

**CURRICULUM VITAE**

**• Personal Details**

**Bracha Shapira**

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Ben-Gurion University of the Negev, Beer-Sheva, Israel  
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**• Education**

B.A. 1983 - 1986

Bar-Ilan University - Department of Computer Science

M.Sc. 1990 - 1994 - Cum-Laude

Hebrew University - Department of Computer Science  
Names of Advisors - Prof: J. Rosenshein, Dr. Uri Hanani  
Title of thesis - Intelligent Diagnosis of Computer Hardware Using  
Frames

Ph.D. 1995 - 1999

Ben-Gurion University,  
Department of Information Systems Engineering  
Name of advisor – Prof. Peretz Shoval  
Title of thesis - Advanced Model of Information Filtering Based on  
Extended User Profiles and Stereotypes Using Cluster-Analysis

**• Employment History**

4. 2011 -	Associate professor Department of Information Systems Engineering (ISE), Ben-Gurion University of the Negev
1.06.2006	Tenured
10.2005 - 4. 2011	Senior Lecturer Department of Information Systems Engineering (ISE), Ben-Gurion University of the Negev
10.2000- 10.2005	Lecturer - tenure track Department of Information Systems Engineering (ISE), Ben-Gurion University

1999-2000	Post-Doctoral research associate (non-tenured) School of Communication, Information and Library Science, Rutgers University, NJ, USA
1998-1999	Visiting scholar (non-tenured) CIMIC – Center for Information Management, Integration and Connectivity, Rutgers University, NJ, USA
1997-1998	Lecturer (non-tenured) Department of Management Science and Information Systems (MSIS), School of Business, Rutgers University, NJ, USA

### • Professional Activities

#### (a) Positions in academic administration

2014 –	Member of the scientific committee-The Institution for Cyber research at BGU
2014 -	Member of the search committee for dean of the Faculty of Engineering
2012 -	Senate member, Ben-Gurion University
2012 -	Head of the Curriculum committee Department of ISE, Ben-Gurion University of the Negev
2011 -	Department chair Department of ISE, Ben-Gurion University of the Negev
2011 -	Chair of teaching committee for PhD studies Department of ISE, Ben-Gurion University of the Negev
2010-	Member of Promotion Committee Department of ISE, Ben-Gurion University of the Negev
2007 - 2011	Chair of teaching committee for graduate studies Department of ISE, Ben-Gurion University of the Negev
2001- 2011	Responsible for teaching assistances assignment Department of ISE, Ben-Gurion University of the Negev

#### (b) Professional functions outside universities/institutions

2016	Organizer - Workshop on "Deep Learning for Recommender Systems" at Recsys 2016
2015	Tutorial presentation at SIGIR 2015 - "Wikipedia as a knowledge source"
2014	Chair - ACM SAC 2014 recommender Systems Track
2014 -	Member of Steering Committee for Beer-Sheva CyberSpark Initiative
2013-2016	Co-Chair – Data Mining for Business intelligence Conference at Ben-Gurion University
2012-	Advisor and reviewer for new academic books and courses - Open University
2012-	Member of CHE (Council of Higher Education) committee for enrichment studies in Israeli Academia
2008 - 2011	Member of the Public Privacy Protection Council, Ministry of Justice, Government of Israel
2008 - 2009	Member of the Strategic Consulting Forum for the National Authority for Data Protection, Prime Minister office, Government of Israel

- 2007 Co-Chair of a NATO Advanced Research Workshop on Security Informatics and Terrorism – Patrolling the Web, Beer-Sheva, Israel, June 2007
- 2004-2005 Member - Special Committee for Privacy Regulation, Ministry of justice, Government of Israel.

Program committee member of the following conferences:

- PAML (2016) - Privacy Aware Machine Learning in the context of the ARES conference
- IEEE SWSTE (2016) - Software Engineering - Focus on Cyber Security
- WWW (2014) - International World Wide Conference 2014
- ECIS (2014) –European Conference of Information Systems
- CARS (2009-2013) – Workshop on Context Aware Recommender Systems at ACM Recsys
- IEEE CBI (2013)- Conference on Business Informatics
- ACM RecSys (2008-2014 ,2013; 2015, 2016 senior PC) –Recommender Systems
- IEEE ISI (2007-2010) – Intelligent and Security Informatics
- ISI-KDD- (2009, 2010, 2012) ACM SIGKDD Workshop on Intelligence and Security Informatics
- CaRR2011- IUI 2011 Workshop on Context-awareness in Retrieval and Recommendation
- MCIS (2010)- Mediterranean Conference on Information Systems
- UMAP (2012-2016)– User Modeling and Personalization
- ACM SAC (2013-2014) , ACM Systems and Computing
- NGITS 2009 – New Generation of Information Technology and Systems

(c) Significant professional consulting

- 2014 Cognilize – Recommender Systems
- 2014 Celtic - Recommender Systems
- 2013 Velocity - Startup - Recommender Systems
- 2011 Business Intelligence on the Web - for a BI company in Lod
- 2006-2007 Media Layers – Machine Learning for Personalization TV advertisements
- 2004 e-Learning Technologies – MABA project – distance learning

(d) Membership in professional/scientific societies

- 2000- ACM – Association for Computer Machinery
- 2005- IEEE Computer

(e) Ad-hoc reviewer for journals:

ACM Transactions in Intelligent Systems and Technology (ACM TIST)

Journal of the American Society for Information Science and Technology  
(JASIST)

Information Processing & Management,

IEEE Internet Computing

IEEE transactions on Man Machine and Cyber Part A and C

IEEE TKDE

Decision Support Systems

User Modeling User Adapted Interaction (UMUAI)

Information Retrieval

Knowledge-Based-Systems

ACM TIST

Review for Funding Agencies

Israel Science Foundation (ISF).

United States-Israel Binational Science Foundation (BSF)

• **Educational activities**

(a) Courses taught

Artificial intelligence – Undergraduate,  
Ben-Gurion University, Information Systems Engineering

Intelligent Systems Applications – Undergraduate,  
Ben-Gurion University, Industrial Engineering & Management

Advanced Information Retrieval Systems – Graduate,  
Ben-Gurion University, Information Systems Engineering

Information Retrieval and Digital libraries – Undergraduate,  
Ben-Gurion University, Information Systems Engineering

Systems Analysis and Design – Undergraduate,  
Ben-Gurion University, Information Systems Engineering,  
Ben-Gurion University, Industrial Engineering & Management, and  
Rutgers University, Business School

Final Projects Seminar - Undergraduate,  
Ben-Gurion University, Information Systems Engineering

Visual Programming -Undergraduate,  
Ben-Gurion University, Information Systems Engineering

Computer Technology - MBA,  
Rutgers University, Business School

Data Structures – Undergraduate  
Open University

## (b) Research students

**Graduated Ph.D**

- 2013 - Yelena Checkina (Joint supervision with Lior Rokach)  
Ben-Gurion University, Information Systems Engineering  
Title : Multi-label Classification
- 2014 - Lihi Naamani. (joint supervision with Lior Rokach and Meir Kalech)  
Ben-Gurion University, Information Systems Engineering  
Title: Preference Elicitation for Group Decisions Using Voting Theory
- 2015 - Gilad Katz (joint supervision with Yuval Elovici)  
Ben-Gurion University, Information Systems Engineering  
Title: Context-Based text and Entity Analysis Using Machine Learning
- 2016 - David Ben-Shimon (joint supervision with Lior Rokach)  
Ben-Gurion University, Information Systems Engineering  
Title: Anytime recommender algorithms

