Guy Shani July, 2016

CURRICULUM VITAE AND LIST OF PUBLICATIONS

• **Personal Details**

Name: Guy Shani
Date and place of birth: December 30th, 1971, Beer-Sheva
Date of immigration: N/A
Regular military service (dates): November 19991 – November, 1996
Address and telephone number at work
Department of Information Systems Engineering
Faculty of Engineering Sciences
Ben-Gurion University of the Negev
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• **Education**

B.Sc.: 1996-1999, Ben-Gurion University, Dept. of Computer Science

M.Sc.: 1999-2002, Ben-Gurion University, Dept. of Computer Science
Advisor: Prof. Ronen I. Brafman and Prof. David Heckerman
Thesis title: An MDP-Based Recommender System

Ph.D: 2003-2007, Ben-Gurion University, Dept. of Computer Science.
Advisor: Prof. Eyal S. Shimony and Prof. Ronen I. Brafman
Thesis title: Learning and Solving POMDPs

• **Employment History** (in reverse chronological order, including sabbatical leave)

2014-Now. Senior Lecturer, Ben Gurion University

2009-2014. Lecturer, Ben Gurion University

2007-2009. Researcher, Microsoft Research, Redmond, WA, in the Machine Learning and Applied Statistics (MLAS) Team. Working on various recommender system applications, decision making under uncertainty, robotics, and other applications of machine learning to software problems.

2002-2003. Software Engineer, Mercury Interactive, Functional Testing Group - Responsible for the Terminal Emulation, Standard Windows Controls and ActiveX grids of the QuickTest and WinRunner tools. Also the creator of the Repository Merge Tool for QuickTest.

2000-2001 Software Engineer, Microsoft, Redmond, WA, Commerce Server Group. Responsible for the Predictor recommendation system within the Commerce Server 2000 tool.

• **Professional Activities** (in reverse chronological order)

(a) Editor or member of editorial board of scientific or professional journal
Editorial board, Journal of Artificial Intelligence Research (JAIR)
Starting 2013

(b) Organizational activities
2011 – Decision Making in Partially Observable, Uncertain Worlds Workshop, IJCAI
2010 – ICAPS POMDP Practitioners Workshop, ICAPS, Toronto
2008 – Workshop on Advances in POMDP Solvers, AAAI, Chicago

(c) Membership in program committees
2016 – International Conference on Planning and Scheduling (ICAPS)
2016 – Conference on Artificial Intelligence (AAAI)
2015 – International Conference on Artificial Intelligence (IJCAI)
2015 – International Conference on Planning and Scheduling (ICAPS)
2015 – Conference on Artificial Intelligence (AAAI)
2014 – ACM Conference on Recommender Systems (RecSys)
2014 – Conference on Artificial Intelligence (AAAI)
2014 – International Conference on Planning and Scheduling (ICAPS)
2013 – International Conference on Artificial Intelligence (IJCAI)
2013 – International Conference on Planning and Scheduling (ICAPS)
2012 – ACM Conference on Recommender Systems (RecSys)
2012 – Conference on Artificial Intelligence (AAAI)
2012 – International Conference on Planning and Scheduling (ICAPS)
2012 – International Conference on Agents and Multi-Agent Systems (AAMAS)
2011 – ACM Conference on Recommender Systems (RecSys)
2011 – International Conference on Artificial Intelligence (IJCAI)
2011 – International Conference on Planning and Scheduling (ICAPS)
2010 – International Conference on Planning and Scheduling (ICAPS)
2010 – ACM Conference on Recommender Systems (RecSys)
2009 – ACM Conference on Recommender Systems (RecSys)
2009 – Uncertainty in Artificial Intelligence (UAI)
2009 – International Conference on Artificial Intelligence (IJCAI)
2008 – ACM Conference on Recommender Systems (RecSys)
2008 – Uncertainty in Artificial Intelligence (UAI)
2007 – Conference on Artificial Intelligence (AAAI)
2006 – European Conference on Artificial Intelligence (ECAI)
2005 – International Conference on Artificial Intelligence (IJCAI)
2004 – Conference on Artificial Intelligence (AAAI)

(d) Administrative activities
2012-2013 – Teaching Committee, Software Engineering
2011-2012 – Seminar organization, Information Systems Engineering
2008-2009 – Seminar organization, MLAS, Microsoft Research, Redmond, WA

