Process Quality and Architectures
Master Seminar

BPT Group

Winter Semester 2011/2012
Agenda

Official Information

Seminar Timeline

Deliverables

Topic Overview

Topics

Organizational Stuff
Title: Process Quality and Architectures

Credit Points: 6

SWS: 4

Registration Deadline: 8th November 2011
Seminar Timeline

03.11.2011 (today)  Presentation of Topics
07.11.2011 noon    Apply for Topics
08.11.2011         Registration Deadline
CW46/2011          Introduction to Research I
                    (How to give scientific presentations?)
CW47/2011          Introduction to Research II
                    (How to write scientific papers?)
CW48/2011          Outline Presentation
CW01/2012          Technical Presentation
05.01.2012         Paper Draft Submission
12.01.2012         Paper Review Submission
CW06/2012          Final Presentation
25.02.2012         Final Paper and Prototype Submission
Grading

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Deliverables - Presentations

- Pecha Kucha Talk
  (20 slides, 20 seconds per slide, slides advance automatically)
- Problem Outline
- Possible Solutions

CW48/2011 Outline Presentation
Deliverables - Presentations

- CW01/2012 Technical Presentation
  - ~ 20 Minutes Talk + 10 Minutes Discussions
  - Focus: Technical Aspects
  - Feedback Session afterwards
Deliverables - Presentations

- CW06/2012 Final Presentation
  - ~ 25 Minutes Talk + 10 Minutes Discussions
  - Focus: Overview of the whole Work
  - If applicable: Demo of Prototype (Proof of Concept)
  - Feedback Session afterwards
Deliverables – Paper and Reviews

- Paper:
  - Minimum 8 Pages
  - Maximum 16 Pages
  - LNCS Style
  - PDF Format
- 2 Peer Reviews

05.01.2012  Paper Draft Submission
12.01.2012  Paper Review Submission
Deliverables – Final Paper

25.02.2012 Final Paper and Prototype Submission

- Paper:
  - Minimum 8 Pages
  - Maximum 16 Pages
  - LNCS Style
  - PDF Format

- Prototype
  - Source Code
  - Executable Application
11

03.11.2011 (today)   Presentation of Topics
07.11.2011 noon      Apply for Topics
Topics

- Send an E-Mail to nico.herzberg@hpi.uni-potsdam.de including:
  - Name
  - Student ID Number
  - Three Topics Ranked by your Preference

03.11.2011 (today)  Presentation of Topics
07.11.2011 noon    Apply for Topics
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Process Monitoring

Nico Herzberg
Process Monitoring
Process Monitoring

- Central discipline to explore quality of business processes
- Measuring process instances and their activities
- Extracting data of process execution out of IT systems
- Represent those data in relation to the process model
Problem
- No suitable notation in BPMN for measurement/event-capturing points

Tasks
- Evaluation of existing approaches about modeling of measurement points
- Development of an own approach if required resp. enhancement of existing once
How to model measurement/event-capturing points in BPMN models

Literature

- Christof Momm, Robert Malec, Sebastian Abeck: Towards a model-driven development of monitored processes.
- Giese, Philipp: Introducing KPIs to BPMN. Hasso-Plattner-Institut 2011.
Techniques to learn about human actions during process execution

**Problem**
- How to capture events of user interaction in business processes?

**Tasks**
- Investigation of different types of user interaction in a business process
- Cluster those different types of user interaction
- How could events be captured in these scenarios?
- Select one of these scenarios and implement a prototype (maybe test it in a user study)
Topic #2

Techniques to learn about human actions during process execution

Literature


Exception Handling for Events

Andreas Rogge-Solti
Exception Handling for Events

■ Setting:
  □ in hospitals, **exceptions are the norm**
  □ Standardization efforts cover only fraction following the **happy path**
  □ Exception support required in monitoring

■ Tasks:
  □ Literature research about **exception handling mechanisms**
  □ Special focus on **rule-based** exception handling
  □ Develop a taxonomy to compare these approaches
  □ How can these exception mechanisms be used in **business process monitoring**?
Exception Handling for Events

- Literature:
Analytical Process Simulation Techniques

Andreas Rogge-Solti
Analytical Process Simulation Techniques

■ Setting:
  □ Business Process Simulation by discrete event simulation is easy to implement, but time consuming in calculation
  □ Analytical simulation however is elegant and fast in calculation, but not always possible
  □ Interesting underlying models: Petri-Nets, Markov Chains, etc.

■ Tasks:
  □ Dig deep into mathematical models of simulations
  □ Find the exact limits of analytical methods
  □ Present them in a comprehensive overview
Literature:

Visualization techniques in monitoring

Andreas Rogge-Solti
Visualization techniques in monitoring

Setting:
- Business Process Monitoring needs good **interfaces**
- User study: “What are the typical questions” exists
- “What are good visualization methods?” is still an open issue
- **Human computer interaction** is related field

Tasks:
- Look at different approaches for visualization
- Get an understanding of psychological aspects of visual representation
- Develop a small Paper-Prototype (Mock-Up)
- Test hypothesis with doctors of University Clinic Jena
Visualization techniques in monitoring

- Literature:
  - Böhme, R. (Last semester's Master seminar work)
Process Similarity

Matthias Kunze
**Problem**: Find similar processes in a model repository

- labels, structure, behavior
- no “ordering” of process models, but pairwise distance (similarity)

Which of them is more similar to the query?
**Problem**: Find similar processes in a model repository

- labels, structure, behavior
- no “ordering” of process models, but pairwise distance (similarity)

**Approach**: Compare given process model with models in the repository

- query model + search radius (similarity tolerance)
- sequential search (slow)
- similarity search with metric tree index
- result set of relevant models for query,
  usually ranked
The ranked result set may not always be very convincing:

**Question:** How can a search result be evaluated towards its quality?

- distance distribution between query and result models
- agreement of different similarity notions towards ranking
- ratio between search radius and distance to best result

**Task:** Research and evaluate quality measures for process similarity search!
Literature


Many different similarity measures for processes exist.

