ELLIIT Nyhetsblad 14 – September 2016

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Målet med ELLIITs nyhetsblad är att sprida information om händelser och nyheter från ELLIIT. Nyhetsbladet är skrivet på en blandning av svenska och engelska.

Nyheter

Budgetpropositionen 2017

Budgetpropositionen för 2017 kom den 21 september. Det man kan utläsa är att de strategiska forskningsområdena kommer att få fortsatt finansiering åtminstone fram tom 2019. Om man tolkar det som står där positivt så kan man även betrakta 2020 som finansierat. Dock kan det komma ytterligare krav på hur pengarna skall användas framöver i den forskningsproposition som kommer i början av november 2016.

350th anniversary in Lund with digital week

Lund University celebrates its 350th anniversary, from December 2016 to January 2018 (as the decision was made in December 1666 and the inauguration held in January 1668). As a part of the jubilee program, there will be four scientific weeks, one on the theme of The Digital Society.

A symposium open for researchers, public and students, held April 24-25, 2017, acknowledges the fact that digitization affects virtually all areas of society, and focus on the interplay between digital technologies, law and regulation, norms and culture, and market aspects and business models. The creator of the Creative Commons concept and author of the book Code is Law, Prof. Lawrence Lessig is among the keynote speakers.

The ELLIIT annual workshop will be held April 26-27, so save the dates for an interesting week in Lund. For more information about the symposium and the program, please contact General Chair Per Runeson or check the website:

http://www.lunduniversity.lu.se/about/about-lund-university/lund-university-350th-anniversary/the-digital-society-symposium

Exploratory testing explored

The concept of exploratory testing of software intensive systems is popular in industry, as it has may result in more realistic test scenarios and possibly lower costs. Exploratory software testing (ET) is a style of software testing that emphasizes the personal freedom and responsibility of the individual tester to continually optimize the value of her work by treating test-related learning, test design, test execution, and test result interpretation as mutually supportive activities that run in parallel throughout the project [Kaner]. However, exploratory testing can be conducted in many flavors, from "freestyle" to "pure scripted".

These concepts are explored by a research team from LU/CS and BTH in collaboration with industry partners from Sony Mobile, Axis Communications and Softhouse. Findings will be presented at the industry-academia events STEW (Software Technology Exchange Workshop) in Linköping Oct 12-13, and at the LUCAS day in Lund, October 20.

Emelie Engström (LU/CS) received ELLIIT funding

Emelie Engström (LU/CS) has received ELLIIT funding for three years to support promising young researchers of under-represented gender. She will primarily focus on tools to support testing decisions in a complex software development context. When the software systems and development organizations grow in size and complexity the overview of needed as well as actual testing deteriorates, and thus the ability to make informed decisions without tool support. She will explore the cognitive needs of test engineers when making strategic and operational testing decisions and investigate how to utilize visual analytics to support these needs.

Furthermore, she wants to contribute to the development of software engineering design science methodology. Design science in software engineering is still in its infancy, leading to an unnecessary gap between research and practice. Researchers and practitioners approach software engineering challenges at different levels of abstraction, from different perspectives and to some extent with different effect targets. Thus, guidance is needed on how to extract and describe software engineering challenges in its application context, to match these descriptions with relevant solution concepts and further to implement, evaluate and generalize knowledge from a context-specific solution.

New web-tool for software testing

The software engineering group at BTH has released **SERP-connect**, a web-tool for linking practical challenges with research results in software testing. Practical challenges and research results are classified and organized along interventions, effects, scopes and contexts:

- Intervention - characteristics of possible solutions
- Effect - the effect targets, or measured effects of an intervention
- Scope - the scope of an effect or an effect target
- Context - factors in the context affecting the applicability of an intervention
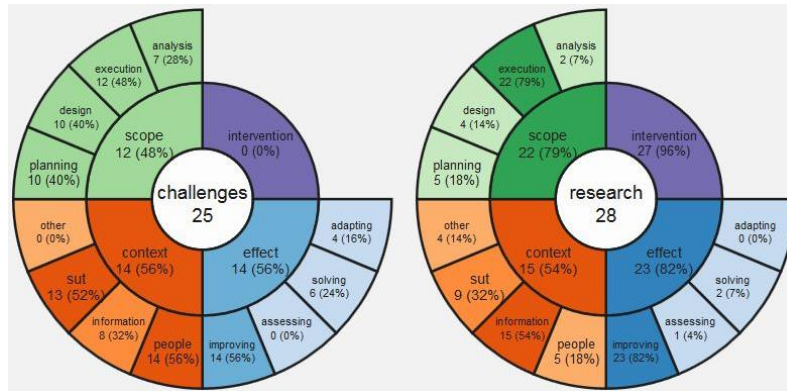
The development of SERP-connect is co-funded by Gyllenstiernska Krapperupsstiftelsen.

First Massive MIMO mobility tests

The feasibility of Massive MIMO has been debated since its was first presented some 6 years ago. ELLIIT researchers in Lund and Linköping have been pushing the technology forefront in the area since the creation of ELLIIT. Initial question marks regarding extraordinary properties and order-of-magnitude gains have been straightened out and turned into exclamation points. Among all, three important questions have been 1) if real propagation environments were rich enough to harvest the full theoretical potential, 2) if the massive real-time "digital beam-forming" could be performed efficiently enough, and 3) if hundreds of channels can be tracked fast enough to allow Massive MIMO to operate efficiently in mobile environments?

Our Massive MIMO research team has provided answers to all three questions above -- all YES! While working on the first two Lund University built the first real-time Massive MIMO testbed together with National Instruments and broke the world-record in spectral efficiency, not once but twice, together with University of Bristol. The second time we almost doubled our previous record from 79 to 145 bit/sec/Hz. The second one delivering 3.2 Gbit/sec over a 20 MHz channel.

The last of the three questions was addressed in late August 2016. Again teaming up with University of Bristol, we performed Massive MIMO mobility tests at Lund University. Using our 100-antenna testbed, we served 10 mobile users simultaneously in the same bandwidth and achieved a ten-fold increase in data rate compared to a traditional single (LTE-like) channel. Tests were performed with six slowly moving terminals (pedestrian speed) and four car-mounted terminals moving up to 50 km/h. The tests showed that our Massive MIMO system, with an LTE-like physical layer, can handle mobility up to at least 50 km/h. The confined space where the tests were performed prevented us from reaching higher speeds.

Watch this video for further details: https://youtu.be/wPPMrr4rHmo

Some Publications:

- Zain Ul-Abdin, Bertil Svensson, "A Retargetable Compilation Framework for Heterogeneous Reconfigurable Computing", ACM Transactions on Reconfigurable Technology and Systems (TRETS), Vol 9(4), August 2016.
- Mario Garrido, "A new Representation of FFT Algorithms using Triangular Matrices", IEEE Transactions on Circuits and Systems I: Regular Papers.
- T. van Chien, E. Björnson and E. G. Larsson, "Joint power allocation and user association optimization for massive MIMO systems," IEEE Transactions on Wireless Communications. To appear.
- C. Mollén, E. G. Larsson and T. Eriksson, "Waveforms for the massive MIMO downlink: Amplifier efficiency, distortion and performance," IEEE Transactions on Communications. To appear.
- A. Pitarokoilis, E. Björnson and E. G. Larsson, "Performance of the massive MIMO up-link with OFDM and phase noise," IEEE Communications Letters, vol. 20, pp. 1595–1598, Aug. 2016.
- G. Amarasuriya, E. G. Larsson and H. V. Poor, "Wireless information and power transfer in multi-way massive MIMO relay networks," IEEE Transactions on Wireless Communications, vol. 15, pp. 3837–3855, June 2016.
- Elizabeth Bjarnason, Michael Unterkalmsteiner, Markus Borg, Emelie Engström, A multi-case study of agile requirements engineering and the use of test cases as requirements, Information and Software Technology, Volume 77, September 2016, Pages 61-79, ISSN 0950-5849, http://dx.doi.org/10.1016/j.infsof.2016.03.008. (A case study of using test cases as requirements by a team from Lund, BTH and SICS)
- Carsten Fritsche, "The Marginal Bayesian Cramér-Rao Bound for Jump Markov Systems", IEEE Signal Processing Letters, 23(5): 575-579, 2016.
- Sina Khoshfetrat Pakazad, Anders Hansson, Martin S. Andersen and Isak Nielsen: "Distributed primal-dual interior-point methods for solving tree-structured coupled convex problems using message-passing", Optimization Methods and Software, http://dx.doi.org/10.1080/10556788.2016.1213839
- Emelie Engström, Kai Peterson, Nauman bin Ali, Elizabeth Bjarnason, SERP-test: a taxonomy for supporting industry-academia communication, Software Quality Journal (2016) doi:10.1007/s11219-016-9322-x
- "Beyond Correlation Filters: Learning Continuous Convolution Operators for Visual Tracking" (oral presentation) by Martin Danelljan, Andreas Robinson, Fahad Khan, Michael Felsberg, ECCV 2016 (To appear)
- "Efficient Multi-Frequency Phase Unwrapping using Kernel Density Estimation" by Felix Järemo Lawin, Per-Erik Forssén, Hannes Ovrén, ECCV 2016, (To appear)
- I Nurdiani, J Börstler, S. Fricker, "The impacts of agile and lean practices on project constraints: A tertiary study", Journal of Systems and Software 119, September 2016, 162–183.

