CS2125 Paper Review Form - Winter 2018

Reviewer: Mike Maksimov

Paper Title: Generating and Evaluating Choices for Fixing Inconsistencies in UML Design Models

Author(s): Alexander Egyed, Emmanuel Letier, and Anthony Finkelstein

1) Is the paper technically correct?
 [X] Yes
 [ ] Mostly (minor flaws, but mostly solid)
 [ ] No

2) Originality
 [ ] Very good (very novel, trailblazing work)
 [ ] Good
 [X] Marginal (very incremental)
 [ ] Poor (little or nothing that is new)

3) Technical Depth
 [ ] Very good (comparable to best conference papers)
 [X] Good (comparable to typical conference papers)
 [ ] Marginal depth
 [ ] Little or no depth

4) Impact/Significance
 [ ] Very significant
 [X] Significant
 [ ] Marginal significance.
 [ ] Little or no significance.

5) Presentation
 [ ] Very well written
 [X] Generally well written
 [ ] Readable
 [ ] Needs considerable work
 [ ] Unacceptably bad

6) Overall Rating
 [ ] Strong accept (award quality)
 [X] Accept (high quality - would argue for acceptance)
 [ ] Weak Accept (borderline, but lean towards acceptance)
 [ ] Weak Reject (not sure why this paper was published)

7) Summary of the paper's main contribution and rationale
   for your recommendation. (1-2 paragraphs)

The paper presents an implementation of previously developed techniques for automated support in fixing inconsistencies in UML models. These techniques are integrated in the design tool IBM Rational Rose. The approach works in the following way. After an inconsistency is located, the tool generates a set of values a model element may take. These generated values depend on the expected type of the model element and the set of values of that type already present in the model. Once there is a generated set, all values are then verified using incremental consistency checking. The result is a set of choices that are guaranteed to fix an inconsistency without violating any other consistency rules.

The paper is well presented and builds on top of previous work from the authors. The approach they implement is also a step up from previous techniques in the field. An example of this is removing false positives that were apparent in the work of “Fixing Inconsistencies in UML Design Models” by A. Egyed. With the goal of not repeating myself, I will expand on more concrete benefits below.

8) List 1-3 strengths of the paper. (1-2 sentences each, identified as S1, S2, S3.)

S1 – The technique discussed in the paper eliminates the tedious task of modelers to manually develop resolution functions and fixing rules for each of their respective consistency rules. The only manual coding work is in the tool builder responsible for implementing the value generation functions.

S2 – The approach is automated and implemented in an already existing design tool "IBM Rational Rose".

S3 – The approach provides feedback to the designer by presenting not only valid choices that satisfy all consistency rules, but also why invalid ones could not. It also removes false positives that were apparent in previous work, as mentioned in the summary.

S4 – The technique iterates through and checks the generated potential fixes and only displays the ones that do not introduce any other inconsistencies.

9) List 1-3 weaknesses of the paper (1-2 sentences each, identified as W1, W2, W3.)

W1 – The major weakness in this approach is that it only generates and considers potential fixes based on the existing pool of model elements, without being able to consider new elements as a potential fix. It can also resolve only one single location at a time and does not factor in the impact of multiple simultaneous fixes.

W2 – It does not completely remove manual overhead. The tool builders responsible for implementing the value generation functions are still required to do manual coding. Due to this human intervention, it is stated that the tool can also miss potential valid fixes depending on the manually coded choice generators.

W3 – During the evaluation of the tool, it was stated that in a worst case scenario, it generated 69 potential fixes. This amount of choices can be overwhelming to the end user because the tool does not actually fix the problem, but merely displays options from which the end user has to ultimately choose from.

W4 – During the evaluation, only a small number (17%) of consistency rules and types of location were tested.