Cognitive systems at the point of care: the CREDO program

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CREDO is a framework for understanding human expertise and for designing and deploying systems that exploit that understanding in supporting tasks like situation assessment, decision-making, plan management and other applications. The framework has evolved through an extensive program of research on human decision-making, in which medicine has provided an important domain for exploring and validating it. It builds on a number of fundamental ideas from cognitive science, and has made a number of theoretical contributions in cognitive theory and knowledge-based cognition. These are embodied in several generations of technologies for designing, implementing and deploying clinical services, early versions of which were reported by Fox and Das (2000).

A key component of the CREDO technology stack is an agent modelling language PROforma (Sutton and Fox, 2003) which has proved to be a versatile formalism for designing applications in many clinical settings and medical specialties. Our experience is that PROforma applications are very well received by clinicians which we attribute to the "human-like" model of knowledge based cognition it uses. Since the first operational software suite for implementing and deploying PROforma applications became available in 1996 many different kinds of applications have been successfully built and trialed, some of which are in large-scale routine use.

This talk will review the cognitive foundations of the CREDO approach and summarise the main theoretical, technical and clinical contributions and some outstanding issues and opportunities. We will also outline proposals for addressing two key challenges for the future: the use of machine learning to enhance the manual knowledge acquisition methodology that is currently supported, and the need to address the ethical issues that we are increasingly facing as we deploy AI systems in professional and other domains.

A detailed written version of the talk is available for distribution at the workshop.

References
Fox J and Das S, Safe and Sound: Artificial Intelligence in Hazardous Applications, AAAI/MIT Press, 2000
Sutton D and Fox J, , **J American Medical Informatics Association 2003 (http://jamia.oxfordjournals.org/content/10/5/433).**