Source Image

Driving Video

Our Generated Video

MetaPortrait: Identity-preserving Talking Head Generation with Fast Personalized Adaptation

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Poster ID: THU-PM-142

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THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

Microsoft

Task Definition of Talking Head Generation

Source Image

Identity

Motion & Expression

Driving Video

Ours Generated Video

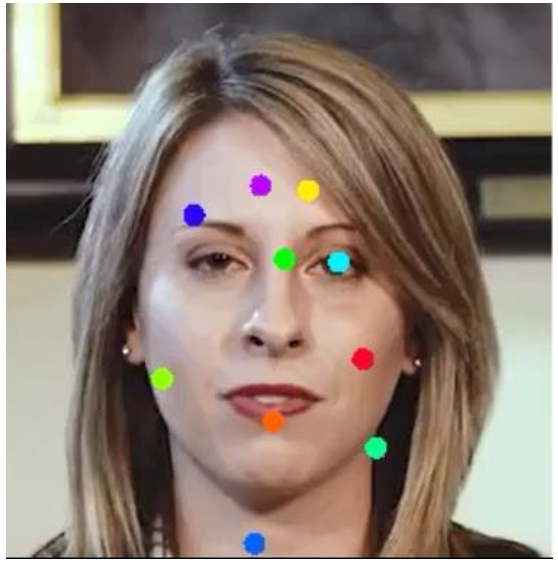
Results

Extensive Needs for Talking Head Creation

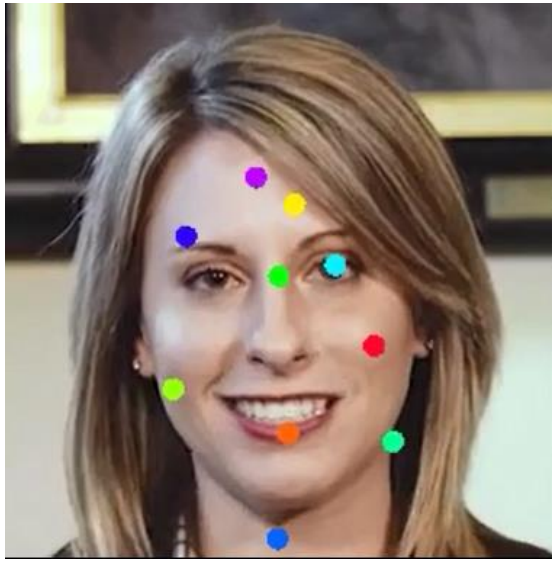
user

avatar

Limitations of Prior Works



Source



Driving

Inaccurate warping from **sparse landmarks** or **3D face prior**

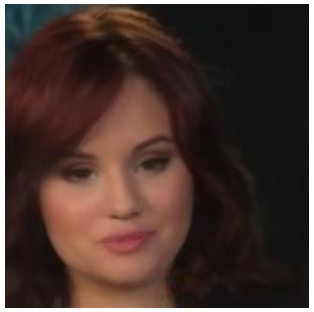
Source

Driving

PIRender

FOMM

Bilayer



