

Implicit Neural Head Synthesis via Controllable Local Deformation Field

Poster tag: TUE-AM-040

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²Flawless AI

Problem Setup

Monocular video

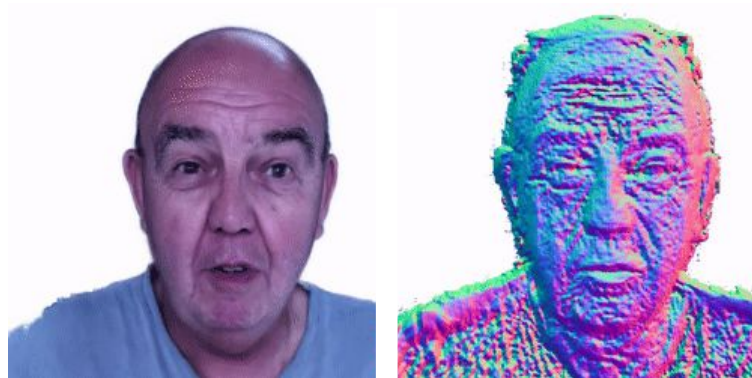


Expression
Poses
Facial keypoints

Tracker



Reconstructed Head
Avatar with Details



Problem Setup

Monocular video



Tracker

Expression
Poses
Facial keypoints

Expression and pose transfer



Source

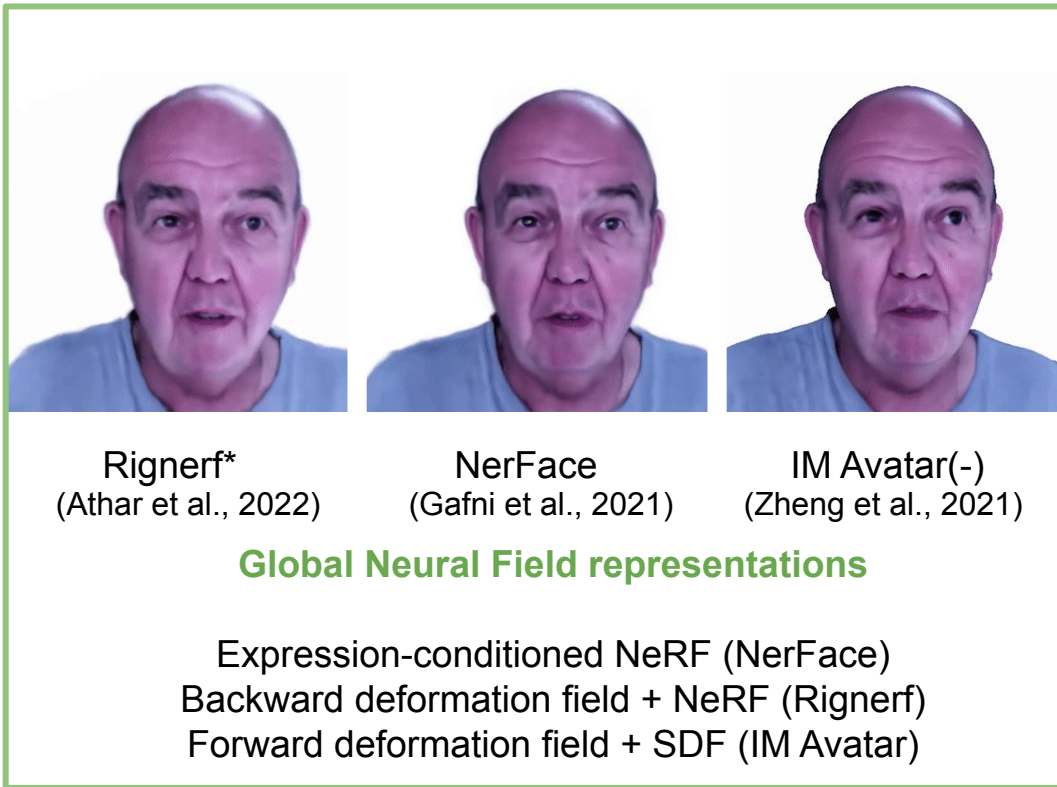


Target

Previous Methods



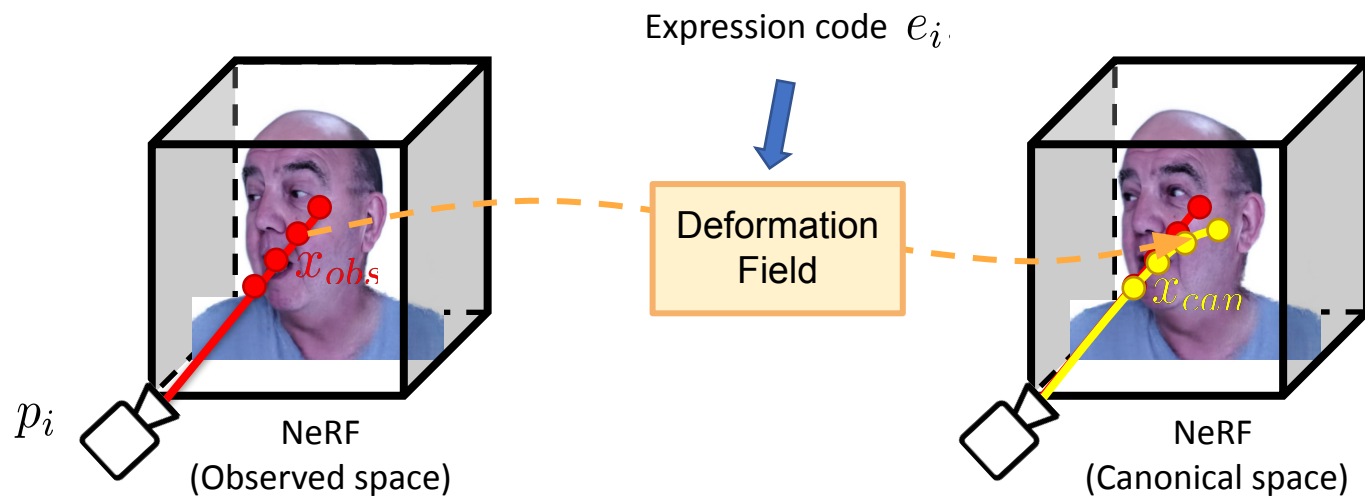
Ground Truth



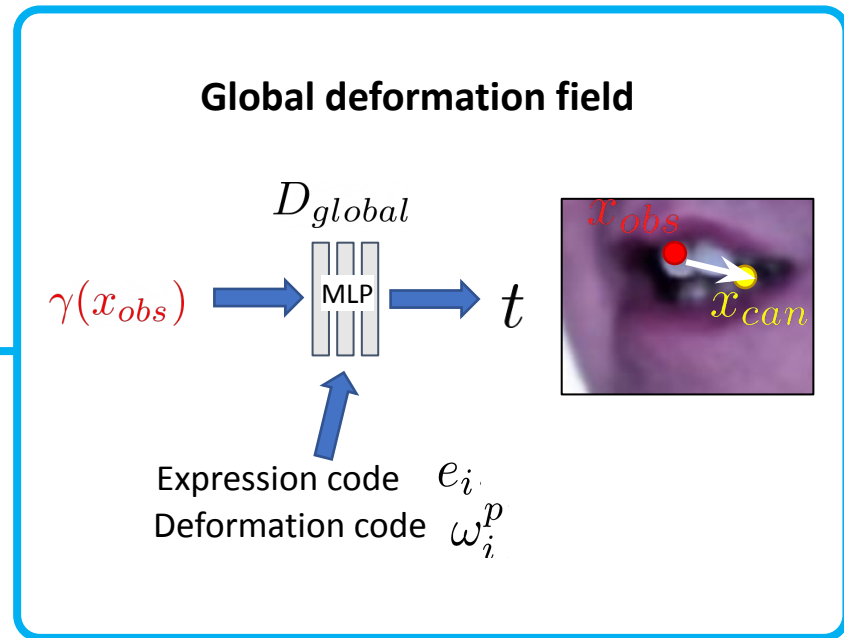
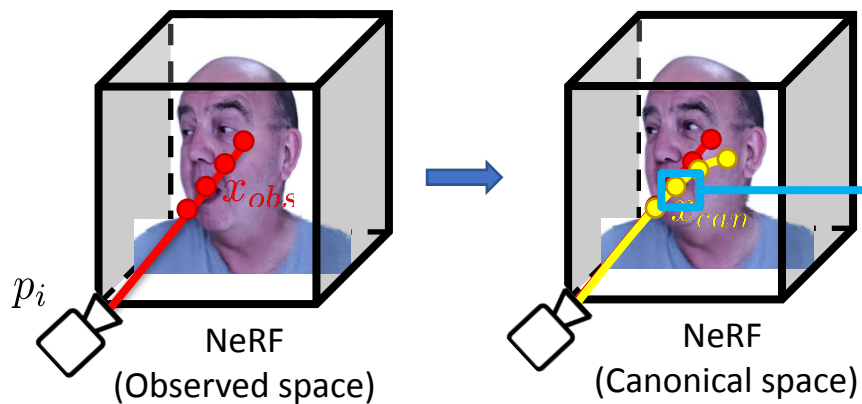
Rignerf* : our implementation of Rignerf

