

Master Project Topics 2016/17

Information Management &
Software Engineering

Information Management & Software Engineering



Business Informatics
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Software and Services
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Ünal Aksu



Deniz Iren

What do we do?



- We focus on the fields of business process management, workflow technology, and business process improvement
- We develop innovative techniques and artifacts to support organizations with managing and improving business processes
- If you are interested in this area, contact us!

Banu Aysolmaz

Process model comprehension by novices



Business process definitions are essential parts of our daily lives. Process models are frequently used to enhance the communication of processes in enterprises. However, processes are not restricted to enterprise settings. Every person may need to read process descriptions and models in daily life (in the university, using public services, going to a hospital etc.).

In this project, we want to explore how novices read process descriptions, and if we can enhance their understanding via model animation. The project includes the design of a process model comprehension experiment. The experiment will be designed for a Crowdsourcing Platform to ensure a high number of experiment participants without any process modeling background.

What novices prefer to learn processes



Business process definitions are essential parts of our daily lives. We may encounter various process descriptions. Visual notations are shown to have higher cognitive effectiveness than text due to higher expressiveness and abstraction. However, it is shown that novices may prefer to use text instead of models.

The purpose of this project is to design an experiment to understand the preferences of novices, and their use of model/text when encountered with process-related problems. The experiment will be designed for a Crowdsourcing Platform to include a large number of novices with varying backgrounds.

Perspective-based process model animation



Process model animation is being used as a way of providing an overview of a process, and understanding every aspect of a process in detail. However, in some use cases, process model readers are only interested in certain perspectives of a process. Depending on the use case, they may prefer to explore activities regarding a certain role or certain information artifact.

The purpose of this project is to develop process model animation techniques for specific process perspectives (i.e. organizational, informational). These techniques will be implemented on our process model animation platform. The project then includes the evaluation of such techniques in an organizational setting.

Process Model Enrichment via Narration



In computer-based learning field, the use of audio and on-screen text as a way of providing multiple sensory input is found to enhance comprehension. In organizations, process models often contain additional descriptions on process elements. The user needs to look for and read such extra information as he examines a process model. This creates extra cognitive load on visual sensory input, and dislocates the user attention from the process model itself.

We have already developed animation techniques to enhance process model reading. The use of narration (and/or on-screen text) to provide additional process information together with animation may result in more effective learning. The purpose of this project is to implement and evaluate a process model narration feature in an organizational setting.

Process Model Error Discovery based on Activity Labels



The errors in process models significantly effect the use of process definitions in organizations. The errors on sequence flow aspects and soundness of process models are already examined in the literature. The inconsistencies in activity labels are also worked on. Other type of errors in process models may exist due to the inconsistencies in activity labels and other process elements. For example, if an activity label is named as “Send project plan to the Manager”, the process should include an artifact named project plan, and a role named Manager. The absence of such elements may point to potential errors.

The purpose of this project is to define potential activity label-process element errors in process models, and define (automated) techniques to reveal such potential errors.

Dennis Schunselaar

The AMUSE project



Within the AMUSE project, we are collaborating with AFAS software and the University of Utrecht. Within AFAS, a new way of creating ERP software is being developed. The core idea is to create an Enterprise Model of an organisation and with a single press of the button the entire ERP application is generated and deployed in the cloud. Within this project, various areas converge, e.g., Enterprise Modelling, Enterprise Ontologies, Model-drive Software Development, and Process Mining. For anyone interested in cooperating with a company and working on a product which will be used by more than 1 million end-users, this is the ideal project!

Minimal qualities expected from the student:

- Programming skills
- Good analytical skills

Hybrid process models are a combination of imperative process models (e.g., Petri nets, BPMN), and declarative process models (e.g., Declare). Hybrid process models offer the best of the structuredness offered by imperative process models and the flexibility offered by declarative process models. At the moment, hybrid process models are emerging as a new paradigm. As a result, very few techniques are available for hybrid process models. If you like working on a master's project defining and pushing the limits of the state-of-the-art, then this is definitely a project for you!

Minimal qualities expected from the student:

- Programming skills (Java)

Han van der Aa

Shadow IT and Business Process Noncompliance



Shadow IT refers to systems and software solutions built and used inside organizations without explicit organizational approval. Shadow IT can be an important source of innovation in organizations. However, it also comes with potential downsides due to a lack of control, documentation, and security issues. Business process noncompliance, where organizational actors accidentally or deliberately deviate from prescribed work practices, has similar characteristics. In some cases, noncompliance can be beneficial to the quality of a process, whereas in other cases it can have detrimental effects.

