

# Initial sensing results

1<sup>st</sup> April 2019

# Outline

- Videos
- 2D human (body + hand) pose estimation
- Semantic segmentation
- Conclusions
- Coming soon

# Videos



Handing-over  
1st person view



Handing-over  
3rd person view



Pouring  
3rd person view



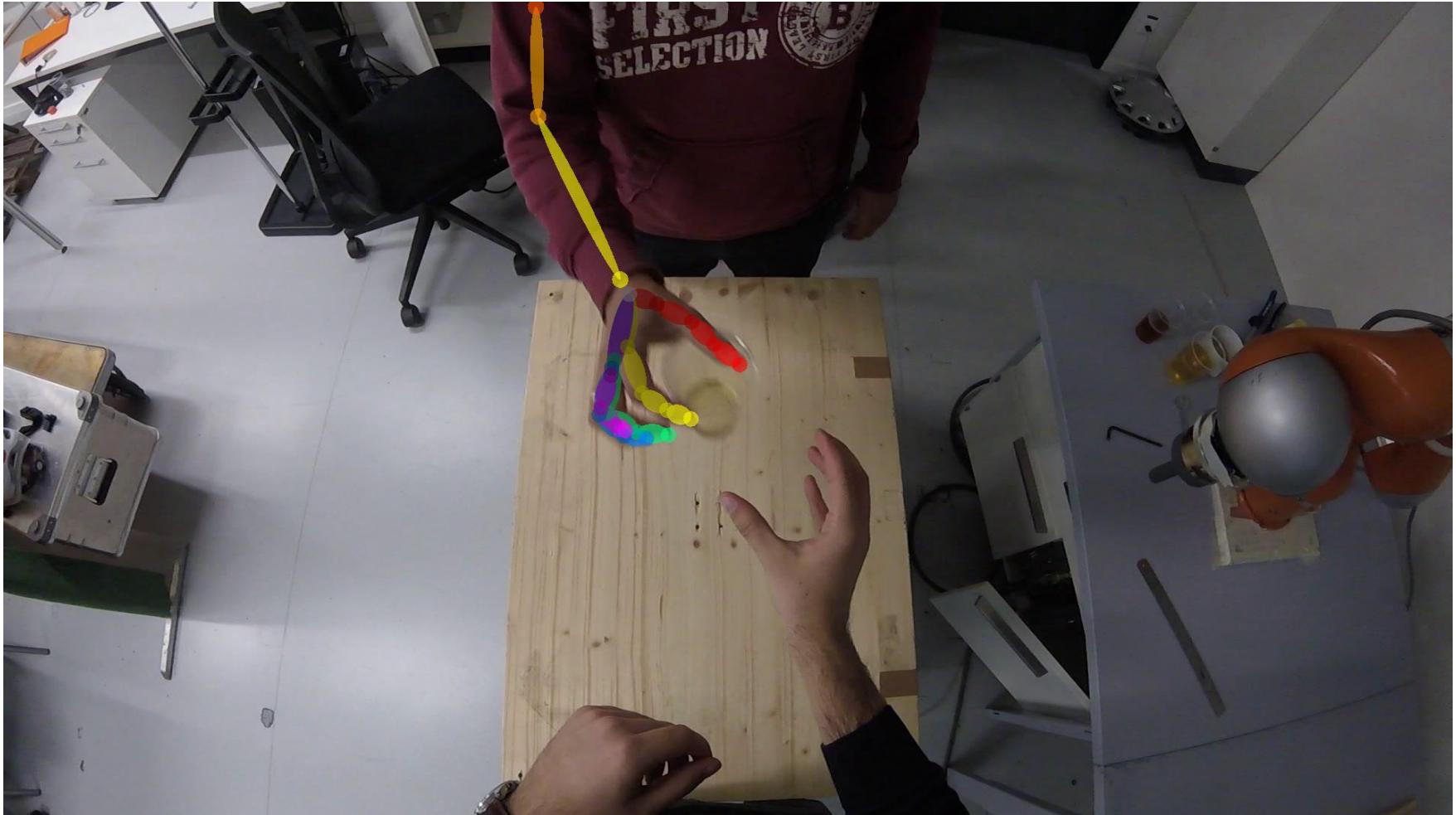
Pouring (half-full)  
1st person view



Pouring (full)  
1st person view

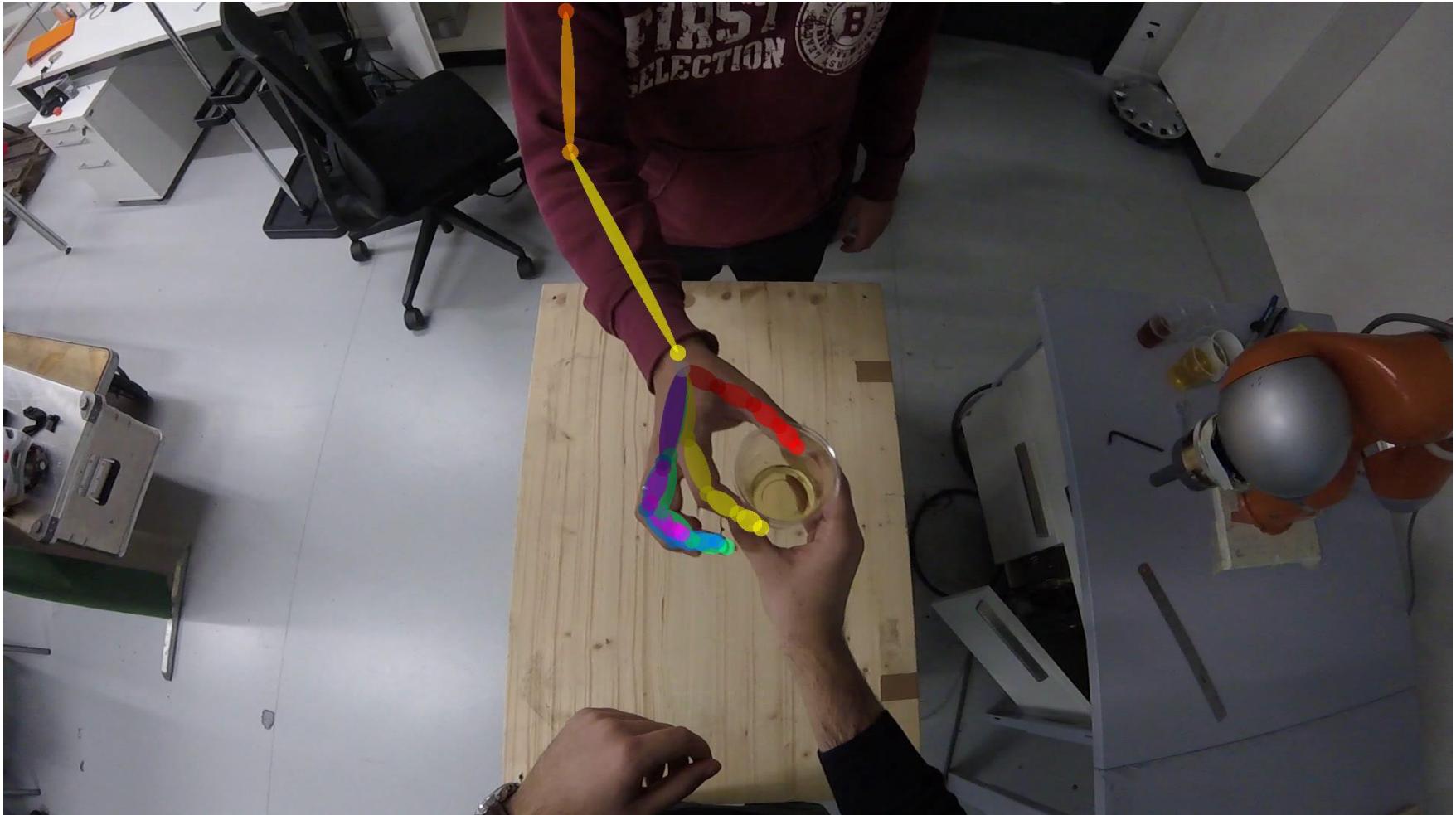
# 2D human (body + hand) pose estimation

- Handing-over (1<sup>st</sup>-person view)



# 2D human (body + hand) pose estimation

- Handing-over (1<sup>st</sup>-person view)



# 2D human (body + hand) pose estimation

- Handing-over (1<sup>st</sup>-person view)



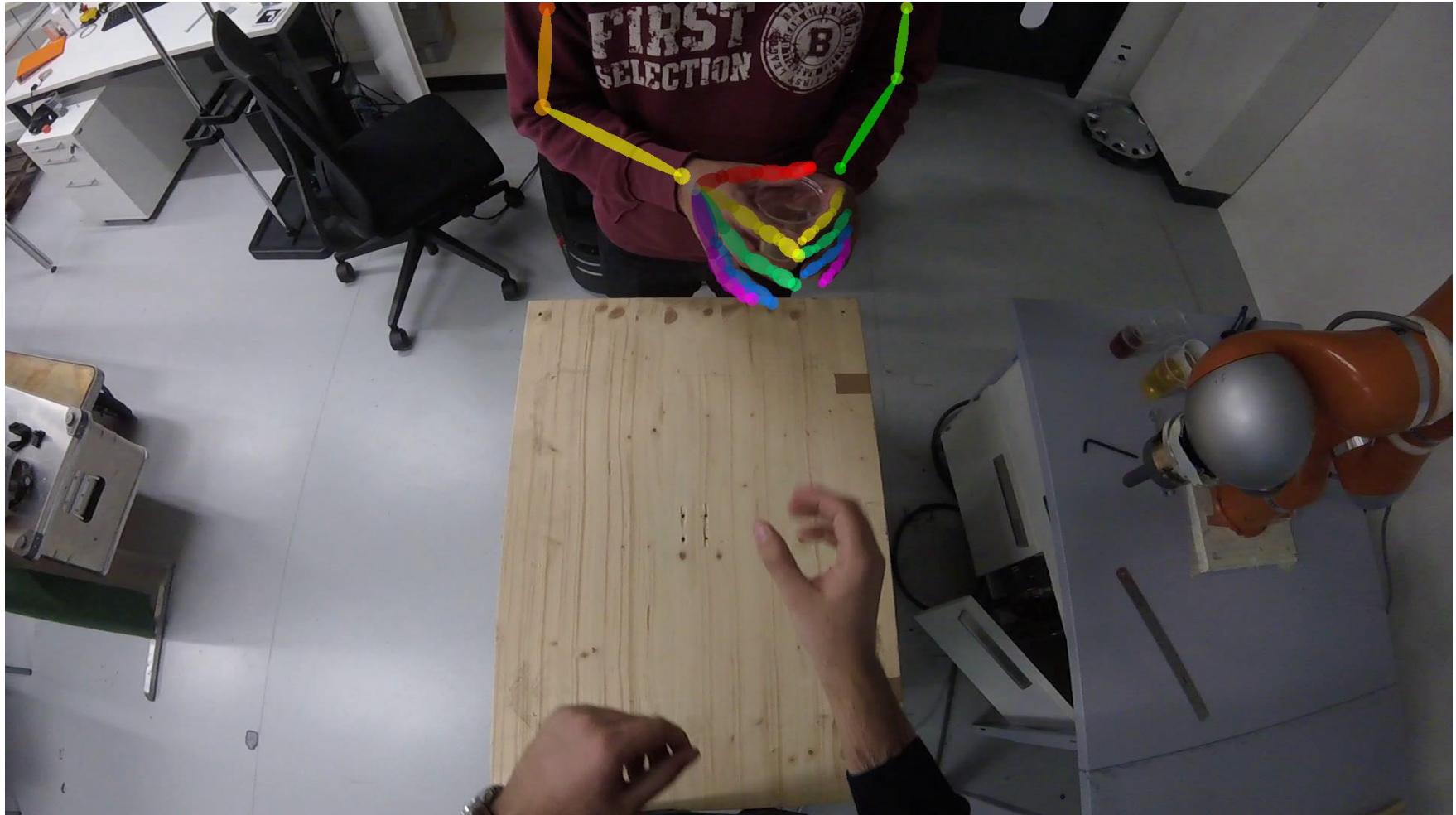
# 2D human (body + hand) pose estimation

