

Single Depth Image 3D Face Reconstruction via Domain Adaptive Learning

Xiaoxu CAI, Jianwen LOU, Jiajun BU, Junyu DONG,
Haishuai WANG, Hui YU

Frontiers of Computer Science, DOI: [10.1007/s11704-023-3541-7](https://doi.org/10.1007/s11704-023-3541-7)

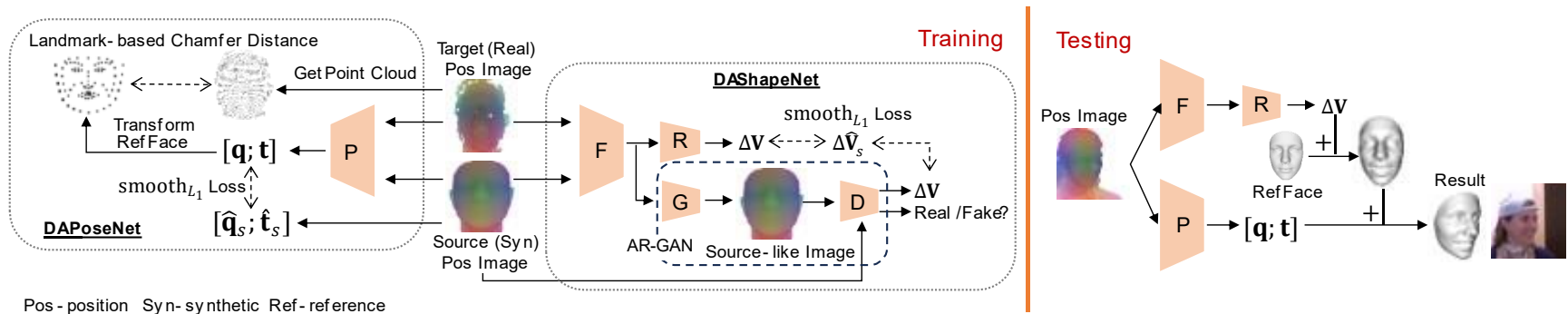
Problems & Ideas

- **Problems**

Absence of a data-efficient, domain-adaptive deep learning-based method for 3D face reconstruction from single depth images.

- **Ideas**

- Apply two domain-adaptive neural networks for predicting head pose and facial shape, respectively.
- Both networks undergo training with a customized domain adaptation strategy, using a combination of auto-labeled synthetic and unlabeled real data.

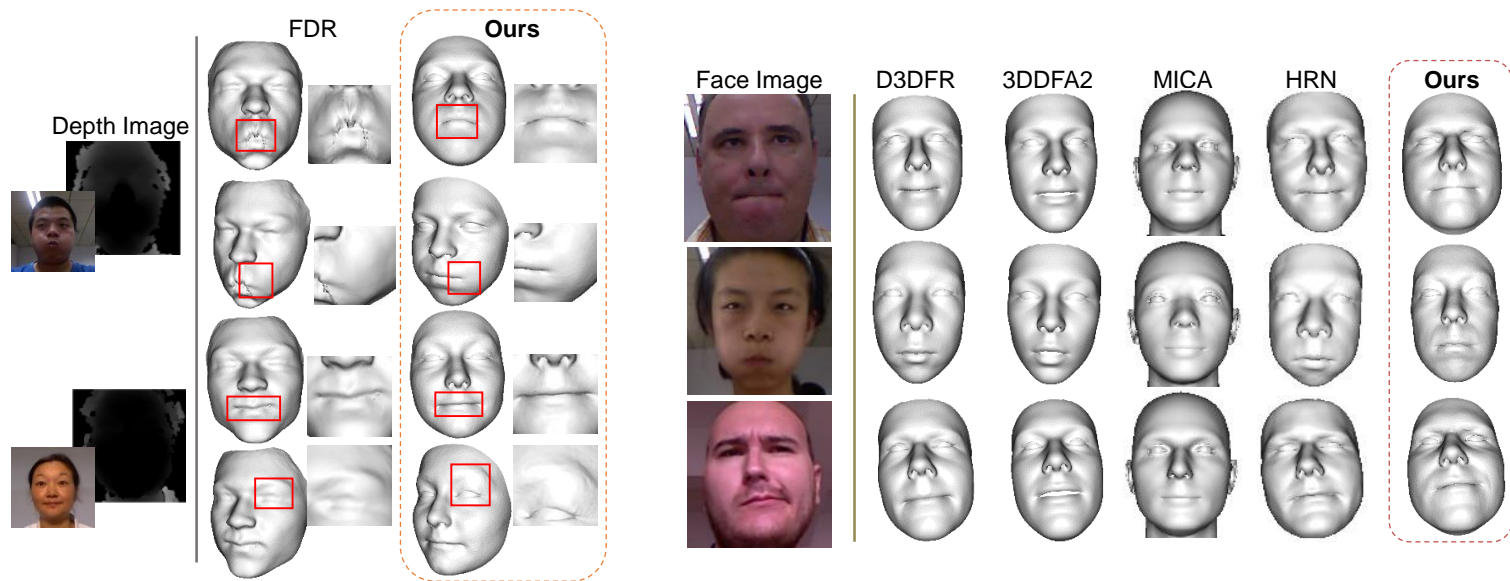


The main pipeline of the proposed 3D face reconstruction method.

Main Contributions

- **Contributions**

- Devise a novel domain-adaptive method for single-depth image 3D face reconstruction. The method relies solely on auto-labeled synthetic data and unlabeled real data for training, making it highly data-efficient.
- Demonstrate successful 3D face reconstructions from highly noisy real-world depth images using the proposed method.



Visual results. Left: visual comparison with a leading depth-based method; Right: visual comparison with SOTA RGB-based methods. Notably, our approach did not employ RGB images as input.