In this thesis project, we set out to investigate the link between Shadow IT and business process noncompliance, for example by investigating how these two phenomena affect each other.

Extracting Compliance Rules from Natural Language Text



Contemporary organizations have to deal with an increasing number of constraints, which stem from various compliance sources, such as Sarbanes-Oxley (SOX), Basel II, and others. Such normative laws and requirements induce organizations to insure that their business processes are compliant with them. Failure to do so can lead to penalties, scandals, and a loss of business reputation. Compliance checking techniques play an increasingly important role in this regard, because they allow organizations to monitor their compliance in real-time and in an automated manner. However, existing techniques require compliance rules to be specified according to a formalized notation, e.g. a process model. This stands in sharp contrast to the natural language texts in which such rules are generally specified.

In this thesis project, we set out to overcome this gap by extracting compliance rules from natural language texts and transforming them in a representation that can be used for compliance checking. We are looking for a student with programming skills. Experience with natural language processing or machine learning are furthermore preferred.

Ünal Aksu

Process Performance Indicators for Resources in Business Processes



- Process-oriented organizations are dealing with optimizing resources in their processes. In order to that, the organizations focusing on Process Performance Indicators (PPIs) as a key asset. However, there is no proposal that allows to define PPIs for resources in an unambiguous and expressive way with a traceability to the business processes. This project aims to define and evaluate a notation of PPIs for resources which will be independent from the language used to model the business process.
- In this project, the student has to have a fundamental knowledge of business process modeling.

Master Thesis opportunities at S2

2016-2017



Software and Services (S2)



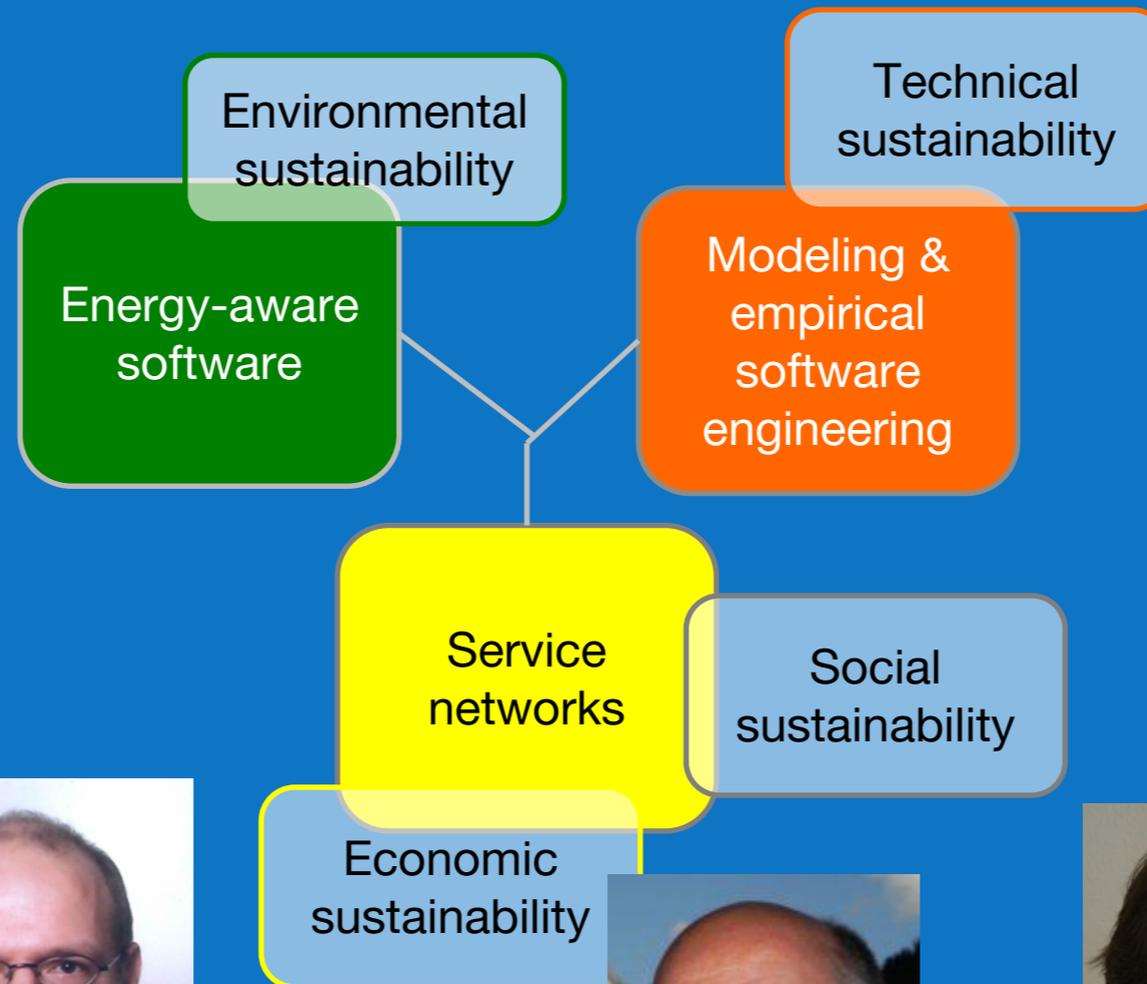
Patricia Lago
Full professor (group leader)