IM Avatar(-)* : IM Avatar without mesh supervision to produce sharper details

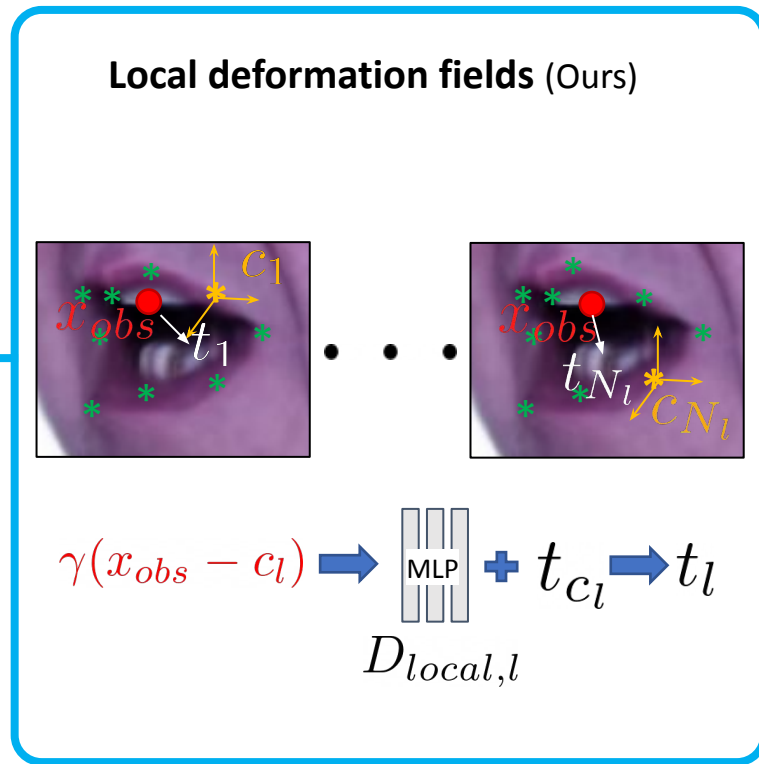
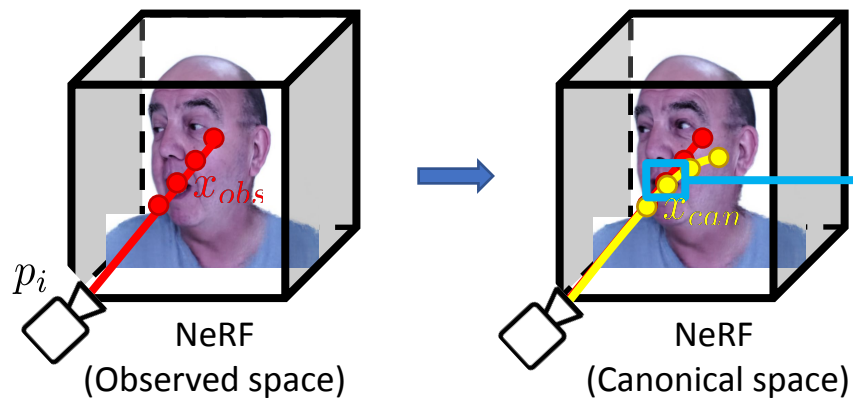
Our Pipeline



