

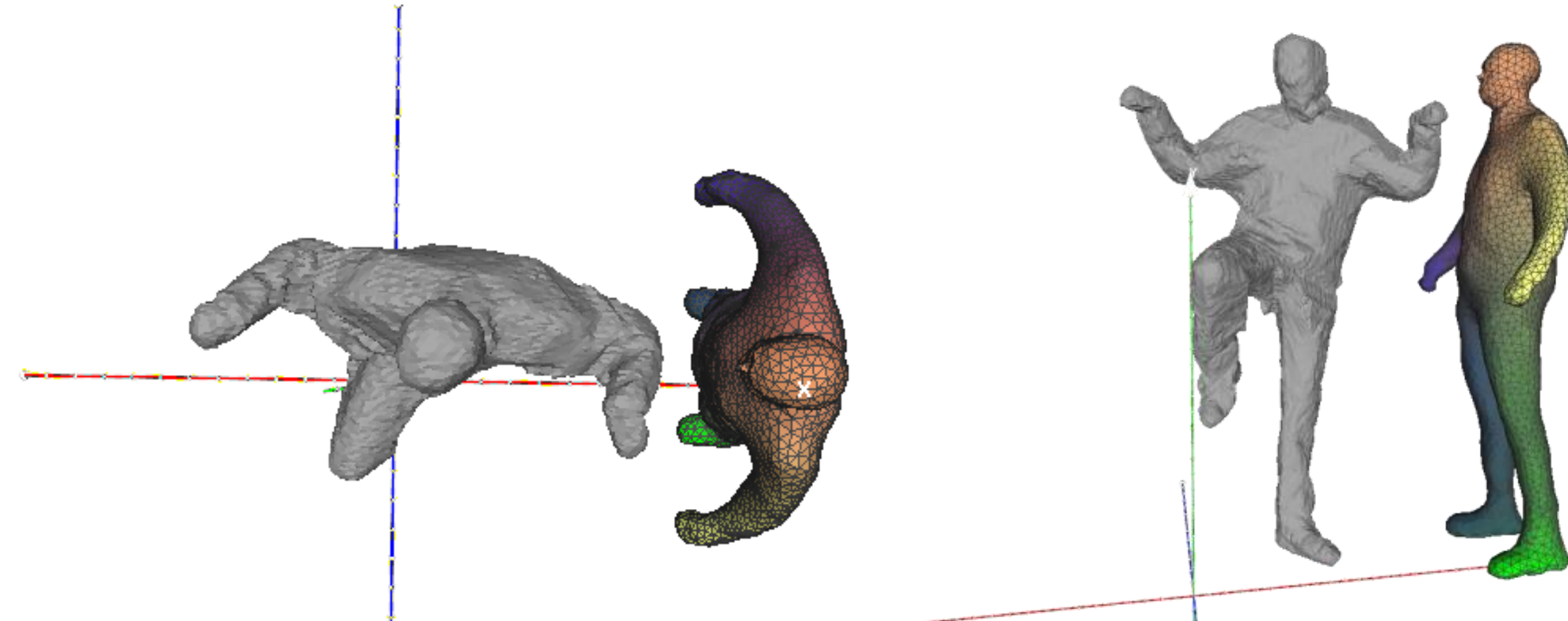
Toward User-specific Tracking by Detection of Human Shapes in Multi-Cameras

Chun-Hao Huang¹, Edmond Boyer², Bibiana do Canto Angonese¹, Nassir Navab^{1,3}, Slobodan Ilic^{1,4}

¹ Technische Universität München, ² LJK-INRIA Grenoble Rhône-Alpes, ³ Johns Hopkins University, ⁴ Siemens AG