**Graduated M.Sc**

- 2004 - Annie Moskowitz – M.Sc.  
Ben-Gurion University, Information Systems Engineering  
Title: Implicit feedback indicators
- 2004 – Shahar Reichman – M.Sc.  
Ben-Gurion University, Information Systems Engineering  
Title: Digital libraries
- 2005 –Yelena Tenebaum – M.Sc.  
Ben-Gurion University, Information Systems Engineering  
Title: Efficient question answer indexing
- 2005 – Gil-Ben-Uziah – M.Sc. (joint supervision with Yuval Elovici)  
Ben-Gurion University, Information Systems Engineering  
Title: Achieving Privacy on the Web using a P2P Network
- 2006 - Dan Melamed – M.Sc. (joint supervision with Yuval Elovici)  
Ben-Gurion University, Information Systems Engineering  
Title: Marcol-Market-based recommender system
- 2008 - Elsana Ibrahim – M.Sc.  
Ben-Gurion University, Information Systems Engineering  
Title: Social-based recommender systems
- 2008 - Veronica Maidel – M.Sc. (joint supervision with Peretz Shoval)  
Ben-Gurion University, Information Systems Engineering  
Title: Ontology-based content based recommender systems
- 2008 - Slava Kissilevitz - M.Sc. (joint supervision with Yuval Elovici and Lior Rokach)

- Ben-Gurion University, Information Systems Engineering  
Title: New approach for achieving k-anonymity in privacy preserving data mining
- 2010 - Liat Antwarg – M.Sc. (joint supervision with Lior Rokach)  
Ben-Gurion University, Information Systems Engineering  
Title: Intention Prediction using hidden Markov Models
- 2011 - Boaz Zabar – M.Sc.  
Ben-Gurion University, Information Systems Engineering  
Title: Integrating social networks and search
- 2011- Ariel Bar – M.Sc. (joint supervision with Lior Rokach).  
Ben-Gurion University, Information Systems Engineering  
Title: Ensemble methods for collaborative filtering
- 2011 - Shirley Freilichman – M.Sc. (joint supervision with Lior Rokach)  
Ben-Gurion University, Industrial Engineering & Management  
Title: Cross domain recommender systems
- 2011 - Raz Wassershtein – M.Sc (joint supervision with Lior Rokach).  
Ben-Gurion University, Information Systems Engineering  
Title: K-Anonymity for multiple view
- 2012- Orly Moreno - M.Sc. (joint supervision with Lior Rokach). (Suma Cum-Laude)  
Ben-Gurion University, Information Systems Engineering  
Title: TALMUD - Transfer Learning Based Multi- Domain Recommender Systems
- 2013 - Yuri Shapira  
Ben-Gurion University, Information Systems Engineering  
Title: k-skip Fingerprint method for information leakage
- 2013 - Alexander Ostrikov - (joint supervision with Lior Rokach)  
Ben-Gurion University, Information Systems Engineering  
Title : Utilization of Geo-location information for collaborative filtering
- 2014 - Yuri Poliak  
Ben-Gurion University, Information Systems Engineering  
Title: Root Detection on Android using JTAG
- 2014 - Radmila Fishel (joint supervision with Lior Rokach)  
Ben-Gurion University, Information Systems Engineering  
Title: Meta Classifier for automatic selection of a recommender system's algorithm
- 2015 - Yasmin Bokovsa (joint supervision with Lior Rokach)  
Ben-Gurion University, Information Systems Engineering  
Title : Risk Management model for network crawling
- 2015 -Dimitry Beckerman (joint supervision with Lior Rokach)  
Ben-Gurion University, Information Systems Engineering

Title: Context Based Anomaly Detection for DNS accesses

2015 - Moran Beladev

Ben-Gurion University, Information Systems Engineering

Title: Recommender Systems for Bundle recommendations

2015 -Nofar Dali (joint supervision with Lior Rokach)

Ben-Gurion University, Information Systems Engineering

Title: Timing of recommender systems

2015 - Guy Shtar (joint supervision with Lior Rokach)

Ben-Gurion University, Information Systems Engineering

Title: Machine Learning for Exact Geo-Location

## **Current Students**

### **Ph.D Students**

Ido Guy

Ben-Gurion University, Information Systems Engineering

Title: Mobile search

Status: Proposal in preparation

Moshe Unger

Ben-Gurion University, Information Systems Engineering

Title: Latent Context aware recommender systems

Status: Proposal approved

Yisrael Mirsky – (joined supervision with Yuval Elovici)

Title: Context aware Analysis for Smartphone Security

Status - Proposal in progress

Victor Mackrankov - (joined supervision with Lior Rokach)

Title: Query Prediction for Sentences Correction

Status - Proposal submitted

Edita Grolman – (joint supervision with Lior Rokach)

Ben-Gurion University, Information Systems Engineering

Title: Transfer Learning for Sentiment Analysis

Status: Proposal submitted

Michael Dimschitz - (joint supervision with Lior Rokach)



Ben-Gurion University, Information Systems Engineering  
Title: Deep Learning for Anomaly Detection  
Status: Proposal in preparation

Efrat Chalfon – Ph.D (joint supervision with Yuval Elovici)  
Ben-Gurion University, Information Systems Engineering  
Title: Attack Graph Optimizations  
Status: Proposal in preparation

Ariel Bar - Ph.D  
Ben-Gurion University, Information Systems Engineering  
Title: Machine learning for Cyber Security

Hagit Grushka- Ph.D  
Ben-Gurion University, Information Systems Engineering  
Title: Risk Factoring

**M.Sc. Students**

Miriam Chodoker

Ben-Gurion University, Information Systems Engineering

Title: Boosting Information Retrieval with Wikipedia

Status: proposal in preparation

Moran Hacham (joint supervision with Lior Rokach)

Ben-Gurion University, Information Systems Engineering

Title: Global Utility for CF Recommender Systems

Status: proposal submitted

Eran Feinman (joint supervision with Lior Rokach)

Title: Intelligent Smartphone Sensing

Ben-Gurion University, Information Systems Engineering

Status:- Proposal in preparation

Liron Ben-Kimon

Title: Biometric authentication for mobile phones

Ben-Gurion University, Information Systems Engineering

Status:- Proposal in preparation

Saar Tal (joint supervision with Lior Rokach)

Title: Intelligent sensing using active learning

Ben-Gurion University, Information Systems Engineering

Status:- Proposal in preparation

Noa Roy - (joint supervision with Lior Rokach)

Title: Modeling Graph Databases

Ben-Gurion University, Information Systems Engineering

Status:- Proposal in preparation

Shahar Admati -(joint supervision with Lior Rokach)

Title: Automatic Wikipedia book generation

Ben-Gurion University, Information Systems Engineering

Status:- Proposal in preparation

Niva Hazon

Title: Bot segmentation using machine learning

Ben-Gurion University, Information Systems Engineering

Status:- Proposal in preparation

Hadar Polad

Title: Graph Obfuscation

Ben-Gurion University, Information Systems Engineering

Status:- Proposal in preparation

Ruben Ohayon

Title: redictive analytics for personalized TV shows

Ben-Gurion University, Information Systems Engineering

Status:- Proposal in preparation

Yael Brumer

Title: Deep learning for next click prediction

Ben-Gurion University, Information Systems Engineering

Status:- Proposal in preparation

**Post Doctoral Fellow**

Meira Levy, 2012

Lena Checkina, 2013

**• Awards, Citations, Honors, Fellowships****(a) Honors, Citation Awards (including during studies)**

- 1997 Ernst& Young Foundation and ICIS – Delegate to the Doctoral Consortium, 8th ICIS. Conference, 1997, Atlanta, USA. – Doctoral Fellow 1997.
- 2005 Best paper award of the year 2005 of the Internet Research journal, for the following paper: Elovici, Y., Glezer, C., Shapira, B., Enhancing customer privacy while searching for products and services on the world wide web. *Internet Research*. 15(4). pp. 378 – 399, Sep, 2005
- 2009 Rich Foundation – Award for Excellence in Research for women researchers
- 2010 Best paper award of the year 2010 of the Journal of the Association of Information Systems (AIS) for the following paper : Arazy, O., Kumar, N., Shapira, B. A Theory Driven Decision Framework for Social Recommender Systems 11(9), 2010.
- 2010 Best Information Systems Publication of 2010 by the Association of Information Systems (AIS) for the paper Arazy, O., Kumar, N., Shapira, B. A Theory Driven Decision Framework for Social Recommender Systems 11(9), 2010.

