MEDICAL SIMULATION TRAINING SYSTEM WITH APPLICATION OF UNITY

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As computer technology advanced, the computer-based simulation has become popular and computer-based simulation training has been adopted in training professionals in other industries such as military, law enforcement, transportation and athletics. Healthcare was not an exception.

Simulation training was adopted to train medical professionals for many procedures and surgeries. Coronary angiography is one of the procedures and surgeries that have been simulated for training medical professionals. Traditional training of coronary angiography happens in a catherization lab, which requires physical resources such as space for lab, C-arm and X-ray intensifier, as well as human resources such as experienced trainers, and patients. The simulation training system was developed to reduce the physical and human resources and training time.

Another purpose of the development of this system was for an affordable training system for medical schools and institutions. For this purpose, it is essential to use free development tools.

Unity is the best development tool to achieve these purposes. Unity is a free cross-platform game engine and used for video games, simulations for computers, consoles and mobile devices. For the development of simulation training system for coronary angiography, Unity provides a physics engine in addition to a game engine. Its game engine offers easy programming for GUI and computer graphics. The movements of catheter and guidewire in arteries was simulated with the physics engine that provides a mass-spring model.

The computer-based simulation training system was developed with Unity for coronary angiography. The catheter and guidewire were modelled after a mass-spring model. Their movements were simulated with the physics engine of Unity. The contrast dye injection was also simulated in the coronary arteries. The flow of the contrast dye in coronary arteries is recorded so that the results of coronary angiography can be reviewed later. This system is capable of serial communication with other control devices through which catheter and guidewire can be controlled.

This simulation training system can be used in medical schools and hospitals to train medical students and refresh medical professionals' knowledge and skills. It is also useful for educators to teach medical students. For students, this system can be a learning tool to prepare themselves for coronary angiography.

Key words: Simulation Training, Coronary Angiography, Unity