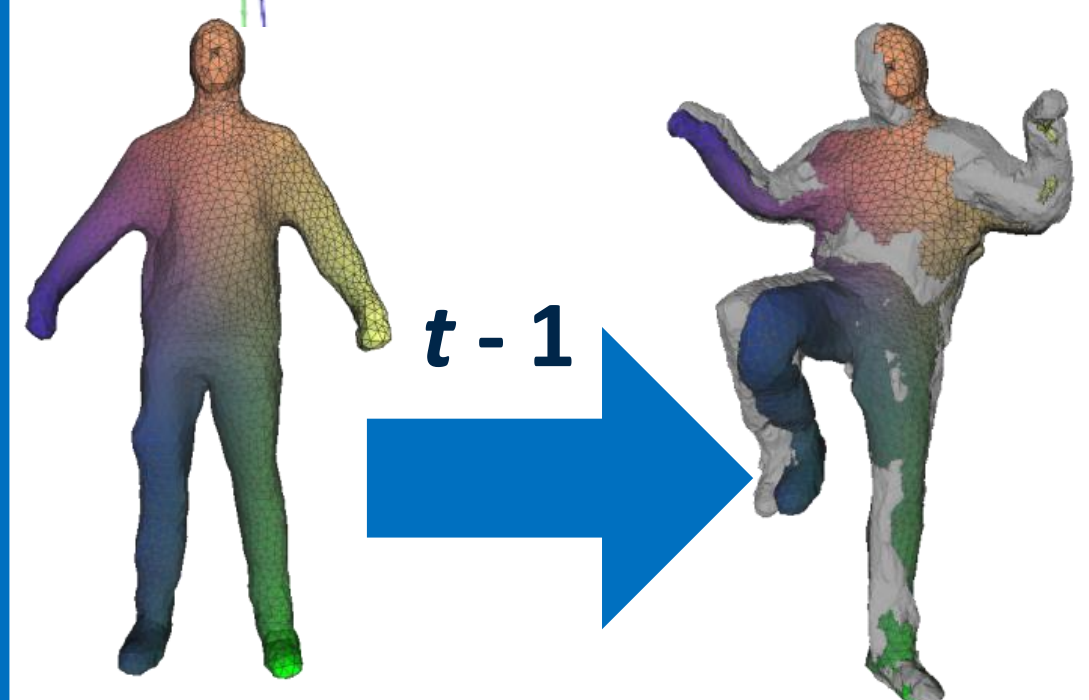
Motivation

When input data and ref. surface are far away...



