Software Engineering Seminar (WS 2015)

Environmental/Goal Change and Control Update

Description

In the context of reactive systems, it is usual to have requirements change, or environments change. In those situations, it is desirable that any updates that are necessary to comply with the new situation are made robustly, and ideally in a *hot-swap* mode, that is, without noticeable downtime. This may be further complicated by conflicting specifications of old and new requirements.

There have been two main branches of thought towards solving this problem. The first approach [1, 2] entails producing an initial system that contains "safe" states for which change is planned ahead. Changes are only realised when on these states.

The second line of research [3, 4] entails extensions to specification logics that allow for update objectives. However, no automated procedure for system update have been put forth yet.

The student is expected to produce a report detailing each approach and pointing out both strengths and weaknesses for each one.

References

[1] Carlo Ghezzi, Joel Greenyer, and Valerio Panzica La Manna. Synthesizing dynamically updating controllers from changes in scenario-based specifications. In *Proceedings of the 7th International Symposium on Software Engineering for Adaptive and Self-Managing Systems*, pages 145–154. IEEE Press, 2012.

[2] Valerio Panzica La Manna, Joel Greenyer, Carlo Ghezzi, and Christian Brenner. Formalizing correctness criteria of dynamic updates derived from specification changes. In *Proceedings of the 8th International Symposium on Software Engineering for Adaptive and Self-Managing Systems*, pages 63–72. IEEE Press, 2013.

[3] Ji Zhang and Betty HC Cheng. Specifying adaptation semantics. *ACM SIGSOFT Software Engineering Notes*, 30(4):1–7, 2005.

[4] Ji Zhang and Betty HC Cheng. Model-based development of dynamically adaptive software. In *Proceedings of the 28th international conference on Software engineering*, pages 371–380. ACM, 2006.

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