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Virtual simulation of eyeball and extraocular muscle reaction during cataract surgery

Abstract

Master-apprentice teaching method is most commonly used in medical education for all the time in transferring the surgical skill from a professional surgeon to a medical practitioner. The current technology has the ability to provide alternative method for different types of surgical practice regardless of ethical issue on human and animal experimentation. Several virtual reality surgery simulators have been developed by the researchers as the purpose to replace web-lab training on human and animal cadavers. Visual realism and haptics realism of the training simulator are the most important parts in imitating the actual surgical atmosphere. This paper presents the implementation of eyeball and extraocular muscles reaction with the response to external force applied from surgical instruments for cataract surgery simulator. An algorithm is created in the system to classify the degrees of rotation relative to the applied force. The application can achieve the visual realism of the reaction of eyeball and extraocular muscle realistically. Finally, the paper concludes with future work to enhance the system.

Keywords — Cataract surgery, extraocular muscle, eyeball reaction, surgical training simulator, virtual reality