

Alexandr Savinov

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CV

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PROFESSIONAL CAREER

December 2009 – Present: SAP Research, Dresden, Germany

- Researcher

July 2006 – June 2009: University of Bonn, [Dept. of Computer Science III](#), Bonn, Germany:

- Researcher (2006)

April 1999 – July 2006: [Fraunhofer Institute for Intelligent Analysis and Information Systems \(IAIS\)](#), [Knowledge Discovery Team](#) (the former GMD — German National Research Center for Information Technology), Sankt-Augustin, Germany:

- Senior Researcher BAT Ib (2005) - Researcher BAT IIa (2001) - Post-doc (1999)

August 1989 – March 1999: [Institute of Mathematics and Informatics](#), Moldavian Academy of Sciences, Laboratory of Artificial Intelligence Systems, Kishinev, Moldova:

- Senior Researcher (1998) - Researcher (1992) - Junior Researcher (1991) - Software Engineer (1989)

EDUCATION

Ph.D., November 1993, Computer Science, [Technical University of Moldova](#), Kishinev, Moldova (ex-USSR).
Thesis: “*Matrix Representation of Fuzzy Knowledge in Expert Systems*”.

Post graduated by Laboratory of Artificial Intelligence Systems, [Institute of Mathematics and Informatics](#), Moldavian Academy of Sciences, Kishinev, Moldova (ex-USSR), March 1994.
Specialization: *Artificial intelligence, Machine learning, Expert systems, Fuzzy systems*

MS, June 1989: [Moscow Institute of Physics and Technology](#) MIPT (State University), Dept. of Aerophysics and Space Research. Specialization: Physics, Mathematics, Electrical Engineering, Computer Science, Artificial intelligence, Machine learning. Thesis supervisor: Prof. D.A. Pospelov

RESEARCH PROJECTS

[2009–2012] **MIRACLE**– Micro-Request-Based Aggregation, Forecasting and Scheduling of Energy Demand, Supply and Distribution, EU Project

[2006–2009] **GLOWA-Volta** – Sustainable Water Use under Changing Land Use, Rainfall Reliability, and Water Demands in the Volta Basin, BMBF Project

[2004–2006] **DataMiningGrid** – Data Mining Tools and Services for Grid Computing Environments, 06/2004-06/2006, EU Project

[1999–2003] **SPIN!** – Spatial Mining for Data of Public Interest, 01/2000-06/2003, EU Project

MiningMart – Enabling End-User Datawarehouse Mining, 01/2000-03/2003, EU Project

KogiPlan – Decision Support for Location and Facility Planning, 2000-2003, BMBF, Germany

RESEARCH INTERESTS

1. **Knowledge:** Semantic Web, Ontology Engineering, Formal Concept Analysis, Knowledge Representation and Reasoning, Logical Inference, Text Mining and Search Techniques, Artificial Intelligence, Machine Learning, Data Mining and Knowledge Discovery, Fuzzy Systems, Spatial Analysis

2. Data: Data grids, P2P systems, Data Models, Databases and Datawarehouses, Database Architectures, Transaction Management, Spatial Data, Spatially Referenced Data, Multidimensional Databases and OLAP
3. Computing: Grid computing, Distributed computing, Web services, Service-oriented architecture, Programming paradigms, Programming languages, Aspect-oriented programming

RESEARCH RESULTS

[2003-Present] Next generation data modeling, programming and computing paradigms

- I have developed a new data modeling paradigm, *concept-oriented model* (COM) [1,4,6,7]:
 - COM is based on partial order relation for describing data semantics
 - nested partially ordered sets is a formal basis for the model
 - concept-oriented query (COQL) language has been developed
- I have developed a new programming paradigm, *concept-oriented programming* (COP) [2,3,5]:
 - generalization of classes and inheritance is proposed, called *concept* and *inclusion*, respectively
 - COP generalizes OOP and is an alternative to AOP
 - Experimental programming language CoJava has been started

[2006-2009] Grid/cloud computing, Semantic annotations, Semantic web

- Semantic annotations, ontologies, distributed workflow execution
- Evaluation, adaptation and use of the following systems: Globus toolkit, Unicore 5.x/6.x, GRIA 5.x. Gridifying existing applications for these systems.

