Curriculum Vitae
Alexander Feldman

February 15, 2016

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Bio Alexander Feldman is a research scientist at the Palo Alto Research Center (PARC). Prior to joining PARC, Dr. Feldman worked as a postdoctoral researcher at University College Cork and as a a visiting researcher at Ecole Polytechnique Fédérale de Lausanne (EPFL) and at Delft University of Technology. He obtained his Ph.D. (cum laude) in Computer Science (Artificial Intelligence) and an M.Sc. (cum laude) in Parallel and Distributed Computer Systems, both from the Delft University of Technology. Dr. Feldman has over forty publications in leading conference proceedings and international journals covering topics in model-based diagnosis, artificial intelligence, and engineering. In cooperation with NASA Ames Research Center and PARC, Alexander Feldman co-organized the International Diagnostic Competitions (DXC).

Interests model-based diagnosis, model-based automated fault isolation and recovery, model-based prognosis, testing and test generation, stochastic local search, satisfiability, constraint optimization techniques, abduction and non-monotonic reasoning, reverse engineering, algorithm design, automated reasoning, qualitative reasoning, signal processing, localization, temporal reasoning, hardware design, machine learning, simulation

Education

9/2005 – 5/2010	*Ph.D. (**cum laude**), Computer Science*
	Delft University of Technology, The Netherlands
	    Thesis: *Approximation Algorithms for Model-Based Diagnosis*
	    Advisor: Prof. Arjan van Gemund

9/2002 – 9/2004	*M.Sc. (**cum laude**), Computer Science (Technical Informatics)*
	Delft University of Technology, The Netherlands
	    Thesis: *Hierarchical Approach to Fault Diagnosis*
	    Advisor: Prof. Arjan van Gemund

9/1997 – 6/2000	*B.Sc., Computer Science* UE Varna, Bulgaria

Employment

9/2014 – now	Researcher System Sciences Laboratory, Model-Based Reasoning Area Palo Alto Research Center (PARC), Inc. California, USA
6/2013 – 9/2014	Founder and President General Diagnostics, Delft, The Netherlands
6/2013 – 9/2014	Technical Consultant Nspyre, Eindhoven, The Netherlands
6/2012 – 6/2013	Research Fellow Complex Systems Laboratory University College Cork, Ireland
6/2010 – 6/2012	Visiting Postdoc Radio Frequency Integrated Circuit Group Ecole Polytechnique Fédérale de Lausanne (EPFL)
6/2010 – 6/2012	Visiting Postdoc Distributed Intelligent Systems and Algorithms Laboratory (DISAL) Ecole Polytechnique Fédérale de Lausanne (EPFL)
6/2010 – 6/2012	Postdoc Institute of Information & Communication Technology Haute Ecole d'Ingénierie et de Gestion du Canton de Vaud, Switzerland
5/2008 – 9/2008	Visiting Researcher Intelligent Systems Laboratory, Embedded Reasoning Area Palo Alto Research Center (PARC), Inc. California, USA
9/2005 – 5/2010	Doctoral Research Fellow Embedded Software Laboratory, Department of Software Technology Faculty of Electrical Engineering, Mathematics and Computer Science Delft University of Technology, The Netherlands
4/2005 – 9/2005	Software Architect Science and Technology BV, Delft, The Netherlands
9/2001 – 4/2005	Senior Programmer Market Risk Management, ING Bank, Amsterdam, The Netherlands
7/2000 – 9/2001	Senior Programmer Zend Technologies Ltd., Ramat Gan, Israel

