Generating Data from Highly Flexible and Individual Process Settings through a Game-based Experimentation Service

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Agenda

Motivation

Research Questions

Flexible & Individual Process Settings

Game Mechanics

Generated Data

Evaluation

Conclusion & Future Work
Motivation

Basic Problem

- Flexible and individual process settings can be found in many domains
- Common properties can be found in those domains
- Problem: Data access is usually restricted - e.g. data privacy in health sector
Motivation

Basic Problem

- Flexible and individual process settings can be found in many domains
- Common properties can be found in those domains
- Problem: Data access is usually restricted - e.g. data privacy in health sector

Solution

- create an interactive flexible and individual process setting, but without restrictions regarding data access
- the general concept stays the same, but the setting is different
- analysis without restrictions is possible
Basic Problem

- Flexible and individual process settings can be found in many domains
- Common properties can be found in those domains
- Problem: Data access is usually restricted - e.g. data privacy in health sector

Solution

- create an interactive flexible and individual process setting, but without restrictions regarding data access
- the general concept stays the same, but the setting is different
- analysis without restrictions is possible

Goal

- generate process change and execution logs
- generate related data for evaluation
- provide a setting for evaluation
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Generating Data from Highly Flexible and Individual Process Settings through a Game-based Experimentation Service
Research Questions

RQ1: „Which data elements are common to a flexible and individual process setting?“

• Find the necessary data building blocks
  • Literature analysis
  • Expert interviews
Research Questions

RQ1: „Which data elements are common to a flexible and individual process setting?“

- Find the necessary data building blocks
  - Literature analysis
  - Expert interviews

RQ2: „How can these building blocks be represented in a game?“

- Map these building blocks to a game-based experimentation environment
Research Questions

RQ1: „Which data elements are common to a flexible and individual process setting?“
• Find the necessary data building blocks
  • Literature analysis
  • Expert interviews

RQ2: „How can these building blocks be represented in a game?“
• Map these building blocks to a game-based experimentation environment

RQ3: „Is a game-based design suitable for generating the data common to a flexible and individual process setting?“
• Evaluation: compare the data to data generated in a real world setting
Agenda

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Flexible & Individual Process Settings

Nursing Home

**Building Blocks**

- Organizational Units

**Problem List**

- Bonus List

**Positive Goals**

**Negative Goals**

Nurses
Flexible & Individual Process Settings

Nursing Home

Building Blocks

Organizational Units

nurses

doctors
Flexible & Individual Process Settings

Nursing Home

Building Blocks

Organizational Units

- Nurses
- Nurse helpers
- Doctors

Problem List

- Bonus List

Positive Goals

Negative Goals
Flexible & Individual Process Settings

Building Blocks

Organizational Units

Subjects

Nursing Home

- Nurses
- Nurse Helpers
- Doctors

Problem List

Bonus List

Positive Goals

Negative Goals
Flexible & Individual Process Settings

Building Blocks

- Organizational Units
- Subjects
- Process Instances

Nursing Home

<table>
<thead>
<tr>
<th>nurses</th>
<th>nurses helpers</th>
<th>doctors</th>
<th>triggers</th>
</tr>
</thead>
</table>

Problem List

- Bonus List

Positive Goals

Negative Goals
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Flexible & Individual Process Settings

Nursing Home

Building Blocks

- Organizational Units
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Nurses

Nurse helpers

Doctors

Environment
Flexible & Individual Process Settings

Building Blocks

- Organizational Units
- Subjects
- Process Instances
- Environment
- Triggers

Nursing Home

- Nurses
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Flexible & Individual Process Settings

Building Blocks
- Organizational Units
- Subjects
- Process Instances
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- Triggers
- Process Fragments

Phases
- Planning

Nursing Home

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- Bonus List

Positive Goals
- Negative Goals

Process Fragments
- Environment
- Triggers

Generating Data from Highly Flexible and Individual Process Settings through a Game-based Experimentation Service
Flexible & Individual Process Settings

Building Blocks

Organizational Units
Subjects
Process Instances
Environment
Triggers
Process Fragments
- Problem List
- Bonus List

Phases

Planning

Nursing Home

Nurses
Nurse Helpers
Doctors

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Flexible & Individual Process Settings

Building Blocks
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Flexible & Individual Process Settings

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Phases

- Planning
- Process Adaption

Nursing Home
Flexible & Individual Process Settings

Nursing Home

Building Blocks
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Phases
- Planning
- Process Adaption
- Execution
Flexible & Individual Process Settings

Nursing Home

Building Blocks
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Phases
- Planning
- Process Adaption
- Execution
- Evaluation
## Flexible & Individual Process Settings

### Nursing Home

<table>
<thead>
<tr>
<th>Organizational Units</th>
<th>nurses, doctors, nurse helpers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
<td>patients</td>
</tr>
<tr>
<td>Process Instances</td>
<td>therapy plans</td>
</tr>
<tr>
<td>Environment</td>
<td>nursing home</td>
</tr>
<tr>
<td>Triggers</td>
<td>symptoms</td>
</tr>
<tr>
<td>Process Fragments</td>
<td>therapies</td>
</tr>
<tr>
<td>Problem List</td>
<td>allergies, …</td>
</tr>
<tr>
<td>Bonus List</td>
<td>it has worked before, …</td>
</tr>
<tr>
<td>Positive Goals</td>
<td>patient feels well again, …</td>
</tr>
<tr>
<td>Negative Goals</td>
<td>patient dies, …</td>
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Motivation

