Human Motion Understanding

2 Human Pose Estimation

Human Motion Understanding
Human Pose Estimation

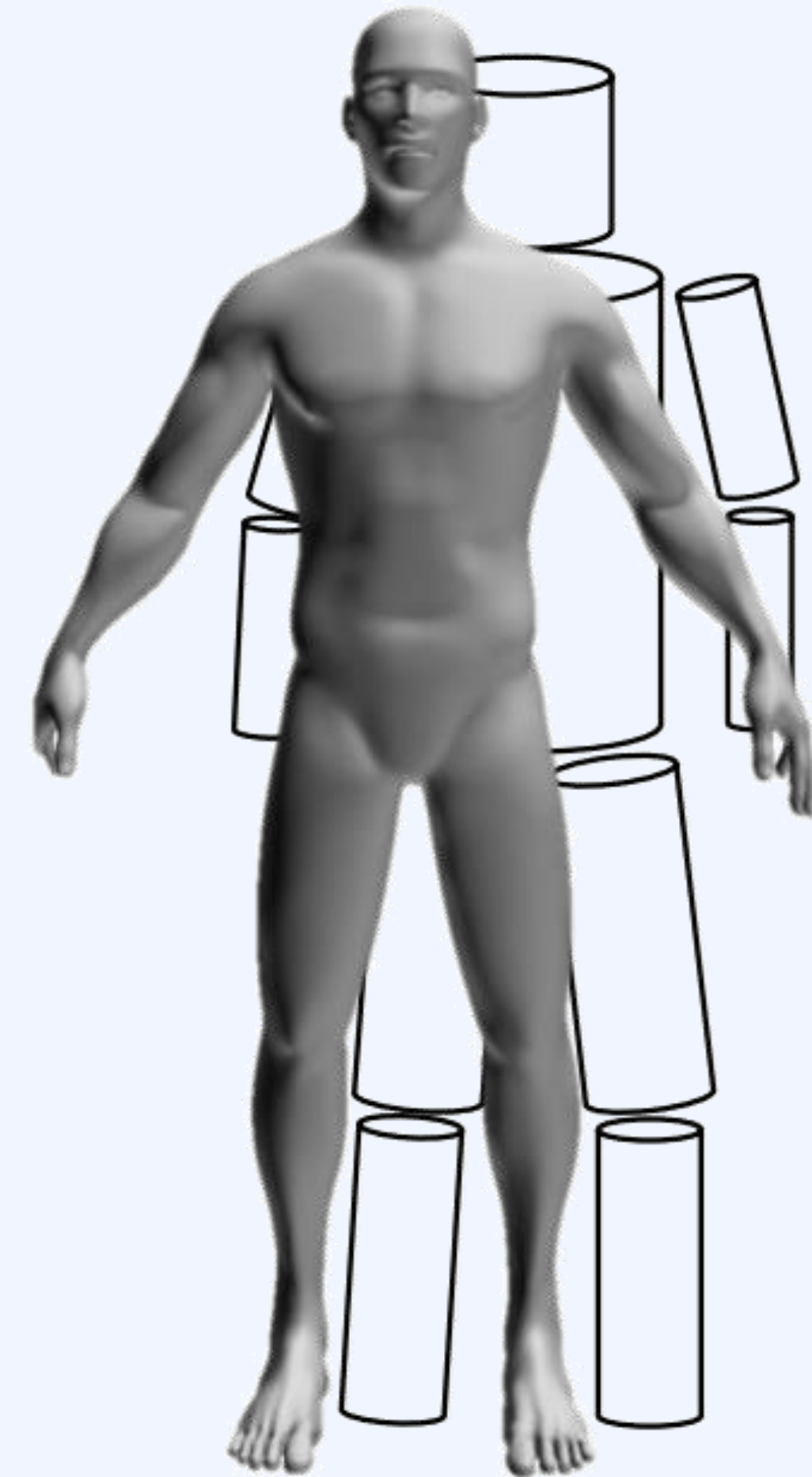