Project Involvement

CBMx	We design and implement a Condition Based Maintenance (CBM) platform for PARC. The purpose of this platform is to provide component-based rapid prototyping environment for building custom prognostic, diagnostic, and sensor-placement solutions. The platform provides automated analytics for optimal diagnostic and prognostic decision making, comparison of algorithms, diagnostic metrics, visualization and Supervisory Control and Data Acquisition (SCADA) interfacing, code generation for diagnostics in control, instrumentation and data cleansing, signal processing, and others. The CBM platform can service electrical, thermal, mechanical, or hybrid systems. An important

	application of the PARC CBM platform is to diagnose thermodynamic systems. My responsibility is to prepare a CBM use-case for thermodynamic cyber-physical system, to work on the diagnostic design aspects of the framework, to design novel algorithms and metrics and to improve state-of-the-art in diagnostic and prognostics within the framework.
CATO	CATO is a Dutch national programme (one of the participants is the Faculty of Civil Engineering and Geosciences at Delft University of Technology) whose aim is to study mechanisms for underground CO_2 capture, transport and storage. My role was to support one of the experiments and to develop VHDL/LabVIEW^{TM} instrument for pre-processing and storing of large amount of measurement data. The instrument allows sampling of up to 32 analogue signals with soft-adjustable sampling rate and acts as an averaging oscilloscope to improve the signal-to-noise ratio of the input signal. See http://www.co2-cato.org/ for more information.
LYDIA-NG	LYDIA-NG is a framework for Model-Based Diagnosis and is a continuation of my doctoral research. LYDIA-NG bears resemblance to products such as Dymola^{TM} and Rodon^{TM}, however, it targets the automation of the design and implementation of decision support and diagnostic systems. The task of diagnosing a system is typically more difficult than simulation as it requires multiple simulations for various parametric values and advanced analysis for mode identification. LYDIA-NG provides modeling and scenario languages (and compilers); many state-of-the-art libraries for simulation, diagnosis, and active testing; tools and component libraries. LYDIA-NG provides own optimized simulation engines similar to the ones in the SPICE circuit simulator or in MODELICA. See http://general-diagnostics.com/ for more information.
UWB Localization	I have participated in this large National Centers of Competence in Research (NCCR) project during a two-year postdoc in Switzerland. The idea of the UWB project was to capitalize on the research and know-how on Ultra Wide Band Technology as well as multi-robot distributed search and localization techniques acquired in previous MICS phases. One of the main goals was to build a system that allows a team of mobile robots to locate themselves and other robots with high precision (order of a cm) very frequently (maybe once per second) and securely, in order to perform collaborative, such as distributed search, coverage, or mapping. The project was focused on distributed algorithms that can be efficiently implemented and on development of low power implementations on integrated circuits. I was responsible for the design and implementation of the receiver firmware and data acquisition algorithms. This project has been carried-out in collaboration with researchers from Ecole Polytechnique Fédérale de Lausanne (EPFL).
GENIUS	Decision support system for diagnosis satellite electrical power systems. GENIUS takes model-based diagnosis one step closer to the end-user by analyzing the real-world case of the Goce satellite. I have applied model-based diagnosis and active testing to data simulated with the SIMSAT ESA operational simulator. The results showed very good diagnostic performance (measured by performance metrics) which convinced end-users that model-based diagnosis and active testing is a mature technology, ready to be used in a wide-class of real-world systems. This project has been awarded by the European Space Agency under the Innovative Triangle Initiative program.
DXF	The DXC Framework (DXF), developed jointly with NASA Ames and PARC, is a collection of programs and APIs for running and evaluating diagnostic algorithms. DXF allows systematic comparison and evaluation of diagnostic algorithms under identical experimental conditions. The key components of this framework include representation languages for the physical system description, sensor data and diagnosis results, a

runtime architecture for executing diagnostic algorithms and diagnostic scenarios, and an evaluation component that computes performance metrics based on the results from diagnostic algorithm execution.

LYDIA   LYDIA implements a big number of algorithms developed through my doctoral work. LYDIA stands for Language for sYstem DIAgnosis and it is a modeling language and a reasoning tool-kit biased (e.g., there is support for health modeling) towards model-based fault diagnosis. One of the objectives of LYDIA is to to implement novel algorithms which will push the frontiers of model-based diagnosis allowing efficient reasoning over larger systems. Responsible for the framework and modeling language design and implementation and the development of fast algorithms for model-based diagnosis.