Ours

Identity could not be well preserved

Framework Overview

Source Image

Driving Video

Landmark Encoding

Motion Estimation

Warping

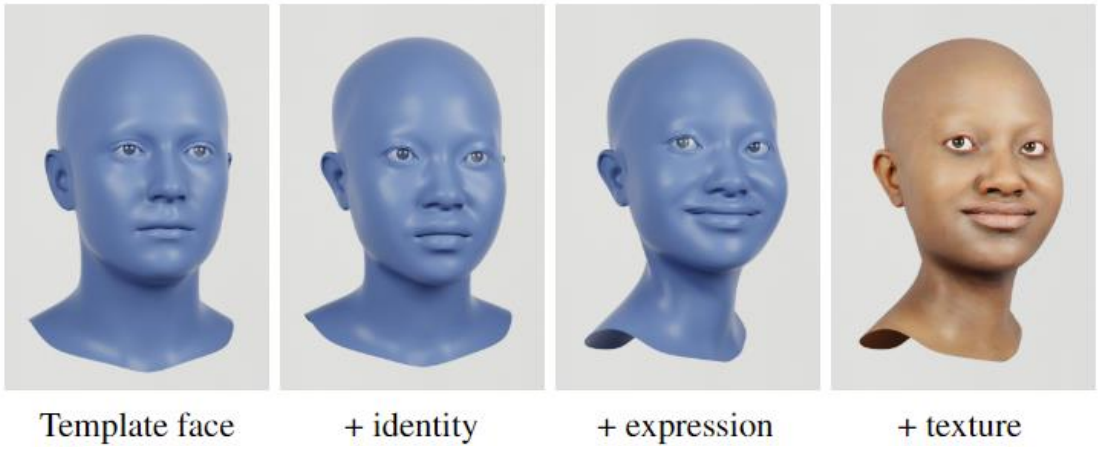
ID-preserving Refinement

Temporal SR

Neural Renderer

Output

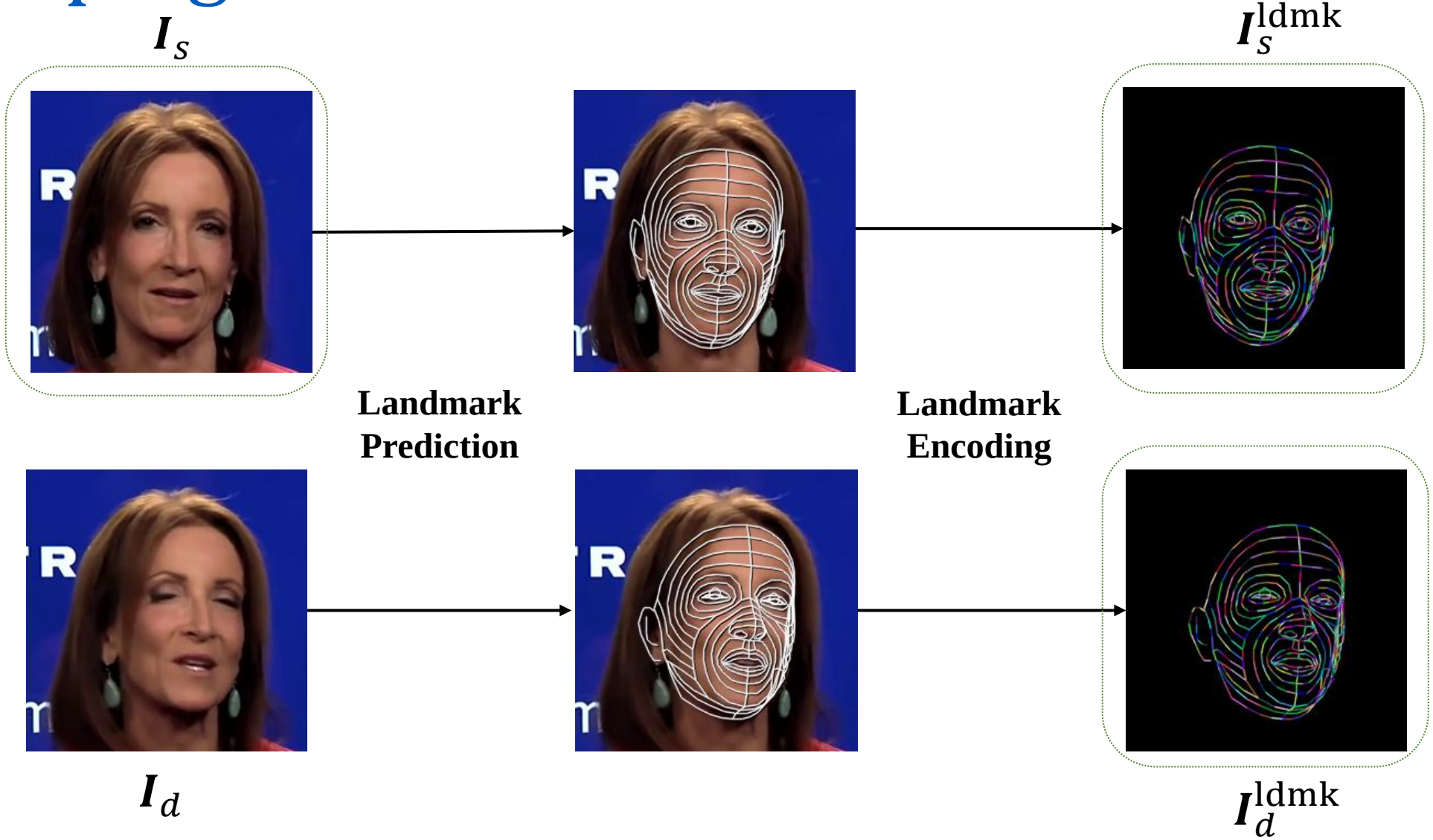
Dense Landmarks



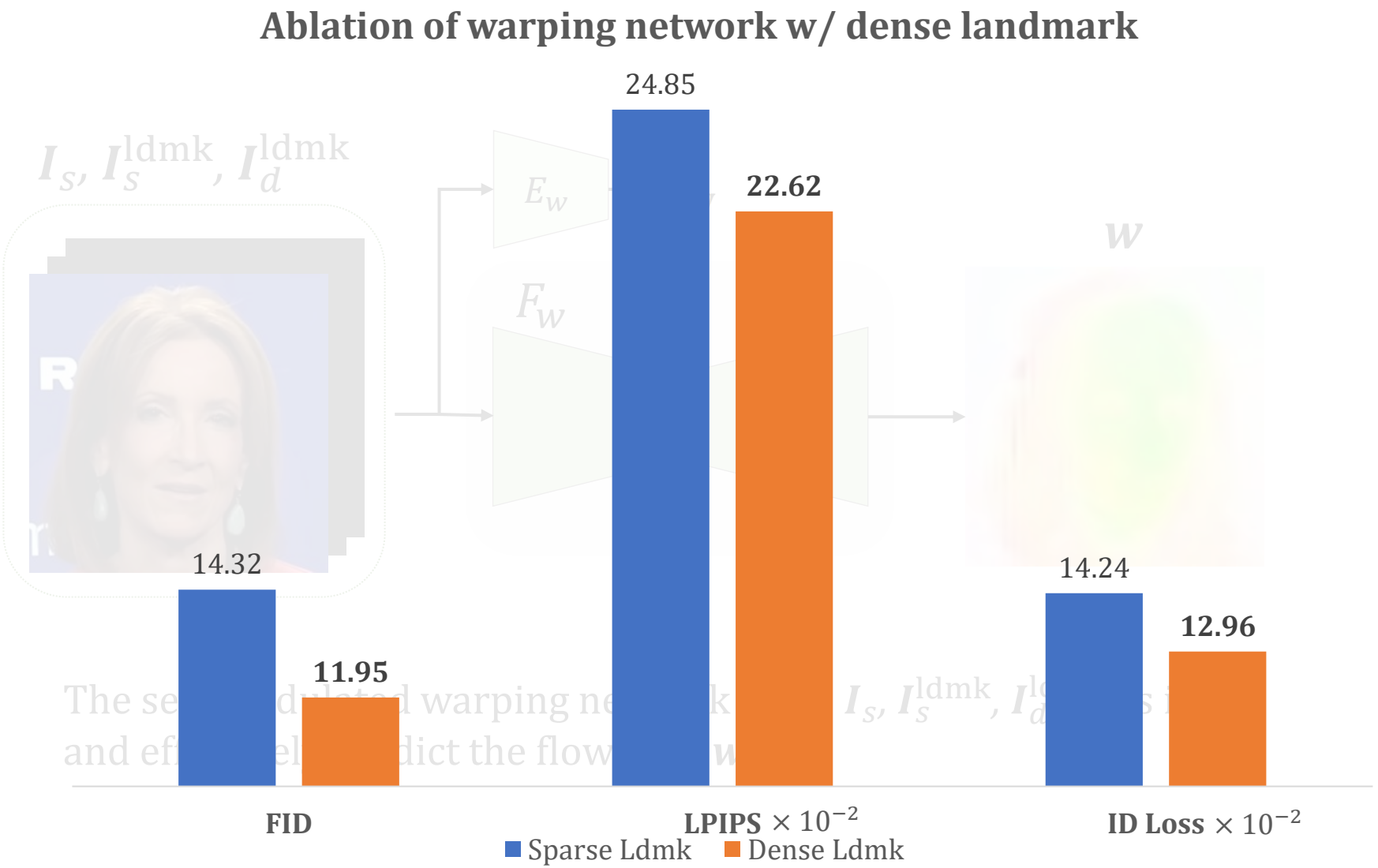
Erroll Wood et al. Fake It Till You Make It, ICCV 2021

