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## 論 文 内 容 の 要 旨

### On the development of a web-based toolkit for supporting reviews of the quality and contents of iStar requirements models

Choosing a paradigm or methodology to teach when incorporating the requirements engineering (RE) subject in engineering curriculum is delicate and challenging as a fundamental question may arise: Which of the existent methodologies is the best and the most suitable for this “holy” mission *i.e.* educational situation?

In this context, the *i\** framework and its modeling language (the *i\** language), a widespread and popular goal- and agent- oriented approach, has witnessed efforts on its introduction in engineering levels worldwide.

Despite its simplicity, as the *i\** language is constituted basically by a simple set of graphical constructs which can be used in exactly two types of diagrams: the Strategic Dependency (SD) and Strategic Rationale (SR), as well as the existence of the *i\** wiki portal that provides a collection of modeling guidelines, rules and best practices; there is still misconception, misinterpretation and misrepresentation depicted in novice learners’ built diagrams which suggest their lack of the *i\** modeling language syntax and semantics grasping.

Like any other existent modeling technique, it is consolidated by free computer-assisted tools that

offer a number of functionalities to help users, in our case students particularly the novice learners, sketch their requirements models as well as check their quality. However, the freely accessible tools that we investigated so far do not cover neither implement the complete list of *i\** rule checks and this may hinder the production of good quality models. To put it more simply, we gathered evidences of these tools' limitations which indicate that there is no complete and solid support for the *i\** framework's novice learners on the model quality checking side.

Accordingly, we reviewed a decent portion of the existing literature and we discovered that only little work was devoted to enhance the syntactical quality of the *i\** models and unfortunately, to our knowledge, the model content validation was left totally neglected. Obviously, more effort on model checking and validation is needed to allow better support and experience of the *i\** goal modeling's novice learners.

The contribution of this thesis is twofold. It addresses the aforementioned issues as it adds the necessary support facilities by developing a web-based toolkit which is model quality checking- and content validation- oriented tools. Thus, it aims at guiding new users to review and revise the quality and contents of their diagrams without the help of a human assistant nearby.

The development process was performed individually in series of steps, addressing first the construction of model quality checker called *i\*Check* in which we tried to cover the wiki-based and derived list of checks for both types of *i\** models by returning clear feedback consolidated with suggestions consisting in correction-oriented GIF animations and in a like manner, the building of *i\** model content validation system aka GENERAT*i\**ON which returns to its users the model's structural and informational (textual annotations) content in a table of contents (TOC) format.

The effectiveness of our toolkit was investigated through several experimental tests in which we asked new learners to debug a series of *i\** diagrams to evaluate how each tool can guide them to locate and correct defects in given models. Results were positive and promising indicating the benefits that novices can get when having such tools around since it is unlikely that an instructor or assistant will always be nearby to offer advice on diagram construction and content validation.