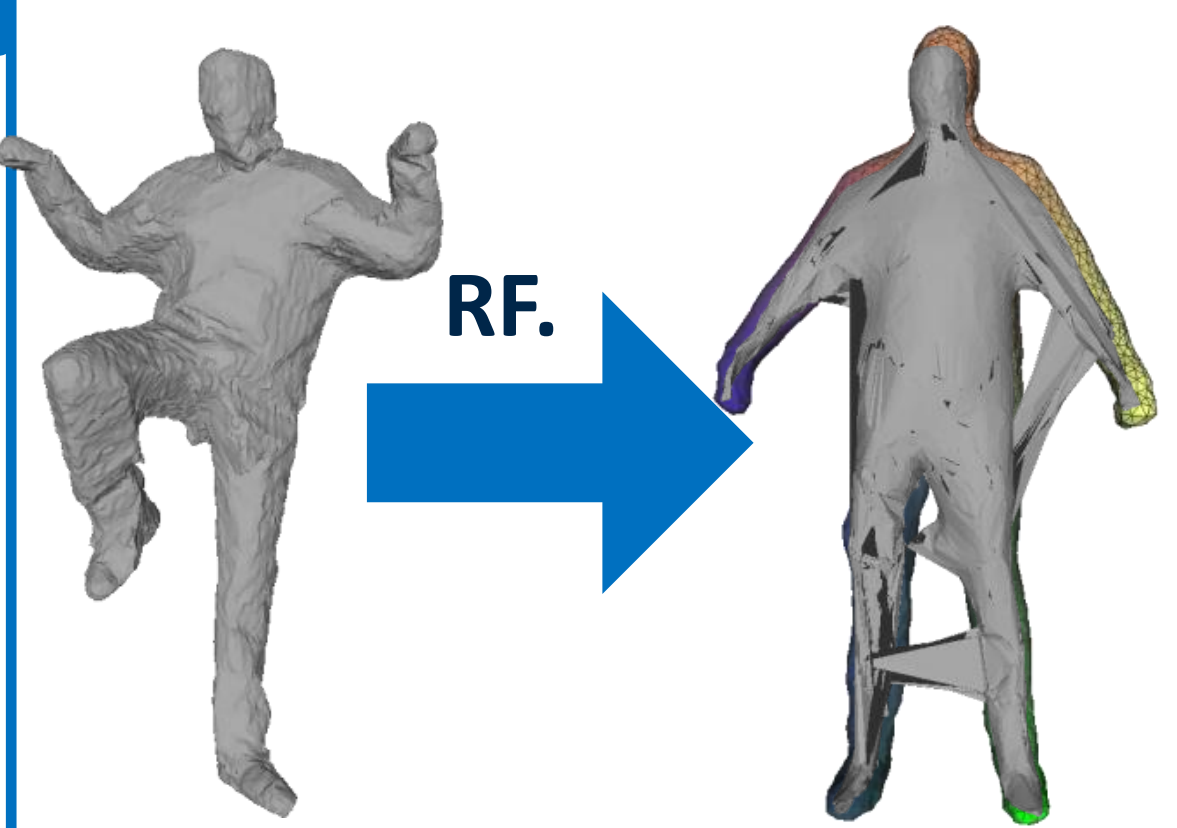
Previous ICP-based approaches

- Warp the ref. surface to the $t-1$ to search correspondences at t .
- Generative
- Prone to drift because of the error accumulation.

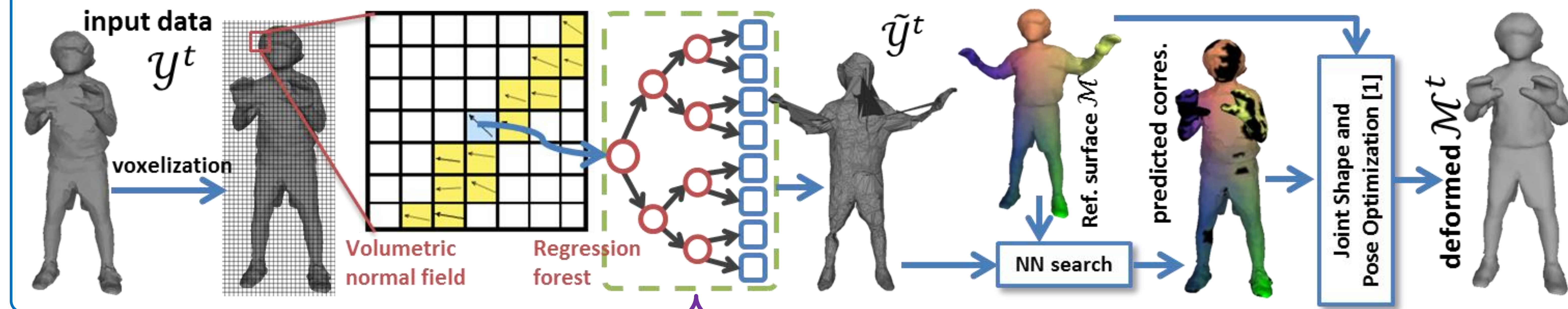


Contribution

- Warp input data to the rest pose by regression forests, and search in ref. for the correspondences.
- Discriminative, depending little on the results at $t-1$.
- Holds to the ability to recover even when $t-1$ is wrong.