- M. Usman, J. Börstler, K. Petersen, "An Effort Estimation Taxonomy for Agile Software Development", International Journal of Software Engineering and Knowledge Engineering, accepted for publication.
- S. Eivazzadeh, P. Anderberg, T. Larsson, S. Fricker, J. Berglund, "Evaluating Health Information Systems Using Ontologies", JMIR Medical Informatics 4(2), June 2016.
- C. Thümmler, A. Keow Lim, I. Holanec, S. Fricker, "A Methodology to Assess Social Technological Alignment in the Health Domain", Innovation and Research in Biomedical Engineering Journal 37(4), August 2016, 232–239.
- E. Engström, K. Petersen, N. bin Ali, E. Bjarnason, "SERP-test: a taxonomy for supporting industry–academia communication", Software Quality Journal (2016): 1–37.
- V. Garousi, K. Petersen, B. Özkan, "Challenges and Best Practices in Industry-Academia Collaborations in Software Engineering: A Systematic Review", Information and Software Technology 79, November 2016, 106–127.
- R. Jabangwe, C. Wohlin, K. Petersen, D. Smite, J. Börstler, "A Method for Investigating the Quality of Evolving Object-Oriented Software Using Defects in Global Software Development Projects", Journal of Software: Evolution and Process, Vol. 28, No. 8, pp. 622-641, 2016.
- D. Badampudi, C. Wohlin, K. Petersen, "Software Component Decision-making: In-house, OSS, COTS or Outsourcing - A Systematic Literature Review", Journal of Systems and Software, Vol. 121, No. 11, November, pp. 105-124, 2016.
- J. Molleri, K. Petersen, E. Mendes, "Survey Guidelines in Software Engineering: An Annotated Review; Proceedings of the 10th International Symposium on Empirical Software Engineering and Measurement, September 2016.
- R. Jabbari, N. bin Ali, K. Petersen, B. Tanveer, "What is DevOps? A Systematic Mapping Study on Definitions and Practices", Proceedings of the International Workshop on Emerging Trends in DevOps and Infrastructure, May 2016.
- I. Nurdiani, R. Jabangwe, K. Petersen, "Practices and Challenges of Managing Requirements Interdependencies in Agile Software Development: A Survey", Proceedings of the 2nd International Workshop on Software Startups, June 2016.
- N. bin Ali, "Is effectiveness sufficient to choose an intervention? Considering resource use in empirical software engineering", Proceedings of the 10th International Symposium on Empirical Software Engineering and Measurement, September 2016.
- C. Wohlin, K. Wnuk, D. Smite, U. Franke, D. Badampudi, A. Cicchetti, "Supporting Strategic Decision-making for Selection of Software Assets", Proceedings of the 7th International Conference on Software Business, pp. 1-15, Springer LNBIP 240, June 2016.
- R. Britto, E. Mendes, C. Wohlin, "A Specialized Global Software Engineering Taxonomy for Effort Estimation", Proceedings of the 11th International Conference on Global Software Engineering, August 2016.
- D. Badampudi, C. Wohlin, "Bayesian Synthesis for Knowledge Translation in Software Engineering: Method and Illustration", Proceedings of the 42nd Euromicro Conference on Software Engineering and Advanced Applications, August-September 2016.
- Öqvist, Jesper, Görel Hedin, and Boris Magnusson. "Extraction-Based Regression Test Selection." Proceedings of the 13th International Conference on Principles and Practices of Programming on the Java Platform: Virtual Machines, Languages, and Tools, 5:1-5:10. Lugano, Switzerland, ACM, August 2016.
- Fors, Niklas, and Görel Hedin. "Bloqqi: Modular Feature-Based Block Diagram Programming" To appear at Onward! 2016: ACM International Symposium on New Ideas, New Paradigms, and Reflections on Programming & Software, Amsterdam, ACM, November 2016.