Our Pipeline

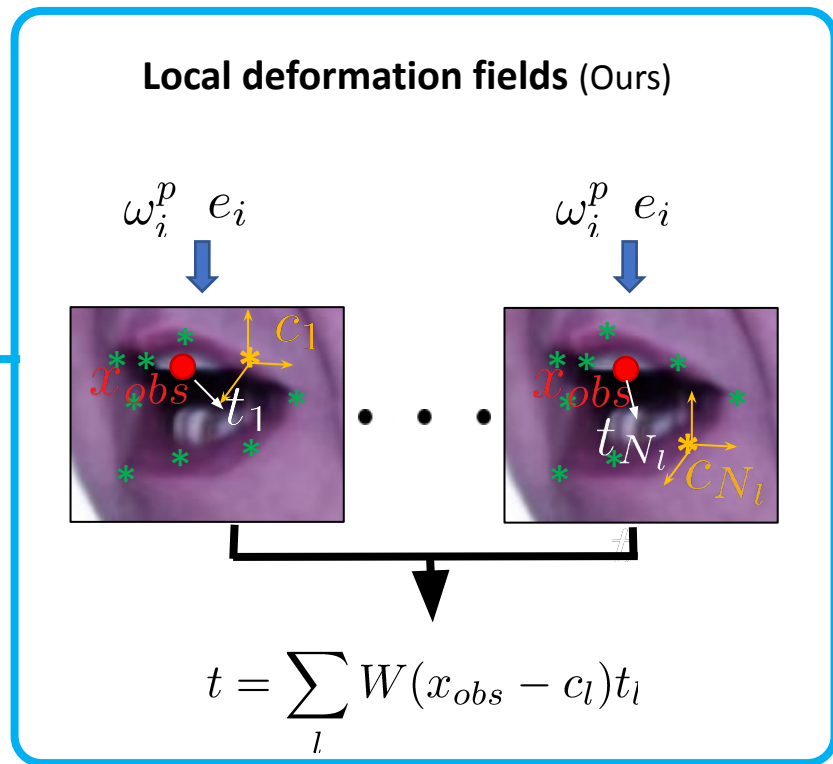
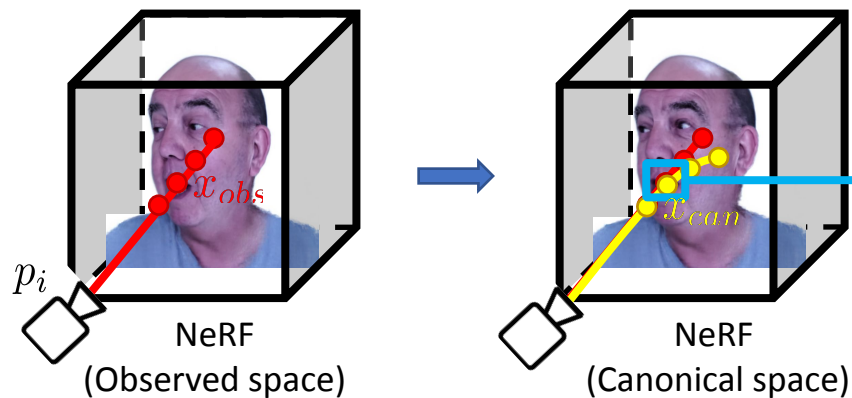


