

Process-Model-Driven Guidance to Reduce Surgical Procedural Errors

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Objectives: Our goal is to provide surgical teams with online guidance and offline training to reduce procedural errors that may lead to adverse events. This guidance is based on precise models of the surgical process that capture best practices.

Methods: Our approach elicits, defines, and validates a hierarchical process model that describes concurrent steps, team communication, and exception management. A narrative document providing a hypertext description of how the teams could carry out the process can be generated for offline training. Online guidance is provided as a context-aware dynamic checklist showing what the teams have done so far, what they are doing now, and what next steps are possible. A post procedure document recapping how the teams actually carried out the process can be generated.

Results: We are evaluating this approach on complex, high risk parts of cardiac surgery. Surgical team focus groups saw a strong potential for the approach to improve training, reduce procedural errors, and reduce post procedure documentation work.

Conclusions: We are designing human simulation studies to evaluate the impact of our approach on surgical safety.