(e) Ad-hoc reviewer for journals
JASIST, TIIS, JAIR, SMC-B, AIJ, JAAMAS, TIST

• Educational activities

(a) Courses taught
Elements of Computing Systems, Information Systems Engineering, Ben Gurion University (2013-2016)
Software Quality Assurance, Information Systems Engineering, Ben Gurion University (2011-2012)
Introduction to Programming, Information Systems Engineering, Ben Gurion University (2011)
Planning and Automated Decision Making, Information Systems Engineering, Ben Gurion Uni-versity (2010-2014)
Recommender Systems, Information Systems Engineering, Ben Gurion University (2010-2015)
Introduction to Operating Systems, Information Systems Engineering, Ben Gurion University (2010-2015)
Introduction to Computer Science, Computer Science Department, Ben Gurion University (2005-2007)
Object Oriented Software Design, Computer Science Department, Ben Gurion University (2004-2005)
Object Oriented Software Design Project and Workshop, Software Engineering Department, Ben Gurion University (2004)
Foundations of Data Structures, Industrial Engineering Department, Ben Gurion University (2003)

(b) Research students
PhD – Sivan Yogen (with Noam Tractinsky), PhD, Ben Gurion University
PhD – Shlomi Maliah, MSc, Ben Gurion University
MSc – Radimir Komarnitsky, MSc, Ben Gurion University
MSc – Dorin Shmaryahu, MSc, Ben Gurion University
MSc – Dor Oppenheim (with Yael Edan), MSc, Ben Gurion University
MSc – Sagi Bazinin, MSc, Ben Gurion University

• **Awards, Citations, Honors, Fellowships**
(a) Honors, Citation Awards (including during studies)
2007 Computer Science Department, Ben Gurion University, Excellence in teaching award.
2004 Computer Science Department, Ben Gurion University, Freedman prize for outstanding student,
2002 Natural Sciences Faculty, Ben Gurion University, Zeebi prize for outstanding M.Sc. thesis.

• **Scientific Publications**
h-index: ISI 6

Google Scholar 21

Citation count: 2179

(a) Book chapters in collective volumes

[*BC-1] Asela Gunawardana and **Guy Shani**
Evaluating Recommender Systems, 2011 (second edition 2015), in Francesco Ricci, Lior Rokach, Bracha Shapira, Paul B. Kantor (eds.):
Recommender Systems Handbook
Springer, pages 257-297
Citations: 605

(b) Refereed articles and refereed letters in scientific journals - running numbers

[J-1] Ronen I. Brafman[PI] and David Heckerman[PI] and **Guy Shani**[S], 2005
An MDP-Based Recommender System
Journal of Machine Learning (JMLR)
Volume 6(Sep): pages 1265-1295
Impact factor (2005) 4.027, Q1, Ranking 9/108
Citations: 314 (ISI 16)

[J-2] **Guy Shani**[PI] and Ronen I. Brafman[PI] and Solomon E. Shimony[PI], 2008
Prioritizing Point-Based POMDP Solvers
IEEE Transactions on Systems, Man, and Cybernetics, Part B (SMCB)
Volume 38: pages 1592-1605
Impact factor (2008) 2.361, Q1, Ranking 13/108
Citations: 24 (ISI 4)

[J-3] Asela Gunawardana[PI] and **Guy Shani**[PI], 2009
A Survey of Accuracy Evaluation Metrics of Recommendation Tasks
Journal of Machine Learning (JMLR)
Volume 10(Dec): pages 2935-2962
Impact factor (2009) 2.789, Q1, Ranking 9/108
Citations: 229 (ISI 6)

[J-4] **Guy Shani**[PI], 2010
Evaluating Point-Based POMDP Solvers on Multi-Core Machines
IEEE Transactions on Systems, Man, and Cybernetics, Part B (SMCB)
Volume 40: pages 1062 - 1074
Impact factor (2009) 3.007, Q1, Ranking 13/108
Citations: 4

[J-5] **Guy Shani**[PI] and Asela Gunawardana[PI] and Christopher Meek[PI] 2011
Unsupervised Hierarchical Segmentation of Discrete Events
Intelligent Data Analysis Journal (IDA)
Volume 15, Issue 4, Pages: 483-501
Impact Factor (2009) 0.929, Q4, Ranking 98/108

