

# An Unsupervised 3D Face Reconstruction Method

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TBSI

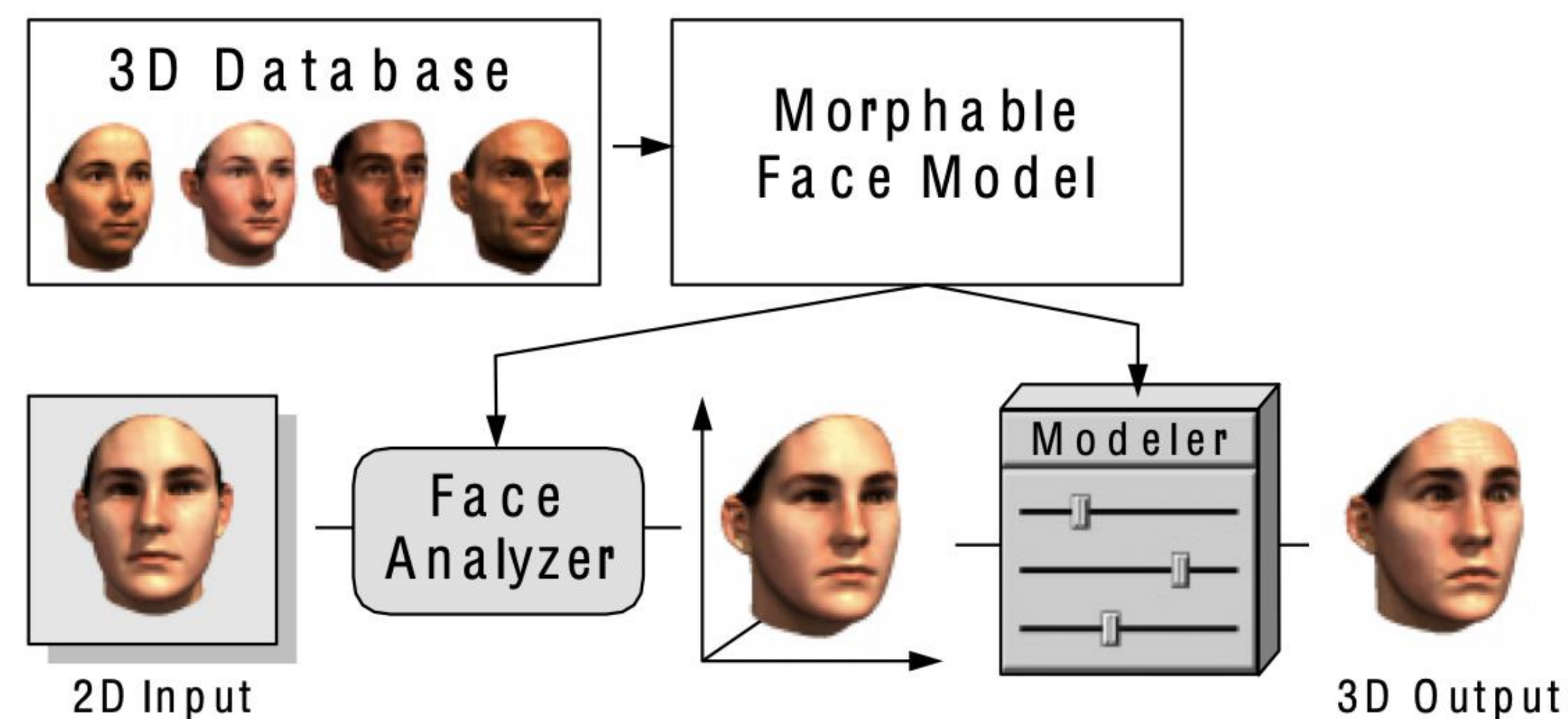
## ABSTRACT

- Real-time 3D face reconstruction
- Landmark-free training and inference
- Accurate reconstruction with skinning attention

## INTRODUCTION

**3D face reconstruction** refers to restoring the 3D shape of the original face from one or more uncalibrated 2D face pictures.

- The most commonly used face models today are based on **3DMM**, that is, three-dimensional morphable face models.



