Readme Segmentation Robotic Instruments

Training Data (3000 2D images + annotations in total)

- 1100 2D ex-vivo images from 4 robotic procedures together with annotated masks in video files. We provide two types of masks where appropriate:
  - 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). This is the case for all masks.
  - 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) depending on the amount of instruments in the image. If there is only one instrument visible, then this set of masks is ignored.
- As these values are provided in video files, there is some chance that due to compression the values in every pixel will not exactly match these values. To account for this, please threshold the values to the nearest expected value.

Test Data

- 370 additional 2D images for each of the 4 recorded procedures provided for training in video files.
- 2 additional recorded procedures each with 1500 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>_Robotic_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 image mask (R,G,B) with annotated instrument (80,80,80) and background (0,0,0) in a video file (choose appropriate codec).

  Naming convention: *<OriginalFolder>/<OriginalName>_ResInstr.mp4*

- 3 channel image mask (R,G,B) with annotated shaft (160,160,160), manipulator (70,70,70) and background (0,0,0) in a video file (choose appropriate codec).

  Naming convention: *<OriginalFolder>/<OriginalName>_ResParts.mp4*

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 for training when testing the 370 additional 2D images for each of the 4 recorded procedures provided for training. For the new procedures 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** is the reference. To be considered for the *Instrument Segmentation Award* participation in the instrument segmentation for rigid instruments is necessary.