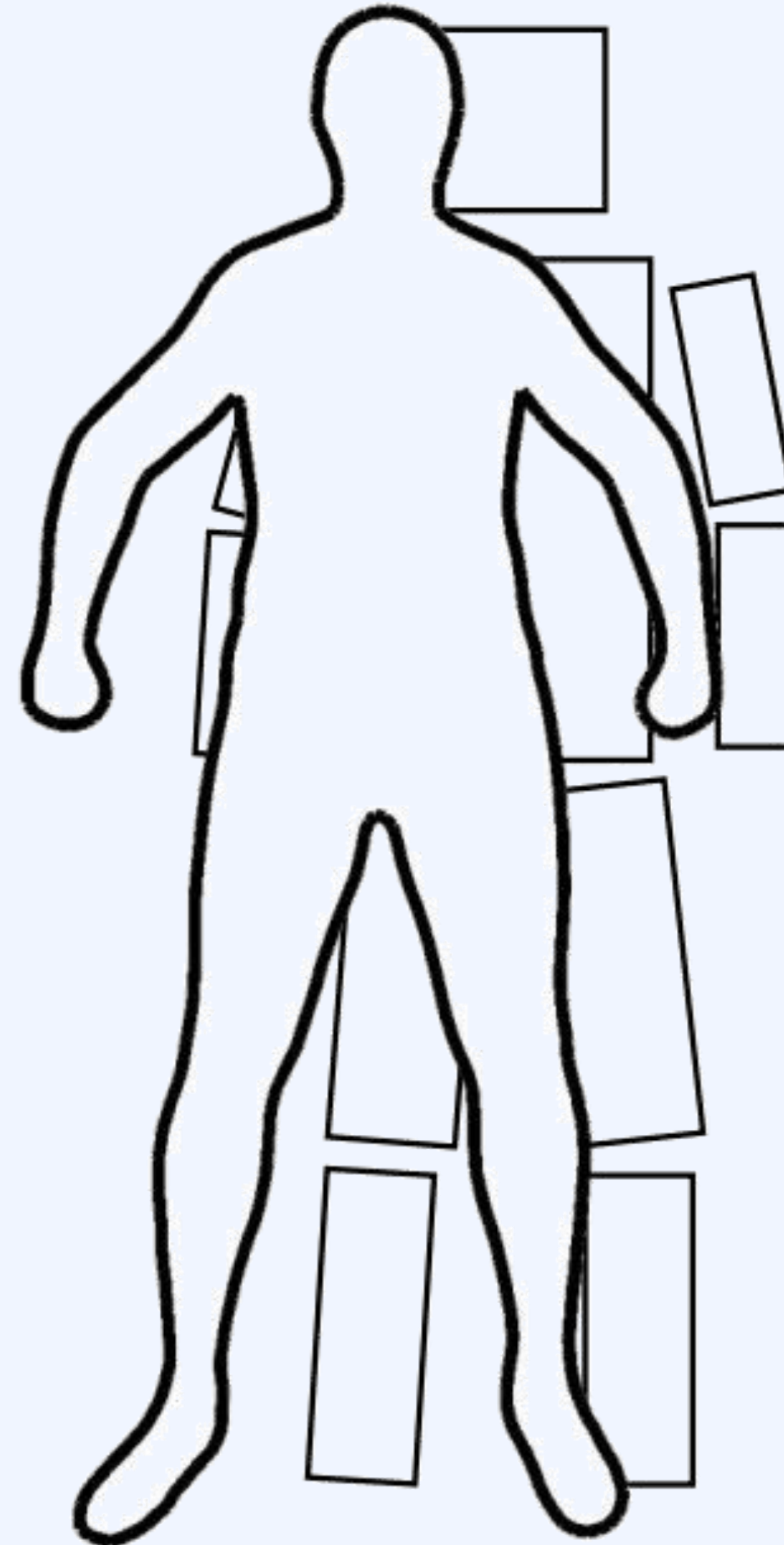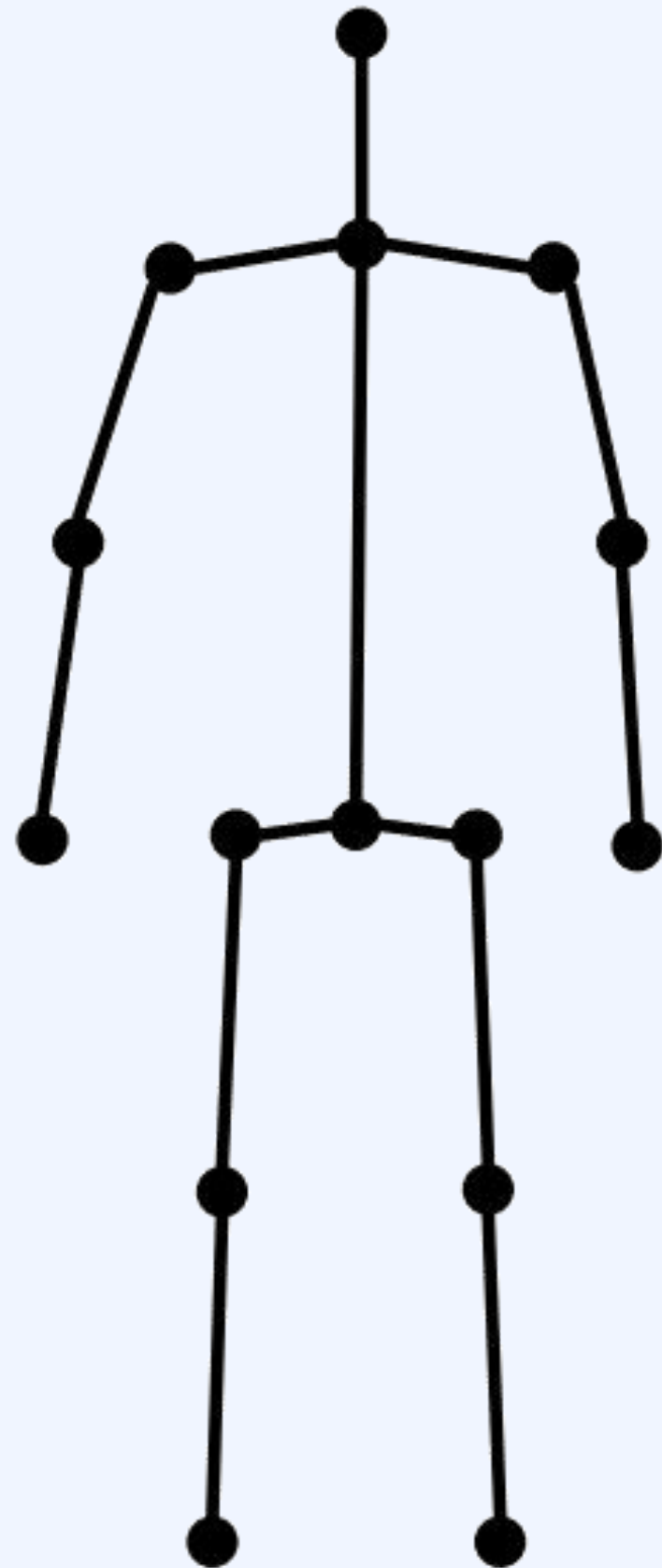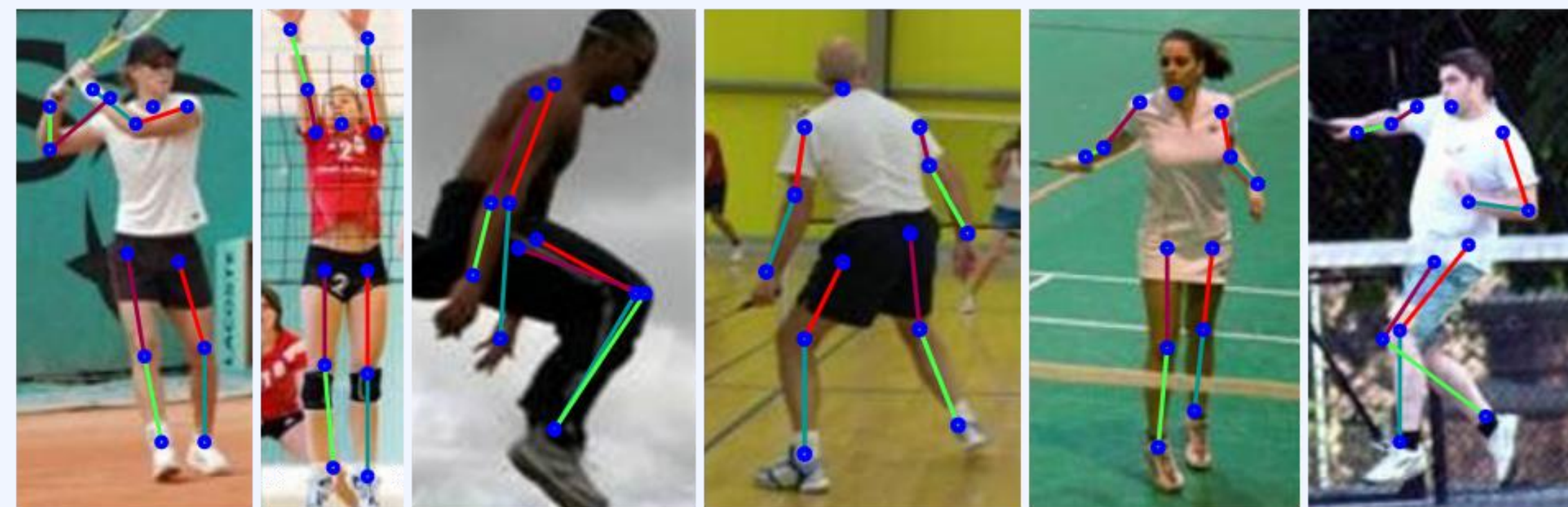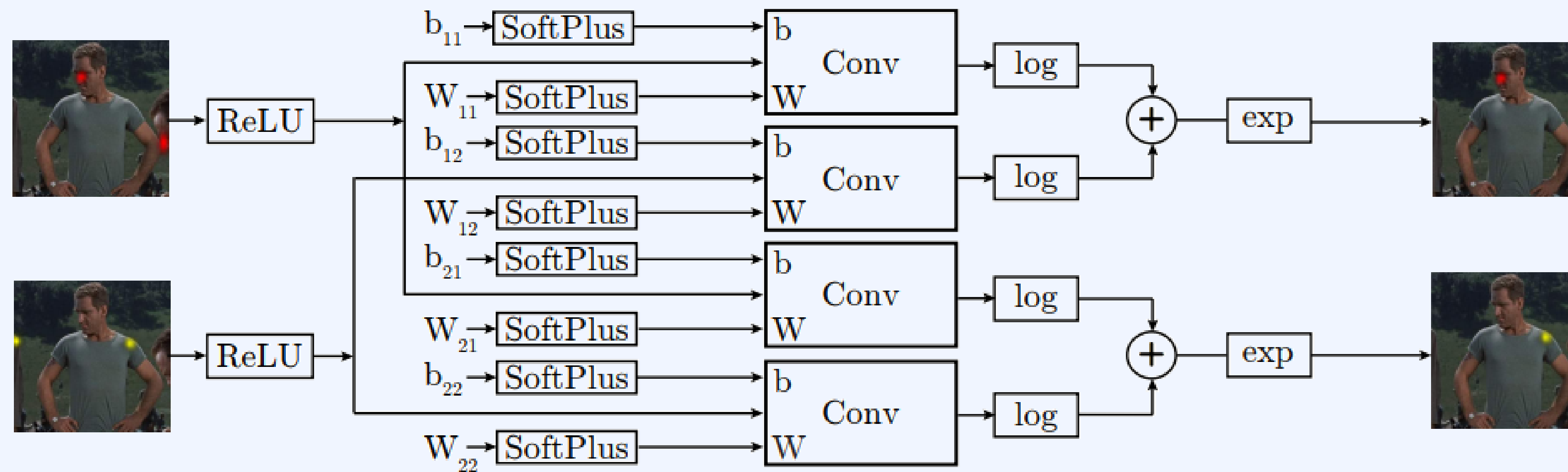Human Body Modeling