- Handing-over (1<sup>st</sup>-person view)



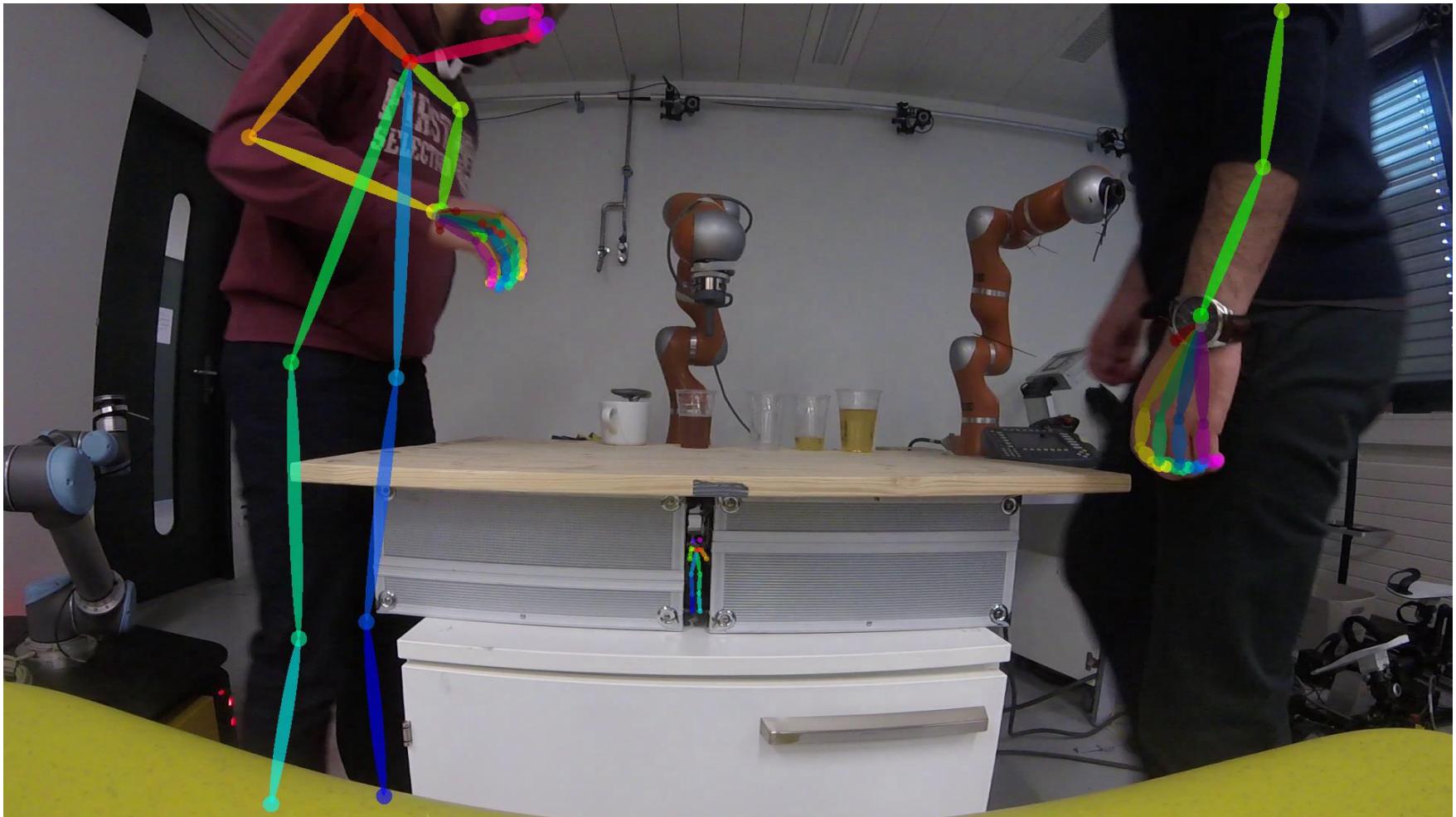
# 2D human (body + hand) pose estimation

- Handing-over (1<sup>st</sup>-person view)



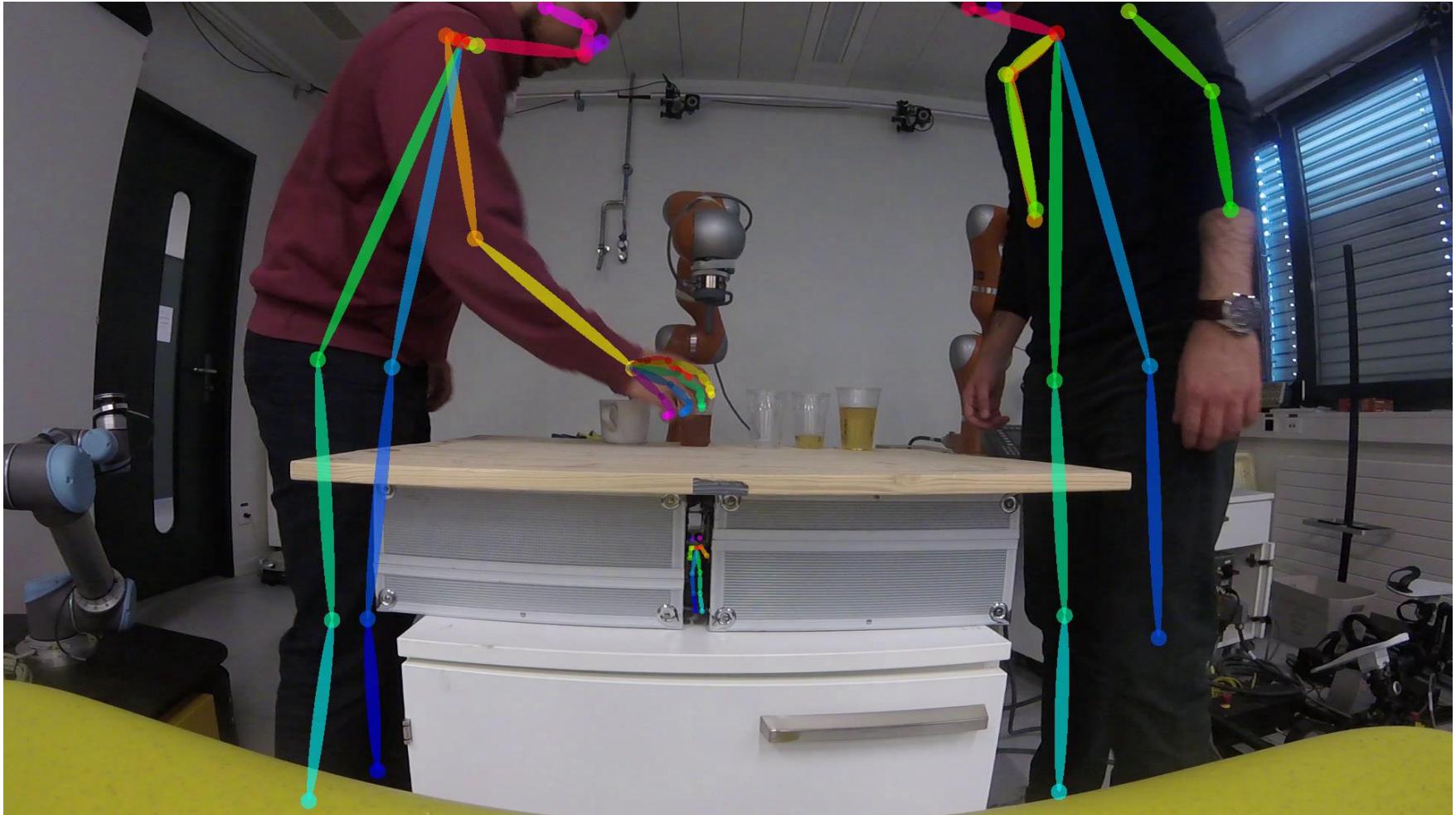
# 2D human (body + hand) pose estimation

- Handing-over (3<sup>rd</sup>-person view)