[J-6] Christopher Raphael[PI] and **Guy Shani**[PI] 2012
The Skyline Algorithm for POMDP Value Function Pruning
Annals of Math and Artificial Intelligence (AMAI)
Volume 65, Number 1, Page 61-77
Impact Factor (2009) 0.929, Q4, Ranking 97/108
Citations: 2

[J-7] **Guy Shani**[PI] and Joelle Pineau[PI] and Robert Kaplow[S] 2012
A Survey of Point-Based POMDP Solvers
Journal of Autonomous Agents and Multi-Agent Systems (JAAMAS)
Volume 27, Number 1, Pages 1-51

Impact Factor (2011) 1.213, Q1, Ranking 26/108
Citations: 102

[J-8] Ronen Brafman[PI] and **Guy Shani**[PI] 2012
Replanning in Domains with Partial Information and Sensing Actions
Journal of Artificial Intelligence Research (JAIR)
Volume 45, Page 565-600
Impact Factor (2011) 1.143, Q2, 36/108
Citations: 17

[J-9] **Guy Shani**[PI] and Asela Gunawardana[PI] 2013
Tutorial on Application-oriented Evaluation of Recommendation Systems
AI Communications
Volume 26, Number 2, Pages 225-236
Impact Factor (2011) 0.5, Q3, Ranking 78/108
Citations: 3

[J-10] **Guy Shani**[PI] and Lior Rokach[PI] and Bracha Shpira[PI] and Sarit Hadash[S] and Moran Tangi[S] 2013
Investigating Confidence Displays for Top-N Recommendations
Journal of American Society for Information Science and Technology (JASIST)
Volume 64, Issue 12, Pages 2548-2563
Impact Factor (2011) 2.081, Q1, Ranking 20/126
Citations: 3

[J-11] **Guy Shani**[PI] 2014
Task-Based Decomposition of Factored POMDPs
IEEE Transactions on Systems, Man, and Cybernetics, Part B (SMCB)
Volume 44, Number 2, Pages 208-216
Impact Factor (2011) 3.08, Q1, Ranking 13/108
Citations: 3

[*J-12] David Ben Shimon [S], Lior Rokach[PI], **Guy Shani**[PI] , Bracha Shapira[PI], 2016
Anytime Algorithms for Recommendation Service Providers
ACM Transactions on Intelligent Systems and Technology, (TIST)
Volume 7, Number 3, Article No. 43,
Impact Factor (2016) 2.04,
Citations: 1

(c) Papers in refereed conference proceedings

[C-1] **Guy Shani**[S], Ronen I. Brafman[PI], and David Heckerman[PI], 2002,
An MDP-Based Recommender System,
Uncertainty in Artificial Intelligence (UAI),
pages 453-460, Edmonton, Acceptance rate (66/192) 34%
Citations: 136

[C-2] Ronen I. Brafman[PI], David Heckerman[PI], and **Guy Shani**[S], 2003,
Recommendation as a Stochastic Sequential Decision Problem,
International Conference on Automated Planning and Scheduling (ICAPS),
pages 164-173, Trento, Acceptance rate (30/98) 31%
Citations: 8

[C-3] **Guy Shani**[S] and Ronen I. Brafman[PI], 2004,
Resolving Perceptual Aliasing In The Presence Of Noisy Sensors,
Neural Information Processing Systems (NIPS),
pages 1249-1256, Vancouver, Acceptance rate 30%
Citations: 6

[C-4] **Guy Shani**[S] and Ronen I. Brafman[PI] and Solomon E. Shimony[PI], 2005,
Model-Based Online Learning of POMDPs,
European Conference on Machine Learning (ECML),
pages 353-364, Lisbon, Acceptance rate (72/365) 19.7%
Citations: 39 (ISI 4)

[C-5] **Guy Shani**[S] and Ronen I. Brafman[PI] and Solomon E. Shimony[PI], 2006
Prioritizing Point-Based POMDP Solvers,
European Conference on Machine Learning (ECML),
pages 389-400, Berlin, Acceptance rate 14.5%
Citations: 19

[C-6] David Ben-Shimon[S] and Alexander Tsikinovsky[S] and Lior Rokach[PI]
and Amnon Meisels[C] and **Guy Shani**[C] and Lihi Naamani[S], 2007,
Recommender System from Personal Social Networks,
The 5th Atlantic Web Intelligence Conference,
pages 47-55, Fontainbleau
Citations: 24 (ISI 4)