Human Motion Understanding
Human Pose Estimation

J. Tompson et al. Joint Training of a Convolutional Network and a Graphical Model for Human Pose Estimation. NIPS (2014)

Conv-based 2D HPE

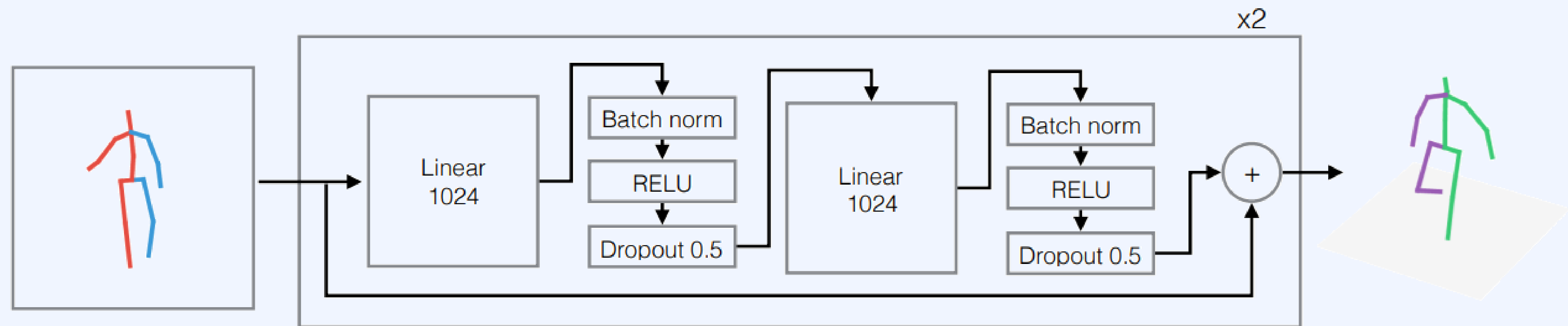J. Martinez et al. A simple yet effective baseline for 3d human pose estimation. ICCV (2017)

