David Tolpin

Contact info

E-mail: david.tolpin@gmail.com

Phone: +972-54-689-1124

Home page: http://offtopia.net/

Objective

I do two things well:

- write cool programs that work, from design to support;
- conduct cutting-edge AI research, from idea to publication.

I like when I can combine both.

Research Interests

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

Skills

- Computer science research: reasoning under uncertainty, heuristic planning, machine learning, probabilistic programming: my google scholar.
- Programming (in many languages and environments): my github.
- Team leading.
- Academic teaching.

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

2017 – now

CLEW Medical (Intensix) – Computer scientist.

Bayesian inference and deep learning on time-space models for early sign deterioration prediction in intensive care.

- Introduced a new scoring scheme of deterioration predictions, for evaluation and training.
- Designed and implemented a novel algorithm for changepoint detection in multivariate vital sign time series.

- Led adoption of deep learning tools and techniques for next generation of deterioration prediction algorithms.

2015 – 2017

PayPal – Research scientist.

- Designed and implemented anomaly detection algorithms for several domains.
- Built a data science team of 4 data scientists.
- Led scientific collaboration with Ben Gurion University of the Negev.
- Submitted 9 patent applications.
- Contributed to 2 open source projects.
- Co-authored 4 academic papers.

2014 – 2015

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

Conferences

1. David Tolpin, Jan Willem van de Meent, Hongseok Yang, Frank Wood. Design and Implementation of Probabilistic Programming Language Anglican. IFL 2016
2. J. W. van de Meent, Brooks Paige, David Tolpin, Frank Wood. Black-box policy search with probabilistic programs. AISTATS 2016
3. David Tolpin. Progressive Temporal Window Widening. AALTD'16 (collocated with ECML PKDD 2016)
4. David Tolpin, Jan Willem van de Meent, Brooks Paige, Frank Wood. Output-Sensitive Adaptive Metropolish-Hastings for Probabilistic Programs. ECML-2015.

5. David Tolpin, Jan Willem van de Meent, Frank Wood. Probabilistic Programming in Anglican. ECML-2015 (Demo track).
6. 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.
7. David Tolpin, Frank Wood. Maximum a Posteriori Estimation by Search in Probabilistic Programs. SOCS-15.
8. David Tolpin, Oded Betzalel, Ariel Felner, Solomon Eyal Shimony. Ratio/nal Deployment of Multiple Heuristics in IDA*. ECAI-2014
9. David Tolpin, Tal Beja, Solomon Eyal Shimony, Erez Karpas, Ariel Felner. Towards Rational Deployment of Multiple Heuristics in A*. IJCAI-2013
10. Nicholas Hay, Stuart Russell, David Tolpin, Solomon Eyal Shimony. Selecting Computations: Theory and Applications. UAI-2012
11. David Tolpin, Solomon Eyal Shimony. VOI-aware MCTS. ECAI-2012. pp. 929-930.
12. David Tolpin, Solomon Eyal Shimony. MCTS Based on Simple Regret. AAAI-2012. pp. 570-576
13. David Tolpin, Solomon Eyal Shimony. Rational Deployment of CSP Heuristics. IJCAI-2011. pp. 680-686
14. David Tolpin, Solomon Eyal Shimony. Rational Value of Information Estimation for Measurement Selection. 25th Mini-EURO Conference: URPDM-2010.

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.

Patents

1. David Tolpin, 2016. US Pat. 9436667: Techniques for rendering media as layers.
2. David Tolpin, 2006. US Pat. 7024621: Methods and systems for rendering electronic data.
3. David Tolpin, 2005. US Pat. 6971062: Methods for rendering footnotes.

Representative Projects

Probabilistic Programming System Anglican

November, 2014 – current

Anglican is an 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.