[C-7] **Guy Shani**[S], Lior Rokach[PI], Amnon Meisles[C], Lihi Naamani[S],
Nischal M. Piratla[C], David Ben-Shimon[S], 2007
Establishing User Profiles in the MediaScout Recommender System,
CIDM, pages 470-476, Hawaii
Citations: 5

[C-8] **Guy Shani**[S] and Ronen I. Brafman[PI] and Solomon E. Shimony[PI], 2007
Forward Search Value Iteration for POMDPs,
International Joint Conference on Artificial Intelligence (IJCAI),
pages 2619-2624, Hyderabad, Acceptance rate (212/1353) 15.7%
Citations: 77

[C-9] Jan Virin[S] and **Guy Shani**[S] and Ronen I. Brafman[PI] and
Solomon E. Shimony[PI], 2007
Scaling Up: Solving POMDPs through Value Based Clustering,
American Conference on Artificial Intelligence (AAAI),
pages 1290-1295, Vancouver, Acceptance rate (253/921) 27.5%
Citations: 24

[C-10] **Guy Shani**[PI] and Pascal Poupart[PI] and Ronen Brafman[PI] and
Solomon E. Shimony[PI], 2008
Efficient ADD Operations for Point-Based Algorithms
The International Conference on Automated Planning and Scheduling (ICAPS),
pages 330-337, Sydney, October 2008, Acceptance rate (43/136) 31.2%.
Citations: 28

[C-11] **Guy Shani**[PI] and Christopher Meek[PI] and Max Chickering[PI] , 2008,

Mining Recommendations From The Web,
The 2nd International Recommender Systems Conference (RecSys),
pages 35-42, New York, Acceptance rate (35/122) 34%.
Citations: 32 (ISI 1)

[C-12] **Guy Shani**[PI] and Chris Meek[PI] and Tim Paek[PI] and Bo Thiesson[C]
and Gina Venolia[C], 2009,
Searching Large Indexes on Tiny Devices: Optimizing Binary Search with Character Pinning
The International Conference on Intelligent User Interfaces (IUI),
pages 257-266, Sanivel Island, Acceptance rate (35/122) 29%
Citations: 2

[C-13] Jilles Steeve Dibangoye[S], **Guy Shani**[PI], Brahim Chaib-draa[PI],
Mouaddib Abdel-Illah[PI], 2009,
Topological Order Planner for POMDPs,
International Joint Conference on Artificial Intelligence (IJCAI),
pages 1684-1689, Pasadena, Acceptance rate (331/1290) 25.7%
Citations: 15

[C-14] Scott Sanner[PI], Robby Goetschalckx[C], Kurt Driessens[C], **Guy Shani**[C], 2009,
Bayesian Real-time Dynamic Programming,
International Joint Conference on Artificial Intelligence (IJCAI),
pages 1784-1789, Pasadena, Acceptance rate (331/1290) 25.7%
Citations: 22

[C-15] **Guy Shani**[PI], Christopher Meek[PI], 2009,
Improving Existing Fault Recovery Policies,
International Conference on Neural Information Processing (NIPS),
pages 1642-1650, Vancouver, Acceptance rate (263/1005) 24%
Citations: 5

[C-16] **Guy Shani**[PI], Christopher Meek[PI], and Asela Gunawardana[PI], 2009
Hierarchical Probabilistic Segmentation of Discrete Events,
IEEE International Conference on Data Mining (ICDM),
pages 974-979, Miami, Acceptance rate (140/786) 17.8%
Citations: 3 (ISI 1)

[C-17] George Chrysanthakopoulos[PI], **Guy Shani**[PI], 2010
Augmenting Appearance-Based Localization and Navigation using Belief Update, International Conference on Autonomous agents and Multiagent Systems (AAMAS), pages 559-566, Toronto, Acceptance rate (163/685) 24%
Citations: 3

[C-18] Christopher Amato[S], **Guy Shani**[PI], 2010
High-level Reinforcement Learning in Strategy Games,
International Conference on Autonomous agents and Multiagent Systems (AAMAS),
pages 75-82, Toronto, Acceptance rate (163/685) 24%
Citations: 17