2D -> 3D

H. Ci et al. Optimizing Network Structure for 3D Human Pose Estimation. ICCV
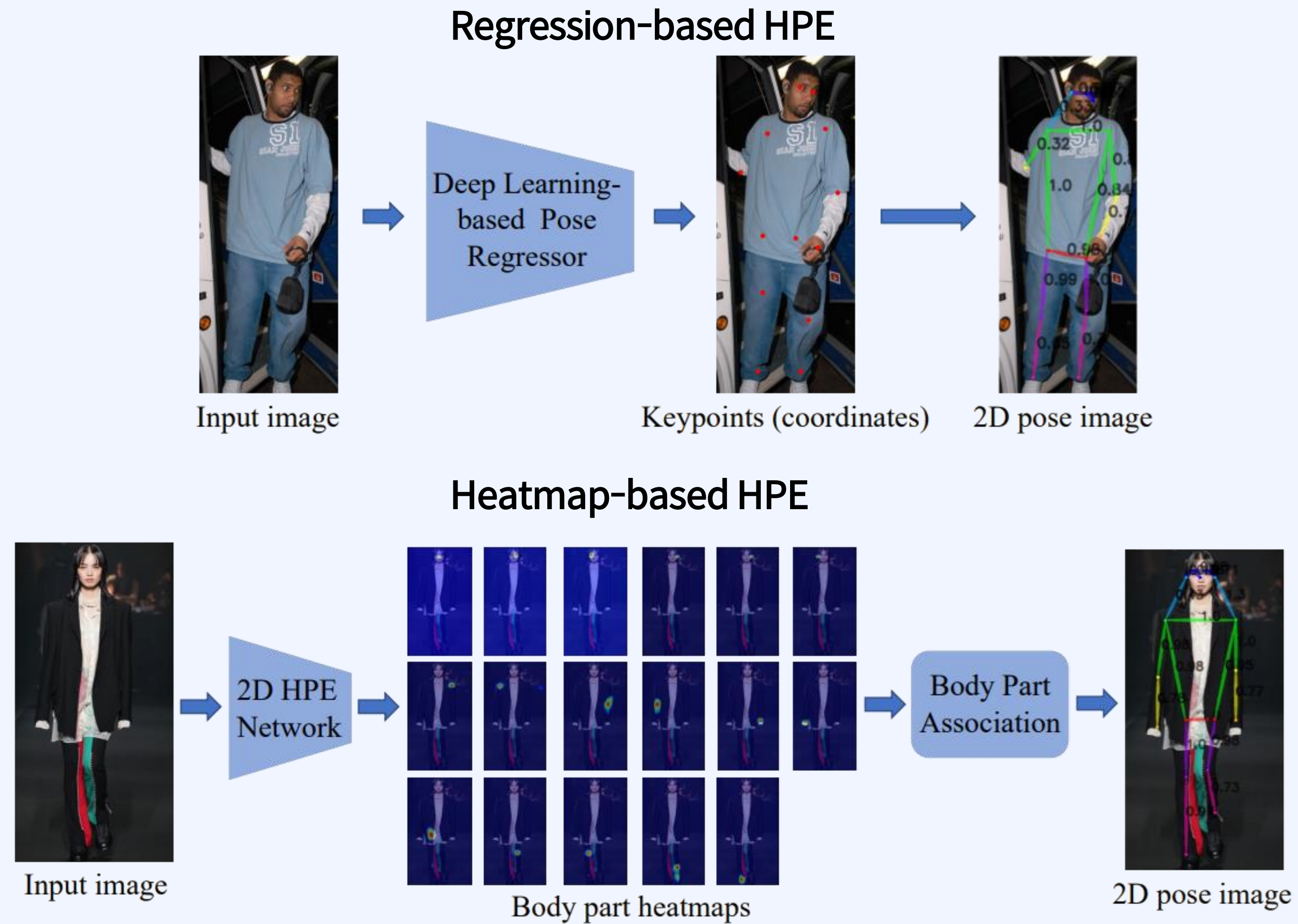
Locally Connected Network (LCN)

5
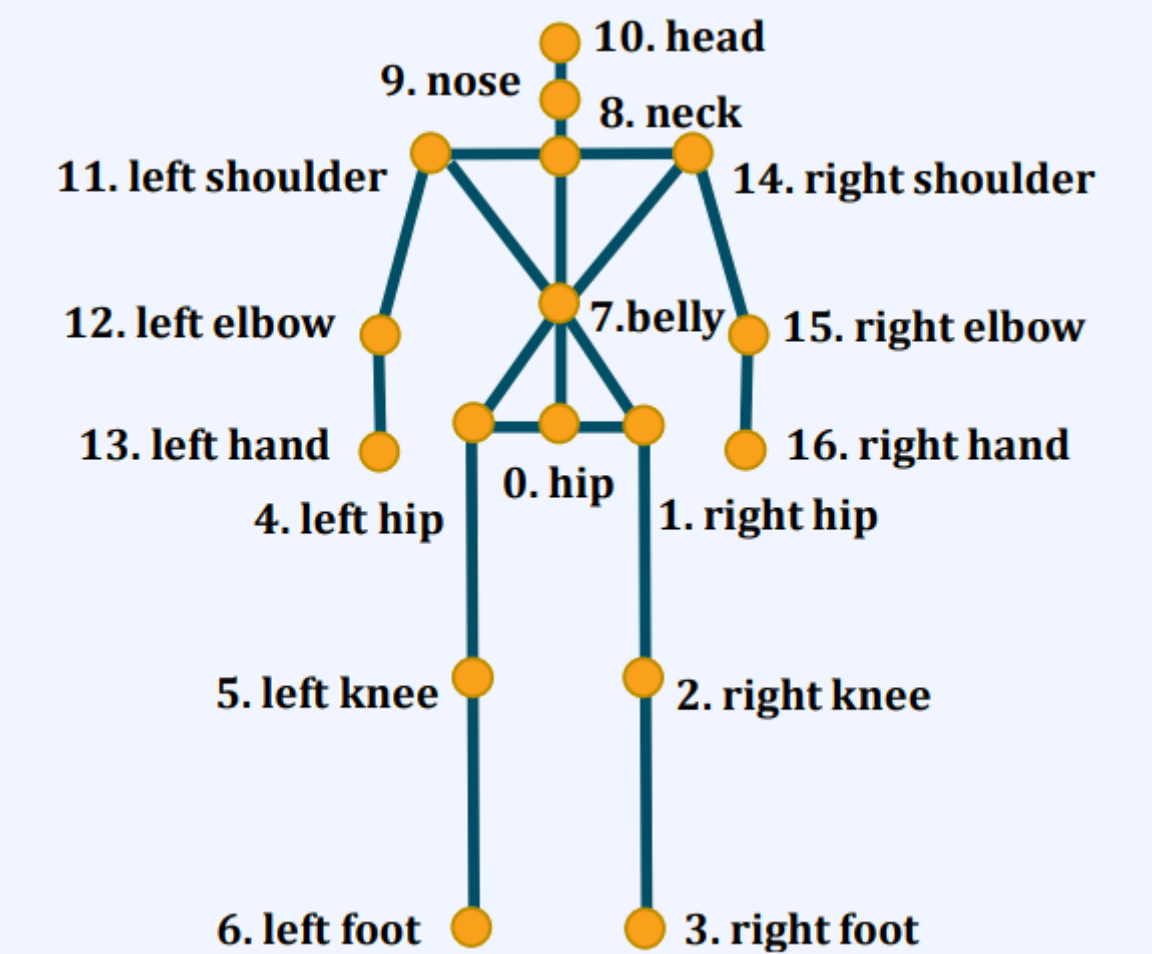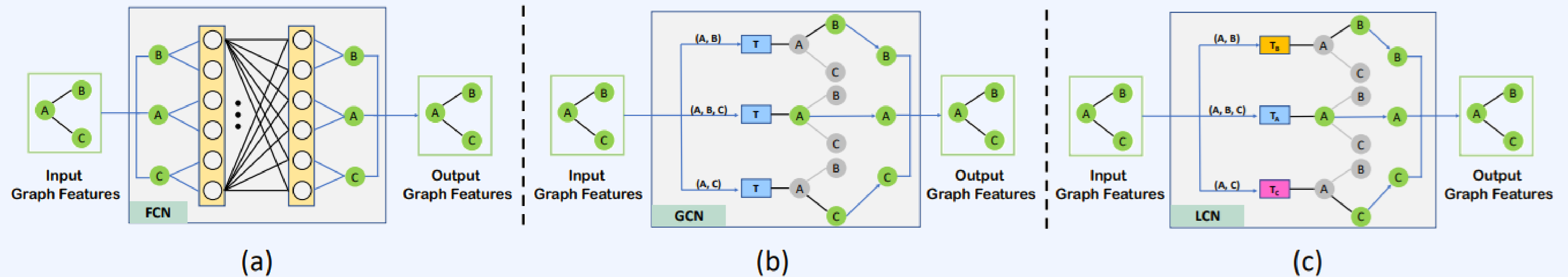
Human Motion Understanding
Human Pose Estimation