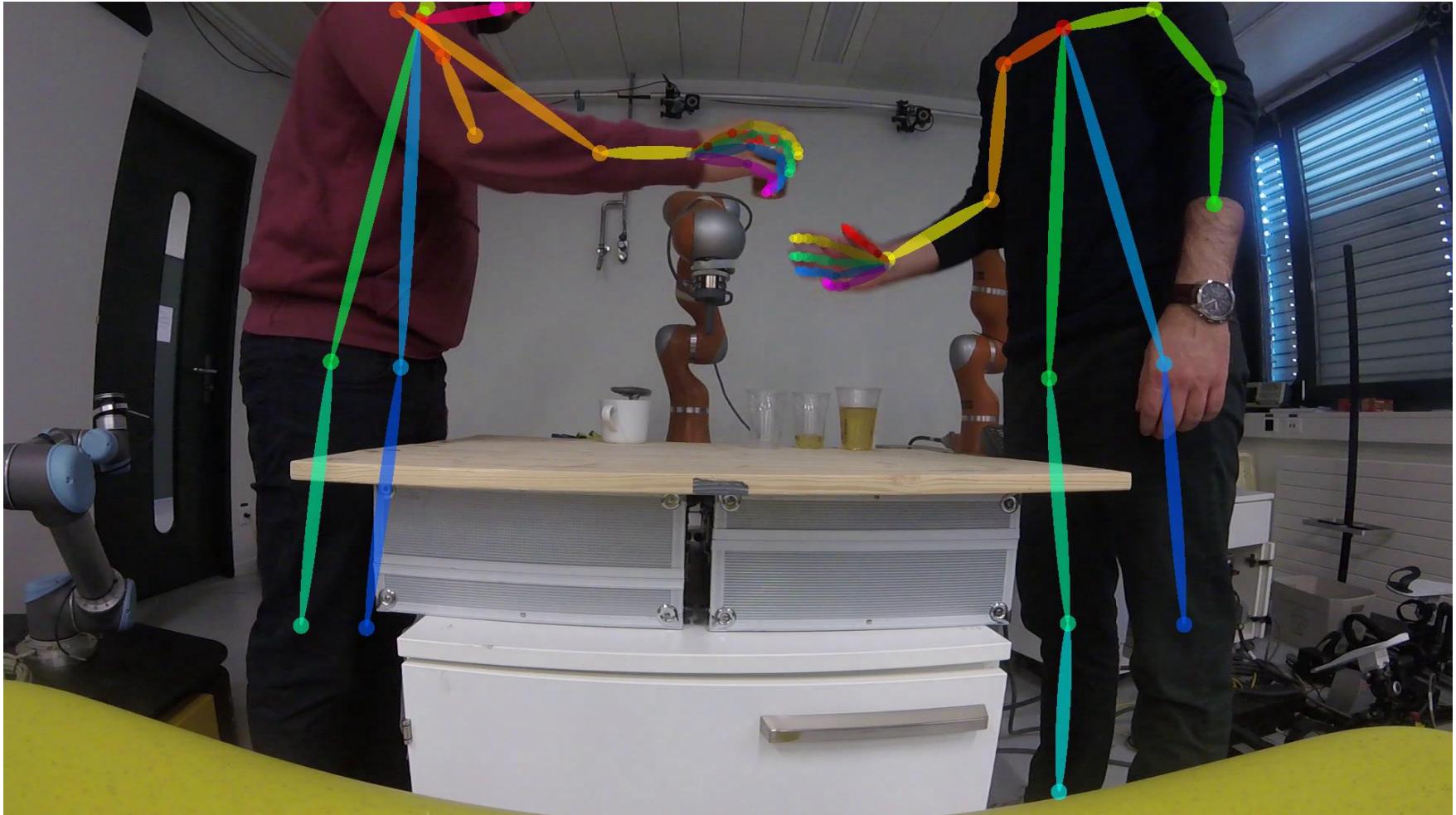
# 2D human (body + hand) pose estimation

- Handing-over (3<sup>rd</sup>-person view)



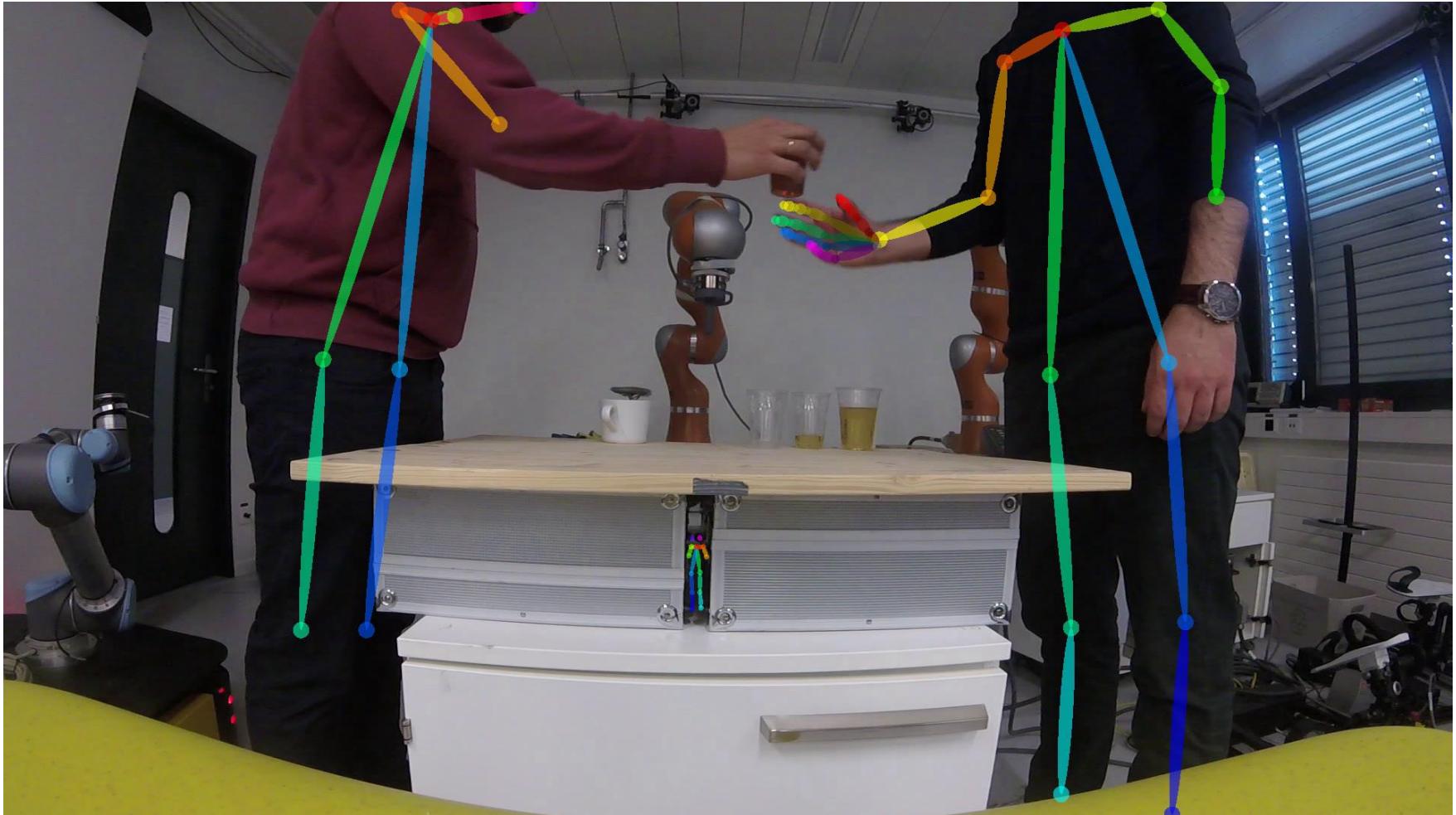
# 2D human (body + hand) pose estimation

- Handing-over (3<sup>rd</sup>-person view)



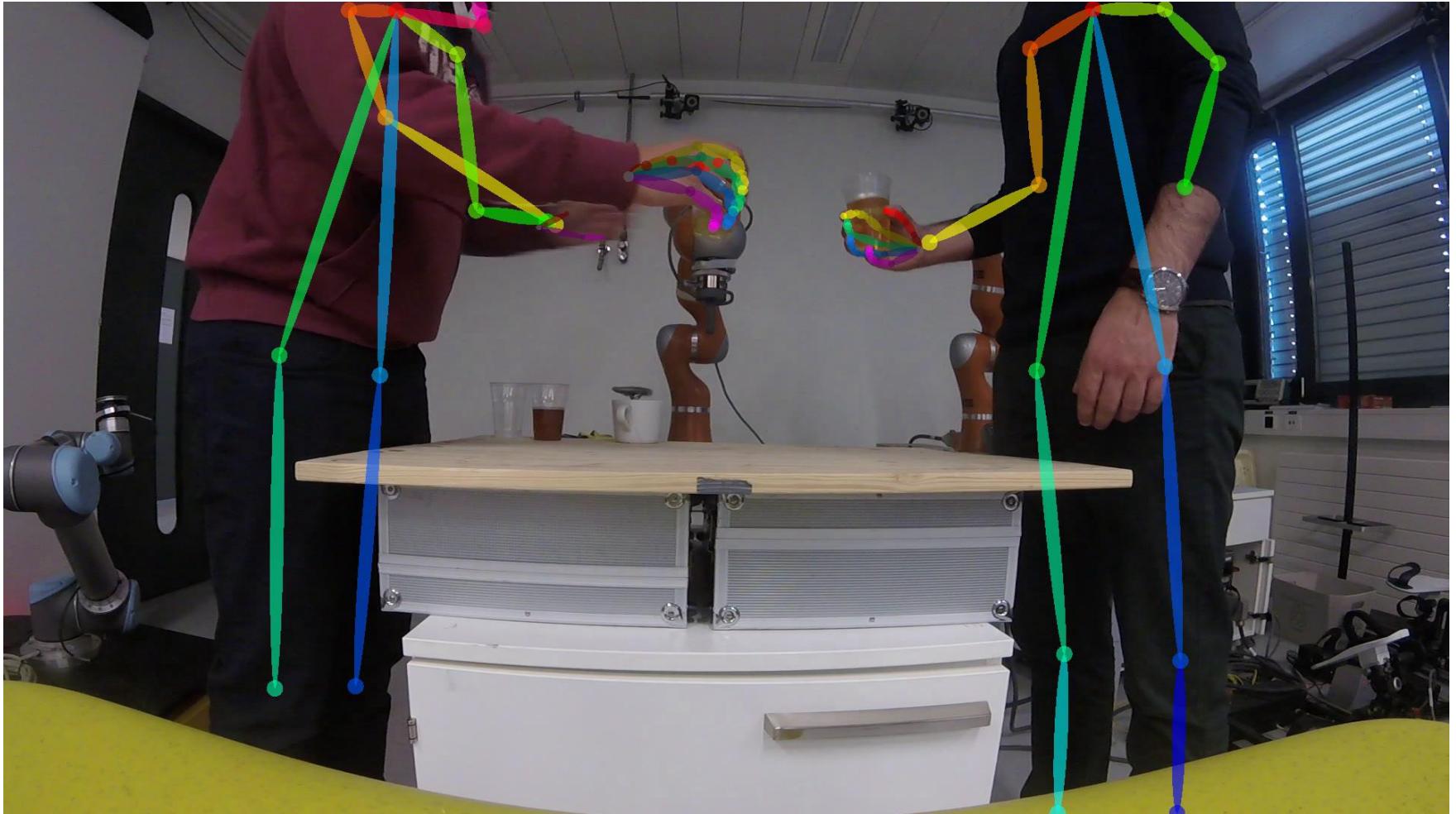
# 2D human (body + hand) pose estimation

- Handing-over (3<sup>rd</sup>-person view)