The Proposed Pipeline



Training data

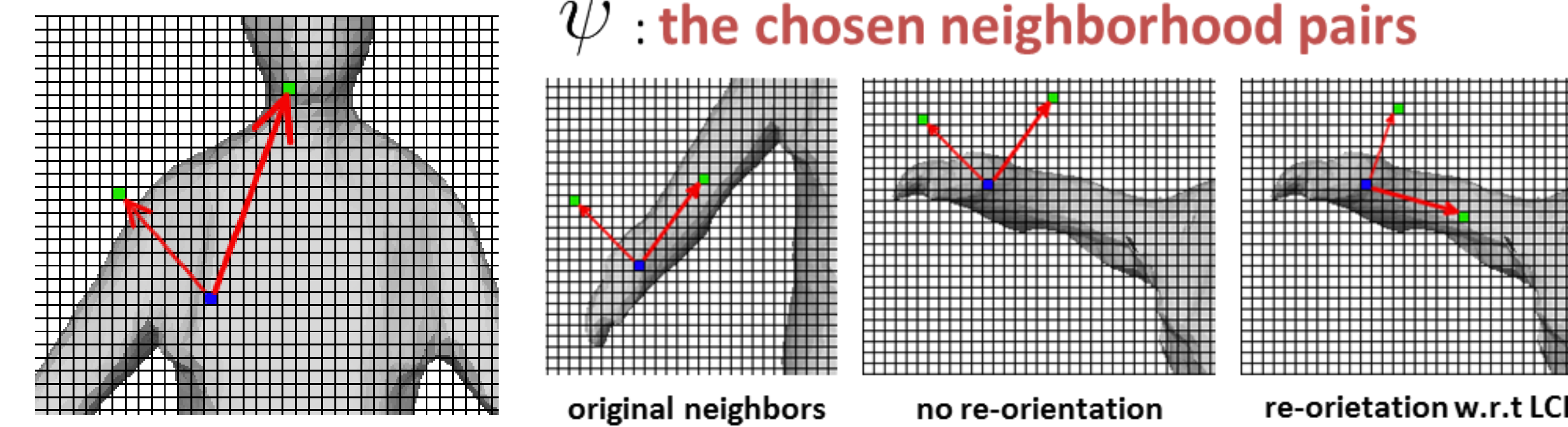
Feature:

Binary test:

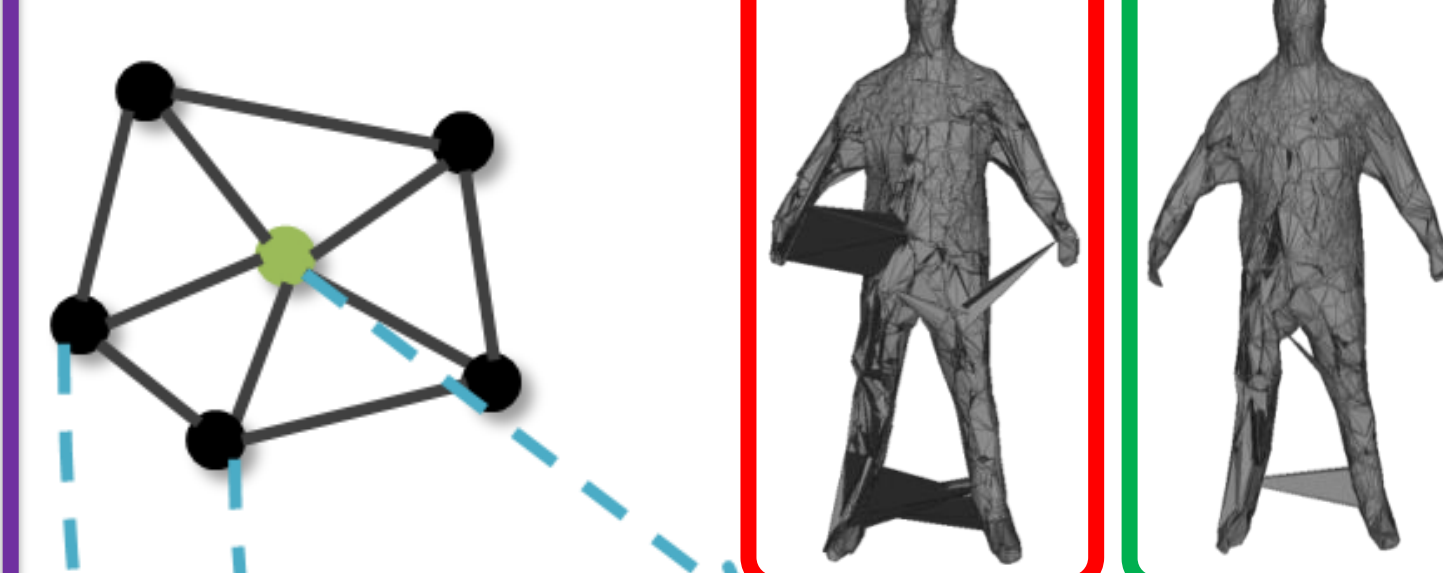
$$f_{\kappa}(\mathbf{v}_v; \mathbf{R}(\psi)) \geq \tau$$

