

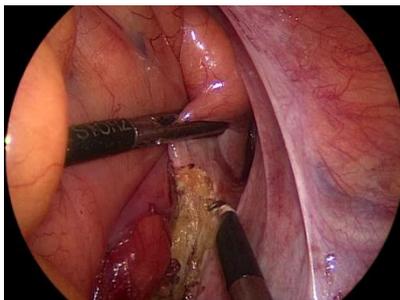


## Sub-Challenge Instrument Segmentation and Tracking

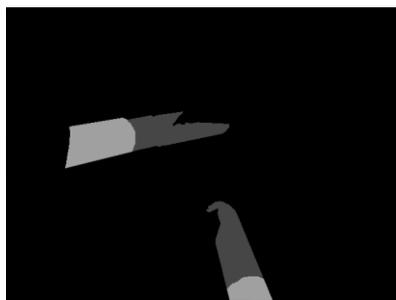
### Readme Segmentation Rigid Instruments

#### Training Data (160 2D images + annotations in total)

- 40 2D in-vivo images from 4 laparoscopic colorectal surgeries together with annotated masks. We provide two types of masks:
  - Mask 1: Each pixel in the mask (R,G,B) is labelled as either background (0,0,0), shaft (160,160,160) or manipulator (70,70,70)
  - Mask 2: Each pixel in the mask (R,G,B) is labelled as either background (0,0,0), instrument1 (20,20,20), instrument2 (40,40,40) or instrument3 (60,60,60) depending on the amount of instruments in the image
- Training Data Example:



img\_xx\_raw.png



img\_xx\_class.png (Mask1)



img\_xx\_instrument.png (Mask 2)

#### Test Data (140 2D images)

- 10 additional 2D images for each of the 4 recorded laparoscopic surgeries provided for training
- 2 additional recorded surgeries with 50 2D images

No mask will be provided for testing for the duration of the challenge.

**Release of the test data: 14.9.**

#### Submission

Please upload your results and the short method description in a separate zip archive named *Segmentation\_<Username>\_Rigid\_Results.zip*

**Format:** Please provide either result segmentations for the whole instrument or results segmentations for instrument parts separated into shaft/manipulator if your method is able to distinguish both as described below or both:

- 3 channel png mask (R,G,B) with annotated instrument (80,80,80) and background (0,0,0)

Naming convention: *<OriginalSurgery>/<OriginalName>\_ResInstr.png*

- 3 channel png mask (R,G,B) with annotated shaft (160,160,160), manipulator (70,70,70) and background (0,0,0)

Naming convention: *<OriginalSurgery>/<OriginalName>\_ResClass.png*

The pixel coordinate system starts at the upper left corner (0,0).

**Note:** Please use the training data in a leave-one-surgery-out fashion: Please do not include the same surgery in the training set when testing the 10 additional 2D images for each of the 4 laparoscopic surgeries provided for training. For the new surgeries the whole training data can be used.

**Deadline: 21.9.**

## **Reference**

For evaluating the instrument segmentation, the DICE coefficient between the reference and the submitted result is used. Furthermore, typical classification metrics like precision and recall are calculated.

## **Award**

The DICE coefficient between the reference and the submitted result of the **whole instrument** (Mask2) is taken into account. To be considered for the *Instrument Segmentation Award* participation in the instrument segmentation for robotic instruments is necessary.