Our Pipeline



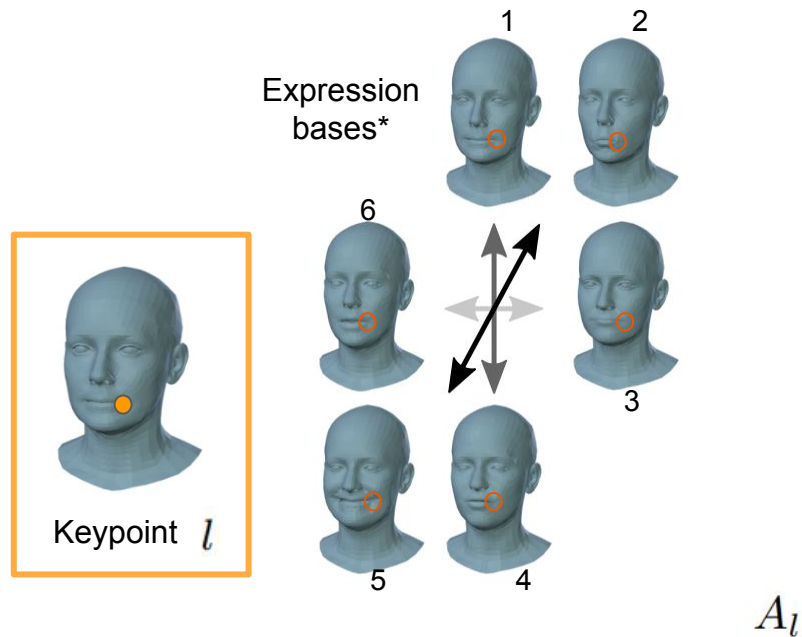
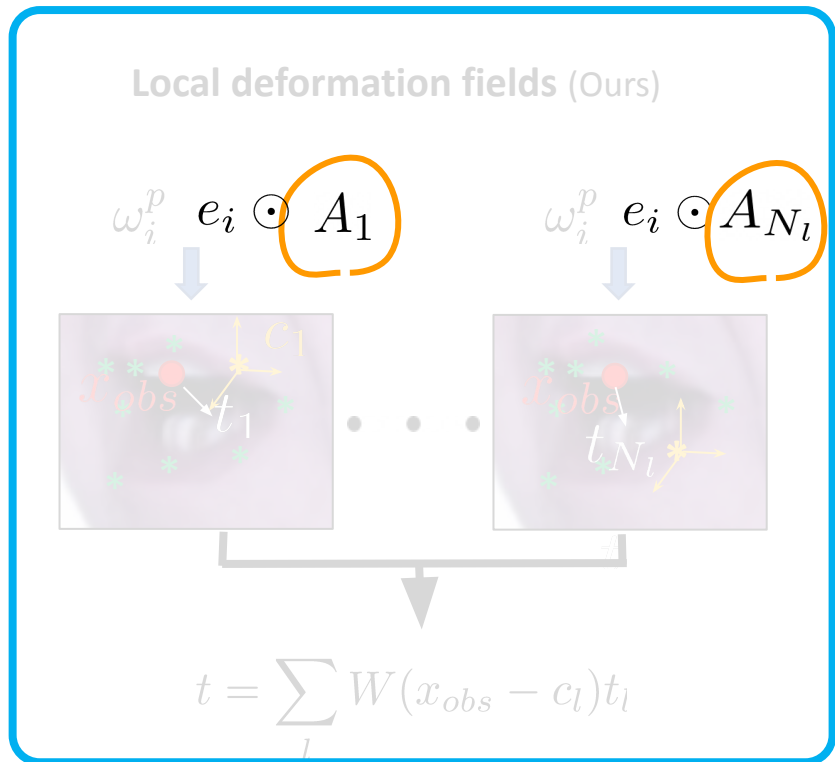
- Sampled points in observed space
- Sampled points in canonical space
- * All keypoints
- * Keypoint that one local field is centred around

Our Pipeline



- Sampled points in observed space
- Sampled points in observed space
- * All keypoints
- * Keypoint that one local field is centred around