Erroll Wood et al. 3d Face Reconstruction With Dense Landmarks, ECCV 2022

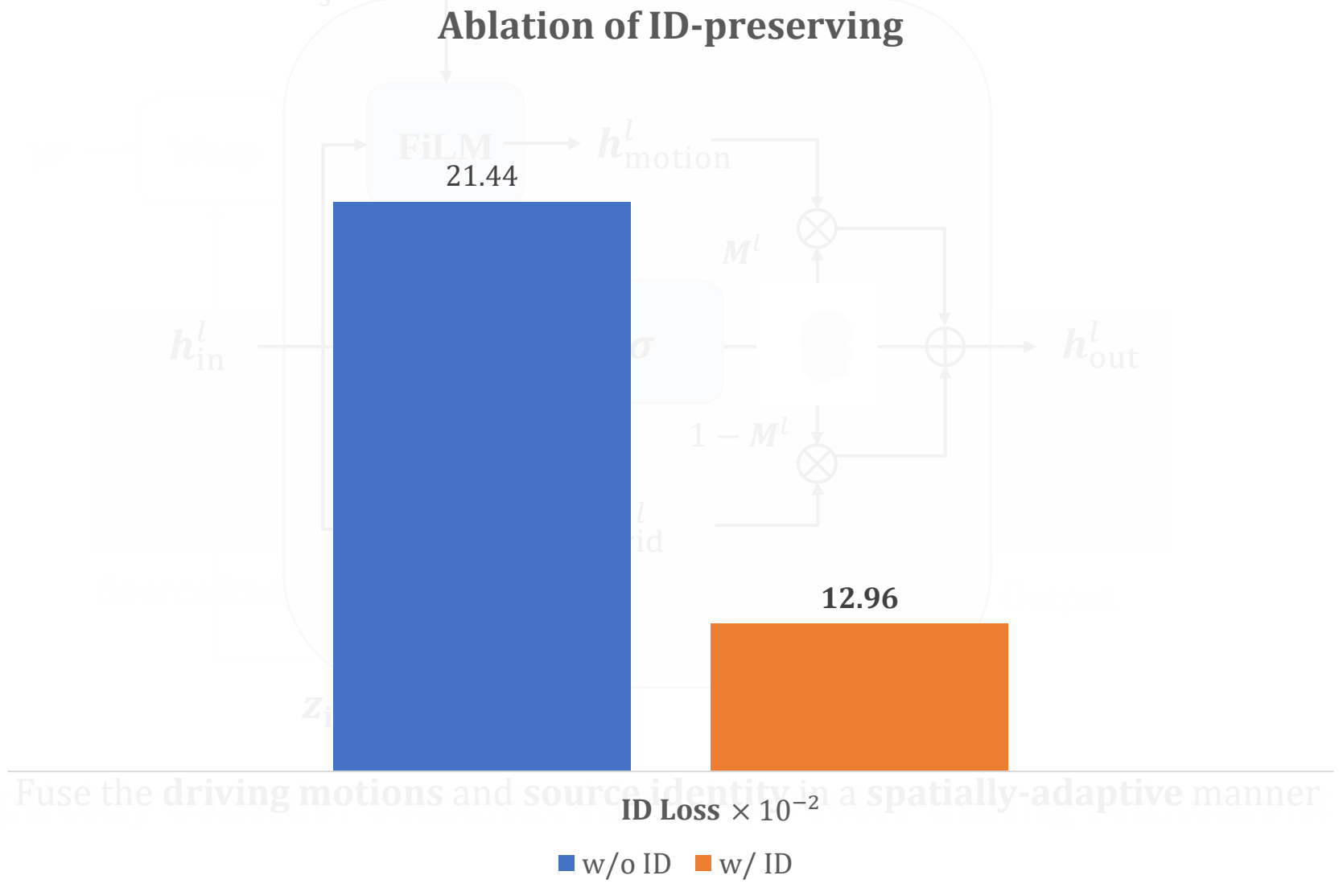
Warping Prediction with Dense Landmarks



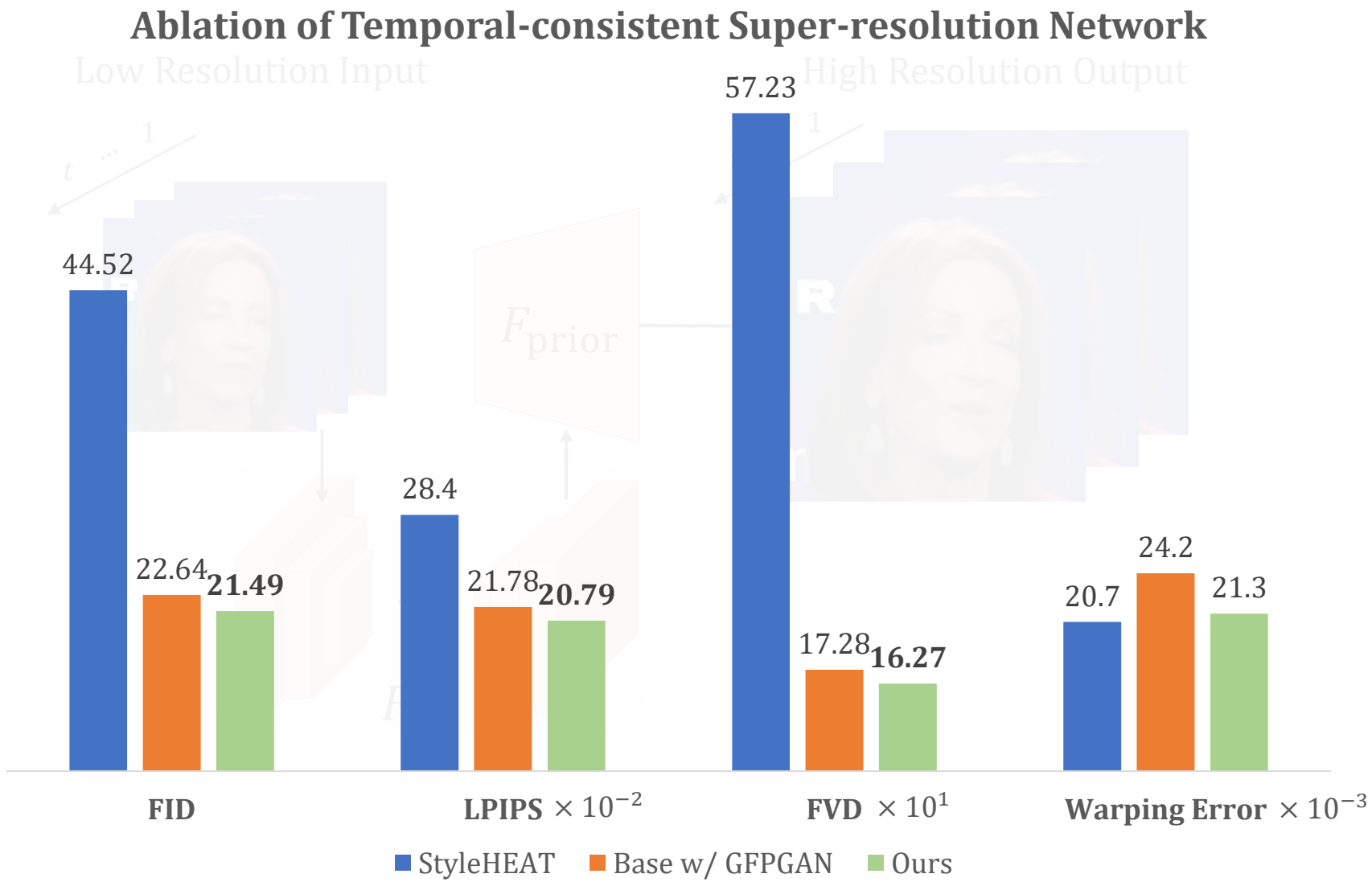
