

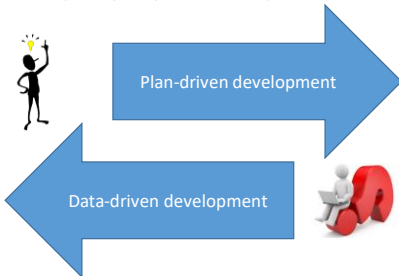
Thesis title: *Quality requirements and data-driven development for IoT devices*

Thesis description:

Internet of things (IoT) has become a strong trend the last couple of years. According to the EU, by year 2020 there might be more IoT devices than humans on the planet. IoT will not just impact our private life's, but will be one driver of the digitization happening in many industries. IoT devices will interact with traditional software systems as well as with each other, creating Systems of Systems with properties difficult to anticipate at design time.



Data-driven development has for several years increased in popularity [1]. Companies such as Google and Netflix use the method extensively to test out new features. Typically, they release a new feature or UI to a small portion of their users and then analyse the data from the usage to evaluate whether they should release the feature to a greater audience or not. At any given time, they are running many parallel tests, generating large amount of information regarding their software. However, even though data-driven approaches are not new, there is not much work done to couple the approach with quality requirements (a.k.a. non-functional requirements) [3] such as performance, usability, etc.



When developing embedded systems including hardware components, such as IoT devices (Internet of Things) [2], there are lead-times and other factors such as certification of hardware making it more difficult to have a pure data-driven process. Instead, often a plan-driven development method is often used. Combining a plan-driven and data-driven development approach is necessary to have innovation as well as high-quality and well-engineered products.

The objective of this master thesis is to study how quality requirements are evaluated both for plan-driven and data-driven situations. The study will include both a literature review as well as interviewing companies how they evaluate the quality requirements in their products.

[1] Bosch, Jan. "Speed, Data, and Ecosystems: The Future of Software Engineering." IEEE Software 33, no. 1 (2016): 82-88.

[2] <http://iotsverige.se/>

[3] Chung, L., Nixon, B.A., Yu, E. and Mylopoulos, J., 2012. Non-functional requirements in software engineering (Vol. 5). Springer Science & Business Media.

Tasks:

- Literature study on quality requirements and data-driven development.
- Working with industry partners to analyse how they work with quality requirements and data driven development in their context.
- Together with the companies, suggest how to improve the current practice and generalize the results outside the specific context.

Key skills:

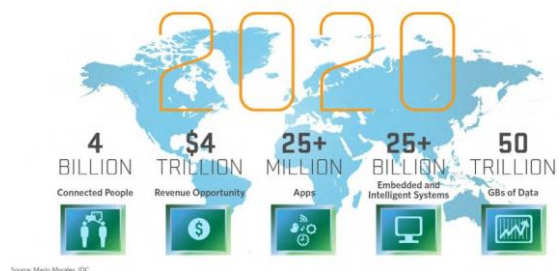
- Essential: software engineering
- Preferred: Requirements engineering, interview skills, software metrics

Applications should include a brief cover letter, CV, and recent grades. In your application, please provide examples of previous experiences or other projects that you consider relevant for the position.

Expected start time: January-March 2017

Location: SICS Swedish ICT AB, Lund

Contact person/s: Thomas Olsson (thomas.olsson@sics.se)



About SICS:

SICS Swedish ICT is a leading research institute for applied information and communication technology in Sweden. SICS is a part of RISE, Research Institutes of Sweden, a non-profit research organization owned by the Swedish government and industry. SICS' mission is to contribute to the competitive strength of Swedish industry by conducting advanced and focused research in strategic areas of computer science, and actively promote the uptake of new research ideas and results in industry and society at large. SICS is an active participant in collaborative national, European, and other international R&D programs.

The Software and Systems Engineering Laboratory (SSE) has as its research theme "successful development of software-based systems for the digital society". The focus is on providing relevant solutions for software and systems development in a society that becomes increasingly connected and automated, and frequently updated through continuous deployment. Special attention is given to large-scale cyber-physical systems, where traditional embedded systems are evolving into systems-of-systems through connectivity, using technologies from the Internet of Things. Currently, the research activities in the SSE lab focus on four areas: process evolution, system architecture, software ecosystems, and system qualities.

The RISE institutes SP, Swedish ICT and Innventia are merging in order to create a unified institute sector and become a stronger innovation partner for businesses and society. At the end of the 2016 we will change our name to RISE. Read more at www.ri.se/en/about-rise

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