Computerized Neurosurgery Skills Evaluation

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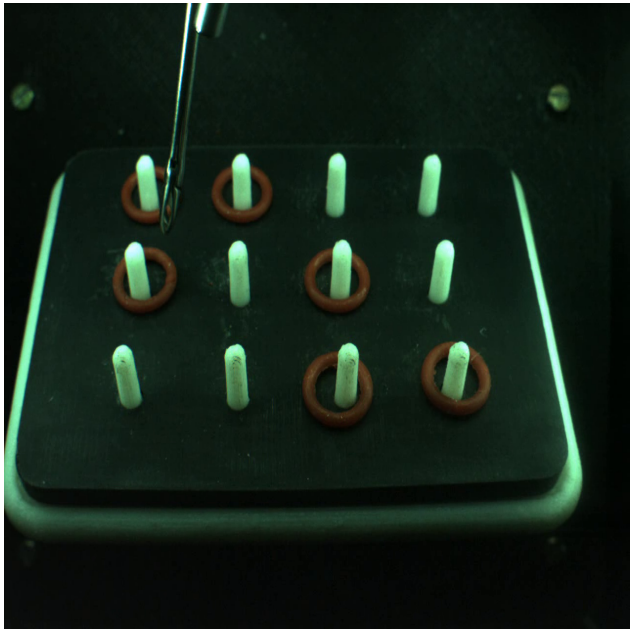
Overview

The presentation is organized as follows:

- Survey of the key problems to be addressed (Image Processing and Vision)
- Related work and literature review
- Future scope of work

Key problems in area of vision

- Neuro-Endotrainer tracking and evaluation



- Neuro-endoscopy tool tracking(Aux camera and Endoscopy camera)
- Micro-suturing skills assessment - effectiveness(images) and Dexterity(video - activity detection and scoring)
- Drilling Skill assessment effectiveness(images) and Dexterity(video - activity detection)

Related work and Literature review - I

The main focus so far has been only the Neuro-endotrainer

- It started with building background on Image Processing and Computer Vision:
  - Notes on DIA - Basics of image representation, filtering operations, Image Warping
  - Mooc on Udacity - Math behind Canny Edge detection and Hough Transform
  - Another Mooc on CV - just specific topics from that made me comfortable with the math. - eg: SIFT descriptor etc
  - Notes on CV that led me to study the math behind projective geometry - mainly Hartley and Zisserman
  - Getting used to coding in openCV

Related work and Literature review - II

- Secondly, the requirements of the project - The evaluation of the task of picking the ring is addressed by detecting whether the board is hit or not.Its a failure when board is hit- **Foreground Detection - MOG** and **TLD**
- Tracking ring's motion - To automate whether a ring is being picked and moved, stationary. - **Activity Identification**

Suggested problems to work on

Currently the following problems are to be addressed

- Endotrainer related:
  - Identify tugging of the ring onto a peg.
  - Endoscopic Camera Evaluation - The tool is to be tracked and determined whether the tool is in the centre of the field or exiting the field and evaluate if it hits the peg.
- Micro-suturing related (Image and Video)
- Drill related (Image and Video)

THANKYOU