**Students' awards**

2013 -

Yuri Poliak - (M.sc student) scholarship from the Ministry of Science and Technology Master, Scholarship in the Field of: Advanced Computing and Cyber Security

Gilad Katz - (Ph.D student) scholarship from the Ministry of Science and Technology Master, Scholarship in the Field of: Advanced Computing and Cyber Security

- 2014 Best student paper - Segal. A., Katzir, Z., Galc, K., Shani, G. and **Shapira, B.** EduRank: Personalization in E-Learning using Collaborative Filtering, The 7th International Conference on Educational Data Mining, EDM 2014, July 4, 2014 - July 7, 2014.
- 2015 Ariel Bar - Ph.D student - Paran scholarship from the Kreitman school for graduate studies at BGU for excellent Ph.D students
- 2015 Moshe Unger - Ph.D student - Prath Scholarship the Kreitman school for graduate studies at BGU for excellent Ph.D students
- 2016 Yisroel Mirsky - Ph.D student - Benny Gantz Award for excellence in research in Cyber Security



## • Scientific Publications

\* Published since last promotion

\*\*Published only with students since last promotion

Authors' role are indicated as following: Principal Investigator <sup>PI</sup>, student <sup>s</sup>, post-doctoral fellow <sup>PD</sup>, co-researcher <sup>c</sup>, technician/laboratory assistant <sup>T</sup>

Google Scholar Number of Citations: **3532**

Google Scholar H-Index (including all conferences papers and books): **22**

ISI Number of Citations **300** (not including self-citations)

ISI H-Index (mainly journal papers): **10** (not including self-citations) – (report attached at the end of the CV)

### (a) Editorship of collective volumes

1. Cecilia S. Gal , Paul B. Kantor, **Bracha Shapira** (Eds.). (2008). Security Informatics and Terrorism: Patrolling the Web: Social and Technical Problems of Detecting and Controlling Terrorists' Use of the WWW. (NATO Science for Peace and Security), IOS Press.
2. \* Francesco Ricci, Lior Rokach, **Bracha Shapira**, Pual Kantor, Recommender Systems Handbook, Springer, 2010, ISBN: 0387858199
3. \*Francesco Ricci, **Lior Rokach**, **Bracha Shapira** Recommender Systems Handbook, 2<sup>nd</sup> Edition, Springer, 2015, ISBN:978-1-4899-7636-9

### (b) Chapters in collective volumes - Conference proceedings, Festschrifte, etc.

#### Conferences with full peer-reviewed papers (also included competitive workshops)

1. **Shapira<sup>PI</sup>, B.**, Raveh<sup>PI</sup>, A., Shoval<sup>PI</sup>, P. and Hanani<sup>PI</sup>, U. (1995). Two Phase Hypertext Model. Proceedings of the Internation Workshop of the Next Generation Information Technologies and Systems (NGITS'95), Naharia, Israel. Amihai Motro and Moshe Tennenholtz (Eds). pp. 146-155. Acceptance rate 30.6%
2. Shoval<sup>PI</sup> P., **Shapira<sup>PI</sup>, B.** and Hanani<sup>PI</sup>, U. (1999). Strategies for Filtering E-mail Messages Combining Content-based and Sociological Filtering with User-Stereotypes. Proceedings of the Next Generation Information Technologies and Systems (NGITS'99), Zikhron-Yaakov, Israel, July 5-7, 1999 Proceedings Series: Lecture Notes in Computer Science, Vol. 1649, Ron Y., Tsur, Shalom (Eds.). pp. 40-49. Acceptance rate 50%.
3. Boger<sup>PI</sup>, Z., Kufliks<sup>s</sup>, T., **Shapira<sup>PI</sup>, B.**, and Shoval<sup>PI</sup>, P. (2000). Information Filtering and Automatic Keyword Identification by Artificial Neural Networks. Proceedings of the 8th European Conference on Information Systems. Vienna, Austria, (ECIS) 2000. pp. 379-385. Acceptance rate 45%
4. Elovici<sup>PI</sup>, Y., **Shapira<sup>PI</sup>, B.** and Meshiach<sup>s</sup>, A. (2002). A New Privacy Model for Hiding Group Interests while Accessing the Web. Proceeding of The ACM Workshop in Electronic Society, at The 9t ACM Conference on Computer and Communication

Security, Washington DC, USA, (WEPS). November 2002. pp. 63-70. .Acceptance rate 27% (12 of 44 papers)

5. Elovici<sup>pi</sup>, Y., **Shapira<sup>pi</sup>, B.** and Meschiach<sup>s</sup>, A. (2002). A New Privacy Model for Web Surfing. Proceedings of the Next Generation Information Technologies and Systems NGITS 2002, Caesarea, Israel, June 24-25, 2002. Springer 2002 Lecture Notes in Computer Science ISBN 3-540-43819-X. pp. 45-47. Acceptance rate 50%.
6. **Shapira<sup>pi</sup>, B.**, Last<sup>pi</sup>, M., Elovici<sup>pi</sup>, Y., Zaafrany<sup>s</sup>, and Kandel<sup>pi</sup>, A. (2003). Using Data Mining for Detecting Terror-Related Activities on the Web. Proceedings of the European Conference on Information Warfare and Security, University of Reading, UK, 30 June - 1 July 2003. Pp. 271-280. Acceptance rate N/A.
7. Kuflik<sup>s</sup>, T., **Shapira<sup>pi</sup>, B.**, Elovici<sup>pi</sup>, Y. and Meschiach<sup>s</sup>, A. (2003). Privacy Preservation Improvement by Learning Optimal Profile Generation Rate 9th International conference on User Modeling, UM03, Pittsburg, June 22-26, 2003. Acceptance rate 24.5%
8. Last<sup>pi</sup>, M., **Shapira<sup>pi</sup>, B.**, Elovici<sup>pi</sup>, Y., Zaafrany<sup>s</sup>, O. and Kandel<sup>pi</sup>, A. (2003). Content-Based Methodology for Anomaly Detection on the Web. Proceedings of AWIC'03, Atlantic Web Intelligence Conference, Madrid, Spain, 5-7 May 2003. Advances in Web Intelligence, E. Menasalvas et al. (Editors), Springer-Verlag, Lecture Notes in Artificial Intelligence, Vol. 2663, pp. 113-123. Acceptance rate 45%.
9. Nemeth<sup>s</sup>, Y., **Shapira<sup>pi</sup>, B.** and Taieb-Maimon<sup>pi</sup>, M. (2004). Evaluation of the Real and Perceived Value of Automatic and Interactive Query Expansion. SIGIR 2004, (short paper) Sheffield, UK, July, 25-29, 2004. pp. 526-527. Acceptance rate 50%.
10. Elovici<sup>pi</sup>, Y., Kandel<sup>pi</sup>, A., Last<sup>pi</sup>, M., and **Shapira<sup>pi</sup>, B.** (2004). Terrorist Detection System. Proceedings of the 8th European Conference on Principles and Practice of Knowledge Discovery in Databases (PKDD 2004), Pisa, Italy, Springer-Verlag, Lecture Notes in Artificial Intelligence 3202, pp. 540-542, September 2004. Acceptance rate 18%.
11. Zaafrany<sup>s</sup>, O., **Shapira<sup>pi</sup>, B.**, Elovici<sup>pi</sup>, Y., Last<sup>pi</sup>, M. and Kandel<sup>pi</sup>, A. (2004). OHT-Online-HTML Tracer for Detecting Terrorist Activities on the Web. ECIW04-European Conference on Information Warfare and Security, London, UK, June 28-19, 2004. pp. 371-378. Acceptance rate N/A
12. Friedman<sup>pi</sup>, M., Schneider<sup>pi</sup>, M. Zaafrany<sup>s</sup>, O., **Shapira<sup>pi</sup>, B.**, Elovici<sup>pi</sup>, Y., Last<sup>pi</sup>, M. and Kandel<sup>pi</sup>, A. (2004). Using Fuzzy Logic to Cluster Web Documents. Nafips 2004 – North American Fuzzy Information Processing Society, Banff, Canada, June 2004. pp. 524-527. Acceptance rate N/A
13. Elovici<sup>pi</sup>, Y., **Shapira<sup>pi</sup>, B.**, Last<sup>pi</sup>, M., Kandel<sup>pi</sup>, A., Zaafrany<sup>s</sup>, O., Friedman<sup>pi</sup>, M. and Schneider<sup>pi</sup>, M. (2005). Content-Based Detection of Terrorists Browsing the Web Using an Advanced Terror Detection System (ATDS). IEEE International Conference on Intelligence and Security Informatics (IEEE ISI-2005), GA, USA, May 2005. pp. 244-255. Acceptance rate N/A
14. Arazy<sup>pi</sup>, O., Kumar<sup>pi</sup>, N. and **Shapira<sup>pi</sup>, B.** (2006). Social Recommendations Systems: Leveraging the Power of Social Networks in Generating Recommendations. The 1st

