

ICT with Industry 2016

7 – 11 November @Oort

Introduction

Since 2013, NWO and STW are collaborating with the research schools ASCI, IPA and SIKS in the organisation of the ICT with Industry workshop. The main aim of the workshop is to stimulate contacts and future collaborations between researchers and professionals from industry and public organisations. At the 2016-edition the steering committee received overall very positive feedback from the participants. The most common remarks were, first of all, that the participants gained a broader view, and learned about new fields and the techniques that they use, which may possibly also be useful in their research work or within their organisations. Second, participants enjoyed meeting new people in a creative setting, yielding useful professional contacts for future collaborations. The workshop also allowed them to showcase their knowledge and skills, and thus gain more visibility. Third, participants appreciated gaining a better understanding of industry needs, and how their research may be useful for practical applications. The format of the workshop also gave people the opportunity to work on problems that they otherwise would not have had the time for. Finally, several participants appreciated the additional guidance from the steering committee in solving their specific cases.

Experience of the existing workshops, such as Physics with Industry, Life Sciences with Industry, Mathematics with Industry and the previous editions of ICT with Industry, was used as points of considerations for this edition. The Workshop ICT with Industry 2016 took place at the Lorentz Center in Leiden from 7 to 11 November 2016.

Problems & Outcome

The industrial partners presented their case study and objectives on the first day. Immediately afterwards, groups of participants began to brainstorm, to program and to look for possible solutions. Each team was guided by an academic team leader and the case owners. The case studies of 2016 were as follows:

- 1. ING:** The IT world is in great flux, especially in the financial industry. Looking at the market expectations concerning continuous improvement and innovation, but keeping in mind that the financial industry is a multi-billion business with a huge legacy in the form of investment in its current IT infrastructure, it is necessary to rethink agility and extend it with the concept of sustainability. Sustainable Agility should help the industry to keep up to speed against acceptable costs. A key lesson is to master complexity. The prime method for doing so is to use abstraction to break the system down into substructures, and to very carefully define and maintain their interfaces. Failure to do so will inevitably result in an increasing resistance to change in your IT system, ending up in the chaos we are currently facing. The core challenge in this ICT with Industry project was to objectively quantify system complexity, making it possible to follow trends on how chaos develops in your system and to react timely and appropriately. Next to that, the ability to quantify complexity opens up the possibility to also express agility in a quantitative way.
- 2. KLM & Thales:** Modern flexibilized zero-margin economy requires equally flexible collaborations between organizations providing services and/or products enabled by software. The appropriate concepts are called digital market places that impact the cross-organizational workflow systems and enterprise resource planning systems. As for the data exchange platform this means data should be shared with many different partner organizations including governmental agencies, e.g. tax administration and customs, protecting access to all others. In order to respond to ad-hoc demands such collaboration networks should be able to quickly respond to their client's needs and be able to swiftly connect their business processes and supporting workflow systems. The aim of this ICT with Industry project was to create the basis for such digital market places and bringing together businesses and scientific disciplines

including computer networks, business informatics, artificial intelligence and law, ontologies, systems architectures and ICT service design. An infrastructure for digital market places will be defined and trustworthiness will be safeguarded by agent-based monitoring and control agents that implement the rules.

- 3. SNS Bank:** Code coverage improvement of database-centric applications. When developing software, two aspects are of great importance: time-to-market and quality. Time-to-market influences the success of new features and allows for quick feedback (data) which in turn can be used for continuous improvement. The quality of the software itself is key for high availability as well as ensuring a good user experience. To allow for these aspects to be guaranteed, SNS Bank N.V. focusses on continuous integration/delivery including automating test-cases, as well as automating software quality assessment. Within this process there were two challenges. Firstly, the available instruments used to assess quality are often not accurate enough. Secondly, automation mainly focuses on the execution and re-execution of test-cases. Their construction is a manual process, which is costly. The goal of this project is twofold: (1) we want to define metrics for code coverage quality assessment for database-centric applications (having complex logic in the embedded queries), and (2) we want to automate the construction of code coverage tests.
- 4. VLPB:** Currently, data is generated for thousands of accessions with each containing tens of millions of markers. Having many (e.g. over 1000) high density genotyped individuals available for per species will become reality for breeding companies within the coming years. The de facto standard for storing variants is in specialized compressed binary files (BCF/VCF), which are indexed to allow for random access to specific genomic positions. Although these positional queries are very fast, they do not allow for flexible and fast interrogation of the data on other features than position. The solutions space is large. A plethora of infrastructure and analytics solutions is available for generic applications in Big Data. It is not obvious which solutions are most suitable for genomics applications and form robust solutions for breeding companies towards the future. The objective of this project was to investigate possible Big Data solutions for high performance and flexible querying, computation and analysis on billions of genotype scores. For applications of genomics big data in breeding companies can we simply pick an existing solution and implement it? Do we need to pick several components from the large number of existing solutions and combine these in a way that suits our needs? Or do we have such specific and distinct requirements that we need custom built solutions?

In short, the workshop resulted in new collaborations and research ideas, which all have the potential to be further developed into research proposals. Funding possibilities were offered by NWO and STW.

Visibility

The workshop results were communicated through the following channels:

- NWO EW newsletter: <http://www.nwo.nl/actueel/nieuws/2016/ew/ict-with-industry-slaat-brug-tussen-theorie-en-praktijk.html>
- NWO website: <http://www.nwo.nl/over-nwo/organisatie/nwo-onderdelen/ew/bijeenkomsten/ict+with+industry+workshop/case+studies>

On 22 March 2017 there will be a session dedicated to ICT with Industry 2016 at ICT.OPEN2017, which is the main ICT research conference in the Netherlands (<http://www.ictopen.nl/>).

Governance

The steering committee consisted of:

Dr. Ana Lucia Varbanescu, University of Amsterdam

Dr. Alexandru Iosup, Delft University of Technology

Prof. dr. Arend Rensink, University of Twente

Dr. Claudia Hauff, Delft University of Technology

Dr. Joaquin Vanschoren, Eindhoven University of Technology

Prof. dr. Remco Veltkamp, University of Utrecht



NWO and STW in collaboration with the research schools, ASCI, IPA and SIKS and the ICT Research Platform Netherlands (IPN) are currently planning the fifth edition Workshop ICT with Industry to be organized in November 2017. A Call for Case Studies will be published soon at:

<http://www.nwo.nl/over-nwo/organisatie/nwo-onderdelen/ew/bijeenkomsten/ict+with+industry+workshop>

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