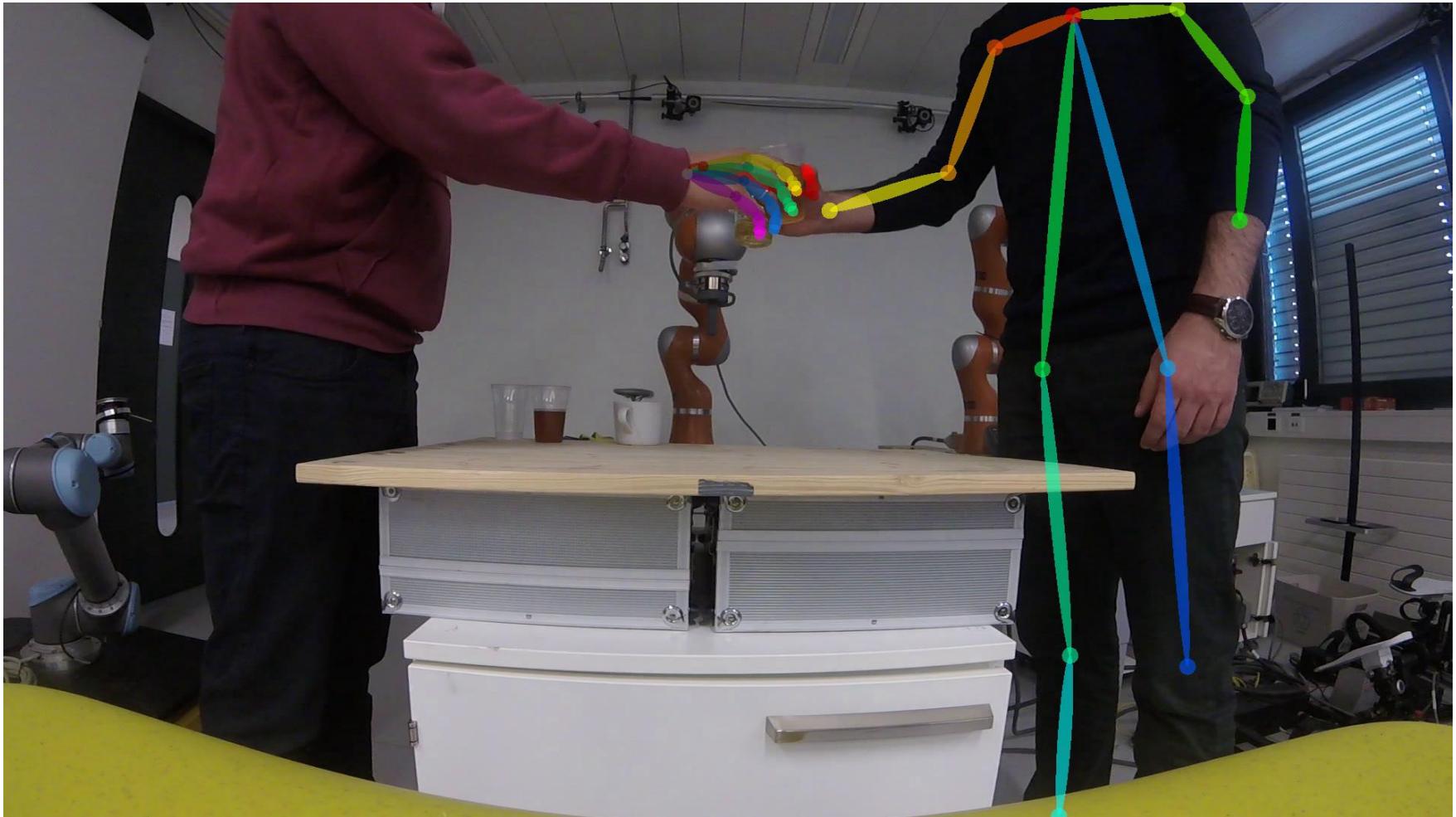
# 2D human (body + hand) pose estimation

- Pouring (3<sup>rd</sup>-person view)



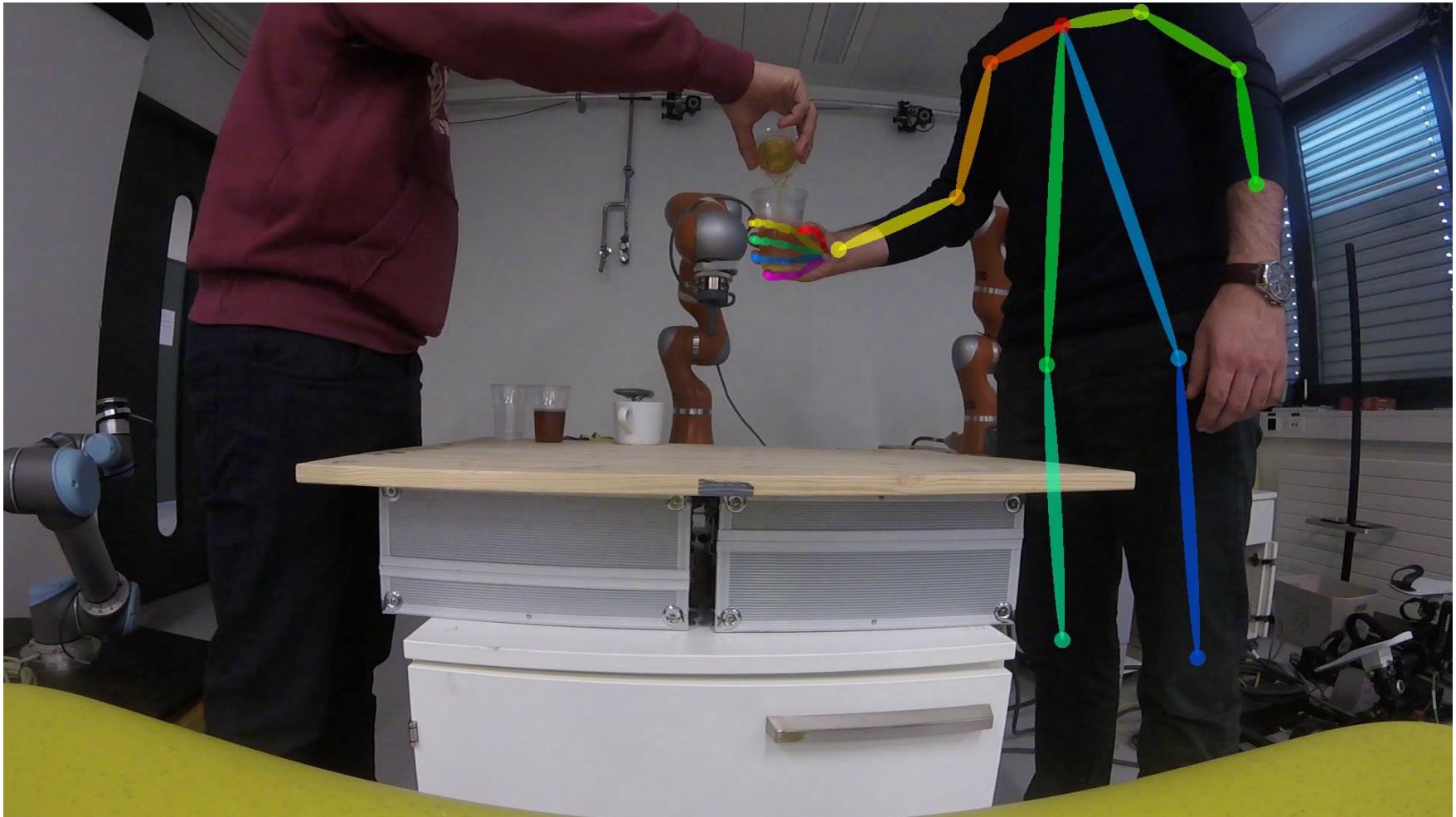
# 2D human (body + hand) pose estimation

- Pouring (3<sup>rd</sup>-person view)



# 2D human (body + hand) pose estimation

- Pouring (3<sup>rd</sup>-person view)



# 2D human (body + hand) pose estimation

- Pouring (1<sup>st</sup>-person view)