International Conference on Design Science Research in Information Systems & Technology (DESRIST 2006), Claremont, California, Feb 24 -25, 2006. Acceptance rate N/A

15. Tenenbaum<sup>s</sup> L., **Shapira<sup>pi</sup> B.** and Shoval<sup>pi</sup> P. (2008). Ontology-Based Classification of News in an Electronic Newspaper, ITA 2008, Varna, Bulgaria, June 23- July 03,2008. Acceptance rate N/A.
16. Maidel<sup>s</sup>, V., Shoval<sup>pi</sup>, P., **Shapira<sup>pi</sup>, B.** and Taieb-Maimon<sup>pi</sup>, M. (2008). Evaluation of an Ontological Content-Based Filtering Method for a Personalized Newspaper. In Proceedings of the RecSys '08, the ACM Conference on Recommender Systems, Lausanne, Switzerland, October 23 - 25, 2008. pp. 91-98. Acceptance rate 31%.
17. \*Levy<sup>s</sup>, M., Shoval<sup>pi</sup>, P., **Shapira<sup>pi</sup>, B.**, Dayan<sup>t</sup>, A., Tubi<sup>s</sup>, M. (2010). Task Modelling Infrastructure for Analyzing Smart Phone Usage, ICMB/GMR 2010: 9th International Conference on Mobile Business and the 9th Global Mobility Roundtable, Athens, Greece, June 13-15, 2010. Acceptance rate N/A
18. \* Porat<sup>s</sup>, T., Naamani<sup>s</sup>, L., Rokach<sup>pi</sup>, L., **Shapira<sup>pi</sup>, B.** (2010). Interactive Audience Selection Tool for Distributing a Mobile Campaign, IADIS International Conference - Information Systems 2010, Porto, Portugal, March 18-20, 2010. Acceptance rate N/A
19. \*Tenenboim<sup>s</sup>, L., **Shapira<sup>pi</sup>, B.**, Rokach<sup>pi</sup>, L. (2010) Identification of Label Dependencies for Multi-label Classification, International Workshop on Learning from Multi-Label Data, (MDL'10), June 25, Haifa , Israel. Acceptance rate 50%.
20. \*Levy<sup>s</sup>, M., Shoval<sup>pi</sup>, P., **Shapira<sup>pi</sup>, B.** (2010). Personalized Knowledge Service Based on Smart Cell-Phone Usage: A Conceptual Framework, 16th Americas Conference on Information Systems, Lima, Peru, August 12-15, 2010. Acceptance rate N/A.
21. \*Dayan<sup>t</sup>, A., Katz<sup>s</sup>, G., Luke<sup>t</sup>, K.H., Rokach<sup>pi</sup>, L., **Shapira<sup>pi</sup>, B.**, Schwaiger<sup>t</sup>, R., Aydin, A., Fishel, R., and Biadsky, N., Recommenders Benchmark Framework, the 11th International Conference on Innovative Internet Community Services (I2CS 2011), Berlin, Germany, June 15-17, 2011. Acceptance rate N/A.
22. \*Chekina<sup>s</sup>, L., Rokach<sup>pi</sup>, L., and **Shapira, B<sup>pi</sup>**. "Introducing diversity among the models of multi-label classification ensemble", European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning, 2012. Acceptance rate N/A.
23. \*Moreno, O., **Shapira, B.**, Rokach, L., Shani, G. TALMUD – Transfer Learning for Multiple Domains, The 21st ACM CIKM (Conference on Information and Knowledge Management), Sheraton, Maui Hawaii, October 2012, pp. 425-434. Acceptance rate 13.4%
24. \*Fire<sup>s</sup>, M., Katz<sup>s</sup>, G., Elovici<sup>pi</sup>, Y., **Shapira<sup>s</sup>, B.**, and Rokach<sup>s</sup>, L., Predicting Student Exam's Scores by Analyzing Social Network Data, International Conference on Active Media Technology, AMT 2012, , Macau, China, December 4-7, 2012. Lecture Notes in Computer Science, Volume 7669 Springer 2012, ISBN 978-3-642-35235-5, pp. 584-595 Acceptance rate 32%



25. \*Shani<sup>pi</sup>, G., Rokach<sup>pi</sup>, L., **Shapira<sup>pi</sup>, B.** Recommending Insurance Riders, ACM SAC 2013, Coimbra, Portugal, March 18 - 22, 2013, pp. 256-263. Acceptance rate 25%
26. \*Tenenboim-Chekina<sup>s</sup>, L., Rokach<sup>pi</sup>, L., **Shapira<sup>pi</sup>, B.** Ensemble of Feature Chains for Anomaly Detection, MCS 2013 : 11th International Conference on Multiple Classifier Systems, Lecture Notes in Computer Science, Vol. 7872, pp. 295-306, Nanjing, China, May 15-17, 2013. Acceptance rate N/A
27. \*Bar, A., Rokach, L., Shani, G., **Shapira, B.**, Schclar, A. Boosting Simple Collaborative Filtering Models Using Ensemble Methods, MCS 2013 : 11th International Conference on Multiple Classifier Systems, Lecture Notes in Computer Science, Vol. 7872, pp. 1-12, Nanjing, China, May 15-17, 2013, Acceptance rate ~50%.
28. \* Heimlich<sup>s</sup>, I., Dolev<sup>c</sup>, S., **Shapira<sup>pi</sup>, B.**, Elovici<sup>pi</sup>, Y., Mimran<sup>t</sup>. D., Messalem<sup>t</sup>. G., and Kopeetsky<sup>c</sup>, M., Exploiting Simultaneous Usage of Different Wireless Interfaces for Security and Mobility, Proceedings of 2nd International Conference on Future Generation Communication Technology FGCT, 2013. pp. 21-26. Acceptance rate N/A
29. \* Bar<sup>s</sup>, A., Mimran<sup>t</sup>, D., Chekina<sup>s</sup>, L., Elovici<sup>pi</sup>, Y., **Shapira, B.**<sup>pi</sup>: Nesto - Network selection and traffic offloading system for android mobile devices. Wireless Communications and Mobile Computing Conference (IWCMC), 2013 9th International, IWCMC 2013: 337-342. Acceptance rate 35%
30. \* Segal<sup>s</sup>. A., Katzir<sup>s</sup>, Z., Gal<sup>c</sup>, K., Shani<sup>c</sup>, G. and **Shapira<sup>pi</sup>, B.** EduRank: Personalization in E-Learning using Collaborative Filtering, The 7th International Conference on Educational Data Mining, EDM 2014, July 4, 2014 - July 7, 2014. (Won Best student paper award). pp. 68-76. Acceptance rate 17%.
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47. Unger M., Bar, A., Shapira, B., Rokach, L., Gudes, E. Context: Lessons Learned from Mobile Context Inference, UBICOMP 2014, Seattle 13-17 September (short paper in the adjunct track) Acceptance rate for short adjunct papers 50%
48. \* Katz, G<sup>s</sup>, Shtok<sup>s</sup>, A., Kurland<sup>c</sup>, O., **Shapira<sup>pi</sup>, B.**, Rokach<sup>pi</sup>, L. Wikipedia-Based Query Performance Prediction. In proceedings of Proceedings of the 37th international ACM SIGIR conference on Research & development in information retrieval, 2014. pp. 1235-1238. Acceptance rate for short papers 32.5%.
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40. \*\*Katz<sup>s</sup>, G., Ofek<sup>s</sup>, N., **Shapira**<sup>pi</sup>, B. ConSent: Context-Based Sentiment Analysis, 2015, Knowledge based systems, 84:162-178 (IF 3.058 ;Q1; 15/121 )
41. \*Unger, M.<sup>s</sup>, **Shapira**<sup>pi</sup>, B., Rokach<sup>pi</sup>, L., Bar<sup>s</sup>, A. Towards Latent Context-Aware Recommendation Systems, Knowledge Based Systems 104: 165-178 (IF 3.058 ;Q1; 15/121 )
42. \*Naamani-Dery<sup>s</sup>, L., Kalech<sup>pi</sup>, M., Rokach<sup>pi</sup>, L. **Shapira**<sup>pi</sup>, B. Reducing Preference Elicitation in Group Decision Making. Accepted to Expert Systems With Applications (IF 2.240;Q1)
43. \*Grolman, E.<sup>s</sup>, Bar<sup>s</sup>, A., Rokach<sup>pi</sup>, L., **Shapira**<sup>pi</sup>, B. Utilizing Transfer Learning for In-Domain Collaborative Filtering. Accepted to Knowledge Based Systems (IF 3.058 ;Q1; 15/121 )