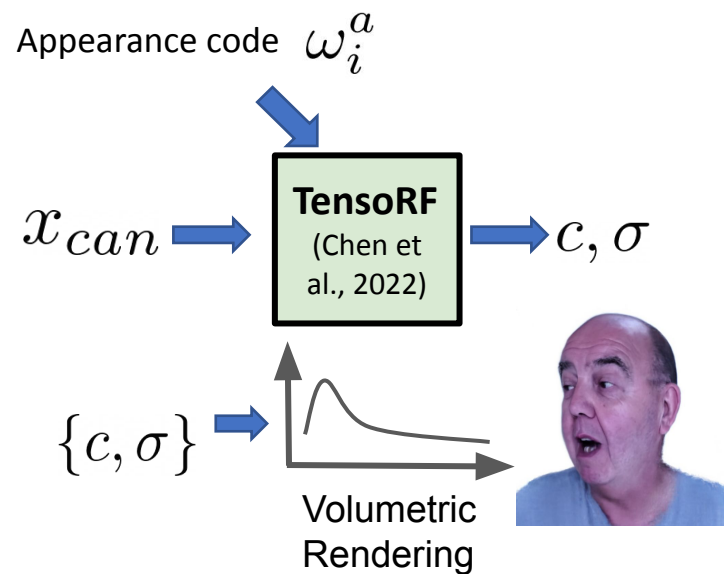
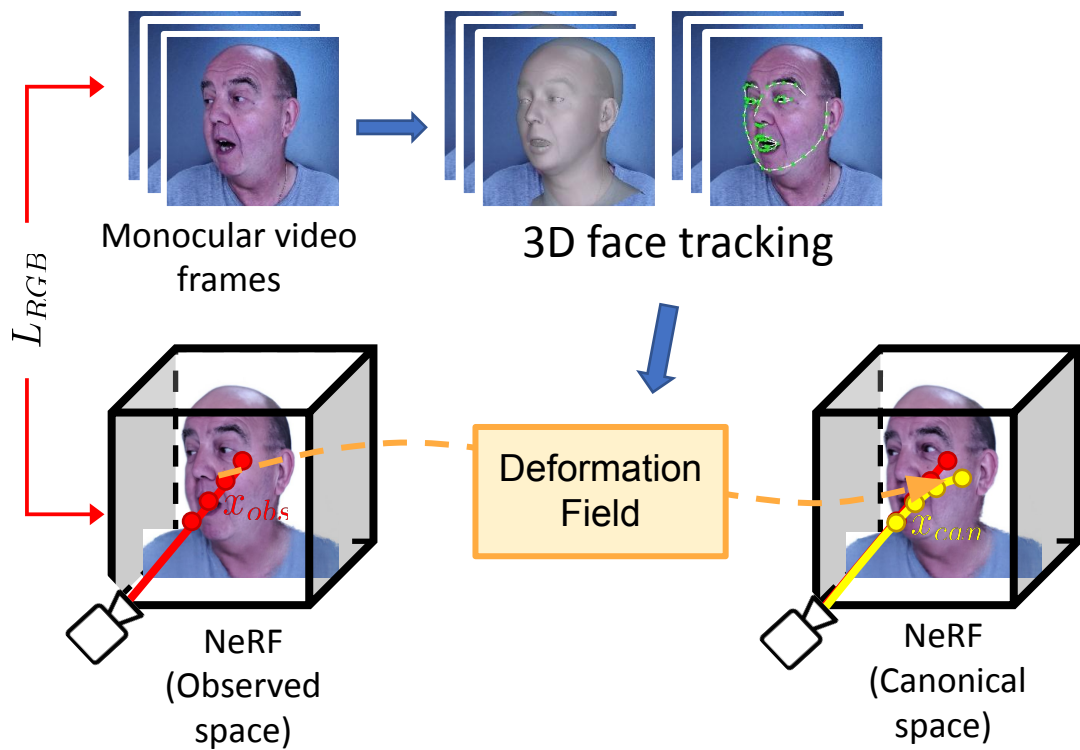
Attention Mask