Warping Prediction with Dense Landmarks



Identity-preserving Refinement



Temporal-consistent Super-resolution Network



Visual Comparison

Source

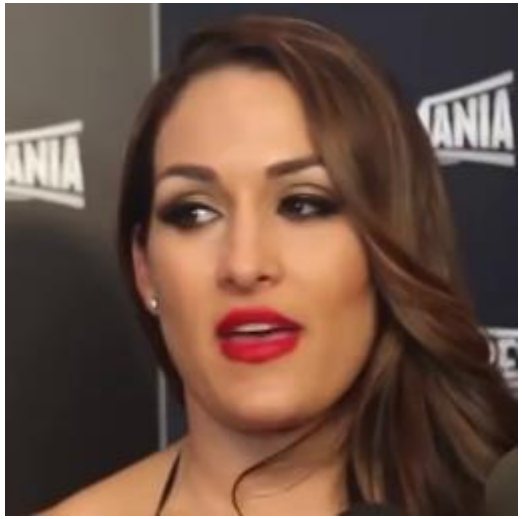
GT

Ours

FOMM

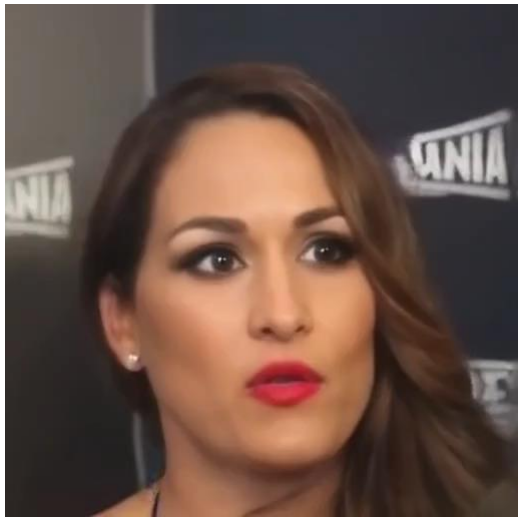
PIRender

Visual Comparison



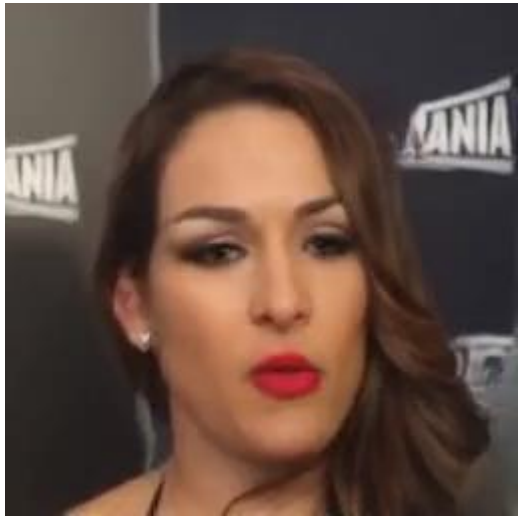
Source

Driving



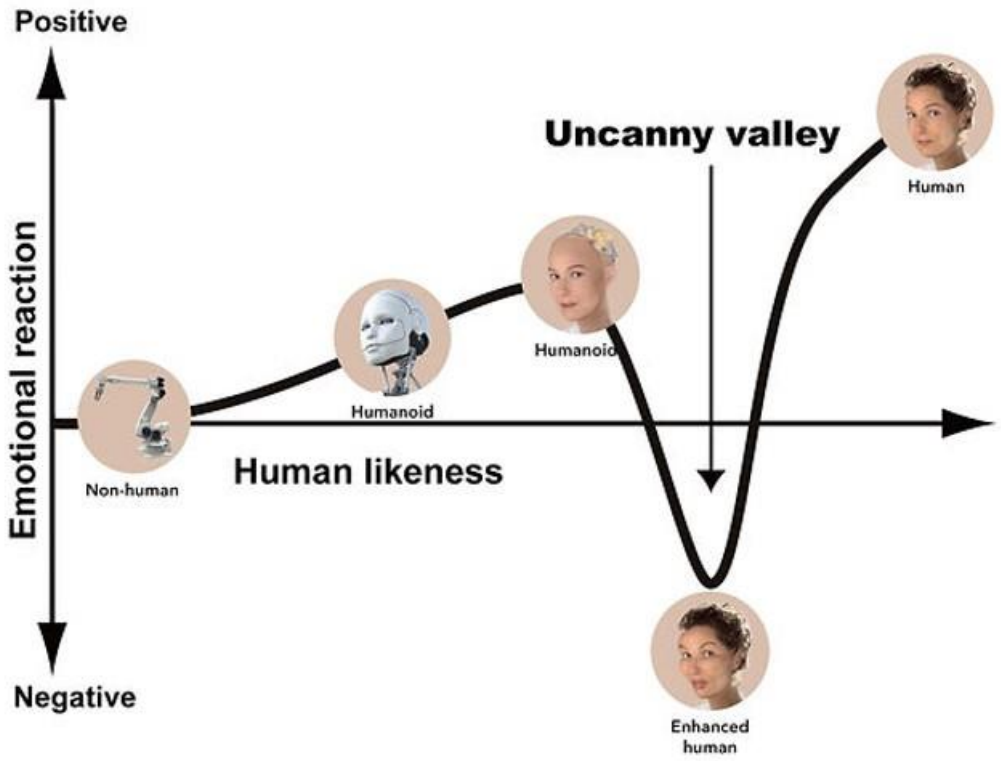
Ours

FOMM



PIRender

Importance of Personalization



One-shot model could never circumvent **uncanny valley**.

Source Image

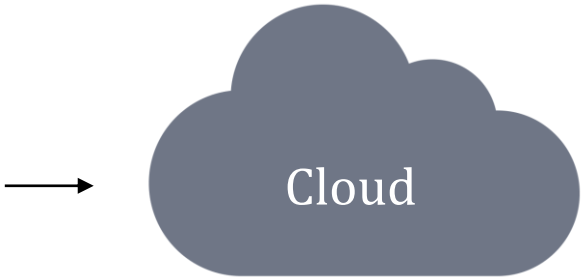
?