• **Lectures and Presentations at Meetings and Invited Seminars not followed by**

**Published Proceedings**

Presentation of papers at conferences/meetings (oral or poster)

- Personalization for Content Management, Workshop of Content Management, INFO 2003, 18<sup>th</sup> Information Week, May 2003, Tel-Aviv, Israel
- Privacy Vs. Profiling, Workshop on Privacy in a Digital Environment – Haifa Center of Law and Technology, 17-19 Dec. 2003, Haifa University, Israel
- Personalization Vs. Privacy on the Internet - Privacy Workshop December 18, 2003, Organized by Haifa University Law school, Neve-Ilan, Israel
- Model of Content-Based Web Monitoring, Conference on Fighting Terror in Cyberspace, April 22, 2004, Tel-Aviv, Israel
- Privacy and personalization, INFO 2006, May 2006, Tel-Aviv, Israel
- MarCol - a market based collaborative search engine. The future of Web Interactions, Invited talk - British-Israeli Conference, April 30 – May 2, 2007, Tel-Aviv, Israel
- The Electronic Newspaper of the Future. Print, Internet, Community (PIC 2007), 25-26 June, 2007, Tel-Aviv, Israel
- The ePaper Project - Developing the future personalized mobile newspaper, INFO 2008, E-Publishing workshop, May 2008, Tel-Aviv, Israel
- Ohad Inbar, Noam Tractinsky, Joachim Meyer, Peretz Shoval, Bracha Shapira, Considerations in the Design of Human-Computer Interface for a Mobile News Delivery Service, The 15th Industrial Engineering and Management Conference (IE&M 2008), Tel Aviv, Israel, March 10-11, 2008
- Search Engines Personalization. INFO 2009, May 2009, Tel-Aviv, Israel
- Recommender Systems. INFO 2010, May 2010, Tel-Aviv, Israel
- Personalization using Social Networks. INFO 2012, May 2012, Tel-Aviv, Israel.
- Cross-Domain Recommendations. Research Workshop of the Israel Science Foundation on Ubiquitous User Modeling (U2M'2012) – July 2012 - State of the art and current challenges. University of Haifa, Israel
- Privacy in the cyber era: contribution or contradiction – Invited Panelist at CyberTech – The event for Cyber Industry, January 27-28, 2014, Tel-Aviv.
- Cyber Research in Industry and Academia .2nd International Conference - C5I - Command Control, Computers, Communications, Cyber and Information. – Invited Talk — March 12-2014, Lod-Israel.
- Transfer Learning for Recommender Systems – Invited talk at **ReCon**; Recommendations Technology Conference. April, 2014- Microsoft R&D Herzelia, Israel.
- Advances in Cyber Research - Invited talk at Center for Emergency Response Center at BGU – Workshop about Cyber risks and opportunities- February 2015
- Cyber Education – Invited talk at Cyber Security Conference 11.02.2015 Organized by National Cyber Bureau and the People and Computers Magazine
- Sderot Conference for Society - November 2015 invited to talk about the Israeli Biometric database
- IAAI 2016 - Annual Symposium of the Israeli Association of Artificial Intelligence Invited Talk "AI and Cyber Security"- 25/01/2016
- GEIC 2016 - Global Entrepreneurship and Innovation Conference -Ben-Gurion University of the Negev "Cyber Security Research: a case study of academia-industry Collaboration" 15/5/2016

Seminar presentations at universities and institutions

- 1998
- Dept. of Management Science and Information Systems, Rutgers University
- 1999
- Dept. of Information Systems, City University of New-York- Baruch College  
Subject: Information Filtering and Stereotypes
  - Center for Information Management, Integration and Connectivity (CIMIC), Rutgers University  
Subject: Information Filtering and Stereotypes  
Subject: A two Phase Filtering Model Integrating Stereotypes
- 2000
- Dept. of Information Systems Engineering, Ben-Gurion University  
Subject: AntWorld – A collaborative search tool
- 2001
- SIGTRS – Special Interest Group on Text Retrieval in Israel  
Subject: Collaborative Filtering Systems
- 2002
- Department of Industrial Engineering and Management, Technion  
Subject: Privacy Model for Web Navigation
  - Dept. of Library and Information Sciences, Hebrew University –Jerusalem  
Subject: Collaborative Internet Search
- 2003
- Israeli Air Forces  
Subject: Search Engines – Current State and Future Trends
  - Dept. of Library and Information Sciences, Hebrew University –Jerusalem  
Subject: Privacy and Personalization. Two sides of the coin?
- 2004
- School of Library and Information Sciences, Hebrew University –Jerusalem  
Subject: Privacy and Personalization on the Web
  - Law and Technology – Haifa University  
Subject: Privacy preservation for users browsing the Web
- 2006
- Zicklin School Of Business, Baruch College, City University of New-York, February,  
Subject: TDS – Terror Detection system
- 2008
- The Minerva Center for Human rights. – Mishkenot Shaannim, Jerusalem, November 2008, Workshop- Privacy Ethics at the Workplace,  
Subject: Surveillance Technologies and Privacy
  - Department of Computer Science – Bar-Ilan University, November 2008  
Subject: Privacy preserving Data Mining
  - Department of Industrial Engineering – Tel-Aviv University, November 2008  
Subject: Information retrieval – overview and trends

2013

- School of Business Administration , Bar-Ilan University, May 2013  
Subject: Cyber Security and Machine learning
- Ornage Institute for Internet Studies Tel-Aviv University  
Subject: Cyber Security and Machine learning

2014

- University of Haifa, Department of Information Systems, April 2014  
Subject: Context Inference
- ISE Department – Ben-Gurion University Research Seminar, May 2014  
Subject: Transfer Learning for Recommender Systems

**• Patents****Granted:**

1. 2010- Peretz Shoval, Veronica Maidel, Bracha Shapira. Ontology Content Based Filtering Method for Personalized Newspapers Registered in Europe and US .  
Registration no. 183391 US7844592 B2
2. 2013 - Shapira, B., Mimran, D., A method for detecting user screens in mobile devices working under symbian operating systems EP 2360578 B1
3. 2014- Aviram Dayan, Meytal Tubi, David Mimran, Bracha Shapira, Peretz Shoval, Meira Levy, Katja Henke, Gregor GLASS, Lutz Schneider, Method and system for task modeling of mobile phone applications  
US 8776009 B2

