Reliability Analysis of Safety Critical Interactive Computing Systems

PHD RESEARCH THEME PROPOSAL

CENTRO DE CIÊNCIAS E TECNOLOGIAS DA COMPUTAÇÃO
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This research theme follows from an ongoing effort to develop tools and techniques for the **systematics analysis of interactive systems**. Formal techniques can provide an incisive analysis that is effective in uncovering potential unforeseen interaction problems [4]. A verification tool has already been developed (the **IVY workbench**), that supports a modelling, verification, and analysis cycle. Verification is achieved through model checking. A number of realistic case studies have been carried out [1, 2, 3].

The goal of the current proposal is to broaden the scope of the approach, applying it to a realistic industrial case study. To that end, a cooperation with the **Brazilian Aeronautics and Space Institute** (IAE) has been established. The project will consist in exploring the applicability of IVY as a tool to carry out acceptance tests on mission critical software. Components of IAE's current lunch system's control centre will be modelled, and a proposal to apply IVY to the next generation control centre made and tested. It is expected that the process will lead to improvements in the modelling language and supporting tool.

The ideal candidate will have an interest/skills in: formal methods (in particular, model checking) and human-computer interaction. The successful candidate should be available to travel abroad to discuss the work and its applicability with research partners.

Funding for the first to second years of the project is negotiable. A research proposal and/or PhD grant application will be submitted in due course to guarantee funds.

References

[1] J. C. Campos and M. D. Harrison. Model checking interactor specifications. *Automated Software Engineering*, 8(3/4):275–310, August 2001.

[2] J. C. Campos and M. D. Harrison. Systematic analysis of control panel interfaces using formal tools. In *Interactive Systems: Design, Specification and Verification*, volume 5136 of *Lecture Notes in Computer Science*, pages 72–85. Springer-Verlag, July 2008.

[3] J. C. Campos and M. D. Harrison. Interaction engineering using the IVY tool. In *ACM Symposium on Engineering Interactive Computing Systems (EICS 2009)*, pages 35–44. ACM, 2009.

[4] M. D. Harrison, J. C. Campos, and K. Loer. Formal analysis of interactive systems: opportunities and weaknesses. In P. Cairns and A. Cox, editors, *Research Methods in Human Computer Interaction*, chapter 5. Cambridge University Press, 2008.