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Research In-Progress

Simple Tools for Efficient Artificial Intelligence Assisted Laparoscopic Training

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Introduction: Artificial intelligence nowadays can be implemented for object recognition, motion analysis and image segmentation. Those assets could be used to enhance laparoscopic training through computer assisted laparoscopic systems.

Methods: A number of simple software tools were developed using Python, Opencv and Tensorflow. The system was able to detect 1.Camera excessive motion, 2.Target out field, 3.Tools out of field, 4.Foggy field, 5.Tools cross-handed, 6.Tools out of target. A preliminary study was performed on 10 laparoscopic videos performed by residents in general surgery. Evaluation of the results was made by comparison of computer analysis outcomes and laparoscopic surgeon rating on the same six skill points mentioned above.

Preliminary Results: Artificial intelligence system was able to detect laparoscopic performance although significantly underrated skills because several necessary surgical motions were translated as errors. Laparoscopic abilities were evaluated faster, objectively and the data results were kept for future reevaluation.

Next Steps: Completion of the system for real-time laparoscopic training analysis and assistance. Simple artificial intelligence tools can be used to improve laparoscopic performance and training.