[C-19] Gilad Katz[S], Nir Ofek[S], Bracha Shapira[PI], Lior Rokach[PI], **Guy Shani**[C], 2011
Using Wikipedia to Boost Collaborative Filtering Techniques,
ACM Conference on Recommedner Systems (RecSys),

pages 285-288, New York, Acceptance rate (24/59) 40.7%
Citations: 11

[C-20] **Guy Shani**[PI] , Ronen I. Brafman[PI], 2011
Replanning in Domains with Partial Information and Sensing Actions,
International Joint Conference on Artificial Intelligence (IJCAI),
pages 2021-2026, Barcelona, Acceptance rate (227/1325) 17.1%
Citations: 16

[C-21] Orly Moreno[S], Bracha Shapira[PI], Lior Rokach[PI], **Guy Shani**[C], 2012
TALMUD: Transfer Learning for Multiple Domains,
International Conference on Information and Knowledge Management (CIKM), pages 425-434, Maui, Acceptance rate 13.4%
Citations: 4

[C-22] Ronen I. Brafman[PI] , **Guy Shani**[PI], 2012
A Multi-Path Compilation Approach to Contingent Planning,
26th Conference on Artificial Intelligence (AAAI),
Toronto, Acceptance rate (294/1129) 26%
Citations: 6

[C-23] Ronen I. Brafman[PI] , **Guy Shani**[PI], 2013
Qualitative Planning under Partial Observability in Multi-Agent Domains,
27th Conference on Artificial Intelligence (AAAI),
Bellevue, Acceptance rate 29%

[C-24] Ido Blank[S], Lior Rokach[PI] , **Guy Shani**[PI], 2013
Leveraging the Citation Graph to Recommend Keywords,
Recommender Systems (ACM RecSys),
Hong Kong, Acceptance rate 34%

[C-25] Amihai Savir[S], Ronen I. Brafman[PI] , **Guy Shani**[PI], 2013
Recommending Improved Configurations for Complex Objects with an Application in Travel Planning,
Recommender Systems (ACM RecSys),
Hong Kong, Acceptance rate 34%

[C-26] **Guy Shani**[PI], Noam Tractinsky[PI], 2013
Displaying Relevance Scores for Search Results,
The 36th Annual ACM SIGIR Conference (ACM SIGIR),
Dublin, Acceptance rate 35%

[C-27] **Guy Shani**[PI], Lior Rokach[PI], Bracha Shapira[PI], Gali Siboni[SI], Eyal Chapnik[S], 2013
Recommending Insurance Riders,
The 28th Symposium on Applied Computing (SAC),
Coimbra

[C-28] Shlomi Maliah[S], Ronen Brafman[PI], **Guy Shani**[PI], Erez Karpas[S], 2014
Partially Observable Contingent Planning Using Landmark Heuristics,
The International Conference on Planning and Scheduling (ICAPS),

Portsmouth, NH

[C-28] Avi Segal[S], Ziv Katzir[S], Kobi Gal[PI], **Guy Shani**[PI], Bracha Shapira[PI]
2014
EduRank: A Collaborative Filtering Approach to Personalization in E-learning,
The 7th International Conference on Educational Data Mining (EDM),
London, UK, Acceptance rate 40%

[C-29] Ronen Brafman[PI], **Guy Shani**[PI], 2014
On the Properties of Online Belief Tracking Using Regression for Contingent Planning,
The 21st European Conference on Artificial Intelligence (ECAI),
Prague

[C-30] David Ben Shimon[PI], Lior Rokach[PI], Bracha Shapira[PI], **Guy Shani**[PI], 2015
Fast Item-based Collaborative Filtering,
ICAART,
Lisbon

[*C-31] Shlomi Maliah[S], Ronen Brafman[PI], **Guy Shani**[PI], 2016
Online Macro Generation for Privacy Preserving Planning,
The International Conference on Planning and Scheduling (ICAPS),
London

[*C-32] Shlomi Maliah[S], **Guy Shani**[PI] , Roni Stern[PI], 2016
Stronger Privacy Preserving Projections for Multi-Agent Planning,
The International Conference on Planning and Scheduling (ICAPS),
London

[*C-33] Radimir Komarnitsky[S], **Guy Shani**[PI], 2016
Online Macro Generation for Privacy Preserving Planning,
The Conference on Artificial Intellgence (AAAI),
Phoenix ,AR

(d) Papers in refereed workshops

[W-1] **Guy Shani**[S] and Ronen I. Brafman[PI] and Solomon E. Shimony[PI], 2005
Partial Observability under Noisy Sensors - From Model-Free to Model-Based,
ICML Rich Representations for Reinforcement Learning Workshop, ICML