C. Zheng et al. Deep Learning-Based Human Pose Estimation: A Survey

Regression-based HPE

Input image → Deep Learning-based Pose Regressor → Keypoints (coordinates) → 2D pose image

Heatmap-based HPE

Input image → 2D HPE Network → Body part heatmaps → Body Part Association → 2D pose image

Human Motion Understanding
Human Pose Estimation

H. Qiu et al. Cross View Fusion for 3D Human Pose Estimation. ICCV

multi-view 2D poses -> 3D pose
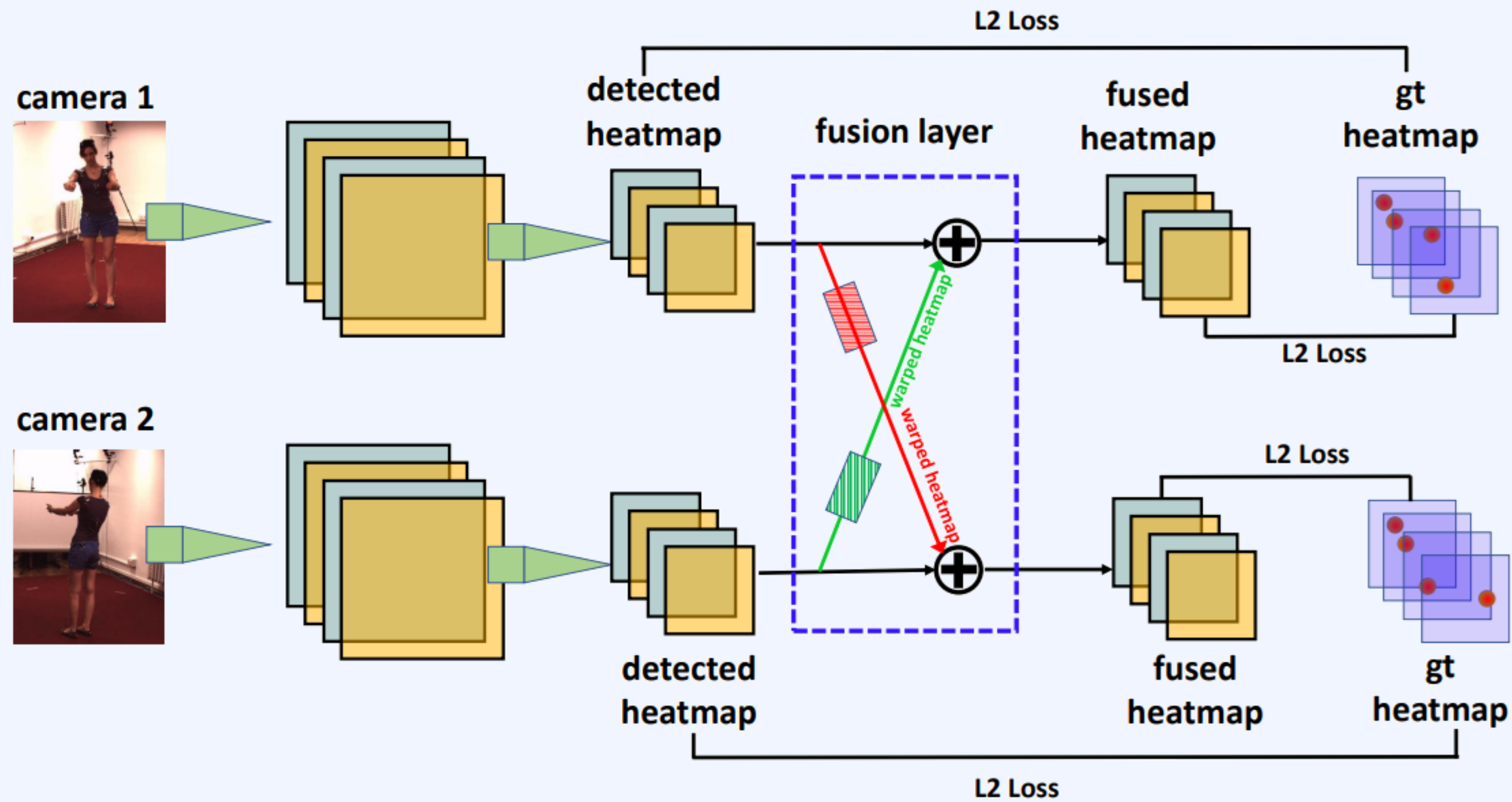
Human Motion Understanding
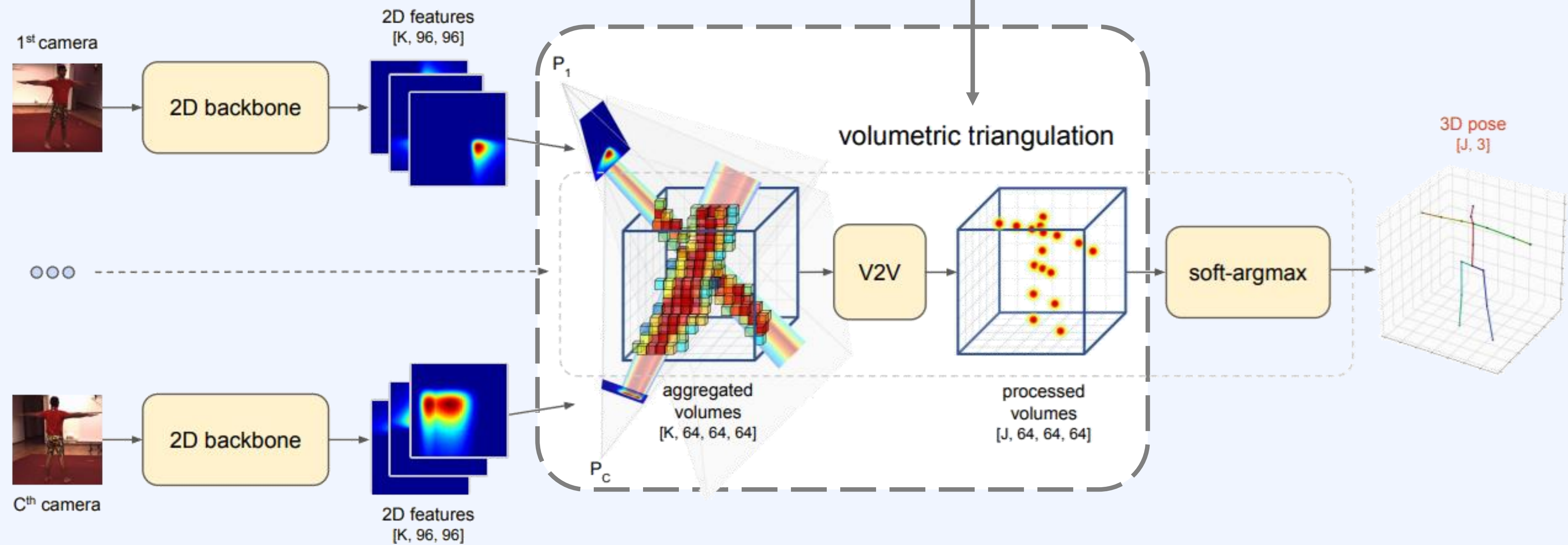# Human Pose Estimation