Research Questions

Flexible & Individual Process Settings

Game Mechanics

Generated Data

Evaluation

Conclusion & Future Work
Game Mechanics: Gameplay

Generating Data from Highly Flexible and Individual Process Settings through a Game-based Experimentation Service
Game Mechanics: Gameplay

Land Info:
- Grass: 100%
- Beach: 0%
- Mountain: 0%
- Woods: 0%
- Desert: 0%
- Costs: 300 gold

Resources:
- Barracks: 0 / 10
- Mage Tower: 0 / 5
- Forge: 0 / 10
- Alchemy Lab: 0 / 9
Game Mechanics: Gameplay

- **Grassland**
- **Day:** 1
- **Gold:** 0
- **Land Info:**
  - Grass: 100%
  - Beach: 0%
  - Mountain: 0%
  - Woods: 0%
  - Desert: 0%
- **Resources:**
  - barracks: 0 / 10
  - Mage Tower: 0 / 5
  - Forge: 0 / 10
  - Alchemy Lab: 0 / 9
  - Costs: 300 gold
Game Mechanics: Gameplay

Each Round

1. Evaluate last round's results
2. Player sees villages where an attack will come the next round
3. Choose defense (warriors etc.)
4. Adapt defense plan of the villages
Game Mechanics: Building Blocks

Game Setting

Building Blocks

- Organizational Units
  - Barracks

Problem List

- Bonus List
  - Positive Goals
  - Negative Goals
Game Setting

Building Blocks

Organizational Units

- Barracks
- Mage Tower
Game Mechanics: Building Blocks

Building Blocks

Organizational Units

Barracks

Mage Tower

Alchemy Lab

Game Setting

Generating Data from Highly Flexible and Individual Process Settings through a Game-based Experimentation Service
Game Mechanics: Building Blocks

Building Blocks

- Organizational Units
  - Barracks
  - Mage Tower
  - Alchemy Lab
  - Forge
Game Mechanics: Building Blocks

Organizational Units
Subjects

Game Setting

Barracks
Alchemy Lab
Mage Tower
Forge
Game Mechanics: Building Blocks

Game Setting

Building Blocks

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- Mage Tower
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Generating Data from Highly Flexible and Individual Process Settings through a Game-based Experimentation Service
Game Mechanics: Building Blocks

Building Blocks

Organizational Units
Subjects
Process Instances
Environment

Game Setting

- Barracks
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Game Mechanics: Building Blocks

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Building Blocks

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Game Mechanics: Building Blocks

Organizational Units
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Positive Goals
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Game Setting

Barracks
Alchemy Lab
Mage Tower
Forge

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Game Mechanics: Building Blocks

Building Blocks
- Organizational Units
- Subjects
- Process Instances
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- Process Fragments

Phases
- Planning

Game Setting

- Barracks
- Mage Tower
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Game Mechanics: Building Blocks

**Building Blocks**

- Organizational Units
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**Phases**

Planning

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Game Setting

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**Game Setting**

**Phases**
- Planning
- Process Adaption
Game Mechanics: Building Blocks

**Building Blocks**

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**Phases**

- Planning
- Process Adaption
- Execution

Game Setting
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Game Mechanics: Building Blocks

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**Phases**
- Planning
- Process Adaption
- Execution
- Evaluation

Game Setting

- barracks
- mage tower
- alchemy lab
- forge
Generated Data

Change Log
- Data about process change operations

Execution Log
- Data about process execution

General Log
- Environmental Data: workload of the organizational units
- Subject-Related Data
  - Previous attacks
  - Info about the village’s field
- Evaluation Data
  - efficiency of an adaption - we know exactly if the user’s approach did work or not
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Evaluation

- Comparison between generated data and real world data
- Domain: Software Development & Support
- Compare data of a certain customer’s problem with the data generated in the game
Evaluation

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Evaluation

Game: General Log
- basic information about village
- enemy description
- how the village's parameters evolved

Game: Change Log
- process change operations - what to do next?

Game: Execution Log
- execution of process steps
## Evaluation

### Game: General Log
- basic information about village
- enemy description
- how the village's parameters evolved

### Game: Change Log
- process change operations
- what to do next?

### Game: Execution Log
- execution of process steps

### Support Case: General
- basic information about customer
- problem description
- how the problem evolved

### Support Case: Change Log
- developer's calendar
- support team calendar

### Support Case: Execution Log
- version log
- protocols of discussions
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Conclusion & Future Work

Using logs to...

- compare approaches to react to a certain situation
  - effects on the subject
  - effects on the process instance
- find out when the same approach is used
- find out about side effects - change already existing "therapies"
- ...

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Conclusion & Future Work

Using logs to…

• compare approaches to react to a certain situation
  • effects on the subject
  • effects on the process instance
• find out when the same approach is used
• find out about side effects - change already existing "therapies"
• …

Conducting experiments

1. let the players learn how to play the game
2. let the players play the game without support
3. let the players play the game with support
4. compare the results
  1. resources used
  2. effectiveness
  3. goals reached
4. …
Thank you for your attention
Questions?