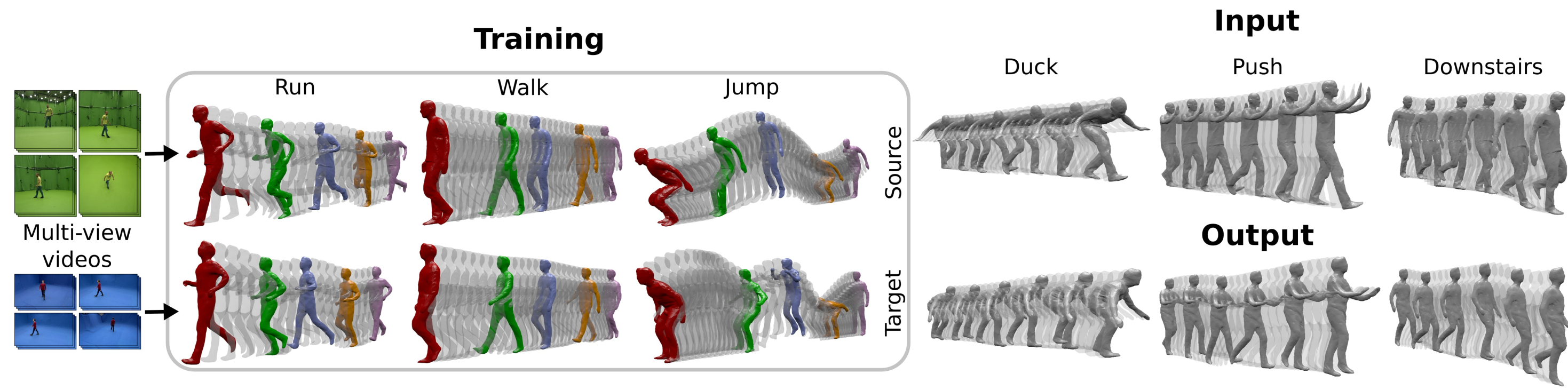


Problem



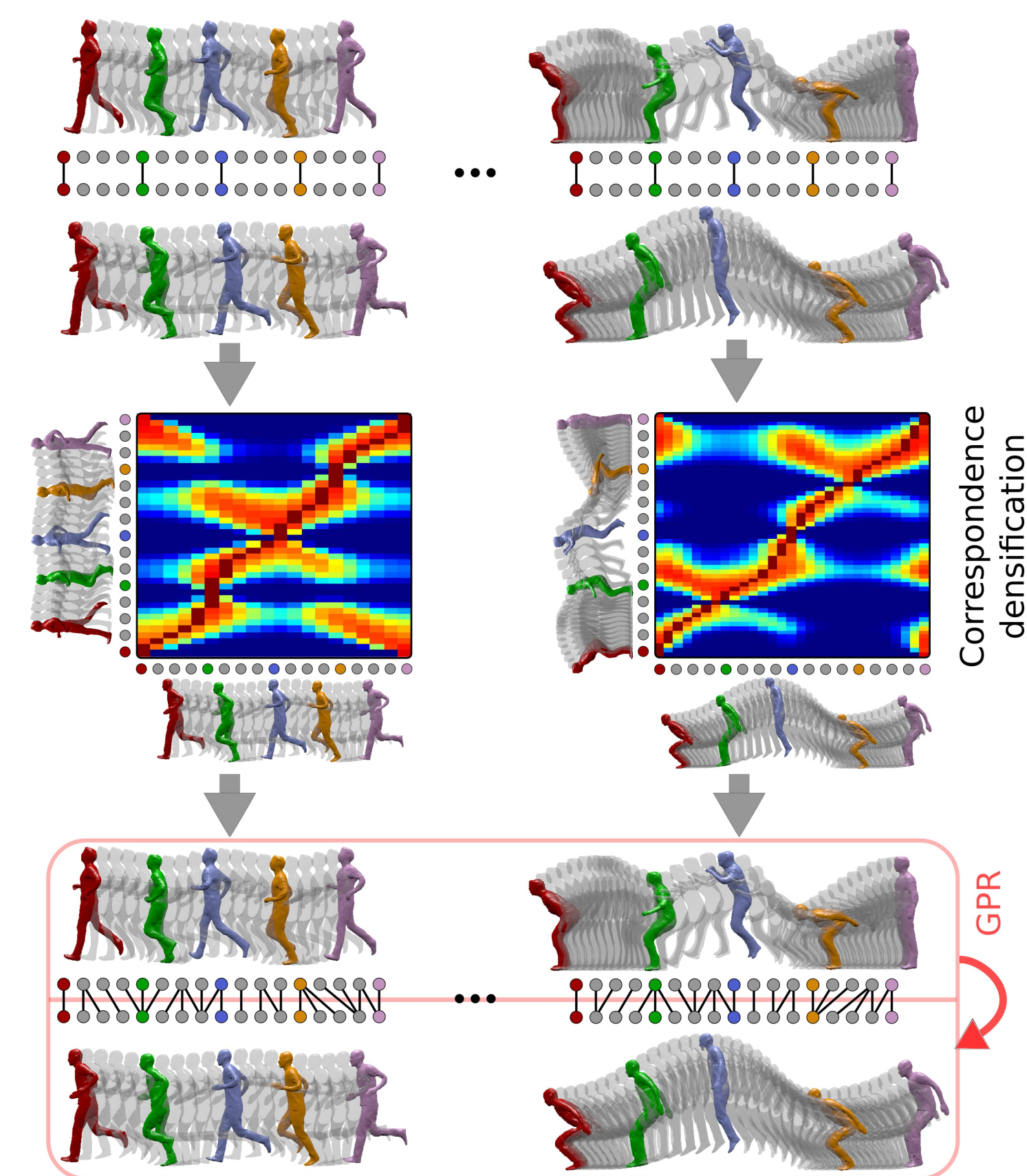
Objective

Transfer motion between captured 4D models for automatic 4D dataset augmentation.

Contributions

- Mesh deformation transfer with Gaussian Process Regression, for improved accuracy and generalization abilities of 3D shape pose mapping.