### Traditional Iterative Approach

- High quality 3d scanning is required
- Unable to use online snapshots
- The characterization ability of 3DMM is limited by samples and linear structure

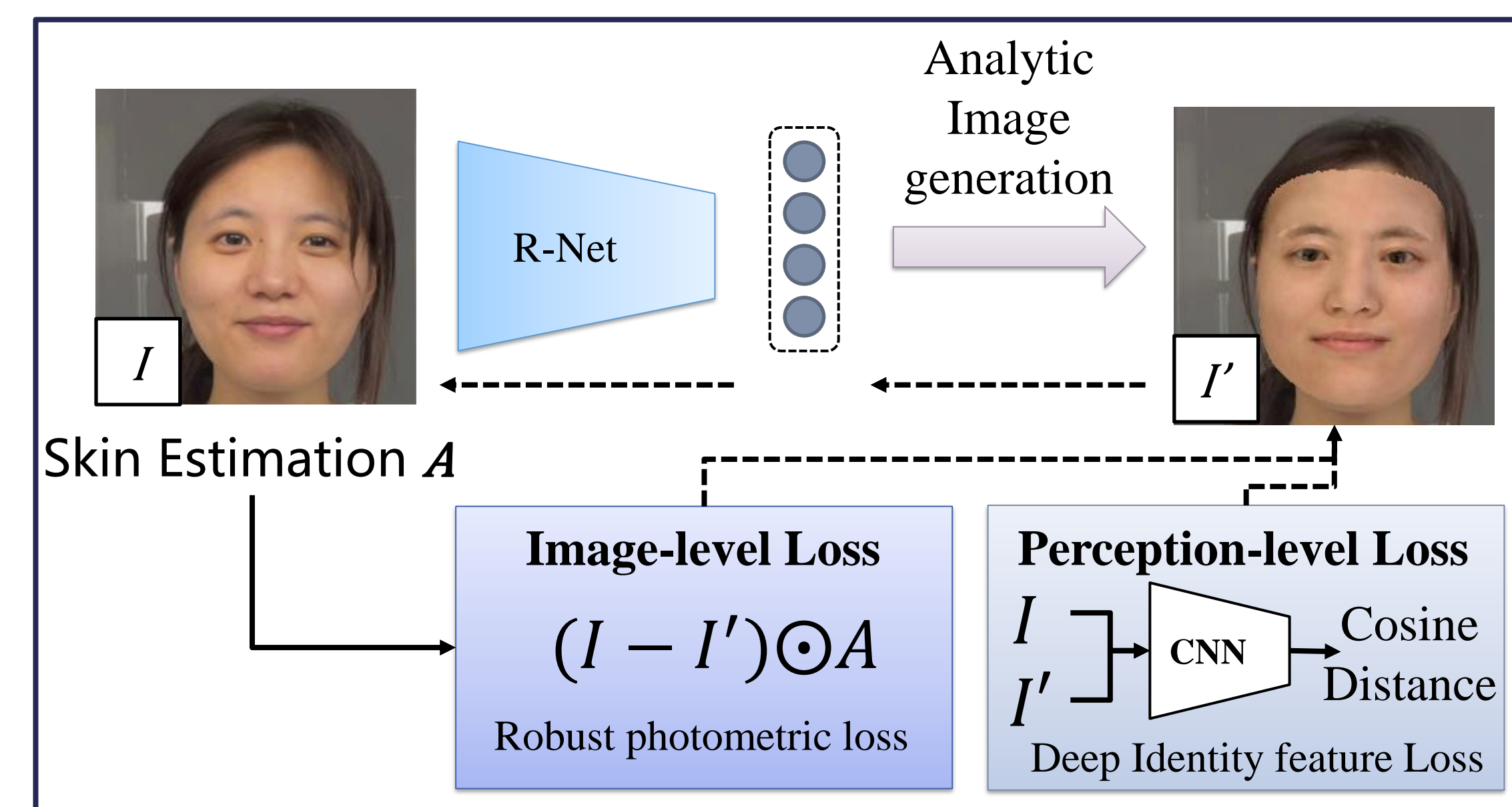
### Our Method

- Learning based
- Real-time reconstruction

## METHOD

### Training

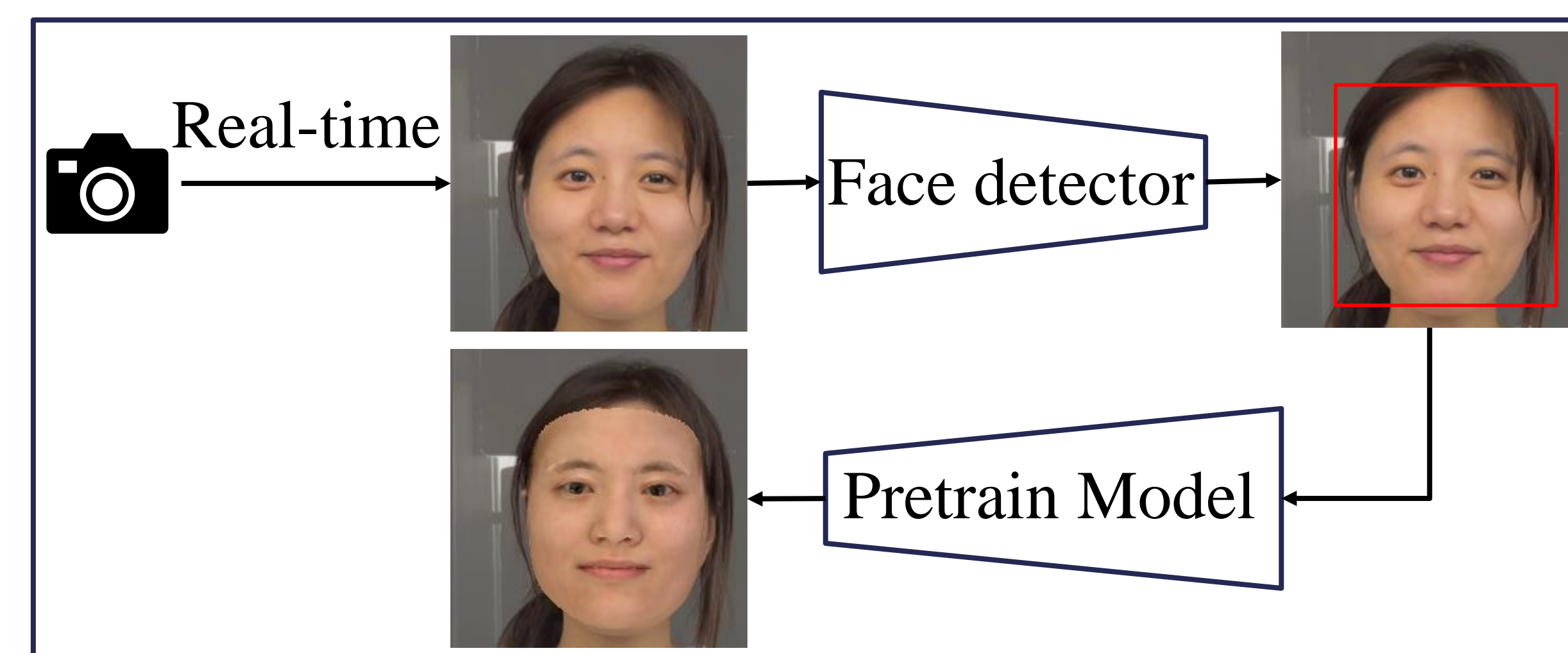
- The model uses about 260K face images as input, and the training network uses ResNet50.
