Reliability Analysis of
Safety Critical Interactive Computing Systems

PhD Research Theme Proposal

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This research theme follows from an ongoing effort to develop tools and techniques for the systematic analysis of interactive systems' designs. Applying formal techniques to analyse interactive systems makes possible such a systematic approach to the evaluation of the usability of a new design. Formal techniques can provide an incisive analysis that is effective in uncovering potential unforeseen interaction problems [5]. These potential problems, once uncovered, can be explored from a usability perspective. A verification tool has already been developed (the IVY workbench), that supports a modelling, verification, and analysis cycle. Verification is achieved through model checking.

The basic building blocks of the verification approach have been defined, and tool support developed. A number of realistic case studies have been carried out [2, 3, 4, 6]. In general these fell under the category of what might be called *control panel interfaces* (c.f. the flight control panel of an aircraft, or the air-conditioning control panel of a car). The goal of the current proposal is to broaden the scope of the approach. We are interested in highly moded interfaces, which pose particular challenges in terms of modelling, and in exploring how the approach can be applied in large-scale complex interactive computing applications. A number of possible application areas have been identified which include software for medical devices, and software for the aerospace industry. 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

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