Alexandr Savinov

Curriculum Vitae   Date: 01.09.2012

1   Personal Data

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2   Professional Career

December 2009 – 2012: SAP Research, Business Intelligence Practice, Data Management & Analytics Team, Dresden, Germany
- Researcher (2009)

July 2006 – June 2009: University of Bonn, Institute of Computer Science III, Bonn, Germany:
- Researcher (2006)

April 1999 – July 2006: Fraunhofer Institute for Intelligent Analysis and Information Systems (IAIS), the former GMD, Knowledge Discovery Team, Sankt-Augustin, Germany:
- Senior Researcher (2005) - Researcher (2001) - Post-doc (1999)

August 1989 – March 1999: Institute of Mathematics and Computer Science, Academy of Sciences of Moldova, Laboratory of Artificial Intelligence Systems, Kishinev, Moldova:
- Senior Researcher (1998) - Researcher (1992) - Junior Researcher (1991) - Software Engineer (1989)

3   Education

Ph.D., November 1993, Computer Science, Technical University of Moldova, Kishinev, Moldova.
Thesis: *"Matrix Representation of Fuzzy Knowledge in Expert Systems"*.

Post graduated, March 1994: Laboratory of Artificial Intelligence Systems, Institute of Mathematics and Computer Science, Academy of Sciences of Moldova, Kishinev, Moldova.
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

4   Expertise

My major areas of expertise are in data modeling, querying and analytics, data mining, machine learning; programming and computing paradigms beyond the standard models. More specifically, I have been working in the following areas:

Data: Data analysis, Data mining, Machine learning, Data warehouses and OLAP, Business intelligence, Data modeling, In-memory databases, Column stores, Database architectures, Data semantics, Spatial data management

Knowledge: Knowledge representation and reasoning, Ontology engineering, Artificial intelligence, Expert systems and DSS, Fuzzy systems, Machine learning, Text mining and search techniques

Computing: Distributed computing, Programming paradigms, Programming languages, Grid/cloud computing, P2P systems, Web services, Service-oriented architecture

Visualization: Visual analytics, Exploratory analysis, Geographic information systems

5   Results

I have developed a novel approach to data modeling and programming. Concept-oriented model (COM) is a novel general-purpose data model which is aimed at simplifying and unifying typical data modeling tasks. Concept-oriented programming (COP) revisits some basic notions like class and inheritance.

[2009-2012] Data analysis and model management

- COQL (initiative project) – translator from COQL query language to SAP HANA in-memory engine (Java, antlr)
- Remix (thought leadership project, video) – a semantic mash up project (SAP Netweaver Cloud, JavaScript, jQuery, SAP UI5, OSGi, Java, REST).
- Cirrus (ToE project) - schema matching for unified modeling
- AMC (productization project) - Auto Mapping Core, a generic library for schema matching (Java)

[2003-2009] Data modeling and programming paradigms

- A novel unified general-purpose data model was developed, *concept-oriented model* (COM) [2-5,7,9,10]:
  - 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 language (COQL) is a syntactic basis of the model
- A novel approach to programming was developed, *concept-oriented programming* (COP) [1,6,8]:
  - generalization of classes and inheritance is proposed, called *concept* and *inclusion*, respectively
  - COP generalizes OOP and is an alternative to AOP

[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

- A novel approach to (dependence) rule induction was developed (Quota) [13]:
  - itemset interestingness is defined as a difference between real probability and expected probability and 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
- A novel approach to fuzzy rule induction was developed [14,17,18,19]:
  - rules are generated from what is known to be impossible (holes in data)
  - an efficient algorithm was proposed based on an original technique called sectioned matrixes
- Data mining system SPIN! was designed and developed [11,12,15]:
  - 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)
- A number of algorithms for spatial data mining and visualization were developed [16]:
  - SQL-based server-side algorithm for spatial data analysis (Oracle spatial, Java)
  - Coupling between SPIN! and CommonGIS geographic information system for spatial data mining (C4.5 tree induction algorithm)
- An experimental system for intelligent analysis of financial time series Activist:
  - Preprocessor for retrieving data and generating new variables 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 Support Vector Machines (SVM)
- Experimental search engine developed and implemented 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

- A novel approach to fuzzy knowledge representation and inference [20,21,22]:
  - it generalizes classical normal forms CNF and DNF
  - using sectioned matrixes makes computations much more efficient
  - a generalized form of the operation of fuzzy resolution was introduced
- This formal approach was implemented in several versions of the expert system shell EDIP (DOS, Windows 3.x, Windows API, C/C++, Assembly language)
- Several diagnostic expert systems in medicine, ecology and biology were created in EDIP

6 Community Activity

Online activity:
- Concept-oriented blog: http://conceptoriented.org/blogs/cob/
- The Concept-Oriented Portal: http://conceptoriented.org/
- Wikipedia article: http://en.wikipedia.org/wiki/Concept-oriented_model
- c2 wiki article: http://www.c2.com/cgi/wiki?ConceptOrientedModel

Program Committee member:
- Data Mining Track, 21th ACM Symposium on Applied Computing (ACM SAC'06), 2006.
- Data Mining Track, 20th ACM Symposium on Applied Computing (ACM SAC'05), 2005.