[1999-2006] Data mining, Knowledge discovery in databases, Rule induction

- I developed a novel approach to (dependence) rule induction (Quota) [10,11]:
 - itemset interestingness is defined as a difference between real probability and expected probability (computed by means of iterative proportional fitting algorithm)
 - an efficient method for finding upper bound for this measure of interestingness was proposed (support quota) which allows us to avoid exhaustive search in the space of all itemsets
- I developed a novel approach to fuzzy rule induction [14,15,16]:
 - rules are generated from what is known to be impossible (holes in data)
 - an efficient algorithm has been proposed based on sectioned matrixes
- I developed architecture and implemented data mining system [SPIN!](#) [8,9,12]:
 - SPIN! has a plug-in architecture (implemented in Java) so that new components can be easily added
 - SPIN! can use EJBs for running (data mining) algorithms (EJB, JBoss)
- I developed algorithms for spatial data mining and visualization [13]:
 - I developed an SQL-based server-side algorithm for spatial data analysis (Oracle spatial, Java)
 - I developed a coupling between SPIN! and CommonGIS geographic information system for spatial data mining (C4.5 tree induction).
- I developed and implemented an experimental system for analyzing financial data Activist:
 - Preprocessor for retrieving data and generating new variable from their definition (Java)
 - Analyzer for computing dependencies from multivariate time-series (C++)
 - Postprocessor for carrying out inference and generating signals (Java)
 - Module for retrieving news feeds/forums and finding dependencies with stock indexes using SVM algorithm
- I developed and implemented experimental search engine [COMBIS](#):
 - The focus is on finding interesting combinations of words rather than individual word occurrences
 - Simple web interface (JSP, JBoss) and access to Google Search API

[1989-1999] Artificial intelligence, Expert systems, Fuzzy knowledge representation and inference

- I developed a novel approach to fuzzy knowledge representation and inference with the following properties [17,18,19]:
 - it is analogous to classical CNF and DNF
 - using sectioned matrixes makes computations much more efficient
 - it uses a novel operation of fuzzy resolution
- I developed and implemented this formal approach in several versions of the expert system shell EDIP (DOS, Windows 3.x, Windows API, C/C++, Assembly language)
- Several expert systems in medicine, ecology and biology were created in EDIP

COMMUNITY ACTIVITY

Program Committee member:

- Data Mining Track, 21th ACM Symposium on Applied Computing (ACM SAC'06), Dijon, France, April 23-27, 2006.
- Data Mining Track, 20th ACM Symposium on Applied Computing (ACM SAC'05), Santa Fe, New Mexico, USA, March 13-17, 2005.

External reviewer:

- Journal of Data and Knowledge Engineering (2005)
- 8th European Conference on Principles and Practice of Knowledge Discovery in Databases (PKDD'04), Pisa, Italy, September 20-24, 2004.
- 7th International Conference on Discovery Science (DS'04), University of Padova, Padova, Italy, October 2-5, 2004.
- Computer Science Journal of Moldova

Online activity:

- Concept-oriented blog: <http://conceptoriented.org/blogs/cob/>
- The Concept-Oriented Portal: <http://conceptoriented.org/>

SKILLS

Systems: Windows, Linux, Solaris, Oracle, MySQL, PostgreSQL, JBoss, WebSphere, Orion (Oracle AS), Hibernate, Globus Toolkit, Unicore 5.x/6.x, GRIA, Condor

Programming Languages: Java, C++, C, Python, Ruby, Visual Basic, Assembly

Technologies and Standards: Semantic Web (RDF, OWL), Web Services and SOA (SOAP, WSDL), XML (DOM, SAX, DTD, XmlSchema, Xerces), J2EE (EJB, RMI, JDBC, JNDI), Eclipse plug-in architecture

Development Tools: Eclipse, IntelliJ IDEA, JBuilder, Visual Studio, Version management (Subversion), Build tools (make, ant, maven), Issue management (Trac, Scarab)

Natural Languages: English (advanced level), German (basic level), Russian (native)

PUBLICATIONS

More than 70 publications (full list in [PDF](#)).