κ : feature channel index

ψ : the chosen neighborhood pairs



Prediction:



Learning:

1. Generate **random splitting**

parameters: $\phi = (\psi, \kappa, \tau)$

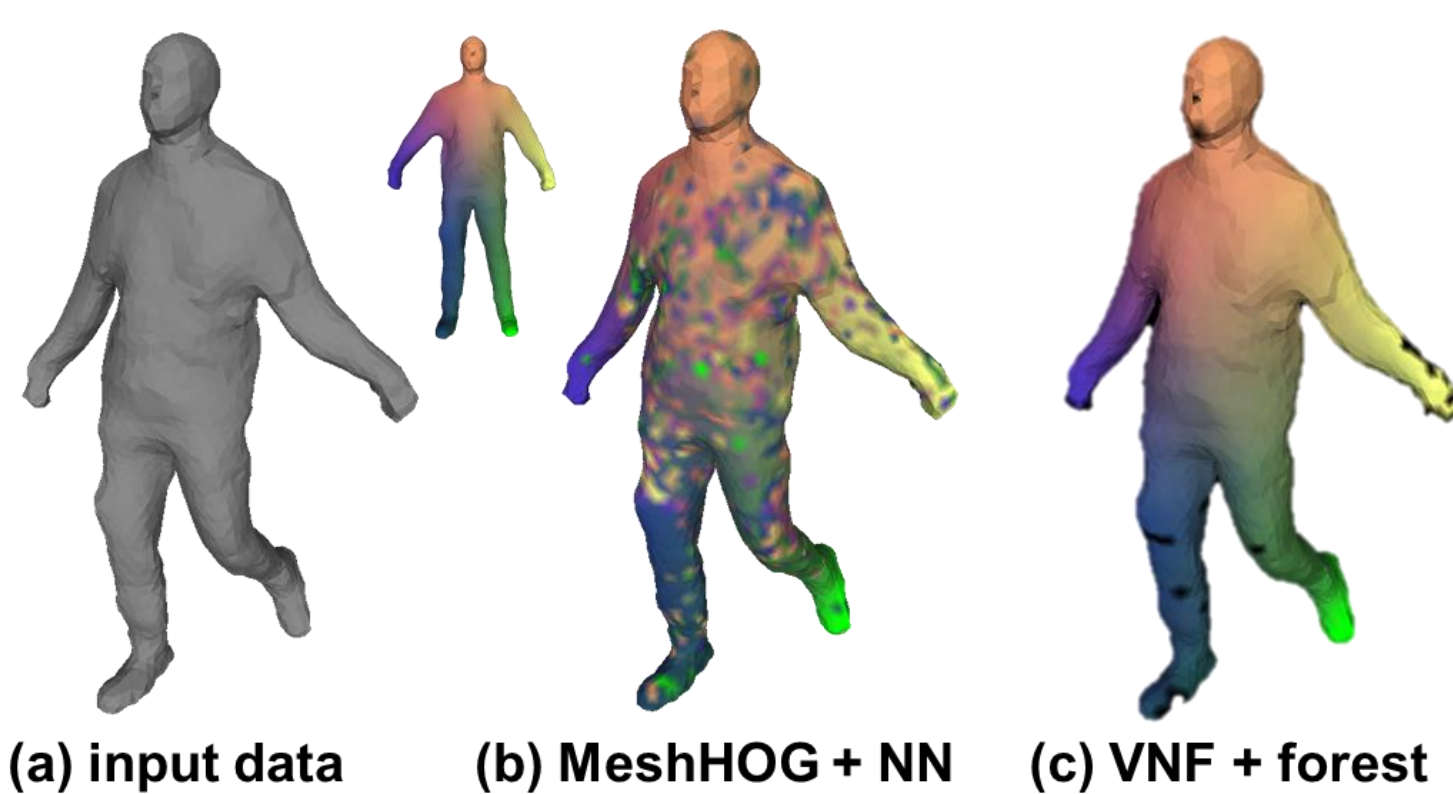
2. Maximize **information gain**.