External reviewer:
- Journal of Data and Knowledge Engineering (2005)
- 8th European Conference on Principles and Practice of Knowledge Discovery in Databases (PKDD'04), 2004.
- 7th International Conference on Discovery Science (DS'04), 2004.
- Computer Science Journal of Moldova (CSJM)

7 Skills

Project management: Project coordination (international); Writing project proposals; Organization of project meetings; SCRUM

Trainings: SCRUM basics, Personal time management, Influencing without authority, Creativity techniques, Managing agile software development (online)

Creativity: Generation of new ideas; Conceptualization and analytical skills; Participation in technological contests

Patents: Experience in patent application writing and submission (USPTO, EPO)

BI tools and technologies: QlikView, Tableau, Microsoft PowerPivot, SAP Visual Intelligence, SAP HANA Studio, SAP Information Design Tool, Microsoft Analysis Services (DAX/Tabular)

Databases: SAP HANA in-memory database, Oracle, MySQL, PostgreSQL

Middleware: Lean Java Server (SAP), JBoss, WebSphere, Orion (Oracle AS), Hybernate

Language technologies: Antlr, Javacc

Programming languages: Java, C++, C, JavaScript, Python, Visual Basic, C#, AspectJ, Assembly

Grid computing: Globus Toolkit, Unicore 5.x/6.x, GRIA, Condor

Geographic information systems: CommonGIS, Oracle Spatial, Spatial data analysis

Networking: UDP, TCP/IP, JMS

Operating Systems: Windows, Linux, DOS

Technologies and Standards: OSGI, Web Services (SOAP, WSDL), REST, XML (DOM, SAX, DTD, XmlSchema, Xerces), J2EE (EJB, RMI, JDBC, JNDI), Semantic Web (RDF, OWL)

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

Natural Languages: English, German, Russian

8 Selected Publications

Full list: PDF. Google citations: http://scholar.google.com/citations?user=sgGY5kEAAAAJ

[1] Savinov, A. Inference in Hierarchical Multidimensional Space, *International Conference on Data Technologies and Applications (DATA 2012)*, Rome, Italy, 25-27 July 2012, 70–76.
[2] Savinov, A. Concept-Oriented Programming: Classes and Inheritance Revisited, *7th International Conference on Software Paradigm Trends (ICSOFT 2012)*, Rome, Italy, 24-27 July, 381–387.
[3] Savinov, A. Concept-Oriented Model: Classes, Hierarchies and References Revisited. *Journal of Emerging Trends in Computing and Information Sciences*, **3**(4), 456–470, 2012. (PDF)
[4] Savinov, A. Concept-Oriented Model: Extending Objects with Identity, Hierarchies and Semantics. *Computer Science Journal of Moldova (CSJM)*, **19**(3), 254–287, 2011. (PDF)

[5] Savinov, A. Concept-Oriented Query Language for Data Modeling and Analysis. *Advanced Database Query Systems: Techniques, Applications and Technologies*, L. Yan, Z. Ma (Eds), IGI Global, 2011, 85–101

[6] Savinov, A. A. Savinov, Concept-Oriented Programming, *Encyclopedia of Information Science and Technology*, 2nd Edition, Editor: Mehdi Khosrow-Pour, IGI Global, 2009, 672–680

[7] 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, IGI Global, 2009, 171–180

[8] Savinov, A. Concepts and Concept-Oriented Programming. Journal of Object Technology, **7**(3), March-April 2008, pp. 91–106, 2008. (PDF)

[9] Savinov, A. Grouping and Aggregation in the Concept-Oriented Data Model. Proc. ACM Symposium on Applied Computing (SAC'06), 482–486, 2006. (PDF)

[10] 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)

[11] 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.

[12] 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)

[13] 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)

[14] 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)

[15] 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)

[16] 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

[17] 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)

[18] 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)

[19] 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)

[20] 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)

[21] 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

[22] Savinov A. Fuzzy propositional logic. Fuzzy Sets and Systems **60**(1), 9–17, 1993