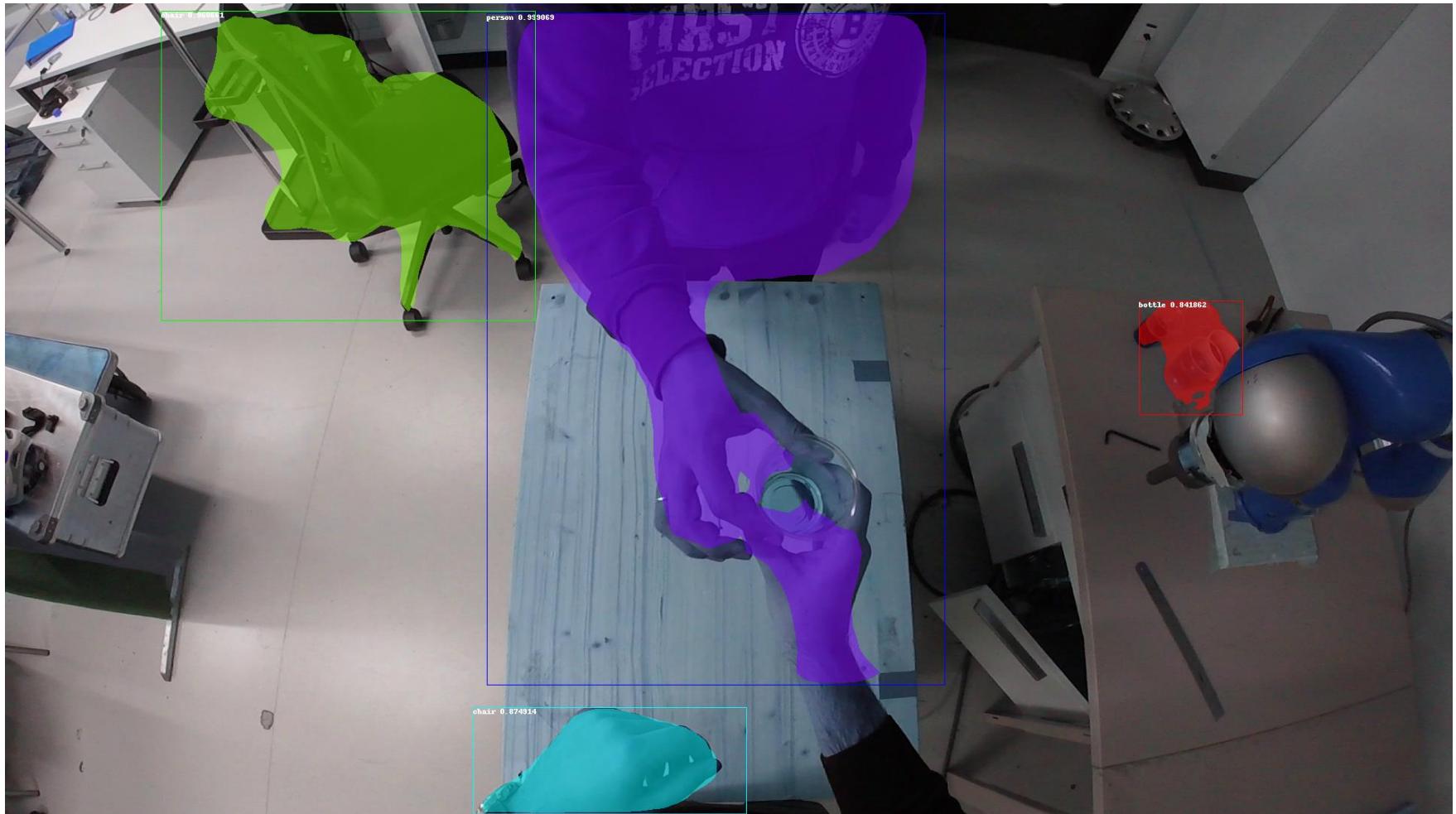


No body -> no hand pose estimation

# Semantic segmentation

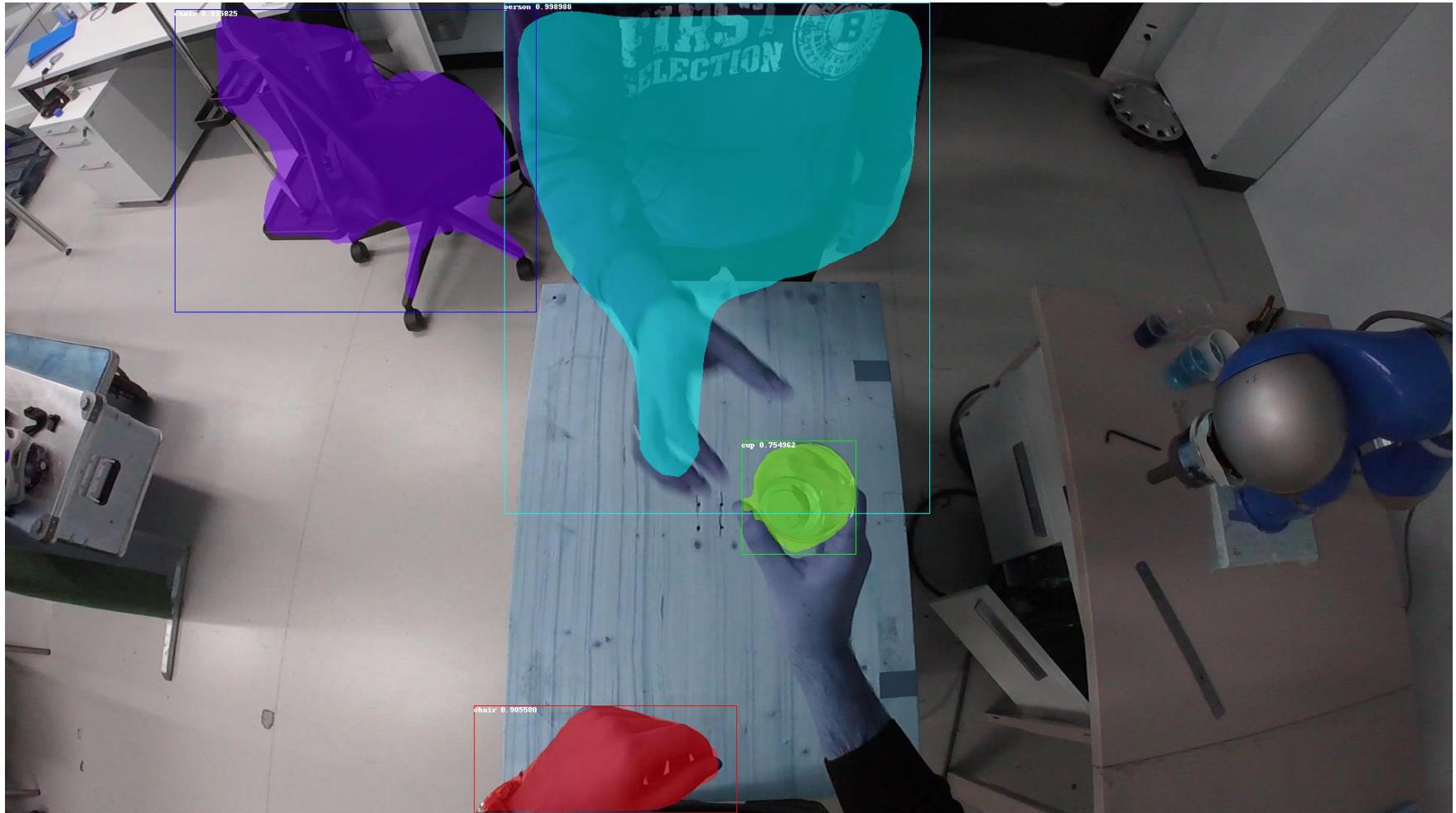
# Semantic segmentation

- Handing-over (1<sup>st</sup>-person view)



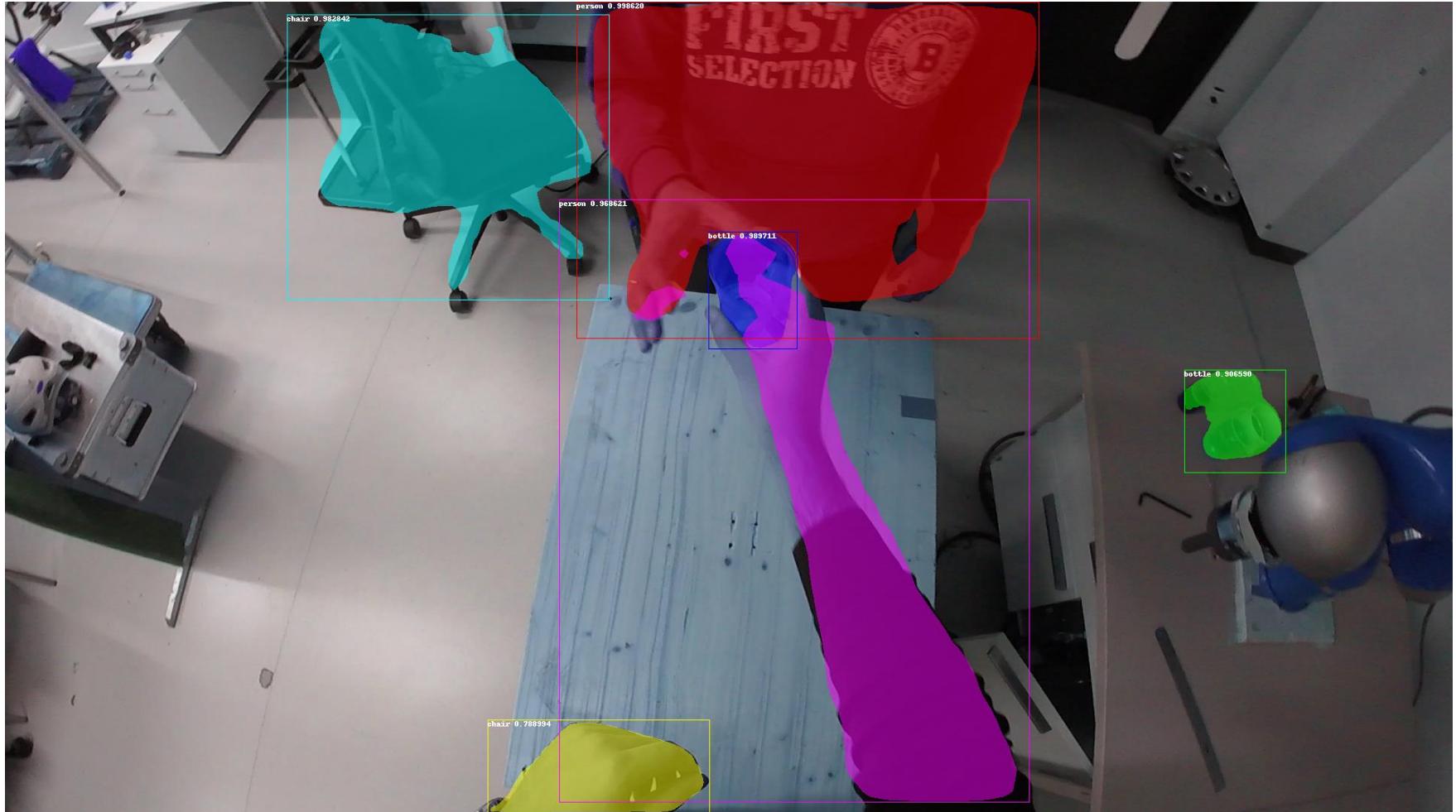
# Semantic segmentation

- Handing-over (1<sup>st</sup>-person view)



# Semantic segmentation

- Handing-over (1<sup>st</sup>-person view)



# Semantic segmentation

- Handing-over (1<sup>st</sup>-person view)



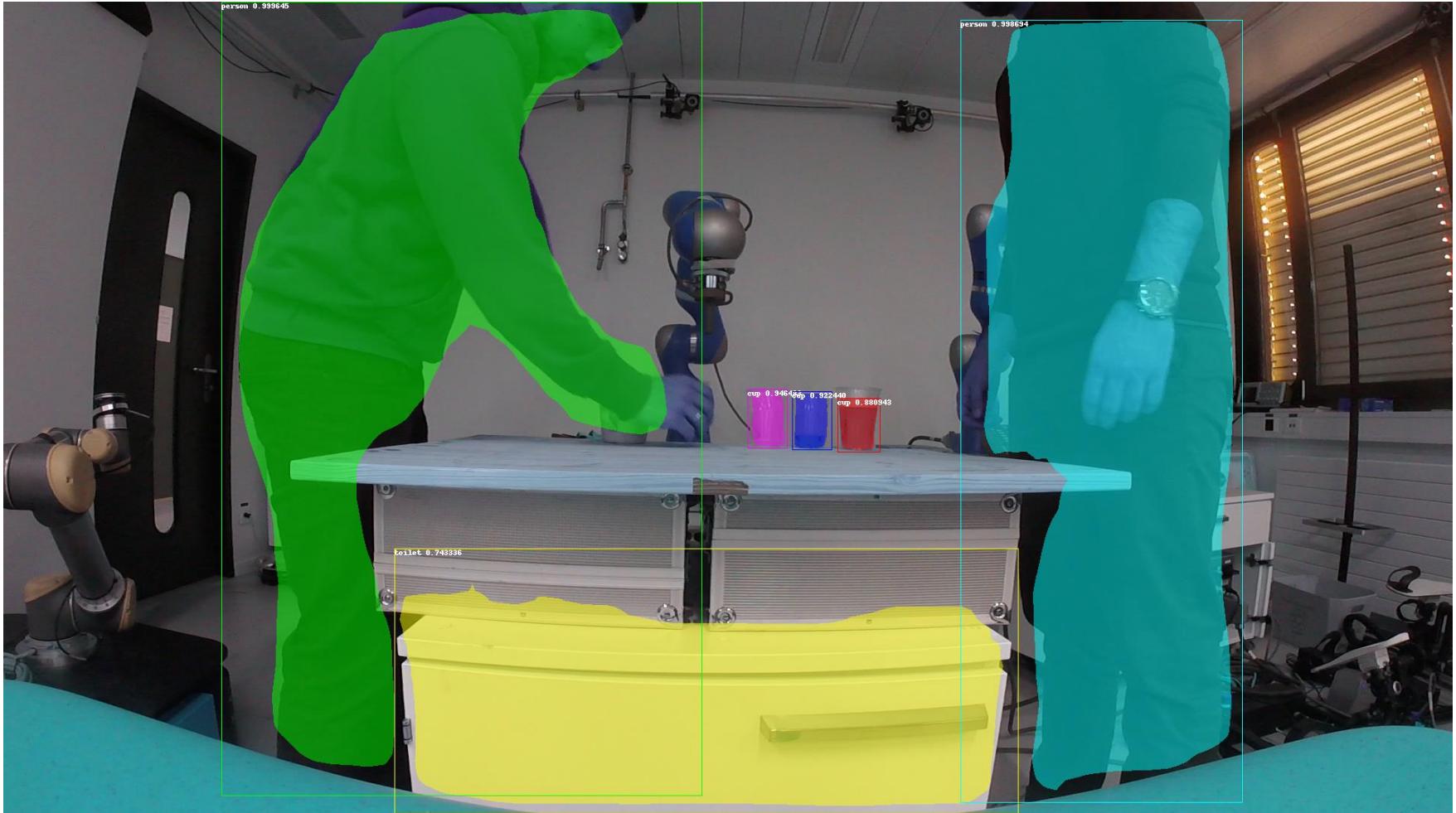
# Semantic segmentation

- Handing-over (3<sup>rd</sup>-person view)