3. Choice of **entropy**: -> got models for outliers?

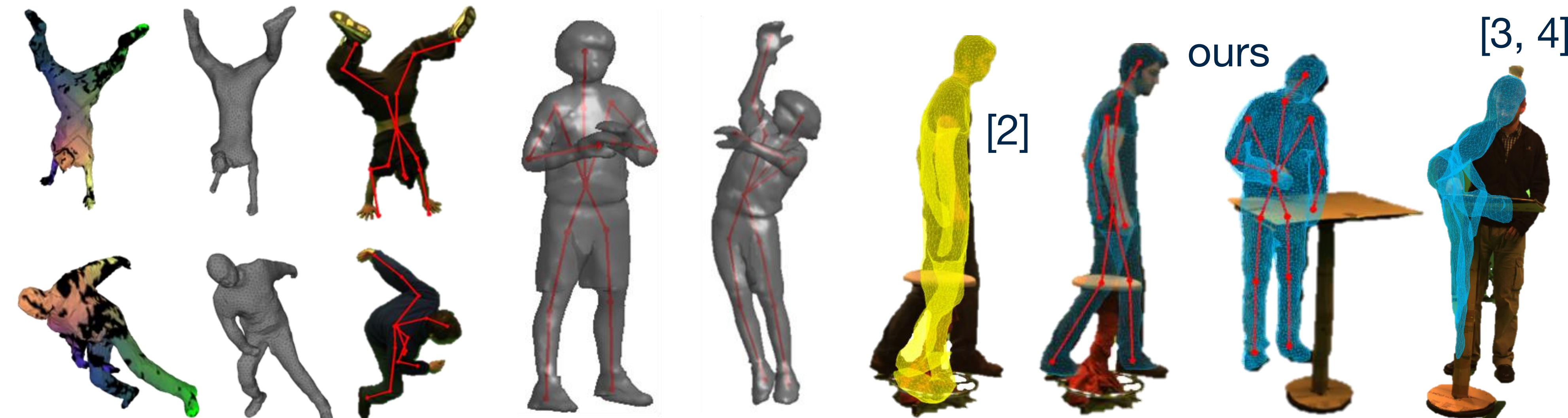
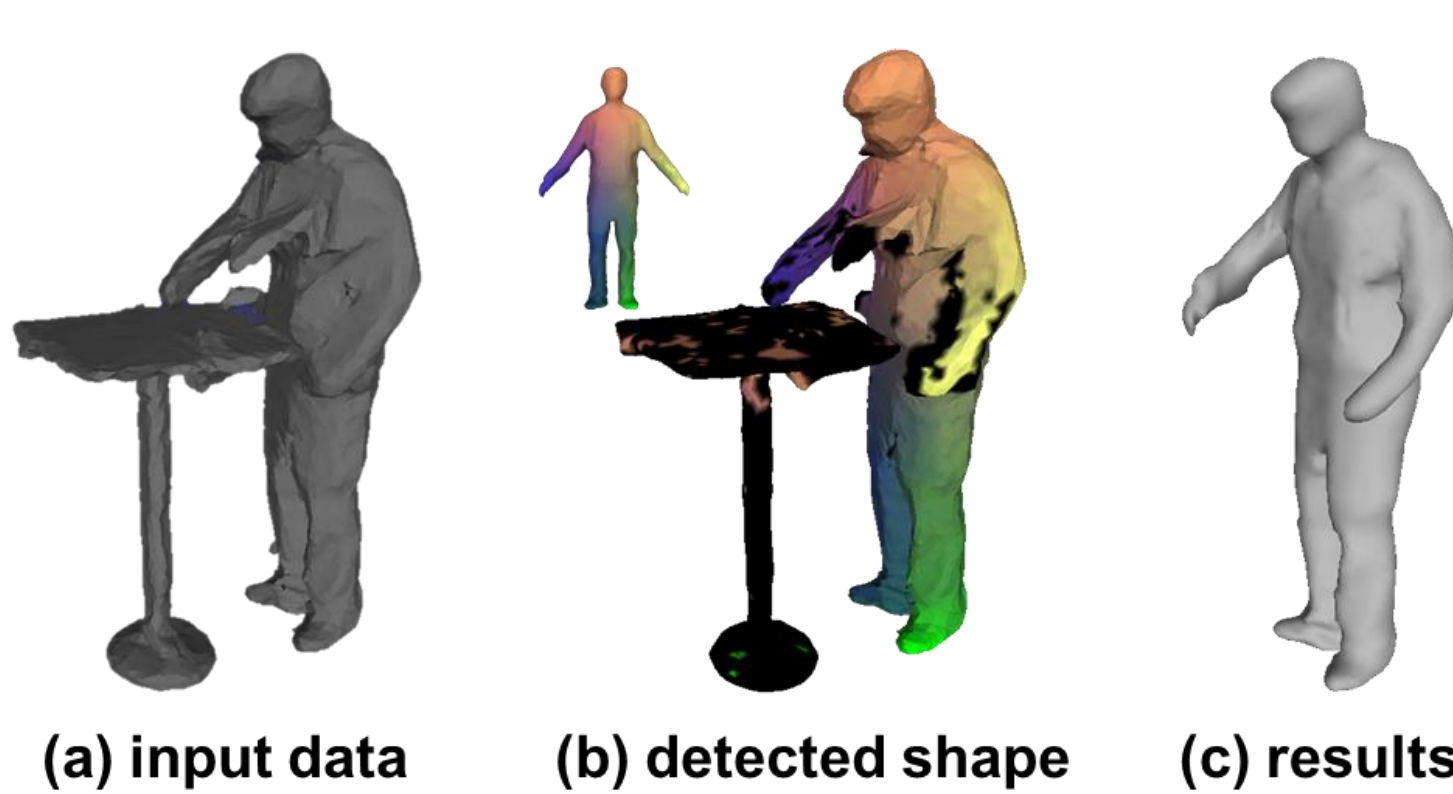
$$\times H(S) = \sigma^2(S)$$

$$\checkmark H(S) = - \sum_c p(c|S) \log p(c|S) + w \sigma^2(S)$$

Correspondence (no outlier)



Correspondence (with outlier)



References

- [1] Huang *et al.*, 3DV 2013.
- [2] Cagniart *et al.*, ECCV 2010
- [3] Straka *et al.*, BMVC 2011.
- [4] Straka *et al.*, ECCV 2012.

