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Automatic Identification of Events in Use Cases

Context

Use cases are a popular method of expressing functional requirements. Typical use case contains a main scenario, which is a sequence of steps, each describing in natural language an activity to be performed by the system or the end user. When a step is performed an event can occur. To cope with events, a use case contains also a set of extensions. Each extension is associated with a step and it consists of an event description and an alternative sequence of steps triggered by that event. Events omitted in requirements specification can lead to rework. Unfortunately, as it follows from the previous research, manual identification of events is rather ineffective (less than 1/3 of events are identified) and it is slow.

Objective

The goal of this research is to propose an automatic method of identification of events in use cases and to evaluate its quality.

Practical implications

The method resulting from the proposed research could be used to enhance contemporary tools for managing use cases.

Approach

From the previous research it follows that using tools of Natural Language Processing one can identify (automatically) for each well-written step its actor (e.g. end user), activity type (e.g. delete operation), and information object manipulated by this activity (e.g. article in a cart). Thus, one can propose an automatic method of identification of events in use cases providing the following hypotheses hold:
Hypothesis 1. Number of types of events that can occur when a use-case step is performed is finite.
Hypothesis 2. Types of events associated with a given step are determined by actor, activity type, and some attributes of the information object.
Hypothesis 3. Types of events that can occur when a given step is performed can be inferred using:

- a finite number of axioms following from analysis of existing use cases, and
- a few inference rules.

We are going to verify the above hypotheses using empirical approach, i.e. by analyzing available use cases. If those hypotheses prove true, then we will try to elaborate:

- an inference engine that would provide for each step a set of possible event types, and
- a set of NLG patterns, one for each event type, which would allow to generate descriptions of events in natural language.

To evaluate linguistic quality of generated descriptions we are going to perform a kind of Turing test, i.e. to compare event descriptions generated by a computer against their counterparts written by humans.