- Temporal matching densification with probabilistic dynamic time-warping, for increased realism by better capturing and preserving each model's dynamic patterns.

Method



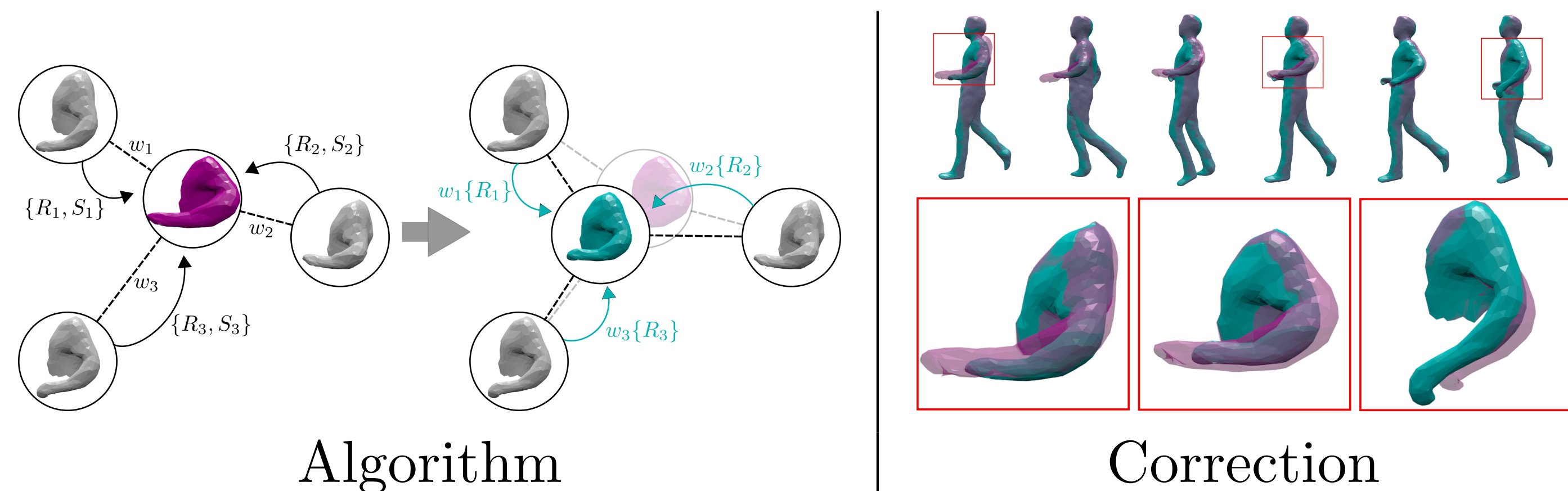
Pose mapping

Given a sparse set of corresponding poses:

1. Pose correspondence densification for each training motion pair.
2. Non-linear pose mapping using GPR for all training motions.

