Surgical Skill Assessment on In-Vivo Clinical Data via the Clearness of Operating Field

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Introduction

Surgical skill assessment:

Surgical Data >> Automated Model >> Surgeon’s Skill Scores

Clinical Dataset

• 57 gastrectomy videos
• 1 operating surgeon
• 6 annotating surgeons
• 3 juniors and 3 seniors
• 14 skill metrics
• Likert Scale 1-5
• Mean of seniors as ground truth

Simulated Data

Clinical Data

Tool Motion

Clearness of Operating Field

Expensive in clinical setting

A skill proxy using only video data

Why is COF a good skill proxy

High correlation with overall skills
High consistency across seniors
High consistency between juniors & seniors

Overall Technical Skill

Overall Procedural Skill

Clearness of Operating Field (COF)

Visualization

Video predicted COF: 3.14
Video annotated COF: 3.00

Experiments

Contribution:
• Skill assessment on clinical data
• COF as a good skill proxy
• An effective automated model

Limitations:
• Only a single operating surgeon
• Only gastrectomy procedures

Conclusion

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