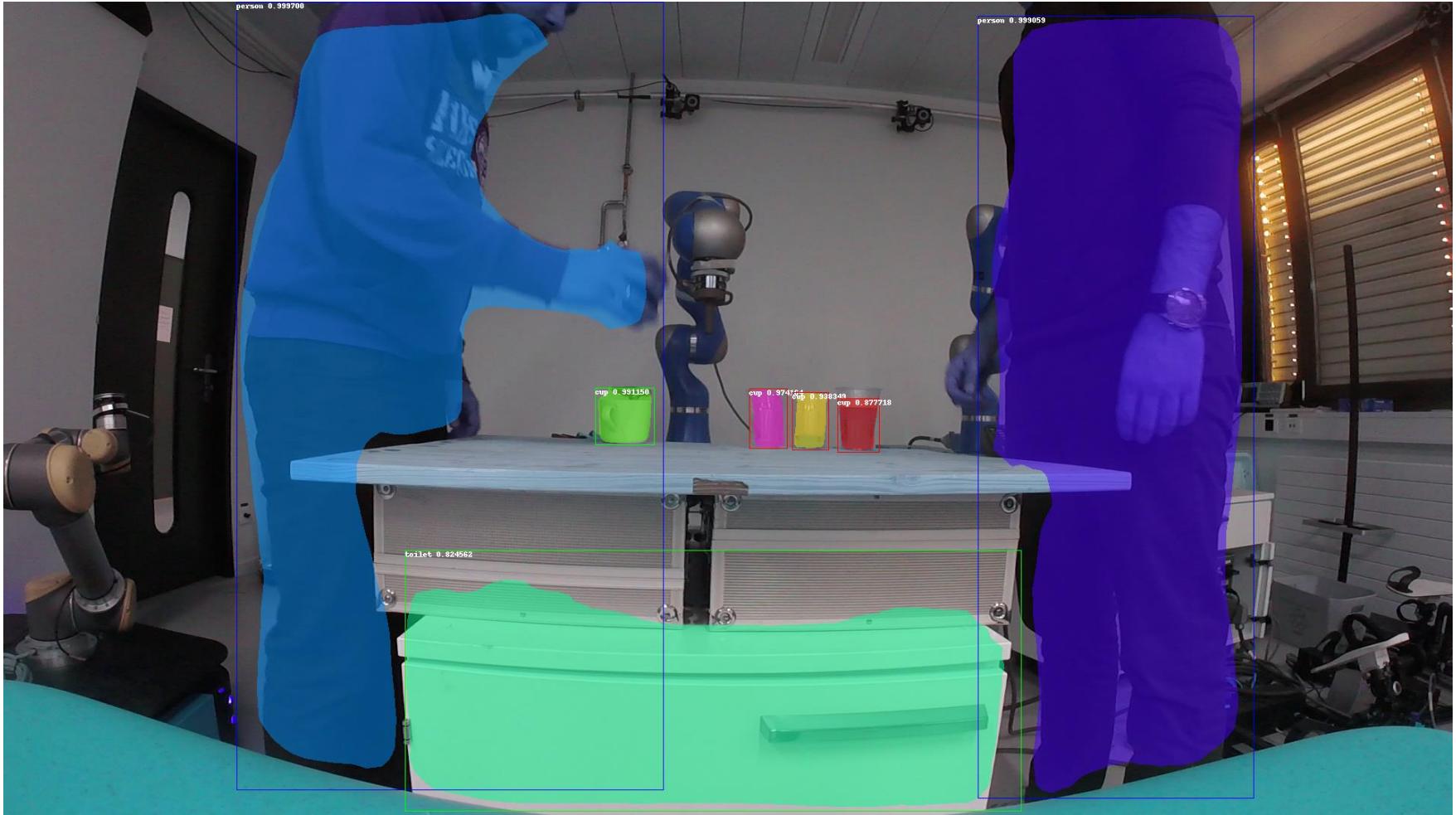
# Semantic segmentation

- Handing-over (3<sup>rd</sup>-person view)



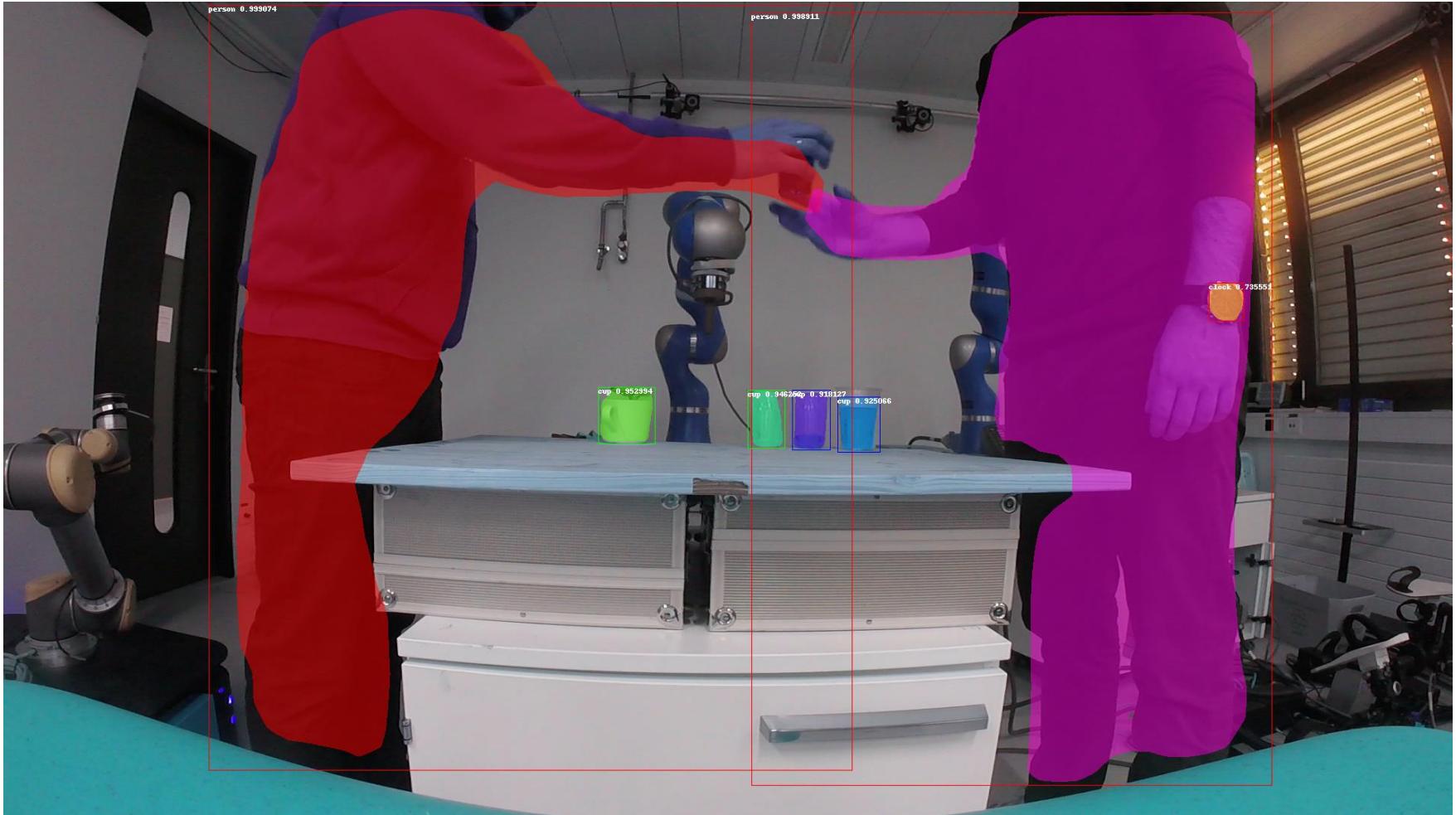
# Semantic segmentation

- Handing-over (3<sup>rd</sup>-person view)



