1. Shape Consistence Under Domain Shift

Goal: Adapting a 2D keypoint estimator from a labelled source domain to an unlabelled target domain. While keeping its shape.

Challenge: The two domains may have different input as well as output distributions, e.g.:

Source domain

Target domain

2. Feature alignment

Domain specific BN layers force different domains to be aligned to the same distribution.

3. Label space alignment

Idea: combine an adversarial term for ensuring aligned predictions in the output space and a geometric consistency term which guarantees coherent predictions between a target sample and its perturbed version.

- Train a regression model on source domain
- During adaptation, we exploit the structure knowledge from the source domain by applying an adversarial term.
- To improve the model’s flexibility, we enforce geometric equivariance between predictions of an input image and its perturbed version.

4. Full Framework

- Feature and label alignment are performed simultaneously
- Feature alignment is performed at every layer
- An adversarial term is used during adaptation to perform label space alignment
- During adaptation, geometric equivariance is used as a regularization term to improve model’s flexibility.

5. Quantitative Results

6. Qualitative Results