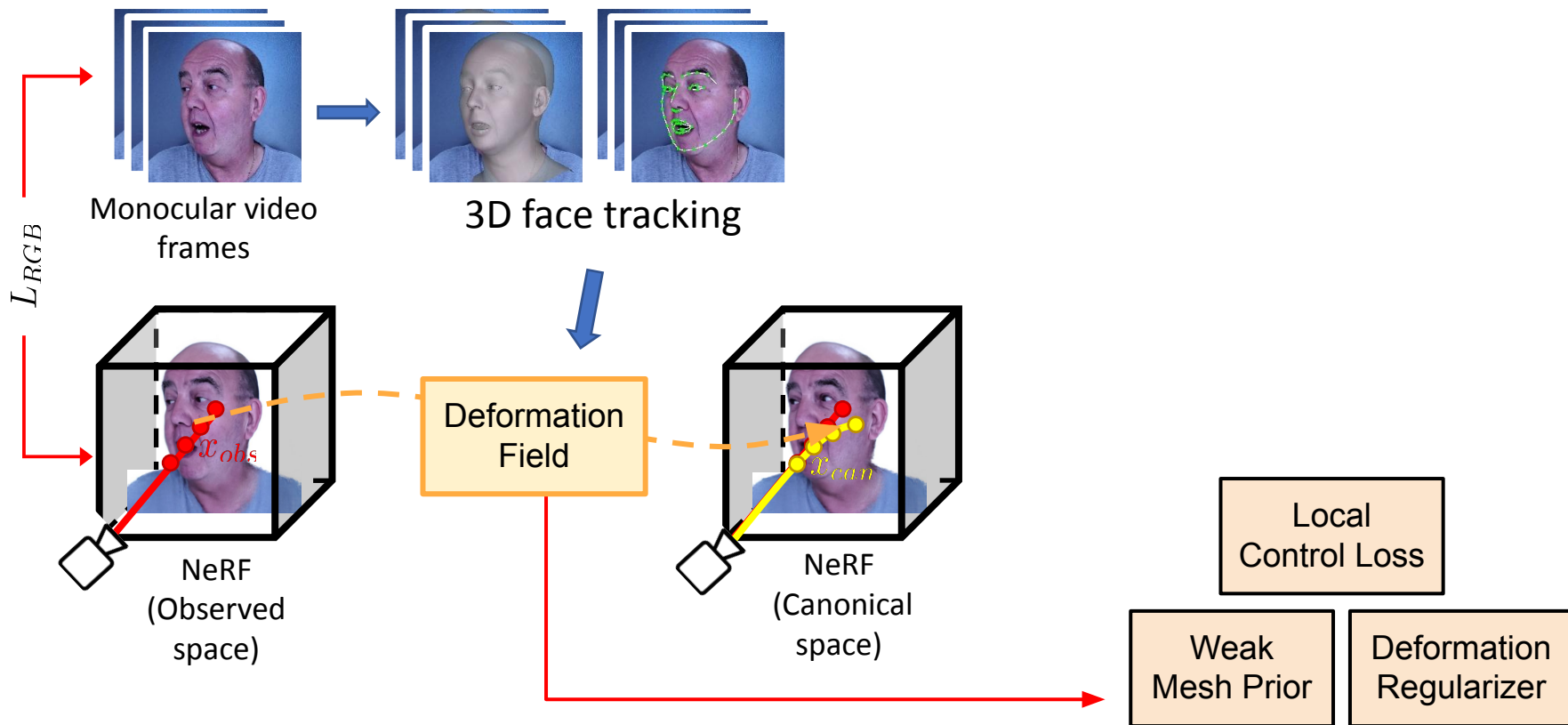
Expression basis	1	2	3	4	5	6
Amount of deformation	0.05	0.6	0.3	0.4	0.9	0.2

* Figure from **Learning a model of facial shape and expression from 4D scans**, Li et al., 2017