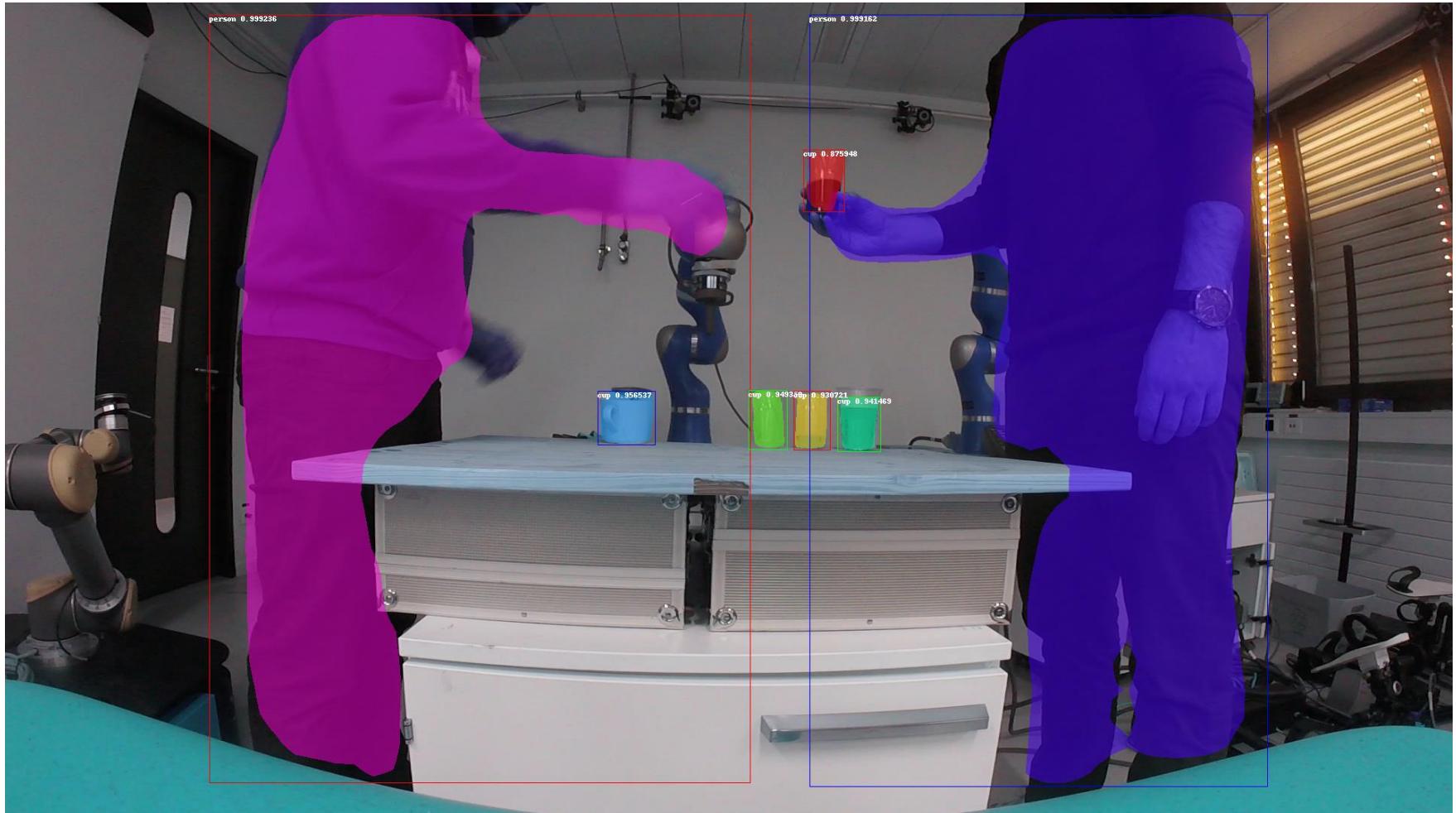
# Semantic segmentation

- Handing-over (3<sup>rd</sup>-person view)



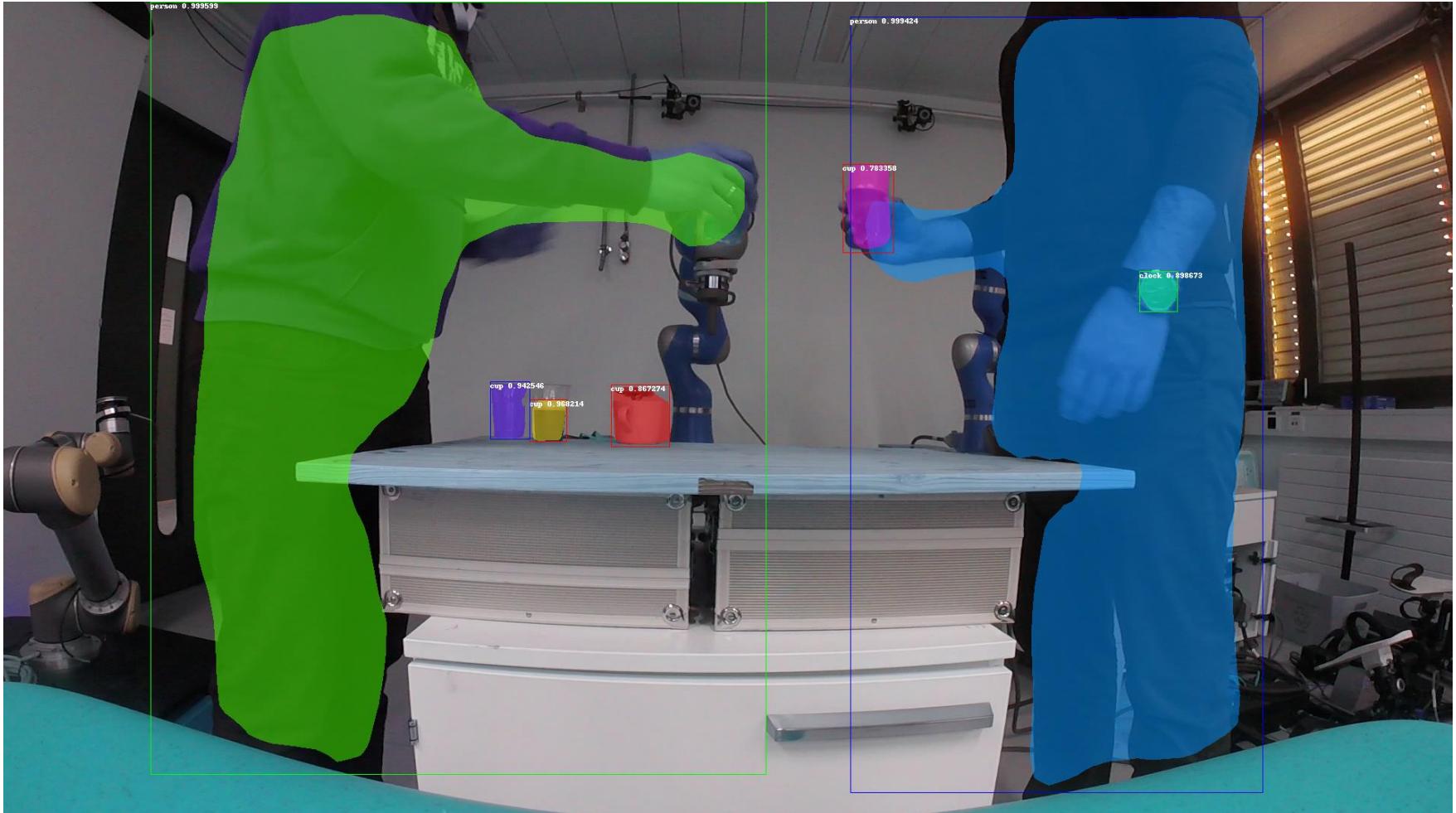
# Semantic segmentation

- Handing-over (3<sup>rd</sup>-person view)



# Semantic segmentation

- Pouring (3<sup>rd</sup>-person view)



# Semantic segmentation

- Pouring (3<sup>rd</sup>-person view)



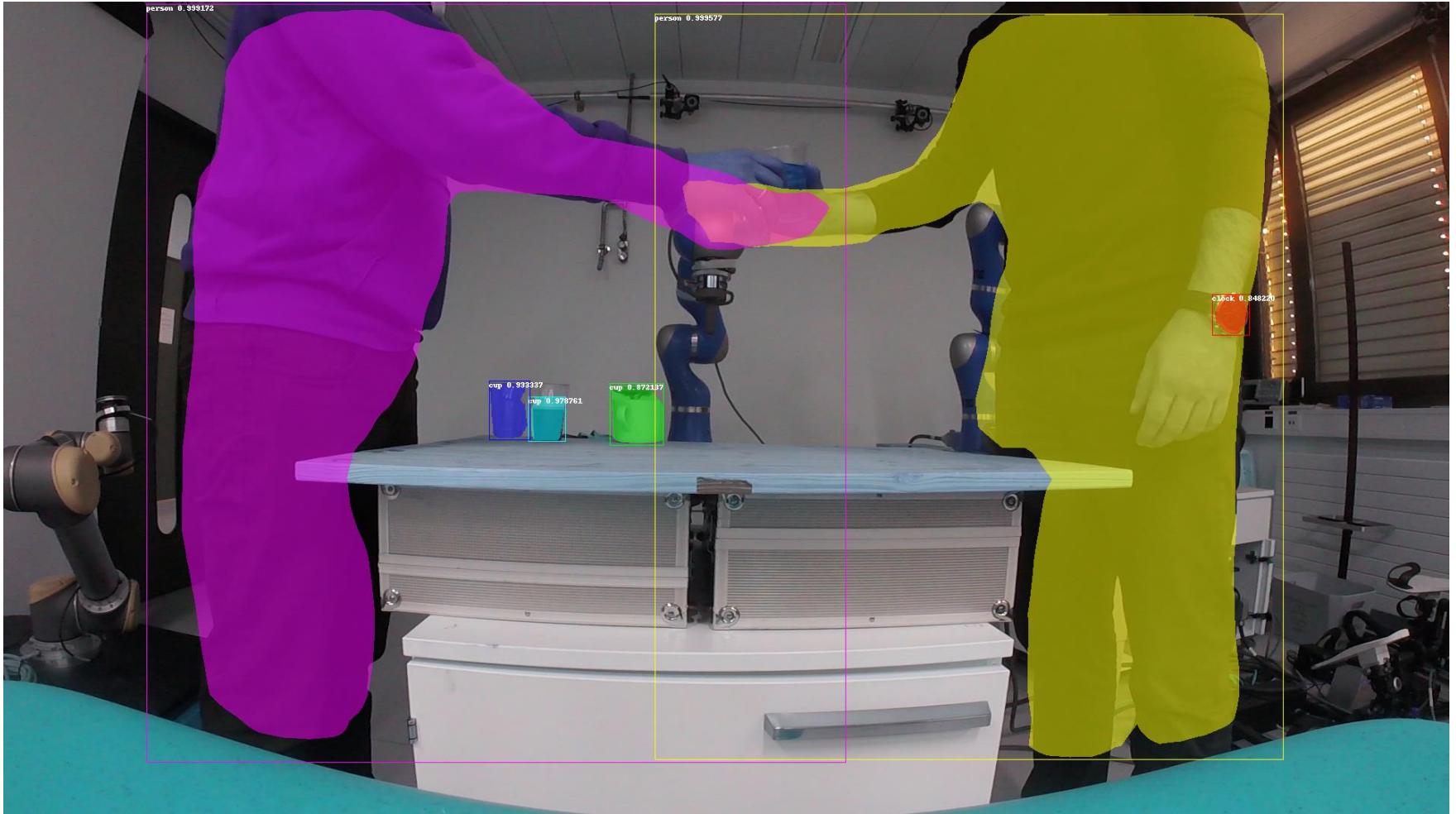
# Semantic segmentation

- Pouring (3<sup>rd</sup>-person view)