K. Iskakov et al. Learnable Triangulation of Human Pose. ICCV

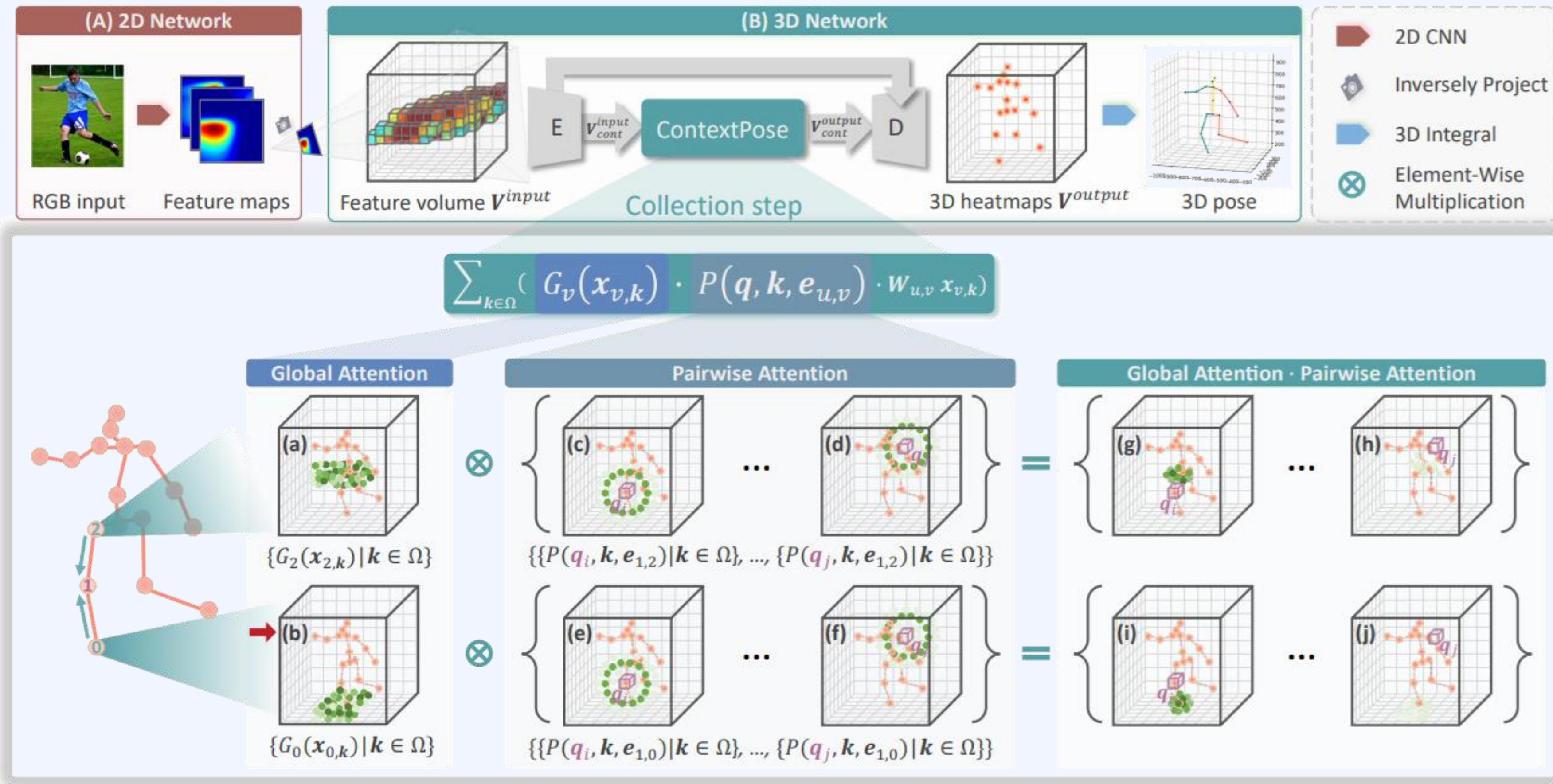R. Hartley and A. Zisserman. Multiple view geometry in computer vision. Cambridge university press, 2003

Human Motion Understanding
Human Pose Estimation

X. Ma et al. Context Modeling in 3D Human Pose Estimation: A Unified Perspective. CVPR

ContextPose
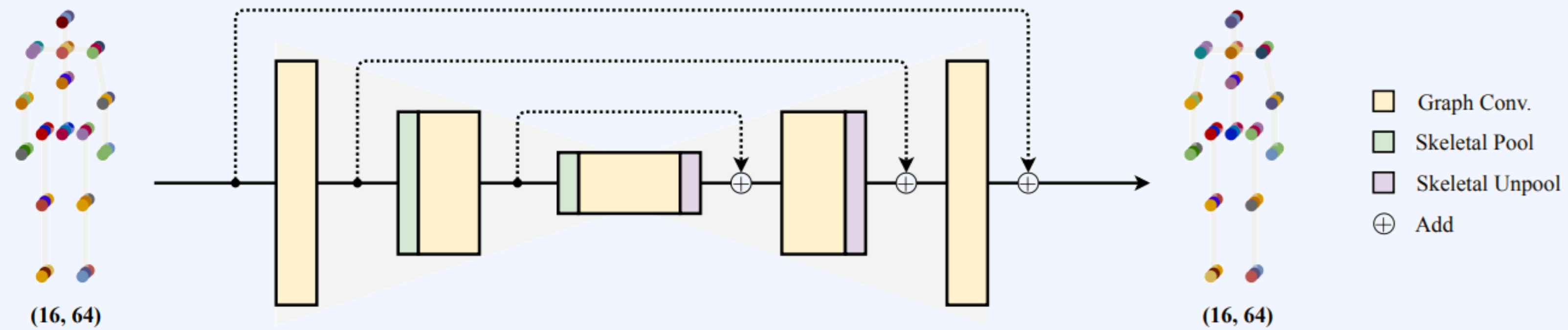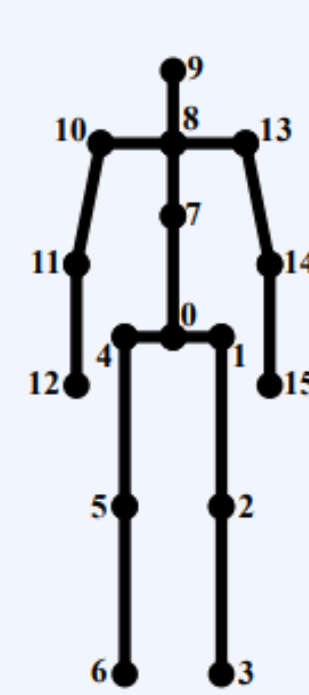
Human Motion Understanding
Human Pose Estimation