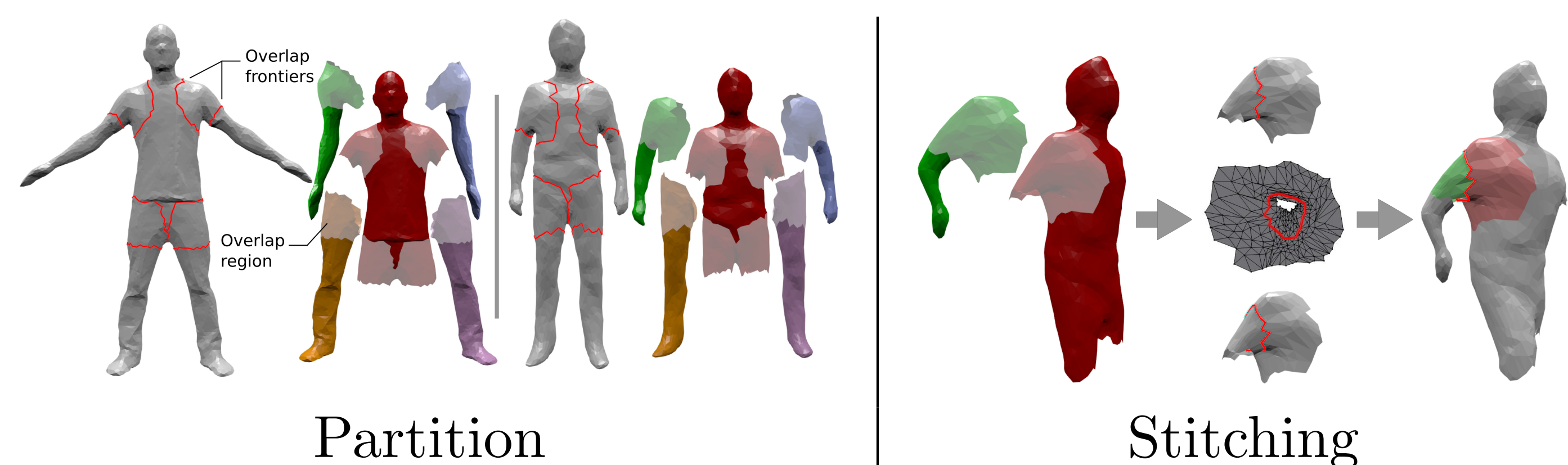
Pose correction

Linear mesh parametrization can cause distortion in predictions:
⇒ Deforming nearest examples in training with locally-rigid transformations to fit the predicted mesh.