[W-2] **Guy Shani**[S] and Ronen I. Brafman[PI] and Solomon E. Shimony[PI], 2005,
Adaptation for Changing Stochastic Environments through Online POMDP Policy Learning,
Workshop on Reinforcement Learning in Non-Stationary Environments, ECML

[W-3] **Guy Shani**[S] and Lior Rokach[PI] and Amnon Meisles[PI]
and David Ben-Shimon[S], 2007
A Stereotypes-Based Hybrid Recommender System for Media Items,
Workshop on Recommender Systems, AAAI

[W-4] **Guy Shani**[PI], 2008,
Point-Based Value Iteration Algorithms for Multi-Core Machines,
AAAI Workshop on Advancements in POMDP Solvers

[W-5] **Guy Shani**[PI], Ronen Brafman[PI], Ran Taig[S], 2012,
Leveraging Classical Planners through Translations,
ICAPS Workshop on the International Planning Competition (IPC)

(g) Published scientific reports and technical papers

[T-1] **Guy Shani**[S], 2004,
A Survey of Model-Based and Model-Free Methods for Resolving Perceptual Aliasing,
Department of Computer Science at the Ben-Gurion University in the Negev
Technical report 05#02

[T-2] Jonathan Carlson[PI], David Heckerman[PI], **Guy Shani**[PI], 2009,
False Discovery Rate for 2x2 Contingency Tables,
Microsoft Research
Technical report MSR-TR-2009-53

• Lectures and Presentations at Meetings and Invited Seminars not Followed by Published Proceedings

(a) Invited plenary lectures at conferences/meetings

2008
"Tutorial on Factored POMDPs and Structured Representations"
AAAI Workshop on Advancements in POMDP Solvers, Chicago

2010-2012
"Tutorial on Evaluating Recommendation Algorithms"
ACM Conference on Recommender Systems (RecSys), Barcelona

(b) Seminar presentations at universities and institutions
2004
"Partial Observability Under Noisy Sensors"
Probabilistic AI Seminar, Stanford University
Microsoft Research, Machine Learning Group, Redmond, WA

2005
"An MDP-Based Recommender System"
Technion, Industrial Engineering Seminar

2007
"Advances In Point-Based POMDP Solvers"
National Seminar on Artificial Intelligence, Ben-Gurion University

2008
"Advances In Point-Based POMDP Solvers"
Seminar on Artificial Intelligence, University of Washington

2010-2012
"Tutorial on Evaluating Recommendation Algorithms"
Machine Learning Seminar, Hebrew University, Jerusalem
Technion, Industrial Engineering Seminar
IBM Research, Tel Aviv

• **Patents**

[P-1] Christopher A. Meek, Guy Shani, 2009
Automated learning of failure recovery policies, ,
Microsoft Corporation, USPTO Application #20110214006, US 8024611

[P-2] Georgios Chrysanthakopoulos, Guy Shani, 2009
Topological-based localization and navigation,
Microsoft Corporation, USPTO Application #20100312386

[P-3] Guy Shani, Lior Rokach, Amnon Meisles, Nischal Pratla, 2007,
Interactive hybrid recommender system,
USPTO Application #20090164442

[P-4] Alam Ali, David Heckerman, Guy Shani, 2002,
Modifying advertisement scores based on advertisement response probabilities,
Microsoft Corporation, US 7370002

• **Research Grants (PI bolded)**

2015 ABC, **Guy Shani** and Shair Arogeti and Gera Weiss and Roni Stern, Tomato Pollination using Drones, 2 years, Total $60,000.

2014 ABC, **Guy Shani** and Ronen Brafman and Michael Elhadad and Amir Shapiro, Service Robot, 3 years, Total $100,000.

2013 ISF, **Guy Shani** and **Ronen Brafman**, Contingent Planning under Partial Observability and Sensing, 3 years, Total 240,000 NIS

2013 Ministry of Agriculture (submitted), **Guy Shani** and Leah Tsror and Victor Elhanati, 3 years, Annual 100,000 NIS, Total 300,000 NIS

