Hand Detection (ICCV 2019, BMVC 2019)

Task: Detect hands in images using bounding boxes and masks.

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

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

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

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