T. Xu et al. Graph Stacked Hourglass Networks for 3D Human Pose Estimation. CVPR

Graph Hourglass

(16, 64)   **(16, 64)**

- Graph Conv.
- Skeletal Pool
- Skeletal Unpool
- ⊕ Add

0. Pelvis
1. R. Hip
2. R. Knee
3. R. Ankle
4. L. Hip
5. L. Knee
6. L. Ankle
7. Thorax
8. Neck
9. Head
10. L. Shoulder
11. L. Elbow
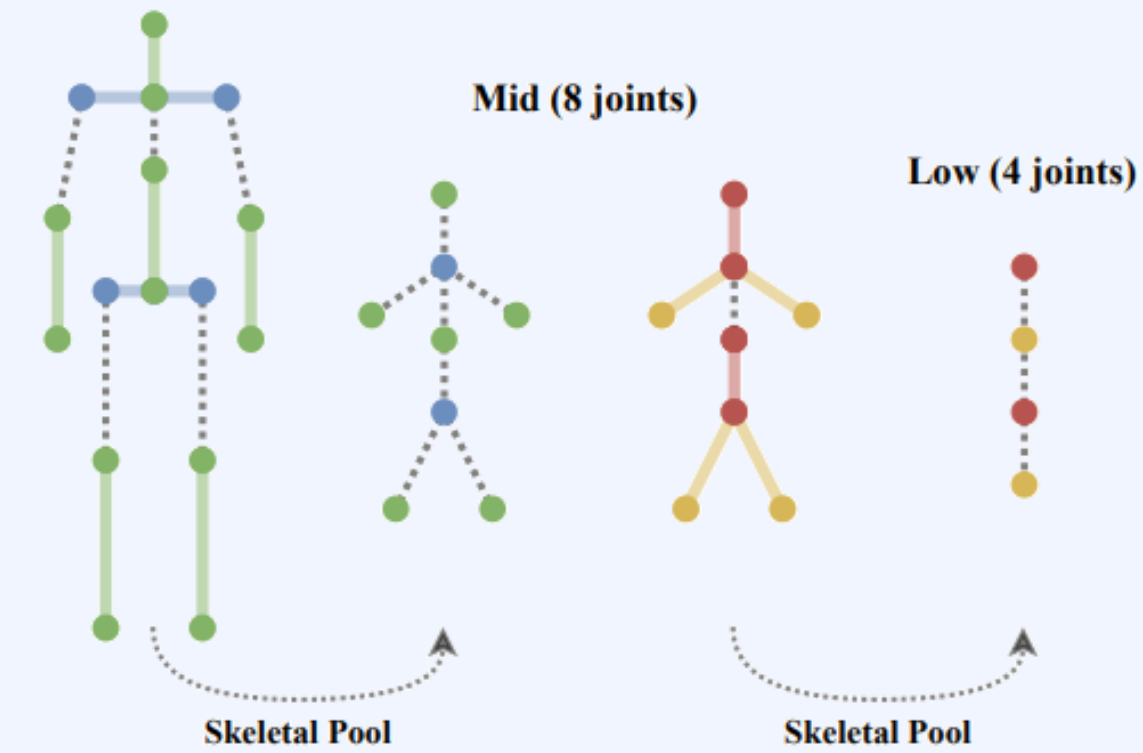12. L. Wrist
13. R. Shoulder
14. R. Elbow
15. R. Wrist

High (16 joints)
Mid (8 joints)
Low (4 joints)

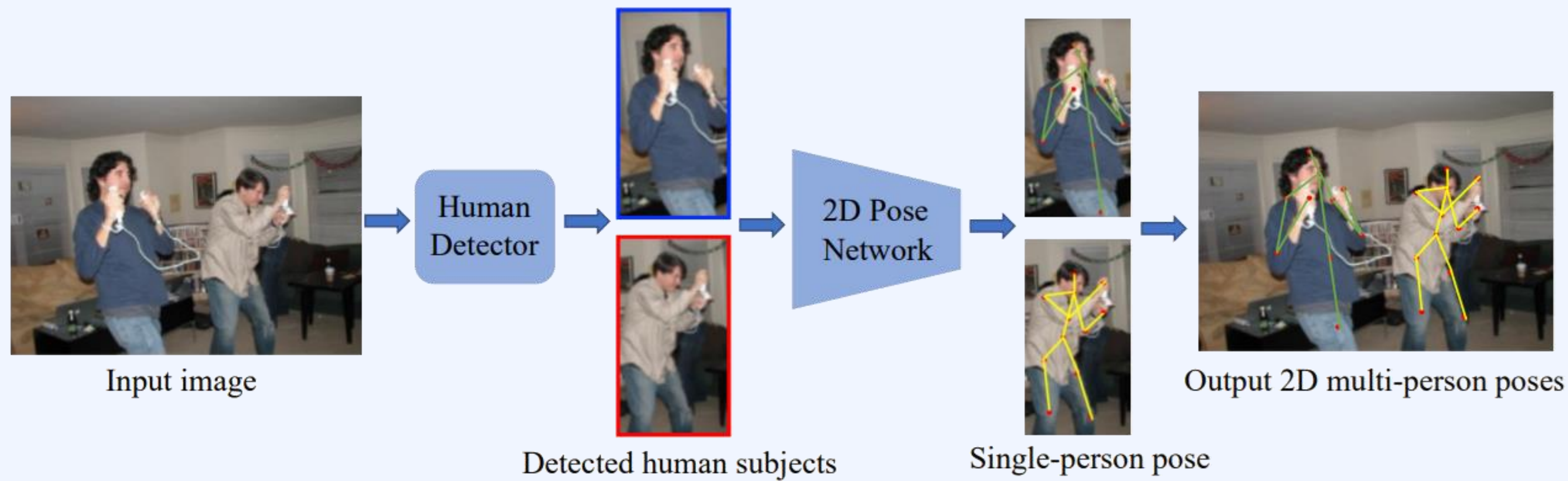Skeletal Pool   Skeletal Pool   Skeletal Unpool

duplicate
duplicate

(a)   (b)   (c)