Fahime Alizadeh
PhD candidate



Giuseppe Procaccianti
Postdoc



Ivano Malavolta
Assistant Professor



Albert Hankel
Research associate



Jaap Gordijn
Associate professor



Hans Burg
Lecturer



Robert Deckers
PhD candidate



Gianantonio Me
PhD candidate

<http://www.s2group.cs.vu.nl/>

Software and Services

Homepage of the Software and Services Research Group of the Vrije Universiteit Amsterdam

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SOD students win contest in Amsterdam Tech City!

🕒 November 7, 2016 📅 Events 👤 admin ✎ Edit

On November 7, 2016, two student teams of the CS Master course in Service Oriented Design presented their project on 'Smart Mobility as a Service' to the Amsterdam Tech City Event "AI & The City". The best project team, selected by the Municipality Amsterdam, won an internship opportunity to develop its ideas under the umbrella of the Amsterdam Smart Mobility program.

The winning team includes: Miguel Gama Nunes, Louise Ivan Payawal, Iulia Cristina Ban, Göran H. Strönstad, and Vasileios-I. Manavis.



Recent Posts

[We just made ALL the contents of our Green Lab course publicly available](#)

[SOD students win contest in Amsterdam Tech City!](#)

[Beyond Native Apps: Web Technologies to the Rescue! \[SPLASH 2016 – Mobile keynote\]](#)

[Talk by Stefano Ruberto \(GSSI\)](#)

[Available PhD position on self-adapting intelligent eHealth apps](#)

Recent Tweets

s2group

Economic/Social Alignment

Jaap Gordijn

Extending *e³value* for ICT4D

- Context:
 - ICT4D: Information technology for development countries
 - *E³value* is a methodology to develop electronic services for networks of enterprises and end-users. (see www.e3value.com)
- Problem:
 - Can *e³value* be used as a service development tool?
- Approach:
 - Analyze the case studies we have in the field of ICT4D and interview experts
- Supervision:
 - Jaap Gordijn (j.gordijn@vu.nl) and Anna Bon

Using block chain technology for Intellectual Property Rights Clearing

- Context:
 - Intellectual Property Rights clearing ensures that artists, sing&song writers, etc. are paid if their music is played on the radio or television
 - Block chain technology is a technology to have distributed administration between various parties (e.g. artists, radio stations, etc.)
 - IPR clearing is done by IPR societies. They obtain money from IPR users (e.g. radio stations) and pay these revenues to IPR owners (e.g. artists)
- Problem:
 - Can the IPR clearing process be streamlined by using block chain technology?
- Approach:
 - Obtain understanding of the block chain technology
 - Work with IPR societie(s) to analyze how block chain technology can streamline the current right clearing process
- Supervision:
 - Jaap Gordijn (j.gordijn@vu.nl)



Sustainable Software Design: Future research challenges

Patricia Lago

Balancing Innovation and Agility in Banking Software

1

Problem

- **Align** banking software worldwide
- Find **innovative** business models
- “**Minimal** viable product” as **fast** as possible

Input:

- Standard architecture for all Countries
- Innovation challenges
- Ability challenges and practices

Results:

- How to support IT-stakeholders (‘Idea CTO’) in innovation projects: recommendations & tools

Contacts: Patricia Lago, Ad van Dongen (Innovation @ING)

Playing cards with Architects

2

Problem

- How to facilitate the **learning of design decision making (DDM)** in software architecture?