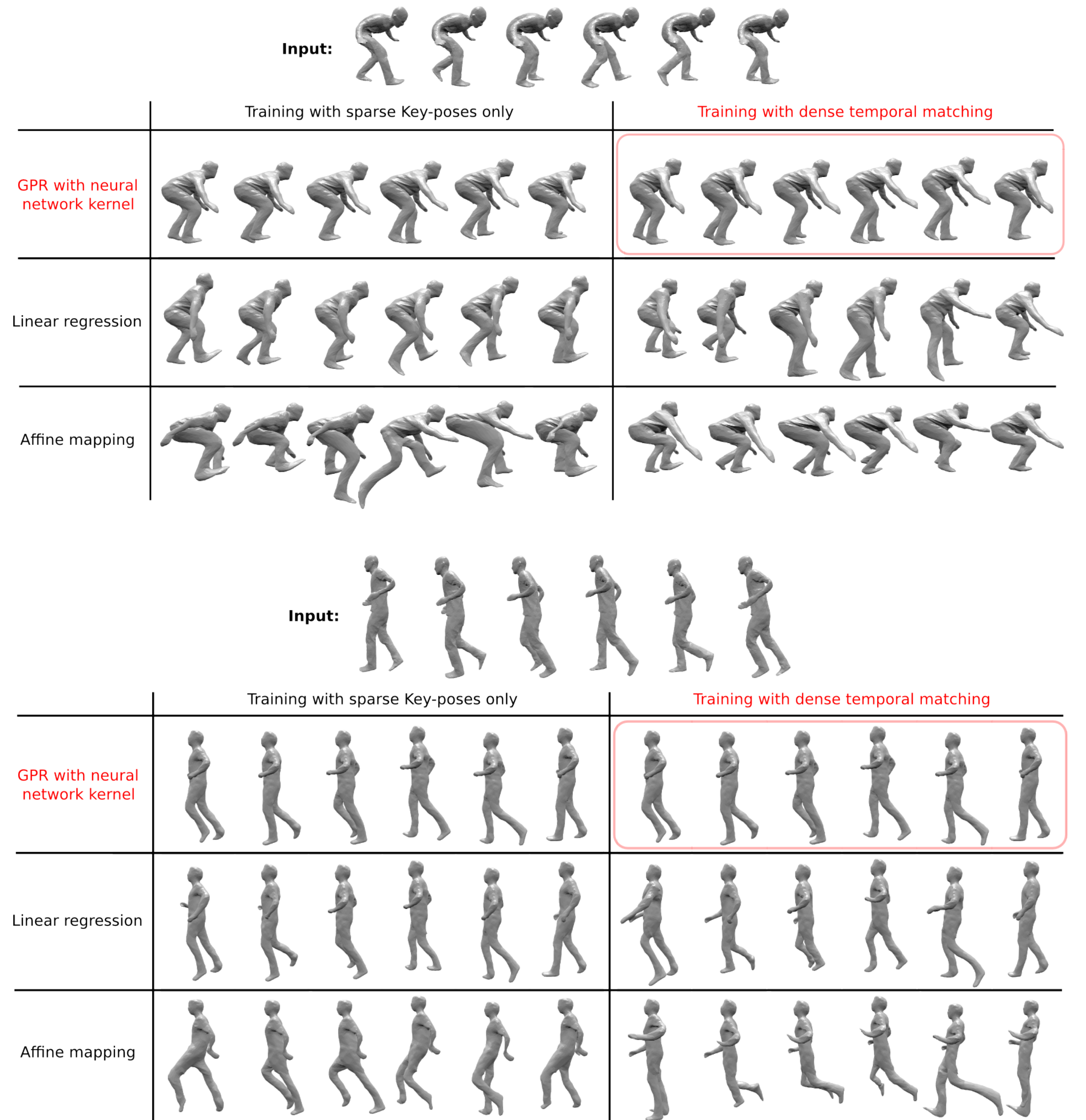
Body partition

Pose transfer accuracy can be improved by considering limbs independently:
⇒ Coarsely segmented overlapping parts stitched automatically using optimal boundaries with Poisson mesh merging.



Qualitative evaluation

Transferring performance from TOMAS (Inria Grenoble Platform) to DAN (Surrey Uni. platform).

