Automated surgical performance metrics

Contact: Andreas Møgelmose, anmo@create.aau.dk

Background

Accurate performance assessment of surgical trainees' performance is crucial to the surgical training pathway and is fundamental for proficiency-based training. Surgeons, therefore, must frequently perform procedures under supervision to develop their skills. However, given the increasing complexity of modern healthcare, constraints on working hours, and ethical considerations regarding patient safety, educators need to develop efficient training programs. In this research project, a collaboration between Open Source Research, Nordlandssykehuset in Bodø, Norway, and AAU, we aim to develop automated, objective, data-driven assessments of surgical skill levels and provide valuable feedback. Automated performance metrics (APMs) are measurements extracted from surgical video films to describe surgeon's movements and assess the progress in training.

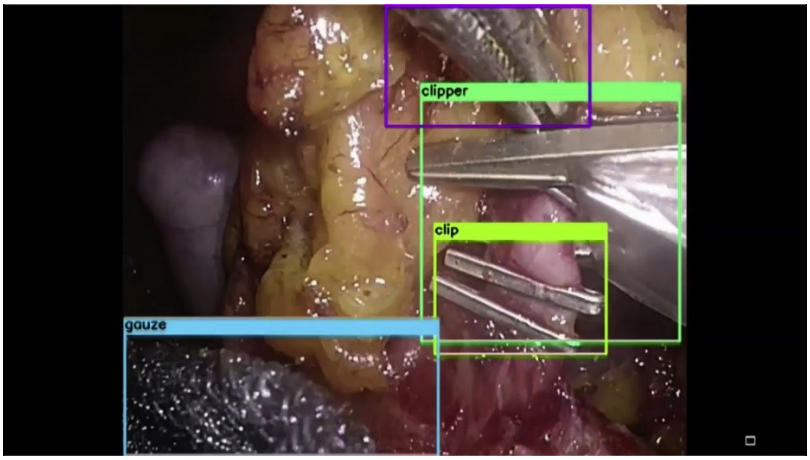

Figure 1 Automated performance metrics can improve surgeons 'performance and increase safety of patients

The challenges:

1. Developing reliable automated performance metrics from video analysis.
2. How to tackle the limitations of the 2D surgical video films (camera position, instability, blurring…etc)?
3. What other APMs are needed? How to develop them?
4. How can APMs used in a training setting? Can we monitor the progress using APMs?

Prospectives

This project will be of great interest to the following stakeholders:

1. Medical industry: this project can significantly improve the quality and fidelity of surgical simulators
2. Hospitals: this project can provide the hospitals with a training tool to be used at surgeon's convenience, improve the safety of surgical patients and reduce the cost of training.
3. Surgeons: this project can help surgeons to reach peak performance and invent new surgical manoeuvres or new procedures.

We aim for a scientific publication based upon your work (with you as co-authors, obviously). There are public datasets available, and Nordlandssykehuset has a proprietary dataset which will be available to you.

Relevant links:

https://osrc.network/computer-vision-in-surgery/

https://pubmed.ncbi.nlm.nih.gov/38864757/