A Catalogue of iStar Extensions

Enyo Gonçalves¹,², Tiago Heineck³, João Araújo⁴ and Jaelson Castro²

05th September 2018
Summary

- Introduction
- Background about iStar extensions
- Related work
- Methodology
- Previous Results
- CATIE: A Catalogue of iStar Extensions
- Conclusions and Future work
Introduction

Since its proposal by Yu (1995), iStar is often extended to incorporate new constructs

- Due to the proposal for a new version of iStar (Yu, 1995), we believe this is the suitable moment to discuss how iStar extensions could be systematized

We performed a set of previous works to identify the existing iStar extensions, to identify the opinion of experts and to mitigate existing conflicts

- These results pointed the need to propose a catalogue

This paper aims to present a catalogue of iStar extensions, including its constructs and analysis about both.

- This catalogue is useful to facilitate the identification of the existing extensions and constructs previously proposed
Background about iStar Extensions

- iStar (YU, 1995) Extensions have been proposed in different ways:
  - Describe in detail the new constructs
  - The extension is presented along with a method
  - Presenting a case study or modelling tool

Fig. 1: Example of iStar extension. Source: (Morandini et al., 2015)
Related Work

- We did not find a catalogue of iStar extensions
  - However, catalogues have been proposed to contribute to join the knowledge of other aspects of the requirements engineering area.

- Examples of catalogues in requirements engineering:
  - A gamification requirements catalogue for educational software (Peixoto and Silva, 2017)
  - A catalogue of Functional Software Requirement Patterns (Palomares et al., 2013)
  - A reusable catalogue of legal requirements derived from specific legal texts regarding security and personal data protection (Toval et al., 2002)
Methodology Overview

Previous Results

- SLR about iStar Extensions
- Mixed Methods Study
- Experiment + Survey for Mitigating Conflicts

Create Extration Template → Extract Information of the Extensions → Create Platform of the Catalogue → Populate the Catalogue

Fig. 2. The method used to create the catalogue of iStar extensions.
Previous Results

- SLR about iStar Extension (Gonçalves et al., 2018a)
  - Identified the papers which propose iStar Extension
  - Search in the principal research databases
  - Until 2016

Fig. 3. Distribution of selected papers per year.
Previous Results

- Mixed methods study with extenders (GONÇALVES et al., 2018b)
  - Interviews with 20 participants ~> Categories and statements
  - Survey with 30 participants ~> Guidelines

Fig. 4: Categories and Their Relationships.
Mitigating conflicts in the graphical representations (Gonçalves et al., 2018c)

- Experiments (new representations) and survey (prioritization)

Fig. 5: An example of mitigated conflict.

- The new representations and prioritization were included in catalogue
CATIE: A Catalogue of iStar extensions

- Catalogued the extensions identified in SLR (Gonçalves et al, 2018a)
- Used a extraction template with predefined fields to extensions and constructs
- istarextensions.cin.ufpe.br/catalogue/
Extension List

- Two views are available: List (a) and Tree View (b)

Fig. 6: Extensions list
Detail extension

- Show the information of the extraction fields to the selected extension

A goal oriented approach to identify and configure feature models for software product lines

Author: Silva, Carla; Borba, Clarissa; Castro, Jaelson
Journal/Conference/Book: Workshop on Requirements Engineering
Type: conference
Year: 2011
Description:

Extensions: Base:
- Original 1 * Modeling Strategic Relationships for Process Reengineering

<table>
<thead>
<tr>
<th>Application Area</th>
<th>Compatibility between metamodel and concrete syntax of extensions</th>
<th>Concepts Definition</th>
<th>Is there tool support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Product Lines</td>
<td>Compatible</td>
<td>Present Definition Partially</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of Extension</th>
<th>Metamodel Completeness</th>
<th>Kind of Construction Proposed</th>
<th>Kind of Validation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sets</td>
<td>Absence of Lists</td>
<td>Node and Lists</td>
<td>Static Semantic</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Constructs</th>
<th>ID</th>
<th>Concept</th>
<th>Type</th>
<th>Image</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>257</td>
<td>cardinality</td>
<td>relationship</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Metamodel Image</th>
<th>Title</th>
<th>Description</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metamodel</td>
<td></td>
<td>metamodel</td>
<td>Show</td>
</tr>
</tbody>
</table>
Show construct list for extension

- Show the list of the constructs (a)

**Fig. 8: Constructs list and details**
### Conflicts List

#### Description

<table>
<thead>
<tr>
<th>Constructs Involved</th>
<th>Description</th>
<th>(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Conflict of new constructs in conflict with the iStar default syntax</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Conflict of one concept with two or more representations - Conflicts of Nodes Identifier in Nômos</td>
<td></td>
</tr>
</tbody>
</table>

#### Conflict: 1 - Conflict of one concept with two or more representations - Plan

Type: One concept with two or more representations in concrete syntax

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Concept</th>
<th>Form</th>
<th>Description</th>
<th>Priority</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>Plan</td>
<td>Parallelogram as a</td>
<td>A new representation of this construct based on the results of an experiment.</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>arrow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan</td>
<td>Plans</td>
<td>octagon</td>
<td>Octagon represents Plans, in the original Tropos is a hexagon</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Plan</td>
<td>Plans</td>
<td>hexagon</td>
<td>Plans are represented as tasks</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Fig. 9: Conflict list and details**
Submitting a new extension

- Based on two steps: Inform Extension (a) and accept extension (b and c)

Fig. 10: Submission and acceptance of a new iStar extension
Conclusions

- Many extension have been proposed since 90’s
- Find a specified iStar extension based require extra time
- It is relevant to analyse these extensions and extract information to easier the identification
- CATIE Catalogue facilitates the identification of existing extensions and their constructs by extenders or users
Future works

- We are working in the definition of a process to conduct iStar extensions
- This process uses the CATIE
- The set of all constructs of iStar extensions of CATIE can be formalised by a conceptual model, metamodel or ontology
References

- Peixoto, M., Silva, C. A Gamification Requirements Catalog for Educational Software: Results from a Systematic Literature Review and a Survey with Experts. 32nd ACM Symposium on Applied Computing (2017)
- Gonçalves, E., De Oliveira, M., Monteiro, I., Castro, J., Araújo, J. Understanding what is important in iStar extension proposals: the viewpoint of re-searchers, Requirements Engineering Journal (2018b)
A Catalogue of iStar Extensions

Enyo Gonçalves¹,², Tiago Heineck³, João Araújo⁴ and Jaelson Castro²

¹ Universidade Federal do Ceará, Campus Quixadá, Brazil
² LER, Universidade Federal de Pernambuco, Brazil
³ Instituto Federal Catarinense, Brazil
⁴ NOVA-LINCS, Universidade Nova de Lisboa, Portugal

05th September 2018