Human Motion Understanding
Human Pose Estimation

E. Zheng et al. Deep Learning-Based Human Pose Estimation: A Survey
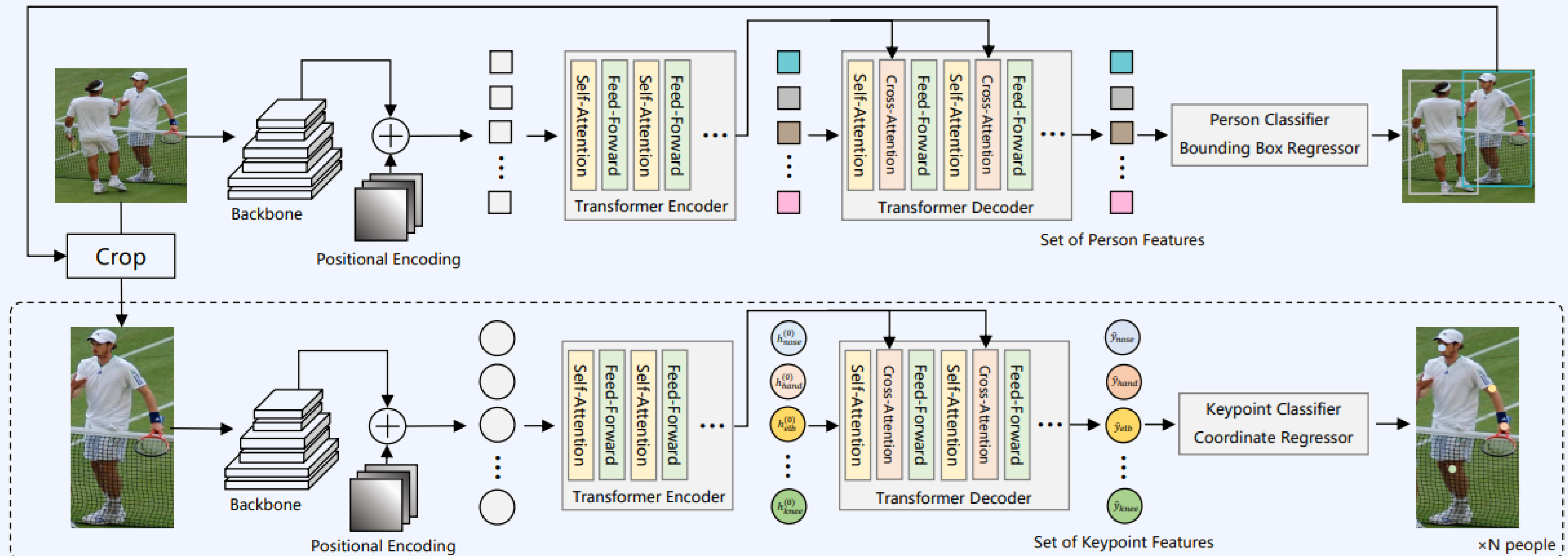

(a) Top-Down Approaches

(b) Bottom-Up Approaches

Human Motion Understanding
Human Pose Estimation

K. Li et al . Pose Recognition with Cascade Transformers. CVPR

PRTR
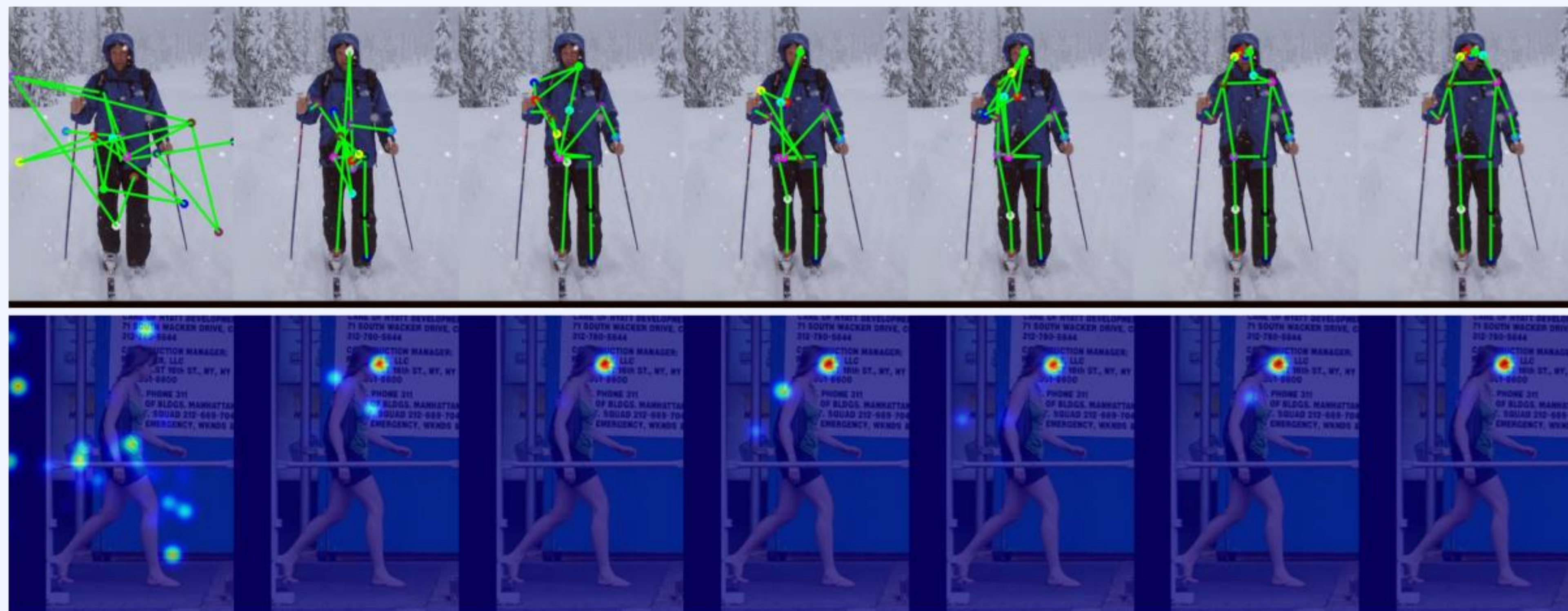
Human Motion Understanding
Human Pose Estimation

K. Li et al . Pose Recognition with Cascade Transformers. CVPR

PRTR

Overlay of heatmaps of 100 queries for Right Ear and Left Eye