FINESSE   The project FINESSE (Fault dIagNosis for Embedded SyStems dEpendability) aims at the improvement of the accuracy of fault diagnosis when applied to electromechanical systems such as the Paper Handling Systems of Océ Copiers. The challenges in fault diagnosis are to infer maximum diagnostic information on the operational status of software and hardware components from a typically limited amount of (noisy) observations. Responsible for the modeling of the system and the design of algorithms for active testing, recovery and prognosis.

DIF   The Diagnosis Interchange Format (DIF) is an XML-based interchange format for Model-Based Diagnosis (MBD). Its main purposes are to allow sharing of diagnostic models, observation data and fault hypotheses, and to facilitate empirical comparative study of the performance of existing and future MBD implementations. Responsible for the DIF schema design and the construction of MBD benchmark suite.

Professional Activities

PC Member   Thirteen AAAI Conference on Artificial Intelligence (AAAI'16)
                 International Conference on Prognostics and Health Management 2015 (PHM'15)
                 International Workshop on Principles of Diagnosis 2015 (DX'15)
                 International Workshop on Principles of Diagnosis 2014 (DX'14)
                 International Workshop on Principles of Diagnosis 2013 (DX'13)
                 European Conference on Artificial Intelligence 2012 (ECAI'12)
                 International Conference on Principles of Knowledge Representation and Reasoning 2012 (KR'12)
                 International Workshop on Principles of Diagnosis 2011 (DX'11)

Reviewer   Journal of Vibration and Control
                 Journal on Artificial Intelligence (AIJ)
                 Journal of Universal Computer Science (JUCS)
                 Journal on Systems, Man and Cybernetics (SMC)
                 IEEE Transactions on Reliability (TREL)
                 International Workshop on Principles of Diagnosis 2010 (DX'10)
                 International Workshop on Principles of Diagnosis 2009 (DX'09)
                 International Joint Conference on Artifical Intelligece (IJCAI'13)
                 International Conference on Prognostics and Health Management 2011 (PHM'11)
                 International Conference on Prognostics and Health Management 2008 (PHM'08)

Organizer   International Workshop on Principles of Diagnosis 2013 (DX'13)
                 Workshop on Diagnostic Reasoning and Model Analysis at European Conference on Artificial Intelligence 2012 (ECAI'12)
                 Third International Diagnostic Competition (DXC'11)
                 Second International Diagnostic Competition (DXC'10)
                 First International Diagnostic Competition (DXC'09)

Teaching Experience

7/2011 – 7/2011	Artificial Intelligence, California State University, Long Beach Part of the summer university program which is an initiative launched in 2006 by the Board of Higher Education of the Canton of Vaud together with several partner universities.
9/2007 – 10/2007	Model-Based Computing, Delft University of Technology Teaching assistant, but also designed the course and gave most of the lectures. This was an optional first-year M.Sc. course and was attended by approximately forty students.
2/2007 – 3/2007	Model-Checking, Delft University of Technology Teaching assistant

Scholarship and Prizes

Ph.D. cum laude

M.Sc. cum laude

Best paper award at the First International Conference on Prognostics and Health Management 2008 (PHM'08)

Gold Leaf certificate at the Seventh Conference on Ph.D. Research in Microelectronics & Electronics 2011 (PRIME'11)

Technical Skills

Proficient
Linux, Solaris, IRIX, HP-UX, Windows, ChibiOS/RT
C/C++, Boost, Qt, Python, PHP, Flex/Bison, LaTeX
VHDL, Verilog
MPI, PVM
Markup languages, SOAP
Sybase, Oracle, MySQL, PostgreSQL
Maple, Matlab, Modelica (Dymola and Open Modelica), LabView

Familiar
Java, Perl, Tcl/Tk, Prolog, Lisp, Pascal, Fortran
Hadoop

Citizenship   Dutch

Languages   English, Bulgarian, Russian (intermediate), Hebrew (basic), Dutch (intermediate)

References

Referee 1:	Prof. Arjan van Gemund
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