

Workshop on Interdisciplinary Approaches to Achieving and Analysing System Dependability

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Many current and expected problems in system dependability push the limits of the practical techniques, research methods and scientific knowledge that are familiar to the DSN audience. Computer-based systems involve a complex interaction of technical and human components set in the context of a physical environment. Unanticipated problems arise as emergent properties of the interplay between these different system components, and may defeat the efforts of the “traditional” DSN disciplines which focus on dependable computer hardware and software. The very success of hardware and software reliability engineering may increase the importance of these emergent problems, e.g. unanticipated user behaviour, affected by computer design and in its turn invalidating the designers’ assumptions. Understanding these problems effectively requires improved interaction between disciplines relevant to these various components, including those that are not usually represented in the DSN community. These disciplines may help by providing models or solution methods from non-computer application areas that have faced similar problems (e.g., modelling very large-scale systems, recognising emergent behaviours, solving or visualising complex models), or by dealing with specific factors that affect dependability (e.g., human cognition, motivation and organisational culture).

Examples of the dependability problems that may benefit from contributions from outside the usual DSN spectrum are:

- where unanticipated use of technology leads to poor dependability: for example, users learn to rely, as part of the normal execution of tasks, on automatic devices meant only to protect against sporadic human failures; or, users intentionally violate (under organisational pressures and constraints) the procedures assumed by automation designers;
- where automation leads to incorrect understanding by users of an unfolding situation (for example, where modes in the design of a flight management system lead to confusion about what the aircraft is actually doing);

- where problems in maintenance and system administration - due to technical, human and organisational factors - affect system dependability (for instance, poor design of system administrator software or decision support; “social engineering” attacks and their implications for design of automation and of procedures);
- where unpredicted environmental influences or demands lead to system break down (where traffic volumes exceed those imagined when the system was designed; in critical emergency situations with surges in the usage of critical facilities);
- where legal constraints lead to design solutions which affect dependability in unintended ways;
- where a case for the dependability of a system involves arguments produced by different specialist methods in different specialist languages, without standard ways of combining them.

The goal of this workshop is to bring together experts from different disciplines and application domains to exchange ideas, make concrete progress across disciplinary barriers, and establish contacts and possible collaborations. At the same time, it is meant to be of value to all DSN participants, providing some introduction to the related disciplines that have value for current dependability problems, examples of what they can deliver, a challenge to consider problems that our individual specialisms may make us neglect, to our peril, and a forum for participants to express needs for interdisciplinary work and experience about its uses and problems.

The selected contributions cover overlaps between the “standard” concerns of dependable systems and networks and those of psychology, sociology and other “human” sciences, the law, or disciplines that although closely related to DSN are usually under-represented, like human-computer interaction and human reliability. The format of the workshop will emphasize extensive discussion and be geared to achieve effective interchange of ideas among people from different backgrounds.