**Question:**
- What is their relation?
- What do they have in common?
  - When do they agree?
- How good are they?

**Task:** Research process similarity measures and evaluate them against human results!


**Literature**


- ...

- existing implementation and documentation
Any process similarity measure relies on a process alignment, that is, information, which nodes represent the same activity in two processes.

- alignment is based on similarity of phrase i.e., labels of business process models
- alignments can be 1:1, n:1, iteratively be optimized

Task:

- Research existing label similarity and alignment algorithms and integrate them into a general framework.
- Experimentally compare and evaluate these algorithms.
Literature

- ...
- existing algorithms and documentation
Modeling Guidelines for BPMN 2.0

Rami-Habib Eid-Sabbagh
Is this a „good“ BPMN diagram?
Examples for „modeling errors“

- Missing label
- Bad labeling of decision point
- 2 end events can be reached
- Don’t use 2 outgoing flows
- Do not model from right to left
- Inconsistent labeling: org unit vs. role
Task

- Context
  - Guidelines help to create readable and consistent models (especially if many modelers are involved)
  - How do I create suitable modeling guidelines?

- Task
  - Collect and categorize existing guidelines (from books, consultants, end users)
  - Example rule categories: BPMN subset, labeling, model structure, layouting, (anti-)patterns
  - Which guidelines can be applied / checked automatically?
  - Evaluate existing / conceive novel algorithms for this

- References
  - „7 modeling principles“, camunda guidelines, „BPMN Method and Style“, interviews
Generating process models from forms, data and form annotation

Rami-Habib Eid-Sabbagh
Rami.EidSabbagh@hpi.uni-potsdam.de
### 6.14.1 der Gemeindeordnung: Anwendung

**Fristigkeit der Schließung**

- **Sachverhalt:**
  - Wer der selbständigen Betrieb eines öffentlichen Betriebes eine Fristigkeit der Schließung einer Gebäude oder einer unzulänglichen Gestaltung anlag, muss das der für den betreffenden Ort zuständigen Behörde schriftlich mitteilen.

**Verfahren**:

- **Vorschriften über die Schließung**
  - Der Betrieb der öffentlichen Betriebe muss der für den betreffenden Ort zuständigen Behörde in schriftlicher Form angegeben werden.
  - Der Betrieb der öffentlichen Betriebe muss der für den betreffenden Ort zuständigen Behörde in schriftlicher Form angegeben werden.
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**Prüfung der Schließung**

- **Vorschriften über die Schließung**
  - Der Betrieb der öffentlichen Betriebe muss der für den betreffenden Ort zuständigen Behörde in schriftlicher Form angegeben werden.
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**Anmerkungen**

- **Vorschriften über die Schließung**
  - Der Betrieb der öffentlichen Betriebe muss der für den betreffenden Ort zuständigen Behörde in schriftlicher Form angegeben werden.
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Task

- Research on text based derivation of process models
- Analyze application forms, e.g. Construction permit
- Define relationships between parts of the application forms and process parts - roles, activities, data, events and control flow elements
- Extract process models from application forms
- Implement a tool that creates process models or parts of process models from application forms
- Define compliance relations between forms and given processes
Literature

- Generating Natural Language specifications from UML class diagrams
  Farid Meziane, Nikos Athanasakis, Sophia Ananiadou
  Requirements Engineering 2006

- Fabian Friedrich Master Thesis – Automated Generation of Business
  Process Models from Natural Language Input

- Günther Fliedl, Christian Kop, Heinrich C. Mayr, “From textual
  scenarios to a conceptual schema”, 2004 Data and Knowledge
  Engineering

- Manuel Blechschmidt – Master Seminar
IT-Services to Business Process Alignment

Rami-Habib Eid-Sabbagh
Rami.EidSabbagh@hpi.uni-potsdam.de
Context
Task

- Research on IT-Infrastructures in the Public Sector / Private Sector
- Analyze Process models and identify reoccurring process parts
- Identify services
- Match IT-Systems to process models
- Link services to process parts and process models
- Design an information systems that manages and gives insights on these relations, e.g which services realizes a particular process
Towards Canonical Process Models

Artem Polyvyanyy
Towards Canonical Process Models
**Context:**
A process can be seen as a partial order of tasks. Process models describe processes as compositions of tasks by means of gateways and control flow arcs. An interesting theoretical problem to investigate is to discover the minimal set of tasks that can be composed in a process model which describes the same process as a given process model. A process model with the minimal set of tasks can be seen as the canonical version of the given process model. Tasks in canonical process models can be treated as such that have unique names (even if two tasks share the same name, e.g., two tasks with name A can be treated as such that are labeled A1 and A2, where A1 and A2 are semantically same as A).

**Task:**
Propose an initial definition (describe properties) of a canonical process model. Motivate canonical process models and collect use cases, e.g., it is faster to check isomorphism of clones.

**Literature:**
Organizational Stuff

Which two slots would be best to be blocked for seminar’s activities?

- Monday 9.15 a.m.
- Monday 11.00 a.m.
- Monday 1.30 p.m.
- Tuesday 11.00 p.m.
- Tuesday 15.15 p.m.
- Wednesday 15.15 p.m.
Next steps

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Questions