- [1] Savinov, A. Concept-Oriented Model and Query Language. Advanced Database Query Systems: Techniques, Applications and Technologies, IGI Global, 2009 (submitted) <http://arxiv.org/abs/0901.2224>
- [2] Savinov, A. Concept-Oriented Programming. Submitted to: Science of Computer Programming, Elsevier, 2008 <http://arxiv.org/abs/0806.4746>
- [3] Savinov, A. A. Savinov, Concept-Oriented Programming, [Encyclopedia of Information Science and Technology](#), 2nd Edition, Editor: Mehdi Khosrow-Pour, 672–680, IGI Global, 2009
- [4] Savinov, A. Concept-Oriented Model, [Handbook of Research on Innovations in Database Technologies and Applications: Current and Future Trends](#), Editors: Viviana E. Ferraggine, Jorge H. Doorn, Laura C. Rivero, 171–180, IGI Global, 2009
- [5] Savinov, A. [Concepts and Concept-Oriented Programming](#). Journal of Object Technology, 7(3), March-April 2008, pp. 91–106, 2008. ([PDF](#))
- [6] Savinov, A. [Grouping and Aggregation in the Concept-Oriented Data Model](#). Proc. ACM Symposium on Applied Computing (SAC'06), 482–486, 2006. ([PDF](#))
- [7] Savinov, A. Hierarchical Multidimensional Modelling in the Concept-Oriented Data Model, 3rd Intl. Conference on Concept Lattices and Their Applications (CLA'05), Olomouc, Czech Republic, 123–134, 2005. ([PDF](#))
- [8] May M., Savinov A. SPIN! — an Enterprise Architecture for Data Mining and Visual Analysis of Spatial Data, In: Visual and Spatial Analysis: Advances in Data Mining, Reasoning and Problem Solving, B. Kovalerchuk, J. Schwing (eds.), Kluwer, 293–317, 2004.
- [9] Savinov, A. SPIN! Data Mining System Based on Component Architecture, Proc. 8th European Conference on Principles and Practice of Knowledge Discovery in Databases (PKDD'04) Pisa, Italy, September 20–24, 2004, 555–557. ([PDF](#))

- [10] Savinov A. Mining Dependence Rules by Finding Largest Itemset Support Quota. ACM Symposium on Applied Computing (SAC 2004), March 14–17, 2004, Nicosia, Cyprus, 525–529. ([PDF](#))
- [11] Savinov A. Mining Spatial Rules by Finding Empty Intervals in Data, Proc. of the 7th International Conference on Knowledge-Based Intelligent Information & Engineering Systems (KES'03), 3–5 September 2003, Oxford, UK, 1058–1063. ([PDF](#))
- [12] May M., Savinov A. SPIN! — an Enterprise Architecture for Spatial Data Mining. Proc. of the 7th International Conference on Knowledge-Based Intelligent Information & Engineering Systems (KES'03), 3–5 September 2003, Oxford, UK, 510–517. ([PDF](#))
- [13] Andrienko N., Andrienko G., Savinov A., Voss H., Wettschereck D. Exploratory Analysis of Spatial Data Using Interactive Maps and Data Mining. *Cartography and Geographic Information Science* **28**(3), July 2001, 151–165
- [14] Savinov A. Mining Interesting Possibilistic Set-Valued Rules. In: *Fuzzy If-Then Rules in Computational Intelligence: Theory and Applications*, Da Ruan and Etienne E. Kerre, eds. Kluwer, 2000, 107–133. ([PS](#))
- [15] Savinov A. An algorithm for induction of possibilistic set-valued rules by finding prime disjunctions. In: *Soft computing in industrial applications*, Suzuki, Y., Ovaska, S.J., Furuhashi, T., Roy, R., Dote, Y., eds. Springer-Verlag, London, 2000. ([PDF](#))
- [16] Savinov A. Mining possibilistic set-valued rules by generating prime disjunctions. Proc. 3rd European Conference on Principles and Practice of Knowledge Discovery in Databases (PKDD'99), Prague, Czech Republic, September 15–18, 1999, 536–541. ([PDF](#))
- [17] Savinov A. Application of multi-dimensional fuzzy analysis to decision making. In: *Advances in Soft Computing — Engineering Design and Manufacturing*, R. Roy, T. Furuhashi and P.K. Chawdhry, eds. Springer-Verlag, London, 1999, 301–314. ([PDF](#))
- [18] Savinov A. Some Properties of New Resolution Rule in the Logic of Possibility Distributions. 4th Eur. Congr. on Intelligent Techniques and Soft Computing (EUFIT'96), Aachen, Germany, September 2–5, 178–182, 1996
- [19] Savinov A. Fuzzy propositional logic. *Fuzzy Sets and Systems* **60**(1), 9–17, 1993