Input:

- Principles of serious gaming and pervasive computing
- 5 years of SOD and SA deliverables containing DDM elements (e.g. design decisions, evaluations, QAs, stakeholder profiles)

Results:

- Body of Knowledge representation (e.g. ontology)
- A set of cards
- Evaluation in an industrial focus group

Contacts: Patricia Lago, Remco de Boer (ArchiXL)

Framing Sustainability as Software Architecture Concerns

3

Problem

- How to **support** sw architects/designers in **modeling sustainability** as concerns and quality requirements?

Input:

- Past case studies that already modeled sustainability concerns
- Feedback from experiments on modeling requirements

Results:

- Survey of OSS modeling tools and their extensibility
- Develop a tool extension (e.g. pencil, profile) for sustainability concerns

Contact: Patricia Lago

Online catalog of energy-aware architectural tactics

4

Problem

- Make available a set of **architectural tactics** for experimentation and reuse

Input:

- Architectural tactics for **energy-awareness** and **cyber-foraging**
- A general model (work in progress) to represent and describe architectural tactics

Results:

- Refinement of the model above
- Build an online catalogue to facilitate sharing and reuse

Contact: Patricia Lago, Robert Deckers

Selecting the *right* Service Oriented Design Method

5

Problem

- How to select the “right” SOD method for a given context?

Outcomes

- (for Literature Study and Seminar)
 - Survey of the literature (state of the art) about **SOD methods**
 - Analysis of SOD **purposes**, eventually from industrial sources
- (for thesis, also)
 - Proof-of-concept of fit-for-purpose (**industrial case study**)

Contacts: Patricia Lago

Green Lab: Future research challenges

Green Lab team (Giuseppe, Ivano, Fahimeh)

The hidden costs of 3rd party libraries in mobile web apps

1



- Thousands of JavaScript libraries out there
- Every web developer uses them

The hidden costs of 3rd party libraries in mobile web apps

1

Main steps:

1. **research questions** formulation and **experiment design**
2. development of a generic **slicing algorithm** that reduces a JavaScript codebase to only the strictly needed functions
3. **dataset** building (~1000 real mobile web apps)
4. experiment **execution**
5. data **analysis**
6. **reflection**

Contacts: Ivano Malavolta, Giuseppe Procaccianti

Understanding how context-awareness is realized in mobile apps

2

THESIS

Exploration into how software developers extract contextual information when developing mobile apps

DATASET: >10k real mobile apps (already mined)

TOOL: extract key parts of a mobile app where it is accessing the context of its users

OUTPUT: catalogue of patterns of use of context + guidelines and tactics for better considering contextual information in mobile apps

Hybrid mobile apps - a cross-store exploratory study

3

THESIS: to extend the performed study on iOS apps

Focus on

- difference of ratings across stores (Google Play vs Apple)
- difference of perceptions across the two types of users
 - value
 - performance
 - bugginess
 - size

A cross-store study on performance-related commits in mobile apps

4

THESIS: to extend the performed study on iOS apps

Focus on

- different number of performance-related commits across stores (Google Play vs Apple)?
- different types of commits?
- how much overlap among categories?

An exploratory study on the usage of networking protocols in mobile apps

5

THESIS: to analyze a dataset of thousands of mobile apps w.r.t. to their use of network protocols

TOOL: given a mobile app, analyzes it (statically), and extracts all the used networking protocols

Goals

- understand how recently introduced protocols are used in real apps (e.g., Google's SPDY, web sockets, custom)
- Different protocols in different categories?
- How many endpoints does an app interact with?
- Any other patterns to discover?

Measuring the Scientific Impact of Software

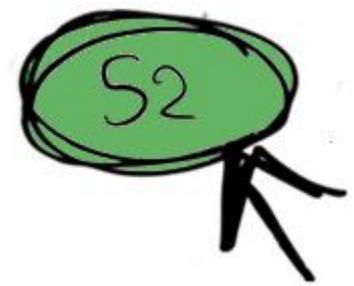
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- **THESIS:** quantify the impact and quality of scientific software
- **Focus:**
 - define metrics and indicators
 - use already known metrics (e.g. reuse, repositories...)
- **Contacts:** Giuseppe Procaccianti, Willem van Hage (eScience)

netherlands

eScience center

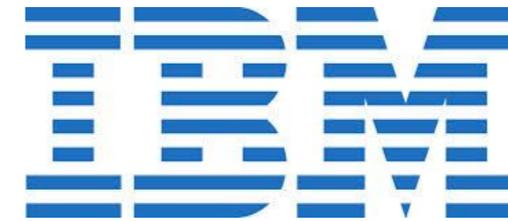
Our industrial partners



Software and Services



Schiphol Group



ING



CGI



netherlands

eScience center