**Applications:**

1. Bracha Shapira, Peretz Shoval, Dudu Mimran, e-Paper, Top Level Design & Architecture. Registered in Europe (2007). Registration no. 185144
2. Shapira, B., Mimran, D., Meyer, J., Rokach, L., Peretz, S., Glass, G., Henke, K., Schneider, L. (2010), A system for detecting usability problems of users while using their mobile devices, EP Patent 2,369,481
3. Rokach, L., Antwarg, L., Shapira, B. (2010), Next-step prediction system and method, EP Patent 2,221,719
4. Kisilevich, S., Rokach, L., Elovici, Y., Shapira, B. (2010), Efficient multi-dimensional suppression for k-anonymity, EP Patent 2,228,735
5. Schclar, A., Rokach, L., Shapira, B., Glass, G., Jepsen, K., Henke, K. (2011), System and method for the detection of usability problems in an interactive application, EP Patent 2,367,113
6. Idan Himlich, David Mimran, Bracha Shapira, Guy Messalem, (2014) System and method for simultaneously routing traffic through multiple network interfaces. Registration no. EP20130194839

**• Research Grants****Competitive****2006-2008**

Granting institution: Ministry of Science,  
Grantees: Bracha Shapira(PI), Yuval Elovici (PI)  
Subject: Privacy Preserving Data-Mining  
Period of grant: 2 years starting April 2006  
Total amount: 46,000 USD

**1/2012-12/2013**

Role: Principle Investigator  
Research Topic: Fellowship grant for Cyber Defense and Advanced Computing for MSc student Yuri Poliak.  
Funding Agency: Ministry of Science and Technology  
Total Grant: 13,000USD

**2012-12/2015**

Role: Research Coordinator (PI) Prof. Bracha Shapira, Other PIs, Prof. Lior Rokach, Prof. Michael Birenhak, Prof. David G. Schwartz, Dr. Inbal Yahav)  
Research Topic: Data Leakage in Social Networks, Detection and Prevention.  
Funding Agency: Ministry of Science and Technology  
Total Grant: 380,000 USD

**1/2013-11/2014**

Role: Principle Investigator (Other PI, Prof. Yuval Elovici)  
Research Topic: Fellowship grant for Cyber Defense and Advanced Computing for Ph.D student Gilad Katz.  
Funding Agency: Ministry of Science and Technology  
Total Grant: 50,000USD

**12/2013- 12/2016**

Granting institution: Ministry of Science and Technology  
Grantees: Bracha Shapira(PI), Lior Rokach(PI), Yuval Elovici(PI), Asaf Shabtai(PI)  
Subject: Context based information leakage detection and prevention from mobile devices  
Period: 36 month  
Total: 506,412 USD

**Total Competitive Grants since last promotion: 990,000 USD**

**Non-Competitive****2005**

Granting institution; Cellcom  
Grantees: Yuval Elovici(PI), Bracha Shapira(co-pi)  
Subject: Detecting Critical Communication Components in a cellular Network  
Period of grant: 6 months starting January 2005  
Total amount: 13,000 USD

**2006-2008**

Granting institution: Deutsche Telekom

Grantees: Bracha Shapira (Project manager-PI), Peretz Shoval, Joachim Meyer, Noam Tractinsky

Subject: ePaper – the mobile newspaper

Period of grant: 24 months starting, April 2006

Total: 1,963,000 USD

**2007-2009**

Granting institution: Ministry of Industry and Commerce, Government of Israel

Grantees: Bracha Shapira(PI), Julie Tzwikel(PI), Meirav Maimon(PI)

Subject: Development and Examination of methods for preventing muscular disorders while working with computers

Period of grant: 2 years starting April 2007

Total amount: ~130,000 USD

**2007**

Granting institution: NATO

Grantees: Bracha Shapira

Subject: Advanced Research Workshop- Patrolling the Web

Period of grant: 6 months, starting April 2007

Total amount: 34,000 USD

**2007-2008**

Granting institution: Ministry of Defense, Government of Israel

Grantees (PIs): Bracha Shapira, Yuval Elovici, Lior Rokach

Subject: Data Protection

Period of grant: one year, starting September 2007

Total amount: ~50,000 USD

**2008**

Granting institution: Deutsche Telekom

Grantees: Bracha Shapira (Project manager-PI), Peretz Shoval, Joachim Meyer

Subject: ePaper – pre production

Period of grant: 7 months starting April 2008

Total: 733,000

**2007-2010**

Granting institution: Deutsche Telekom

Grantees: Bracha Shapira (Project manager-PI), Peretz Shoval, Lior Rokach, Joachim Meyer

Subject: SmartMobile

Period of grant: 26 months, starting September 2009

Total: 2,495,124 USD

**9/2009-3/2011**

Granting institution: Deutsche Telekom

Grantees: Ehud Gudes (Project manager-PI), Peretz Shoval, Bracha Shapira(Co-Pi), Arnon Strum

Subject: Database security

Period of grant: 18 months, starting September 2009

Total: 1,224,330 USD

**2009-2011**

Granting institution: Deutsche Telekom

Grantees: Lior Rokach(PI), Bracha Shapira(PI)

Recommendation Next steps

Period of grant: 18 months starting Dec. 2009

Total: 650,847 USD

**12/2009 – 6/2011**

Granting institution: Deutsche Telekom

Grantees: Bracha Shapira (Project manager-PI), Shlomi Dolev, Yuval Elovici

Subject: Privacy keeping on mobile devices

Period of grant: 18 months starting Dec. 2009

Total - 1,130,000 USD

**2/2010-11/2010**

Granting institution: Deutsche Telekom

Grantees: Bracha Shapira (Project manager-PI), Peretz Shoval, Joachim Meyer

Subject: ePaper Production

Period of grant: 9 months starting Feb. 2010

Total 807,554 USD

**2011-2012**

Granting institution: Deutsche Telekom

Grantees (PIs): Lior Rokach, Bracha Shapira , Guy Shani

Customer Analytics pre-study

Period of grant: 6 months starting Nov. 2011

Total: 420,266 USD

**2011-2012**

Granting institution: Deutsche Telekom

Grantees: Bracha Shapira (Project manager-PI), Shlomi Dolev,

Security messaging service - Accessdroid

Period of grant: 18 months starting Dec. May 2011

Total: 1,044,443 USD

**2012**

Granting institution: Deutsche Telekom

Grantees (PIs): Lior Rokach, Bracha Shapira , Guy Shani

Customer Analytics –Part 2

Period of grant: 6 months starting July. 2012- Dec. 2012

Total: 287,268 USD

**10/2011-09/2012**

Granting institution: Israeli Ministry of Defense  
Grantees (PIs): Bracha Shapira, Yuval Elovici and Lior Rokach  
Information Leakage Detection  
Total Grant: 29,000 USD

**2011-2012**

Granting institution: Israeli Ministry of Defense  
Grantees (PIs): Bracha Shapira, Yuval Elovici and Lior Rokach  
Global Attacks by Local Intruder-2  
Period of grant: 21 months starting October 2011  
Annual amount ~190,000 USD

**2011-2012**

Granting institution: Deutsche Telekom  
Grantees: Bracha Shapira (Project manager-PI), Yuval Elovici  
AnDroid Business Phone - BizDroid  
Period of grant: 18 months starting Dec. May 2011  
Total: 1,232,200 USD

**10/2011-09/2013**

Granting institution: Israeli Ministry of Defense  
Grantees (PIs): Bracha Shapira, Yuval Elovici, Rami Puzis, and Lior Rokach  
Evaluation Environment for Simulating Cyber Attacks  
Period of grant: 24 months starting October 2011  
Annual amount ~101,509 USD

**12/2012-11/2013**

Role: PI and Research Manager (Other PIs, Prof. Lior Rokach, Prof. Yuval Elovici)  
Research Topic: Information Protection II.  
Funding Agency: Israeli Ministry of Defense  
Total Grant: 66,000 USD

**01/2012- 12/2014**

Granting institution: Ministry of Commerce – Magnet Program  
Grantees (PIs): Bracha Shapira, Lior Rokach  
Subject: Detection of Small Anomalies  
Period: 36 month  
Total: 254,000 USD

**08/2012-12/2014**

Granting institution: Deutsche Telekom  
Grantees (PIs): Yuval Elovici, Bracha Shapira, Lior Rokach  
Subject: LAMA - Phase I  
Period of grant: 28 month  
Total: 1,230,627 USD



**11/2012-12/2014**

Granting institution: Deutsche Telekom  
Grantees (PIs): Bracha Shapira, Lior Rokach  
Subject: CrossxDate Usage  
Period of grant: 25 month  
Total: 138,888 USD

**9/2012-11/2013**

Role: Principle Investigator (Other PIs, Prof. Lior Rokach, Prof. Yuval Elovici)  
Research Topic: Anomaly Detection Laboratory.  
Period: 15 month  
Funding Agency: Israeli Ministry of Defense  
Total Grant: 220,690 USD.