- Giacomo Como, Fabio Fagnani, "From local averaging to emergent global behaviors : The fundamental role of network interconnections", Systems & Control Letters, 96, pp. 70–76, 2016

- Giacomo Como, Enrico Lovisari, Ketan Savla, "Convexity and robustness of dynamic traffic assignment and freeway network control", Transportation Research. Part B: Methodological, 91, pp. 446–465, 2016

- Anders Rantzer, "On the Kalman-Yakubovich-Popov Lemma for Positive Systems", IEEE Transactions on Automatic Control, 61:5, pp. 1346–1349, 2016.

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- Mannesson, Anders; Yaqoob, Muhammad Atif; Bernhardsson, Bo and Tufvesson, Fredrik, "Tightly Coupled Positioning and Multipath Radio Channel Tracking", In IEEE Transactions on Aerospace and Electronic Systems, 2016

- Rusek, Fredrik and Edfors, Ove, "An information theoretic characterization of channel shortening receivers", In IEEE Transactions on Communications 64(4). p.1490-1502, 2016

- Ke Zhang, Yuming Mao, Supeng Leng, Sabita Maharjan, Yan Zhang, Alexey Vinel, Magnus Jonsson, Incentive-Driven Energy Trading in the Smart Grid // IEEE Access, 4, 2016, pp. 1243-1257.

- A. Aerts, M. Reniers, and M.R. Mousavi. Model-Based Testing of Cyber-Physical Systems. Chapter 19 of H. Song, D.B. Rawat, S. Jeschke, and Ch. Brecher, Cyber-Physical Systems Foundations, Principles and Applications. pp. 287--304, Elsevier, 2016.

- V. Hafemann Fragal, A. Simao and M.R. Mousavi. Validated Test Models for Software Product Lines: Featured Finite State Machines. Proceedings of the 13th International Conference on Formal Aspects of Component Software (FACS 2016), Lecture Notes in Computer Science, Springer, 2016.

- S. Costa Paiva, A. Simao, M.R. Mousavi and M. Varshosaz. Complete IOCO Test Cases: A Case Study. Proceedings of the 7th Workshop on Automated Software Testing (A-TEST 2016), ACM Press, 2016.

- M. Mohaqeqi and M.R. Mousavi. Sound Test-Suites for Cyber-Physical Systems. Proceedings of the 10th International Symposium on Theoretical Aspects of Software Engineering (TASE 2016), IEEE Computer Society Press, 2016.

- S. Kunze, W. Mostowski, M.R. Mousavi, and M. Varshosaz. Generation of Failure Models through Automata Learning. Proceedings of the 2nd International Workshop on Automotive Software Architectures (WASA 2016), IEEE CS Press, 2016.

- F. Ghassemi and M.R. Mousavi. Product Line Process Theory, Journal of Logic and Algebraic Methods in Programming, 85(1): 200--226, Elsevier, 2016.