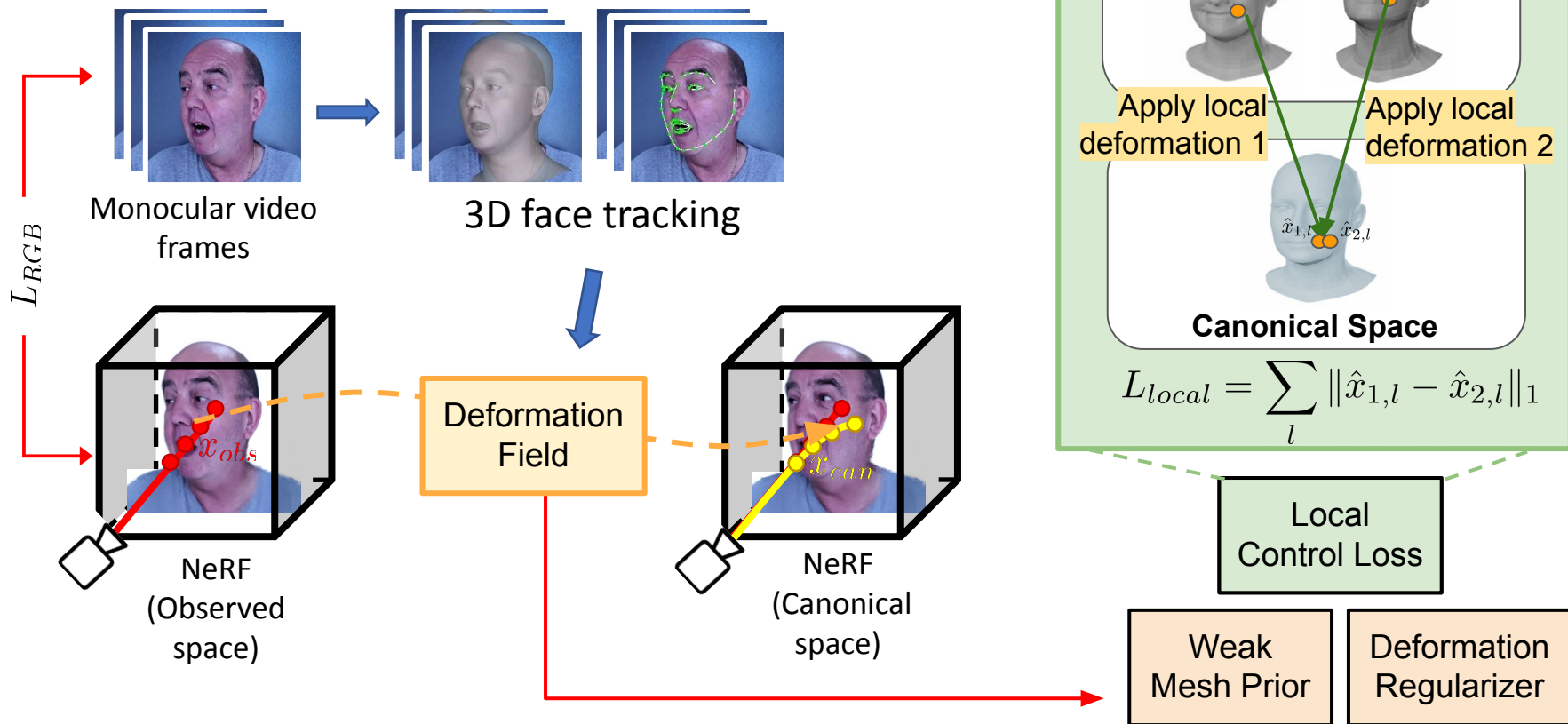
Our Pipeline



Our Pipeline

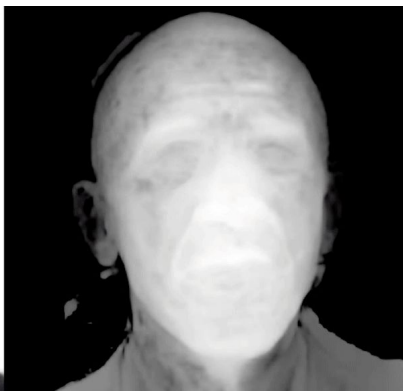


Our Pipeline



More Results

Test Pose & Expression Reconstruction



Expression Transfer



Source

Target

Comparison with Baselines



Ground Truth

Ours

Rignerf*
(Athar et al., 2022)

NerFace
(Gafni et al., 2021)

IM Avatar(-)
(Zheng et al., 2021)

Rignerf* : our implementation of Rignerf

IM Avatar(-)* : IM Avatar without mesh supervision to produce sharper details

Thank You!

See paper
and more
results



https://imaging.cs.cmu.edu/local_deformation_fields/