**01/2013- 12/2013**

Granting institution: Israeli Ministry of Defense  
Grantees (PIs): Yuval Elovici, Bracha Shapira, Lior Rokach  
Subject: Secure Monitoring for Mobile deices  
Period: 12 month  
Total: 43,769 USD

**03/2013- 3/2013**

Granting institution: AMDOCS  
Grantees (PIs): Bracha Shapira, Shani Gay  
Subject: EV - uni. Data analysis project  
Period: 3 month  
Total: 4,875 USD

**3/2013-7/2014**

Role: PI (Other PIs, Prof. Lior Rokach, Prof. Yuval Elovici, Dr. Rami Puzis)  
Research Topic: Acceleration of cyber-attacks over time.  
Funding Agency: Elbit LTD, Israeli Ministry of Defense  
Total Requested Grant: 681,000USD

**04/2013-06/2013**

Granting institution: Deutsche Telekom  
Grantees(PIs): Bracha Shapira, Ehud Gudes  
Subject: Personalized Context in the cloud study  
Period of grant: 2 month  
Total amount: 65,187 USD

**07/2013-06/2015**

Granting institution: Ministry of Commerce – Magnetron Program  
Grantees (PIs): Bracha Shapira (project manager), Armin Shmilovici  
Subject: Context aware sentiment analysis for transcribed text  
Period: 24 month  
Total: ~354,000 USD

**08/2013-12/2013**

Granting institution: Deutsche Telekom

Grantees (PIs): Yuval Elovici, Bracha Shapira, Lior Rokach

Subject: Motionlogic

Period of grant: 16 month

Total: 773,731 USD

**09/2013-12/2014**

Granting institution: Deutsche Telekom

Grantees (PIs): Bracha Shapira, Lior Rokach, Ehud Gudes

Subject: Soundtrax

Period of grant: 15 month

Total amount: 551,730 USD

**10/2013-12/2014**

Granting institution: Deutsche Telekom

Grantees(PIs): Bracha Shapira, Lior Rokach

Subject: Monetizing Generated XDR Data

Period of grant: 14 month

Total amount: 252,850 USD

**01/2014- 01/2015**

Granting institution: Israeli Ministry of Defense

Grantees(PIs): Yuval Elovici, Bracha Shapira, Lior Rokach

Subject: Local Information Protection

Period: 12 month

Total: 57,406 USD

**02/2015-12/2017**

Granting institution: Israeli National Cyber Bureau

Grantees: Bracha Shapira

Subject: Attack graph obfuscation for cyber defense

Period: 24 month

Total: 110,000 USD

**9/2015 - 12/2016**

Granting institution: Deaustsch Telekom

Grantees: Bracha Shapira, Lior Rokach

Subject: Beehive - Honeypots analytics

Period: 6 month

Total: 490,000 USD

**10/2015- 10/2016**

Granting institution: IBM

Grantees: Bracha Shapira, Lior Rokach

Subject: Risk factoring of data

Period: 12 month

Total: 75,000 USD

**3/2016 - 3/2018**

Granting institution: Ministry of Commerce – Magnetron Program

Grantees: Bracha Shapira

Subject: Data Fabrication

Period: 24 month

Total: 270,000 USD

**Total non-competitive grant since last promotion: 9,917,445USD****• Present Academic Activities**(a) Research in progress

Beehive - Machine Learning Analytics for honeypot data- with Lior Rokach, students: Ariel Bar, Niva Hazon- completion expected - December 2016

- Context aware anomaly detection - with Assaf Shabtai, Lior Rokach , Yuval Elovici, Assaf Schuster (Technion). Students: Yisrael Mirsky, Liron Ben-Kimon, 2 scientific programmers- completion expected - December 2016

- XDR - Data Fabrication. Students: Sigal Elnkave, Moshe Unger, Completion expected - March 2018

- Obfuscation of attack graphs with Rami Puzis. students : Hadar Polad, Tom Gunda completion expected – 09/2018

(b) Books and articles to be published

Invited manuscript from Morgan Claypool series in Information Retrieval: Boosting Information Retrieval with Wikipedia

Submitted for publication:

Namani Dery<sup>s</sup>, L. Kalech<sup>c</sup>, M. Rokach<sup>c</sup>, L., Shapira, B. Reducing Preference Elicitation in Group Decision Making, submitted to Decision Support Systems (Q1 - 20/135)-  
**Accepted with Minor revisions**

- Ariel Bar, Editia Grolman, Lior Rokach, Bracha Shapira, Utilizing transfer learning for collaborative filtering, **accepted with Minor revisions to Knowledge based systems** (Q1)

- Paper Moran Beladev

- Paper Ariel Bar

- Paper Recsys Editia

- Paper Recsys - Moshe

- Paper Guy Shtar

Avi Segal Ya'akov (Kobi) Gal Guy Shani Bracha Shapira – A Difficulty Ranking Approach to Personalization in E-learning - Submitted to

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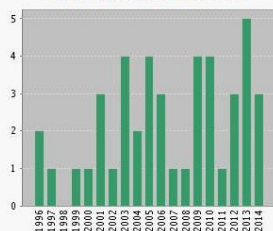
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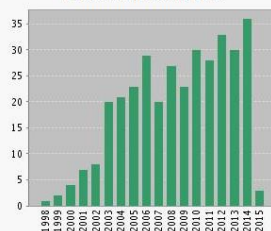
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• **Synopsis of research (including reference to publications and grants listed above)**

My main research interests are in the Information Retrieval (IR) domain. I have been working mainly on user profiling and personalization and their application to recommender systems using machine learning methods. In addition, I work on applying these methods to the cyber security domain.

I am interested in the following topics:

**Recommender Systems**

I am dealing with development of new algorithms for recommender systems, their evaluation and with utilization of information from external sources (such as mobile sensors data, Wikipedia and social networks) to improve accuracy of results. My studies related to recommender systems include:

- Cross domain recommender systems – One of the main challenges related to recommender systems is the lack of sufficient data to model the user's behavior of the users in the domain of recommendation in order to accurately predict their preferences. A possible solution is to integrate in the model data from related domains with sufficient data. In (Shapira et al., 2013- UMUI) we looked at the feasibility of integrating data from overlapping users in other domains. We have also learned from domains with no overlapping users applying transfer learning, a recent machine learning method that can learn a model in domains with sufficient data and transfer the knowledge to the domain at hand. In (Moreno et al., 2012) we improved an existing algorithm and learned from several domain while computing and considering the relatedness between the domain to adjust the level of learning from each of the domains. Results prove the superiority of the approach.
- Social networks – I was dealing with integrating data from social network (e.g., Facebook) into the recommender systems process. Specifically in (Shapira, et al. 2013 – UMUI), we have compared several data integration techniques to resolve the sparsity challenge of recommender systems. In (Katz, et al., 2011), we have shown that integration of data from Wikipedia about the candidate items for recommendation in order to enrich the data and improve s results over similar algorithms that does not utilize such data and over algorithms that apply expert data (rather than the crowd related data that exist in Wikipedia).
- Context inference – with the raise of the popularity of smart mobile devices that are equipped with many sensors, it is possible to infer the context of the user in order to provide recommendations that consider the exact context of the user. We have developed an application that activate many sensors on the user's device and enables the user to report on pre-defined contexts in order to collect context related data. We collected a large amount of user context related data in a user study that was conducted with ~ 40 students during two weeks collecting context related data from sensors every 10 minutes. In (Unger et al., 2014) we describe the lessons learned from analysis of the data. Within other findings we reported on the correlation between unsupervised (cluster based) and supervised inference; on features that are effective for detection across contexts; and the method to reveal it. We compared and discussed the personal and group models to tackle to new user problems, and were able to obtain improved accuracy of context inference results.
- Development of algorithms to improve personalization of news services (Shapira et. al, IUI 2007). These algorithms are developed as part of the ePaper project that I manage at the Deutsche-Telekom Laboratories at BGU. The personalization algorithms include a time-based collaborative filtering algorithm that considers the time span of news items when predicting their relevancy to the users. The study looks at different domains assuming that the relevancy of items for different domains should have different relevancy decay factors.

