inference — introduced and implemented a new adaptive Metropolis-Hastings algorithm for probabilistic programming, publication under review.
- Bayesian Statistics — applications of probabilistic programming to reinforcement learning.

2007 – 2014

Ben Gurion University of the Negev – Lecturer.

Principles of programming languages, system programming, computer architecture, compiler construction (TA).

2013 - Excellence in teaching award.

January, 2005 – February, 2006

Polimetrix/YouGov – Consultant.

Joined the startup at an early stage. Designed and developed the online survey system used by the company, along with the survey authoring language and tools. The system is capabile of conducting extremely high volume online surveys and offers survey designers flexible and powerful tools.

April, 1999 – December, 2004

RenderX – Developer, CTO.

As a part of the startup from day one, designed one of the first and still one of the best XSL formatting engines, XEP, implemented core functionality, and led a team of engineers, writers, and support staff. Authored several patents related to digital typography and document processing.

April, 1996 – June, 1998

IREX – Coordinator for US–Armenia Internet Access and Training Program.

Publications and Patents

Journals

1. David Tolpin, Solomon Eyal Shimony. Semimyopic Measurement Selection for Optimization Under Uncertainty. IEEE Transactions on Systems, Man, and Cybernetics, Part B, Part B, 42(2):565–579, 2012
2. David Tolpin, Solomon Eyal Shimony. Rational Value of Information Estimation for Measurement Selection. Intelligent Decision Technologies, 6(4):297--304, 2012.
3. David Tolpin, 2007. Probabilistic Networks for Knowledge Description. A Survey. Information Processes, Russian Academy of Sciences. 2007, Vol 1.

Conferences

1. Eli Boyarski; Ariel Felner, Roni Stern, Guni Sharon; David Tolpin, Oded Betzalel, Solomon Eyal Shimony. ICBS: The Improved Conflict-based Search algorithm for Multi-Agent Pathfinding. IJCAI-2015.
2. David Tolpin, Frank Wood. Maximum a Posteriori Estimation by Search in Probabilistic Programs. SOCS-15.
3. David Tolpin, Oded Betzalel, Ariel Felner, Solomon Eyal Shimony. Rational Deployment of Multiple Heuristics in IDA*. ECAI-2014
4. David Tolpin, Tal Beja, Solomon Eyal Shimony, Erez Karpas, Ariel Felner. Towards Rational Deployment of Multiple Heuristics in A*. IJCAI-2013
5. Nicholas Hay, Stuart Russell, David Tolpin, Solomon Eyal Shimony. Selecting Computations: Theory and Applications. UAI-2012
6. David Tolpin, Solomon Eyal Shimony. VOI-aware MCTS. ECAI-2012. pp. 929-930.
7. David Tolpin, Solomon Eyal Shimony. MCTS Based on Simple Regret. AAAI-2012. pp. 570-576
8. David Tolpin, Solomon Eyal Shimony. Rational Deployment of CSP Heuristics. IJCAI-2011. pp. 680-686

9. David Tolpin, Solomon Eyal Shimony. Rational Value of Information Estimation for Measurement Selection. 25th Mini-EURO Conference: URPDM-2010.

Patents

1. David Tolpin, 2006. US Pat. 7024621: Methods and systems for rendering electronic data.
2. David Tolpin, 2005. US Pat. 6971062: Methods for rendering footnotes.

Representative Projects

Probabilistic Programming System Anglican
November, 2014 – current

Anglican is a open source, just-in-time-compiled probabilistic programming language embedded in Clojure. Anglican is higher-order, Turing-complete, and supports accurate inference in models that make use of complex control flow, including stochastic recursion. It also includes primitives from Bayesian nonparametric statistics.

Implemented Anglican, as a language embedded in Clojure. Community-maintained examples of probabilistic programs written in Anglican cover a wide range of inference settings.

RNV — Relax NG validator
October, 2003 – March, 2004

RNV is an implementation of Relax NG Compact Syntax validator in ANSI C.

The validator is widely used and is known to be conformant and the fastest implementation of Relax NG.

***XEP* — XSL Formatting Objects Rendering Engine**
April, 1999 – July, 2003

Designed and led a team of engineers to implement the first commercially available and still one of the best implementations of XSL Formatting Objects. Wrote core modules of the formatting engine.

***rwww* — WWW Search Engine with Support for Russian Morphology**
1994 – 1996

Designed and implemented a non-dictionary stemming algorithm for the Russian language (Rustem). Wrote the stemming module in Scheme and ANSI C. Modified and improved freeWAIS to support 8-bit encodings and calls to external wordform normalizers. Wrote a distributed WWW scanning robot.

Miscellanea

Languages: Hebrew, English, Yiddish, Armenian, Russian.