

SunSet: Scrub Nurse Non-technical Skills Training System

Context

- Necessity to ensure scrub nurses practice of adverse events or rare surgical procedures
- Hospital requirements with polyvalent scrub nurses

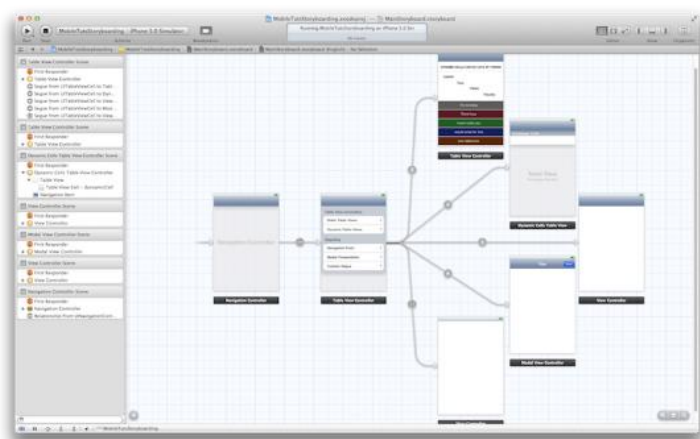
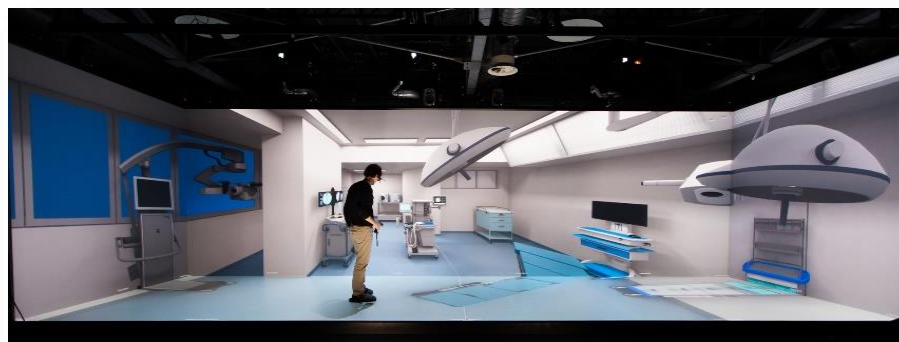
The SunSet project aims at:

- Overcoming the limitations of existing systems:
 - costly and subjective human based training in sensitive clinical environments
 - non-realistic simulated environments
 - assessment of technical skills only
 - lack of quantitative metrics
 - lack of flexibility
- Proposing a new paradigm in surgical teaching and assessment of non-technical skills
- Reducing teaching cost and improving its quality
- Developing and assessing a new generation of virtual reality based surgical training system [1] covering inter-personal non-technical skills

Motivations

- Development of an innovative training software suite based on immersive and collaborative virtual reality technology for training and evaluating non-technical skills
- In agreement with the recommendations of the Haute Autorité en Santé (HAS) for a better teaching and evaluation of surgeons using simulation systems, covering the required surgical skills [6]
- Integration of methods and systems developed in the CominLabs S3PM project
- Implementation and evaluation of neurosurgical scrub nurses training sessions
- Pluridisciplinarity:
 - Medical professionals (scrub nurses, surgeons)
 - Psychologists
 - Computer scientists and engineers (virtual reality, knowledge representation, formal methods, surgical procedure modelling)

SunSet Training



SunSet Author



SunSet Eval

Content specification

- Study of a shared working memory model between real and virtual actors in virtual environments
- Definition of simulation scenarios according to work domain analysis and actual observations [5]
- Adjustment of evaluation of non-technical skills forms for scrub nurses [2, 4]

Authoring and implementation

- Scenario authoring tools for trainers
- Specification of hardware requirements
- Implementation available on immersive VR platforms
- On-line semantic assessment of simulated scenarios
- Addressed to junior and senior scrub nurses

Evaluation

- Cognitive and interpersonal skill **metrics** [3]
- Automatic verification of scenarios based on semantic checking and ontology reasoning
- Evaluation tools to compare the qualitative and quantitative progress over time

1. Claude G., Gouranton V., Caillaud B., Gibaud B., Jannin P., Arnaldi B. (December, 2016). From Observations to Collaborative Simulation: Application to Surgical Training. ICAT-EGVE, Little Rock, Arkansas, USA.
2. Michinov E., Jamet E., Dodeler V., Haegelen C., Jannin P. (2014). Assessing Neurosurgical Non-Technical Skills: An exploratory study of a new behavioral marker system, *Journal of Evaluation in Clinical Practice*, 20(5): 582-588.
3. Morineau, T., Riffaud, L., Morandi, X., Villain, J., & Jannin, P. (2015). Work domain constraints for modelling surgical performance. *International Journal of Computer Assisted Radiology and Surgery* ; 10(10): 1589–1597
4. Mitchell, L., Flin, R., Yule, S., Mitchell, J., Coutts, K., Youngson, G. (2013). Development of a behavioural marker system for scrub practitioners' non-technical skills. *Journal of Evaluation in Clinical Practice*, 19: 317-323.
5. Clarke D. B., Kureshi N., Hong M., Sadeghi M. and D'Arcy R. C. N. (2016). Simulation-based training for burr hole surgery instrument recognition. *BMC Medical Education* 16:153.
6. Simulation en santé : état des lieux et perspectives de développement, Rapport de la Haute Autorité de Santé Janv. 2012