We believe that the time is an important factor for news personalization where the level of the update of the items is of high importance. Another personalization algorithm consists of integrating news ontology news to improve a content-based personalization algorithm (Maidel et al, RecSys 2008). Each user profile is represented by ontology concepts, and the news items are being automatically classified into the same ontology concepts using N-grams language model based multi-label classifier. The relevancy of an item to a user is predicted using a function that measures the similarity (distance) between an item and a user profile by considering not only the co-occurring concepts but also the occurrences of neighboring (parent and child) concepts, according to the hierarchical ontology. During the study we ran many simulations and user experiments in order to calibrate the system and combine both algorithms in order to obtain the best results. These studies are performed with Prof. Peretz Shoval from BGU/ISE and the graduate students: Veronica Maidel and Nimrod Steinbock.

- Two-phase adaptation of group profiles – Development of a two-phase model for adaptation of group profiles (stereotypes) for information filtering systems. The new model includes an on-going and a critical-point adaptation and is based on cluster-analysis methods for the group profiles representation and adaptation .We are now in a process of implementing the model and evaluating TREC data. This project which was recently completed was conducted jointly with Prof. Peretz Shoval from BGU/ISE and Mrs. Diana Lisinger – a graduate student.
- Profiling as a privacy preservation tool – Development of a model for privacy preservation that will enable users to access information over the Web without exposing their interests. The model is aimed at preventing eavesdroppers from using identifiable users' tracks and construct an accurate user profile. It is assumed that the user may want or need to send his or her identification over the net but still wishes retain information needs and profile private. Our suggested model is designed to conceal the user profile from an eavesdropper on the path between the user and the surfed site on the Web by generating fake transactions aiming at blurring the actual user's interests (Shapira et al., JASIST 2005). This project was recently ended. I worked on it jointly with Dr. Yuval Elovici from BGU/ISE and Adlay Meshiach – a graduate student.

## **IR Theory**

Research related to this topic include:

- IR-Modeling – development of an IR model based on the Information Structure (IS) model taken from the decision science theories. The IS modeling enables a comparison between of different IR systems when standard IR evaluation measures fail to indicate the preferred system (Elovici et al., IR journal 2003). In. On this project I am working with Prof. Paul Kantor from Rutgers University and Dr. Yuval Elovici from BGU/ISE.
- Combination of IR systems to improve precision - A model of combination of IR systems is developed that is based on Information Structure (Bunun et. al., forthcoming). We are working on a formal and empirical proof of the effect of combination of systems on retrieval results. We assume that combined IR systems obtain better results than separately operated systems. On this project I am working with Prof. Paul Kantor from Rutgers University, Dr. Yuval Elovici from BGU/ISE and Alex Binun from BGU/ISE.
- Evaluation of IR and IF systems – Definition of an evaluation framework for IR systems. The framework includes objective and subjective evaluations and a comparison between these two aspects. The framework consists of simulation runs and user studies. It deals with the "real value" of the information to the user, compared to the "perceived value" that

is usually measured. I am also studying the assessment of experts' judgments as a basis for systems' evaluation compared to users' judgments.

### **Search Engines**

The research related to search engines aim at improving user's satisfaction from search results. My research projects related to this topic include:

- Query Prediction – using Wikipedia – a joint project with Oren Kurland (Technion), preliminary results were published in (Katz et al., 2014)
- Social-based search engine – in this study (Shapira & Zabar, 2013) we personalize search engine results using information from the user's social network to improve. The search engine results are ranked according to the ranking of the user close "friends" as derived from the social context of the user.
- Collaborative systems – We are dealing with the known "free ride" problems in the collaborative systems domain, where users tend to use knowledge inferred from other users' knowledge, but are not willing to contribute their own knowledge. We are trying to tackle the problem by developing an economic model for collaborative systems, where users will "buy" and "sell". We intend to examine the feasibility of such a model and its effect on users' behavior in collaborative environments. On this project I am working with Prof. Paul Kantor from Rutgers University and Dr. Yuval Elovici from BGU/ISE, also involved is Dan Melamed – a graduate student (Melamed et al., 2007 IEEE Intelligent Systems).

### **IR and Machine Learning**

- Privacy preserving data mining (PPDM) using K-anonymity – this study is part of a joint research with TAU, Bar-Ilan, and Haifa University, and is funded by the ministry of science, culture and sports. This study is conducted with Dr. Yuval Elovici, Dr. Lior Rokach, from BGU/ISE and the graduate student Slava Kisilevitz. During the study we developed several algorithms based on K-Anonymity technique to prepare (anonymize) DBs for data-mining while assuring that linking the DBs won't reveal the identity of subjects recorded in the DB. We are running simulation to compare our method to other PPDM methods and results are encouraging (Kisilevitz et al., ISIPS 2008; Kisilevitz et al., forthcoming).
- Multi-label classification- in this study that stems from needs identified in the ePaper project, we develop a new method for multi-label classification (i.e., automatic classification of items to more than one class), that seem to be feasible unlike existing methods that needs to prepare a model for every combination of single methods. The new method learns latent relations between the single classes and prepare models only for combined classes with identified relations, thus the number of models is dramatically decreased (Tenenbaum et al., ITA 2008). This research is conducted with Dr. Lior Rokach and the Ph.D student – Yelena Tenenbaum.
- Graph-based information leakage prevention. In this study we deal with the problem of unintended leakage of confident information from organization based on automatic content analysis of outgoing messages, and their classification to "confident" or "non-confident". We develop a new method for identifying documents as "confident" even if most of the document has non-confident information. Unlike standard classifiers that would consider such "mixed" documents as non-confident, our method is designed to overcome this problem by tagging the training data using a special context graph that represents the

context of the keywords related to the non-confident data. The model is based on the context of the non-confident content rather than on the appearance of non-confident terms, thus, the classification is more accurate. This research is conducted jointly with Dr. Yuval Elovici and Gilad Katz (a M.Sc, student).

- Data protection for XML-based content using positive examples. This study is funded by the ministry of defense and is conducted with Dr. Yuval Elovici, Dr. Lior Rokach, and Eitan Menahen (a Ph.D student). The research aims at blocking messages in a network by learning and building models for "good" and "bad" messages only from positive examples (as only positive examples for "good" messages exist). We develop a new method that uses clustering for positive learning. Also, the research deals with defining a firewall for XML-based content considering the special features of XML content (i.e., the structure). We implement the method and run simulation to test and calibrate the algorithm.
- Intention prediction using HMM. This research is related to the SmartMobile project at the Deutsche-Telekom Laboratories that I manage, in which we need to predict the intention of the user (her next step) from a sequence of her session data. For this we try to use Hidden Markov Model and learn the probabilities of different types of users to perform different sequences of operations, in order to be able to track the user current sessions and predict her next step. This research is performed with Dr. Lior Rokach and Liat Antwarg (an M.Sc. student).