

Hand Detection (ICCV 2019, BMVC 2019)

Task : Detect hands in images using bounding boxes and masks

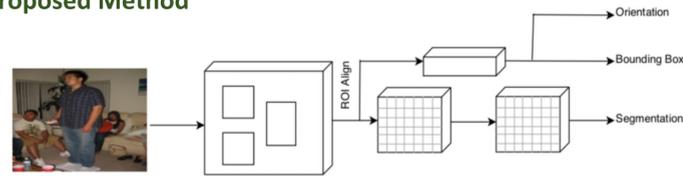
Hand masks are shown in green color, and hand orientations are visualized in red arrows



Why should we care about this problem?

- Activity Recognition – hands are the dominant interaction mode for humans
- Hand Gesture Control – movies, music, and games
- Robotic-Object Grasping – learn from human hand grasping

Proposed Method



Qualitative Results



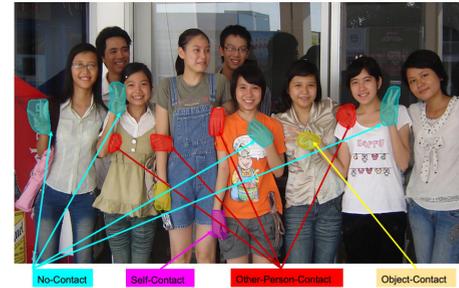
Reference – Contextual Attention for Hand Detection in the Wild, ICCV 2019

Demo



Hand Contact Estimation (NeurIPS 2020)

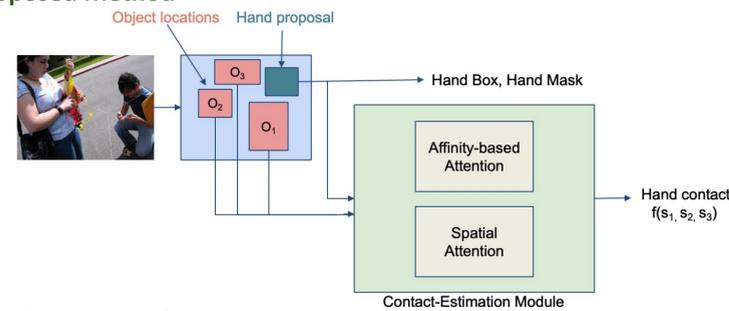
Task: Detect hands and classify their physical contact states



Why should we care about this problem?

- Contamination Prevention – identify if someone contacts surgery apparatus
- Microsoft's Holoportation, Metaverse – reconstruct virtual humans
- Contact Tracing – identify contact areas from an infectious person

Proposed Method



Qualitative Results



No-Contact Self-Contact Other-Person-Contact Object-Contact

Reference – Detecting Hands and Recognizing Physical Contact in the Wild, NeurIPS 2020

Demo



Hand Tracking (CVPR 2022)

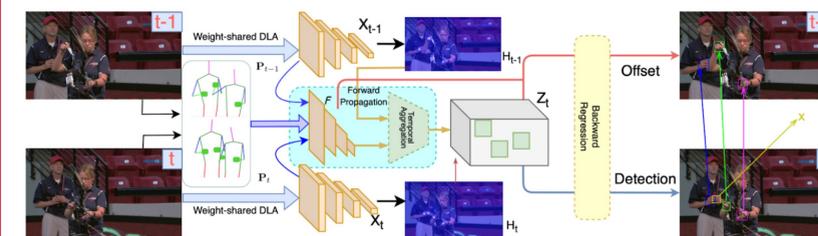
Task: Detect hands in videos & track them over time (temporal correspondence)



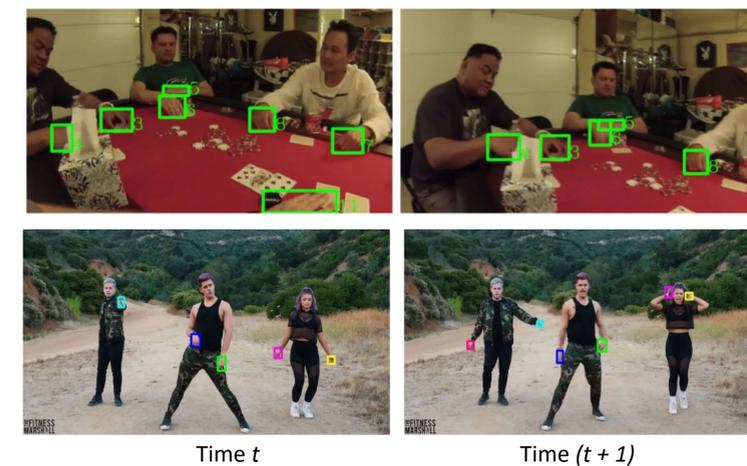
Why should we care about this problem?

- Augmented/ Virtual Reality – hand tracking is central to AR/ VR interactions
- Skill evaluation – identify if a surgeon is operating correctly
- Assistive driving – use hand gestures to control a car's system

Proposed Method



Qualitative Results



Reference - Forward Propagation, Backward Regression, and Pose Association for Hand Tracking in the Wild, CVPR 2022

Demo



Hand-Body Association (CVPR 2022)

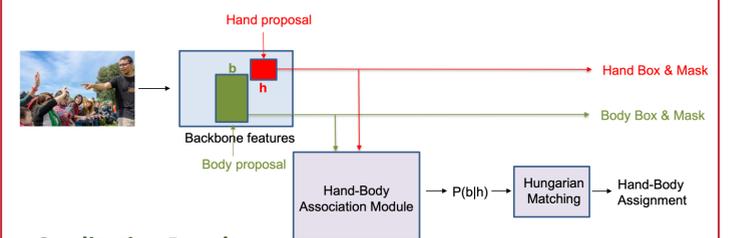
Task: Detect hands and bodies in images and associate them with corresponding people



Why should we care about this problem?

- Safety Applications – identify the person using a device dangerously in a factory and alert them
- Sign Language – identify which people are involved in hand-gesture communication in a multi-person scenario
- Societal Applications - access the motor and social skills of people with mental disorders by hand-body tracking and assist
- Computer Vision – action recognition, hand tracking, hand contact estimation, 3D human reconstruction, and so on.

Proposed Method



Qualitative Results



Reference – Hand Detection and Hand-Body Association in the Wild, CVPR 2022

Demo