- H. Beohar, M. Varshosaz, and M.R. Mousavi. Basic Behavioral Models for Software Product Lines: Expressiveness and Testing Pre-Orders. Science of Computer Programming, 123(1): 42--60, Elsevier, 2016. (*)

- A. Duracz, H. Eriksson, F. A. Bartha, F. Xu, Y. Zeng, W. Taha. "Using rigorous simulation to support ISO 26262 hazard analysis and risk assessment", in 12th IEEE International Conference on Embedded Software and Systems (ICESS 2015), New York, NY, USA, August 2015.
- W. Taha. et. al. "Acumen: An Open-source Testbed for Cyber-Physical Systems Research", to appear in Volume 169 (2016) of the Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering.
- A. Duracz, F. A. Bartha, and W. Taha. "Accurate Rigorous Simulation Should be Possible for Good Designs", in Proceedings of the 2016 International Workshop on Symbolic and Numerical Methods for Reachability Analysis (SNR 2016), Vienna, Austria, April 2016.
- Y. Zeng, C. Rose, W. Taha, A. Duracz, K. Atkinson, R. Philippsen, R. Cartwright, M. O'Malley. "Modeling Electromechanical Aspects of Cyber-Physical Systems.", in Volume 7, No 1 (2016) of the Journal of Software Engineering for Robotics, Special Issue on Domain-Specific Languages and Models for Robotic Systems.
- A. Aljarbouh, A. Duracz, Y. Zeng, B. Caillaud and W. Taha. "Chattering-Free Simulation for Hybrid Dynamical Systems", in Proceedings of the 2016 IEEE International Conference on Computational Science and Engineering, Paris, France, August 2016.
- W. Taha, L.-G. Hedström, F. Xu, A. Duracz, F. A. Bartha, Y. Zeng, J. David and G. Gunjan. "Flipping a First Course on Cyber-Physical Systems", in Proceedings of the 2016 Workshop on Embedded and Cyber-Physical Systems Education, Pittsburgh, PA, USA, October 2016.

Keynotes and Invited Talks:

- Anders Hansson (LiU/AC) gave the invited talk "Distributed Robustness Analysis" at the Workshop on Convex and Real-Time Optimization, Aalborg
- Michael Felsberg (LiU/ISY/CVL) has given invited talks at the International Workshop on Geometry, PDE's and Lie Groups in Image Analysis, August 24-26, and the European Machine Vision Forum, September 8-9.
- Ove Edfors (LU/EIT) gave a keynote presentation about massive MIMO at NI week in Austin in August for more than 3500 persons on site and another few thousands online.
- Fredrik Tufvesson(LU/EIT) gave a keynote "Channel characteristics for cooperative ITS and positioning" at the Workshop on Cooperative Communication and Positioning (CCP) in conjunction with IEEE Intelligent Vehicles Symposium in Gothenburg in June.

Awards and Appointments:

- Martina Maggio (LU/AC) received the best paper award at 22nd IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2016) for the paper "A Tool for Measuring Supply Functions of Execution Platforms" co-authored by Juri Lelli and Enrico Bini.
- Buon Kiong Lau (LU/EIT) has been appointed as a Distinguished Lecturer of the IEEE Antennas and Propagation Society for a 3-year term.
- Antonios Pitarokoilis at LiU/ISY/Communication systems received the Swe-CTW best student journal paper award 2016, for the paper Uplink Performance of Time-Reversal MRC in

[Massive MIMO Systems subject to Phase Noise](), (IEEE Trans. Wireless Communications 2015), coauthored with Saif Mohammed and [Prof. Erik G. Larsson]().

- Docent Kai Petersen (BTH) has been promoted to Professor of Software Engineering at BTH, May 2016.
- Docent Darja Smite (BTH) has been promoted to Professor of Software Engineering at BTH, May 2016.
- Steffen Malkowsky (LU/EIT) together with his research colleague Paul Harris from University of Bristol got five awards for their work with the massive MIMO testbed in fierce competition with more than 100 other contributions at the 2016 NI Engineering Impact Awards ceremony in Austin, Texas, in the beginning of August: NI's Wireless and Mobile Communications Award, NI's Engineering Grand Challenges Award, Hewlett Packard Enterprise (HPE) Edgeline Big Analog Data Award, Powered by Xilinx Award, 2016 Customer Application of the Year Award.