Driving Image

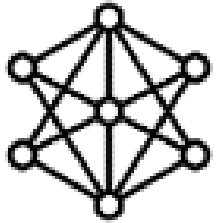
Hallucinate **occluded** parts is **ill-posed** under **one-shot** setting.

Personalization is Computationally Intensive

Several minutes of user video



Hours of optimization

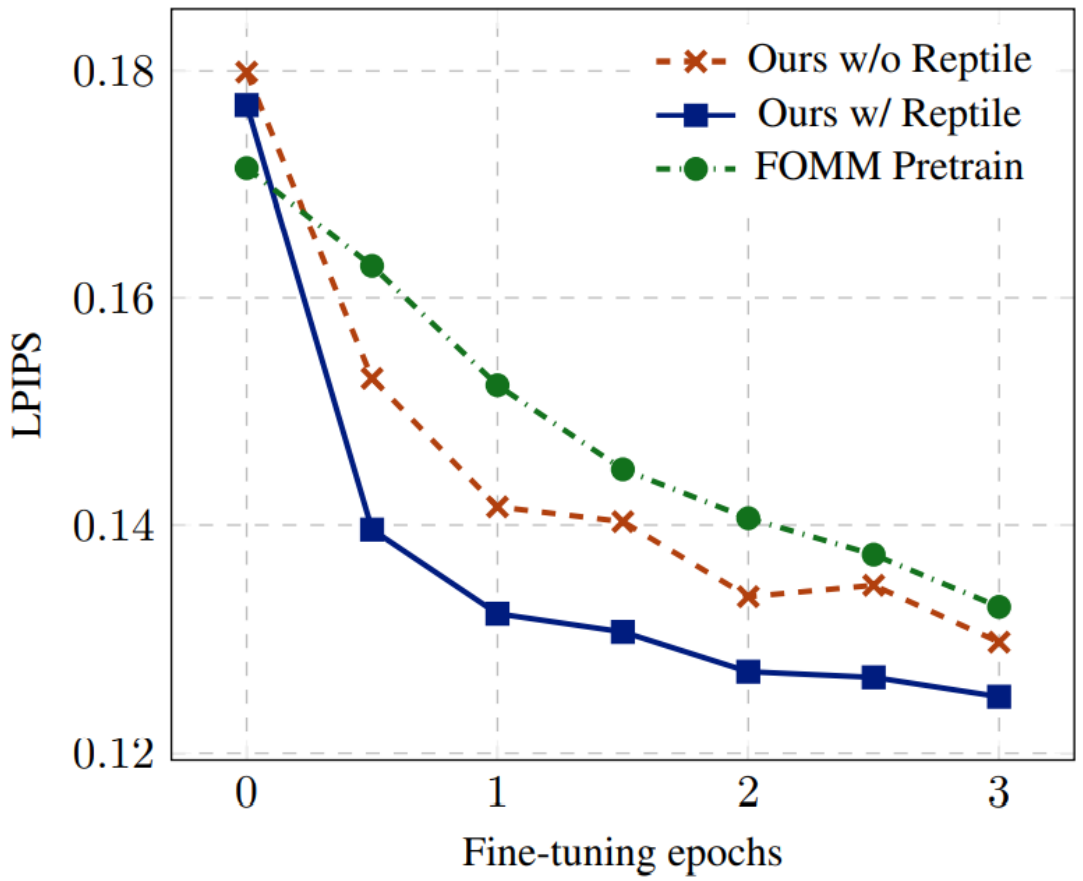


Personalized model

Meta-learning for Fast Personalization

- Find a **good initialization** that can be rapidly adapted to new identities.

<1 minutes personalization



Results before Fast Personalization

30 secs Personalization

Source

GT

Before Personalization

Results after Fast Personalization

Source

GT

Personalized Output
LPIPS: **0.1485** → **0.082**

Thanks!

Code is available!