

A Distributed Multi-agent Architecture in Simulation Based Medical Training

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Abstract. In the United States as many as 98,000 people die each year from medical errors that occur in hospitals, according to a book with the title *To Err is Human*. It was found that in America 75 percent of the failures in rescue were caused by either the diagnosis or the treatment being too late. Many of these deaths could have been avoided by improved the communication and coordination with in the medical teams.

Team training using medical simulators is one of the methods to increase the skills of a multidisciplinary group of employees in the delivery room and especially to prevent inadequate communication in critical obstetric situations. Hoever with most of the currently available simulators, the level of realism is not particularly high. Next to the toy like external appearance, it is also the not really flexible material applied which has the effect that the training experience is still quite remote from the reality. Especially, most of the commercial products today are designed as a stand alone system that does not really take the team training aspects into account. For a more realistic experience and an optimal training result, we are aiming at the next generation simulation based training facilities, involving as many different senses as possible: vision, sound, smell and also importantly a realistic touch experience (moistness, warmth, friction). It brings more software and hardware devices and components into the training room.

This paper addresses the issues of distributed interactions in such a simulation based medial training environment. A scripting language is proposed, using a metaphor of play, with which the timing and mapping issues in describing the distributed presentations are covered. A distributed multi-agent based architecture for the such systems is also presented, which covers the timing and mapping issues of conducting such a script in a medical training environment.

The concepts of the play metaphor, the scripting language and the architecture are found to be applicable in simulation based medical training, because of the similar requirements on timing and mapping in applications of both distributed multimedia entertainment and simulation based medial training. However there are also clear differences between these two application areas. Further research and development need to be done to deal with the issues such as multiple participants in team training and the verification of the actual performance of a training session.

Keywords: Distribution, multi-agent, delivery simulator, medical training.