Program chairs and Editorships:

- Zain Ul-Abdin (Halmstad University) will co-chair a workshop titled Reconfigurable Computing – From Embedded Systems to Reconfigurable Hyperscale Servers, to be held on in conjunction with the 26th International Conference on field Programmable Logic and Applications at EPFL, Switzerland on Friday the 2nd September 2016. [http://fplwrc2016.cit-ec.uni-bielefeld.de/]()
- Buon Kiong Lau (LU/EIT) was the Lead Guest Editor of the Special Issue on Theory and Applications of Characteristic Modes, which was published in the July 2016 issue of the IEEE Transactions on Antennas and Propagation.
- Fredrik Gustafsson and Carsten Fritsche from (LiU/AC) organized the special session "Recent advances in Estimation Performance Bounds and Applications" at FUSION 2016 (19th International Conference on Information Fusion)
- Michael Felsberg (LiU/ISY/CVL) is co-organizer of the Visual Object Tracking Challenge Workshop in conjunction with ECCV 2016, October 10.
- Karl-Erik Årzén (LU/AC) is program co-chair for the topic "Software Architectures for Cyber-Physical Systems" at DATE 2017.
- Mohammad Mousavi (HH) has co-chaired the 5th IFIP WG 1.8 Workshop on Trends in Concurrency Theory, held in conjunction with CONCUR 2016 in Quebec City, Canada.
- Mohammad Mousavi (HH) co-chairs the 6th International Workshop on Design, Modeling and Evaluation of Cyber Physical Systems (CyPhy'16) held in conjunction with ESWeek 2016 in Pittsburgh, USA.
- Alexey Vinel (HH) has chaired the 11th International Workshop on Communication Technologies for Vehicles, Nets4Cars-2016-Fall, 13-14 September, Halmstad.

Some new dissertations:

- Anna Vapen (LiU/IDA) will defend her PhD thesis "Web Authentication using Third-parties in Untrusted Environments" on Sep 30, 2016.
- Jonas Dürango (LU/AC) presented his Lic thesis "Control Strategies for Improving Cloud Service Robustness" in May 2016
- Ph.D. student Antonios Pitarokoilis at LiU/ISY/Communication systems defended his thesis "Phase noise and wideband transmission in massive MIMO". He is now postdoc at KTH.
- Kristoffer Öfjäll (LiU/ISY/CVL) defended his PhD thesis "Adaptive Supervision Online Learning for Vision Based Autonomous Systems" on May 20.
- Muhammad Atif Yaqoob, LU/EIT presented his lic thesis "Inertial Measurement Unit based Virtual Antenna Arrays - DoA Estimation and Positioning in Wireless Networks" in May.
- Nikita Lyamin (HH) will present his Lic thesis "Performance evaluation of C-ACC/platooning under ITS-G5 communications" in December 2016.
- Adam Duracz (HH) will defend his PhD thesis, titled "Rigorous Simulation: Its Theory and Applications" on December 1st, 2016 in Halmstad, Sweden.

Personalförändringar

- Tan Tai Do (Ph.D., KTH, 2015) is new postdoc at LiU/ISY/Communication Systems.
- Postdoc Salil Kashyap at LiU/ISY/Communication systems resigned August 2016 for position at Marvell

Forskningsfinansiering

- Nytt EU-Projekt (Horizon ICT-1): Bonseyes
  Budget: 7405 000€ (total), 394 000€ (BTH in collaboration with University of Applied Sciences Northwestern Switzerland); Coordinator: NViso SA (Switzerland).
  Short Outline: The Internet of Things lets computing capabilities on the edge advance faster than in the cloud. We develop a marketplace for edge device owners and systems developers to cooperate across companies and industries.
- New Vinnova-project within Smartare Elektroniksystem: "Prototype System for Massive MIMO in the New 5G Spectrum Band". Liang Liu (LU/EIT) is project leader with Sony Mobile Communications is industrial partner. The goal of this project is to build a complete and flexible experimental testbed for 5G massive multiple-input multiple-output system working at 30GHz, including investigation and implementation of the overall system architecture, the radio frequency subsystem, and the soft-defined radio based baseband subsystem.