

# Automated evaluation of surgeon technical performance

#### Investigators

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**Description** Software, Education/Training

Field Healthcare IT

### **Advantages**

Objective Automated Less labor intensive

#### **Technology Status**

Available for licensing & sponsored research

Patent Status U.S. Patent 10,692,395

UMB Docket# CM-2016-014

**References** JAMA Surg. 2017 Jun 1;152(6):1-8. <u>doi:</u> 10.1001/jamasurg.2017.0092

J Trauma Acute Care Surg. 2017 Jul;83(1 Suppl 1):S124-S129. <u>doi: 10.1097/TA.</u> <u>000000000001467</u>

J Trauma Acute Care Surg. 2015 Jul;79(1):105-10. <u>doi:</u> <u>10.1097/TA.000000000000006</u> <u>85</u>

## **Overview**

The technical skills of a surgical resident are typically evaluated by experienced mentors during training. However, this process is time-consuming, labor-intensive and may involve evaluator biases. In an effort to standardize such technical evaluations, UMB researchers developed an automated, sensor-free method using select parameters such as hand-motion entropy, the time to complete procedures, ratio of idle to active time, and instrument changing.

## **Market & Applications**

The most frequently used surgical performance evaluation is the objective structured assessment of technical skills (OSATS). While useful, this examination may be prolonged and costly due to additional staffing requirements and use of surgical facilities. In addition, the OSATS assessments are conducted by different evaluators, which may introduce variance in scoring techniques. An automated system to evaluate technical performance would undoubtedly be useful as an objective assessment tool for surgical trainees, including for determination of military surgeons' readiness prior to deployment.



#### **Technology Details**

The system monitors the hands of a surgical operator using a video camera and software to track various parameters. The operator would wear sensor-free gloves of opposing colors to allow automatic tracking of each individual hand during a surgical procedure. Proof of concept studies conducted on cadavers demonstrated the system's ability to distinguish between experts versus resident surgeons. Experts scored the lowest entropy values, with less idle time and shorter time to complete the procedure (i.e., dividing pectoralis minor), using fewer instruments. Improvement with training for resident surgeons was demonstrated, as well as the deterioration of proficiency 12-18 months later. This technology promises to enable the

automated & objective assessment of technical skills.

## **Stage of Development**

Published proof-of-concept studies demonstrated system's effectiveness as tool for the objective assessment of technical competency.