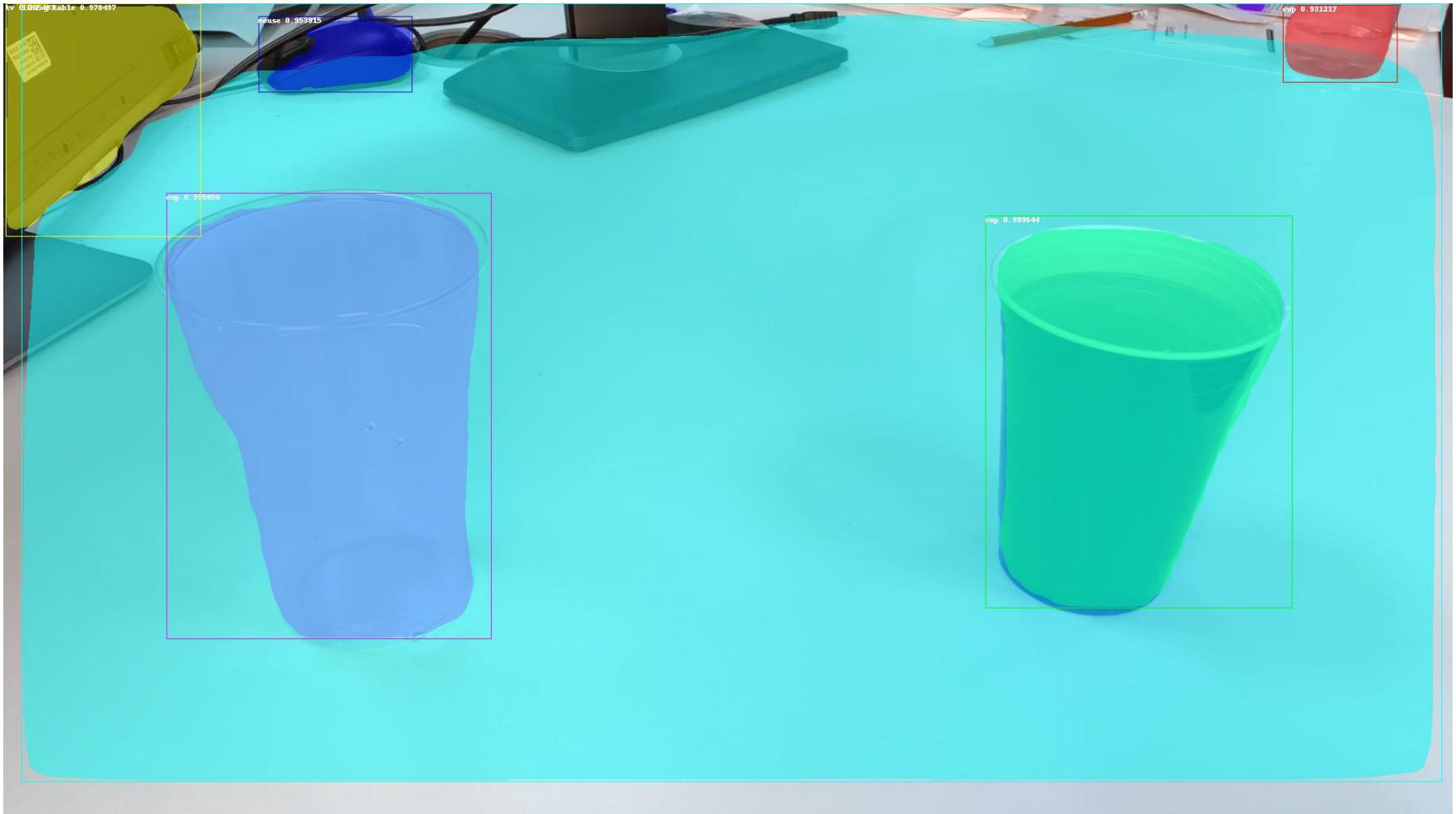
# Semantic segmentation

- Pouring (3<sup>rd</sup>-person view)



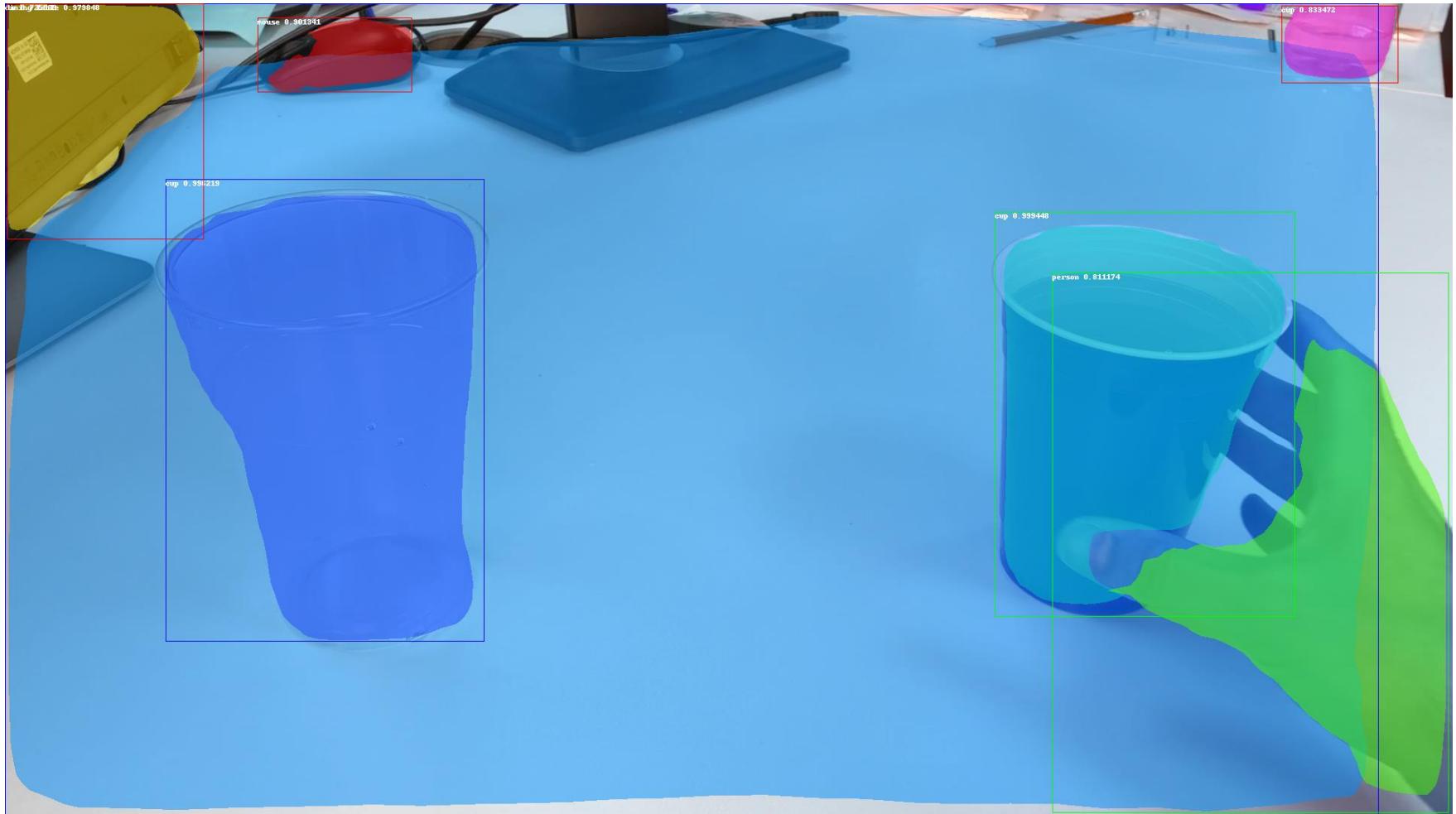
# Semantic segmentation

- Pouring (1<sup>st</sup>-person view)



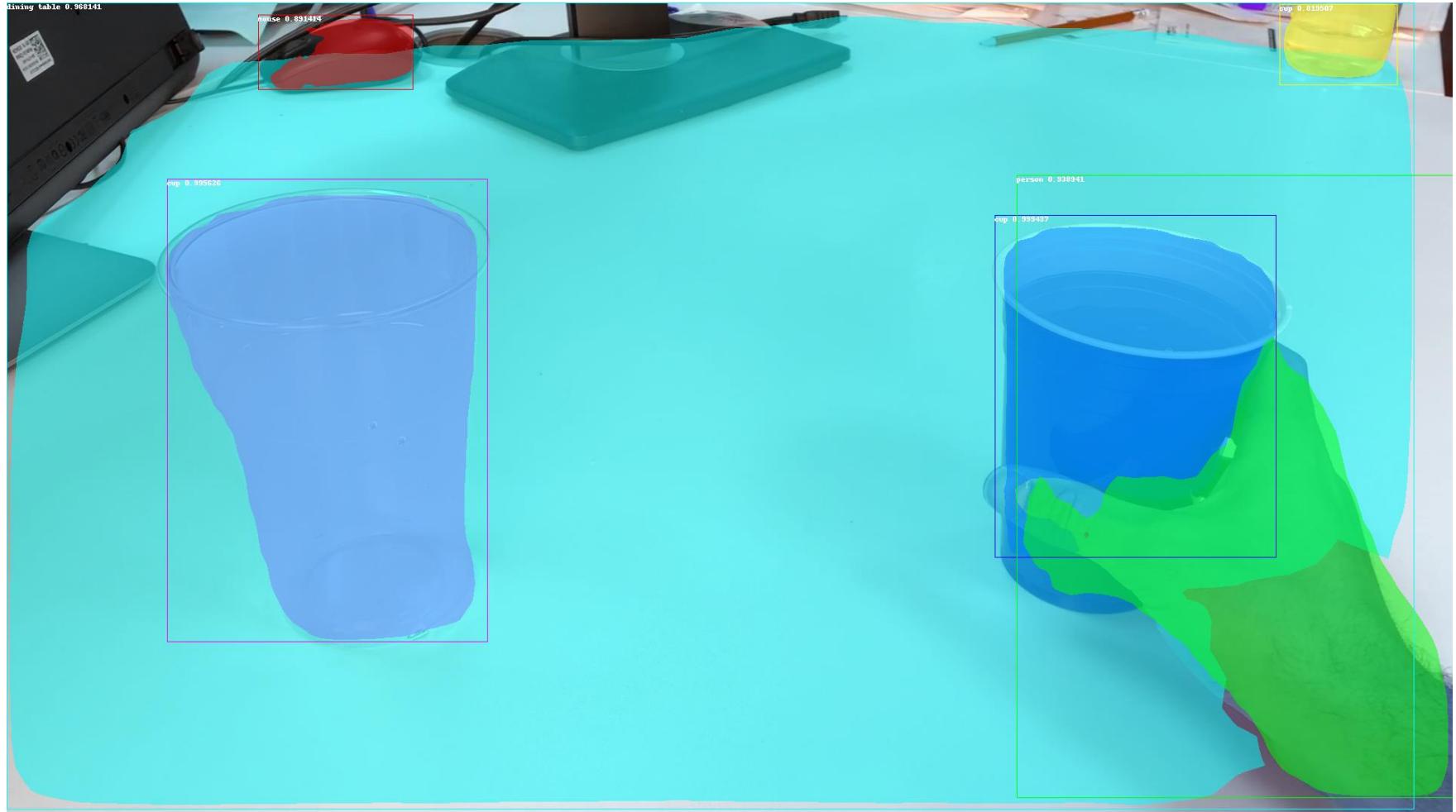
# Semantic segmentation

- Pouring half-glass (1<sup>st</sup>-person view)



# Semantic segmentation

- Pouring half-glass (1<sup>st</sup>-person view)



# References

- Pose estimation:
  - OpenPose: realtime multi-person 2D pose estimation using Party Affinity Fileds
  - Zhe Cao and Gines Hidalgo and Tomas Simon and Shih-En Wei and Yaser Sheikh
  - CVPR2017
- Semantic segmentation:
  - Mask R-CNN
  - Kaiming He, Georgia Gkioxari, Piotr Dollár, Ross Girshick
  - CVPR2017