2013 Amdocs, **Guy Shani** and Bracha Shapira, 1 year, $5,000

2013 MAFAT (ROBIL), **Hugo Guterman**, Guy Shani and Ronen Brafman and Eyal Shimony, 1 year, 750,000 NIS

2012 MAFAT (DARPA Challenge), **Hugo Guterman**, Guy Shani and Ronen Brafman and Eyal Shimony, 1 year, 750,000 NIS

2013 Microsoft Research, **Guy Shani**, 1 year, $15,000

2012 Microsoft Research, **Guy Shani**, 1 year, $15,000

2011 Microsoft Research, **Guy Shani**, 1 year, $15,000

2011 Ministry of Agriculture, **Guy Shani** and Leah Tsror, 2 years, Annual 50,000 NIS, Total 100,000 NIS

• **Synopsis of research**

I am interested in two main research areas: automated decision making and recommender systems:

Automated Decision Making: in many applications systems need to make autonomous decisions on actions that affect the environment. Such autonomous systems may operate in stochastic environments, and often do not have complete knowledge of the state of the environment. Perhaps the most common example are robotic systems that perceive the world through a set of sensors, providing partial and noisy information about the environment. Markov decision processes (MDPs), and partially observable Markov decision processes (POMDPs) provide a mathematical formalization of such agents, allowing us to compute sound policies that optimize some aspect of the desirable outcome. I am interested in algorithms for learning and solving MDPs and POMDPs.

Specifically, in the past decade there has been a considerable scaling up in POMDP solvers, mainly due to point-based methods that rapidly compute approximate policies. I am actively investigating more methods for further scaling up in this setting. Furthermore, this scaling up has allowed many applications, that traditionally avoided POMDPs due to the difficulty in solving the model, to investigate the POMDP alternative. I am interested in any application that demonstrates the power and usability of the POMDP techniques.

Recommender Systems: modern e-commerce websites often suggest items of interest to the user, in the hope of actively increasing the sales throughput. Systems that actively suggest items to users are known as recommender systems. I am interested in new applications of recommender systems, beyond the traditional scope of movies or book recommendations. Each new application brings a set of new, unencountered research questions that require investigation. Furthermore, I am interested in new algorithms for computing recommendations, that focus on a specific need that arises in new applications. I am also interested in additional criteria that recommendations should optimize for, such as diversity, novelty, confidence, and many more. Lately, I am also investigating proper methods for the evaluation of recommendation algorithms.

I am currently involved in the following projects:

- Planning Under Partial Observability: I am moving from the mathematically challenging model of POMDP to the less expressive, but more scalable model of contingent planning. Under this model, we assume non-deterministic, but non-stochastic transitions, and deterministic observations. This model allows us to specify and solve much larger domains and scale to real world problems. Collaboration with: Ronen Brafman.
- Optimization in Production Environments: I am involved in applying techniques from automated planning and decision making to various problems in production environments with autonomous unmanned vehicles (AUVs). The Industrial Engineering department is creating a lab for modeling such environments and we will study the deficiencies in current approaches and apply optimization techniques to improve performance. Collaboration with Sigal Berman, Roie Zivan.
- Computation in Agriculture: I am investigating various applications of computation techniques from machine learning and vision to problems in agriculture. The first project attempts to identify patches of weeds in wheat fields in order to reduce the amount of herbicide used when spraying the fields. We analyze images taken from a regular digital camera to identify the patches and send instructions to the sprayer which parts of the area that it covers require spraying. A second project attempts to automatically identify decreased plants from images. As a pilot study, we learn to distinguish between images of various diseases in potatoes. This project can be used both by farmers for identifying problems in their fields through cell phones, and for automatically sorting potatoes before shipping them to the markets. A third project is the creation of an information system for the farming company Shikma. This is currently only a technical project, but in the future we can study interesting farming management problems using this system. Collaboration with Leah Tsror, Dan Blumberg, Yael Idan. (Grant from Ministry of Agriculture)
- Recommender Systems: I am investigating a number of interesting research directions in recommender systems. First, I am looking at building a recommender system for complex user interfaces. In many applications the user interface has grown beyond the ability of novice users to learn it fully. Automatically exposing new features to users based on their personal level of expertise is an interesting problem. The pilot project here focuses on the Eclipse IDE, and I intend to also study complex UIs in Microsoft Office products. A second project studies

recommender systems in the unexplored area of recommending insurance coverage. This area offers some interesting variants of standard recommendation techniques. We are currently studying data from a large Israeli insurance company. Finally, I am studying better presentation mechanisms than the standard five-star method for presenting ratings and recommendations. It would be interesting to see how people respond to other presentation techniques.

- **Present Academic Activities**