

Posudek oponenta* diplomové práce

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Název práce: Meta-Adaptation Strategies for Adaptation in Cyber-Physical Systems

Vlastní text (sem prosím napište text posudku, délka textu posudku není omezena):

Classical self-adaptation consists in choosing a new system configuration to adapt to the current situation; in this scenario, all possible configurations must be identified at design time. For Cyber Physical Systems (CPS), identifying in advance all the possible adaptations may be difficult (or impossible) and, therefore, self-adaptation may fail in the presence of unforeseen situations. The thesis proposes an approach for *meta-adaptation*, in which new tactics are dynamically created at runtime when classical adaptation provided by IRM-SA fails. Each new generated tactic is evaluated in the running system and, if it correctly adapts the system, it is applied. Three different kinds of meta-adaptation are proposed (Knowledge exchange by data classification, process period adjusting, assumption parameter adjusting) and their implementation in jDECCo is described. The three meta-adaptations are evaluated on a Firefighter coordination system case study.

In general, the thesis is understandable. Overall, I think that the student has demonstrated of having understood the research problem and he has proposed reasonable solutions. The theoretical presentation is acceptable and the experiments section is sufficient. The amount of work done is adequate for a master's thesis.

In the following, I report some (minor) problems I have found in the thesis:

- Section 2 is not well structured and contains several repetitions: sections 2.2 and 2.4 say the same concepts about IRM, and sections 2.2 and 2.6 about DECCo.
- In Section 2.5 (page 14), it is written „To scale at runtime, SAT solving for selecting the application configuration is employed”. Using SAT solving for selecting the configuration is a reasonable and good choice; however, I would not say that SAT is scalable (SAT is NP-complete).
- In Section 2.5 (page 16), it is written „if a parent invariant is refined by OR-decomposition, then it is in C if and only if at least one of its children invariants is in C, too“. Is it correct? I was expecting that if the parent is in C, then at least one of its children is in C.
- In the description of the algorithms in Section 4, the pseudocode reported in Figs. 10 and 12 could have been defined in a more formal way. Moreover, the pseudocode and the CFGs in Figs. 11 and 15 report the same algorithms. I would have chosen only one form of representation of the algorithm and I would have linked more tightly the description of the algorithm with its representation.
- I would have given three short names to the meta-adaptations strategies. In the present form, it is not easy to reference to them (as they have very long names).
- I think that too much space is devoted to the description of the implementation. Instead, I would have devoted more space to the descriptions of the three meta-adaptation strategies.
- I would have appreciated a more wide experimental section.

Doporučení k obhajobě:

Z výše uvedených důvodů práci *doporučuji* k obhajobě.

Vynikající práce vhodná pro soutěž studentských prací	ANO X
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I think that the student has understood the research problem and he has provided a reasonable contribution. It seems that, from the scientific point of view, the results of the thesis are valuable, as they have also been presented in "I. Gerostathopoulos, T. Bures, P. Hnetynka, A. Huječek, F. Plasil, and D. Skoda. Meta-Adaptation Strategies for Adaptation in Cyber-Physical Systems. In ECSA '15: Proceedings of the 9th European Conference on Software Architecture, pages 45-52. Springer, September 2015."
I don't think that the (minor) deficiencies of the presentation can impact too much on the final evaluation. Therefore, my final rating is 1.

V Praze dne: January 18, 2016

Podpis:**

* *nehodící se škrtněte (vymažte)*

** *do SISu vkládejte formulář nepodepsaný (ve formátu PDF), podpis je potřeba doplnit až na vytištěný posudek.*