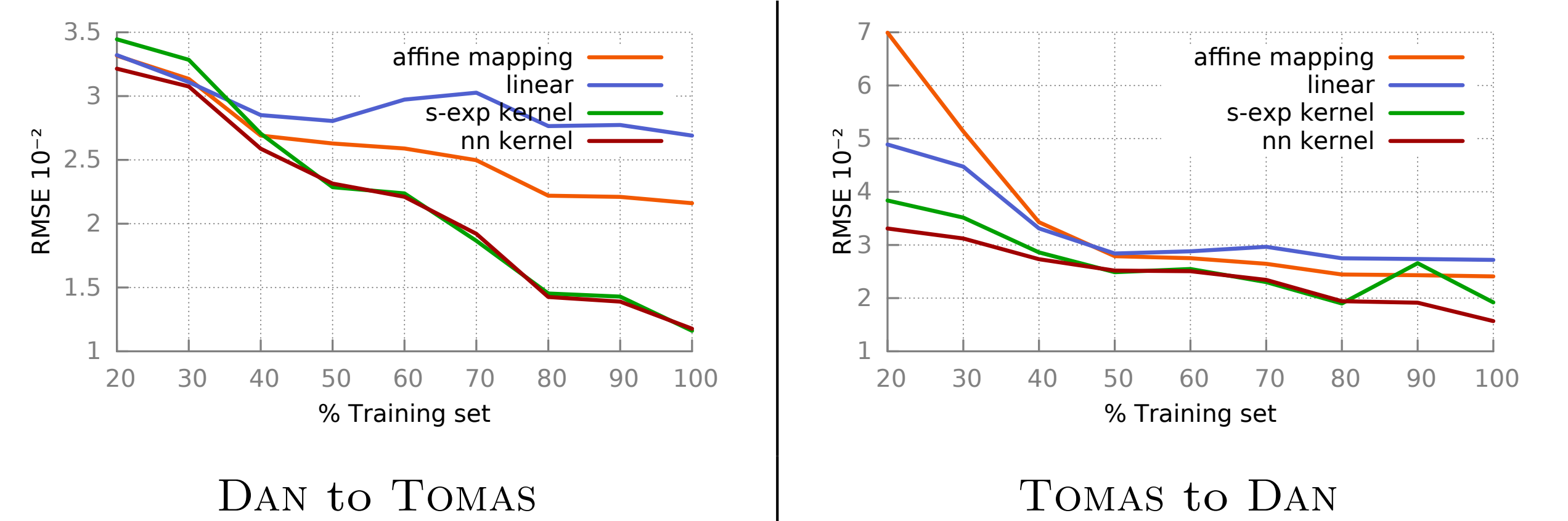


Quantitative evaluation

From fully annotated motion datasets, we show the reconstruction error of a testing subset, w.r.t. the training subset size, to evaluate:

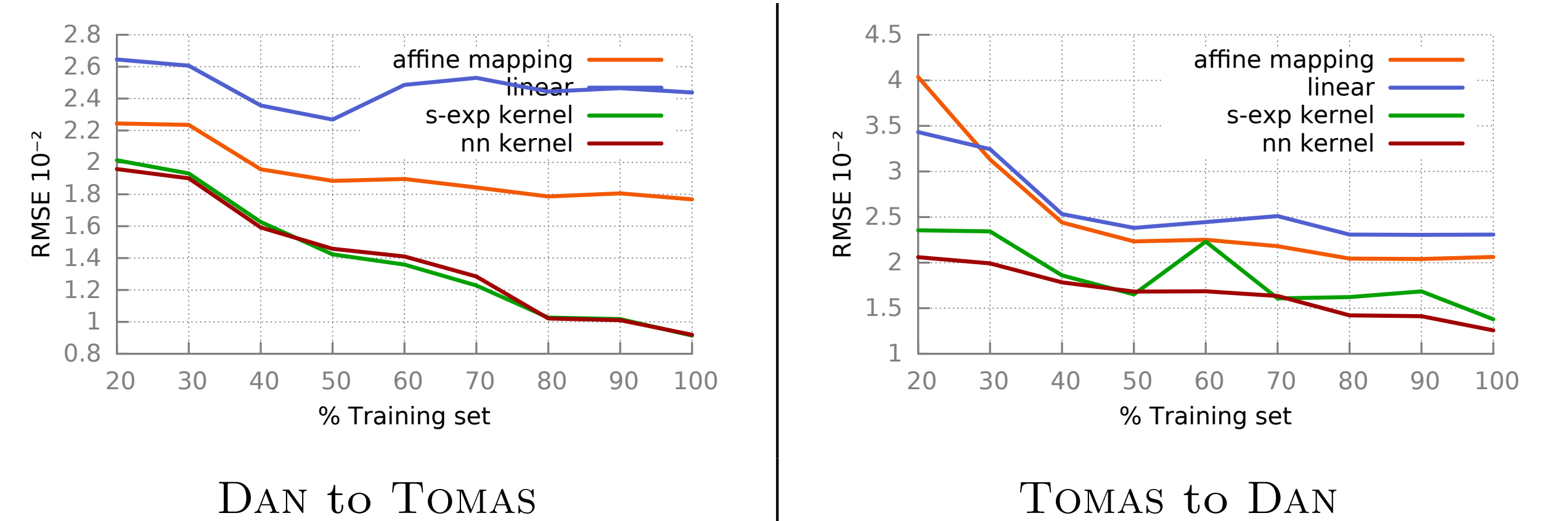
Regression models

Training subset initialized randomly.



Correspondence densification

Training subset initialized with key-poses.



Body partition

GPR model with neural network kernel.