- The training goal is to optimize the weights of 5 basis such as identity, and the training process is divided into two types of loss.



Training pipeline for single image 3D face reconstruction

### Inference

- We first changed the input to a stream of photos output by the camera in real time.
- In addition, to speed up and avoid manual annotation of the landmark, we added a module to detect faces in real time and use the faces in crop as input.

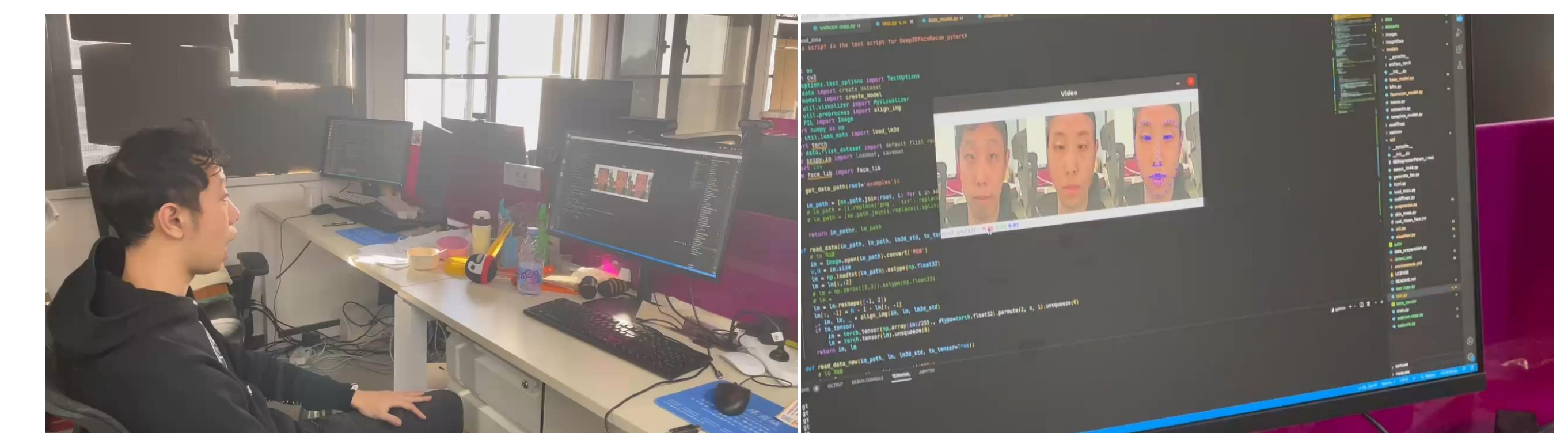
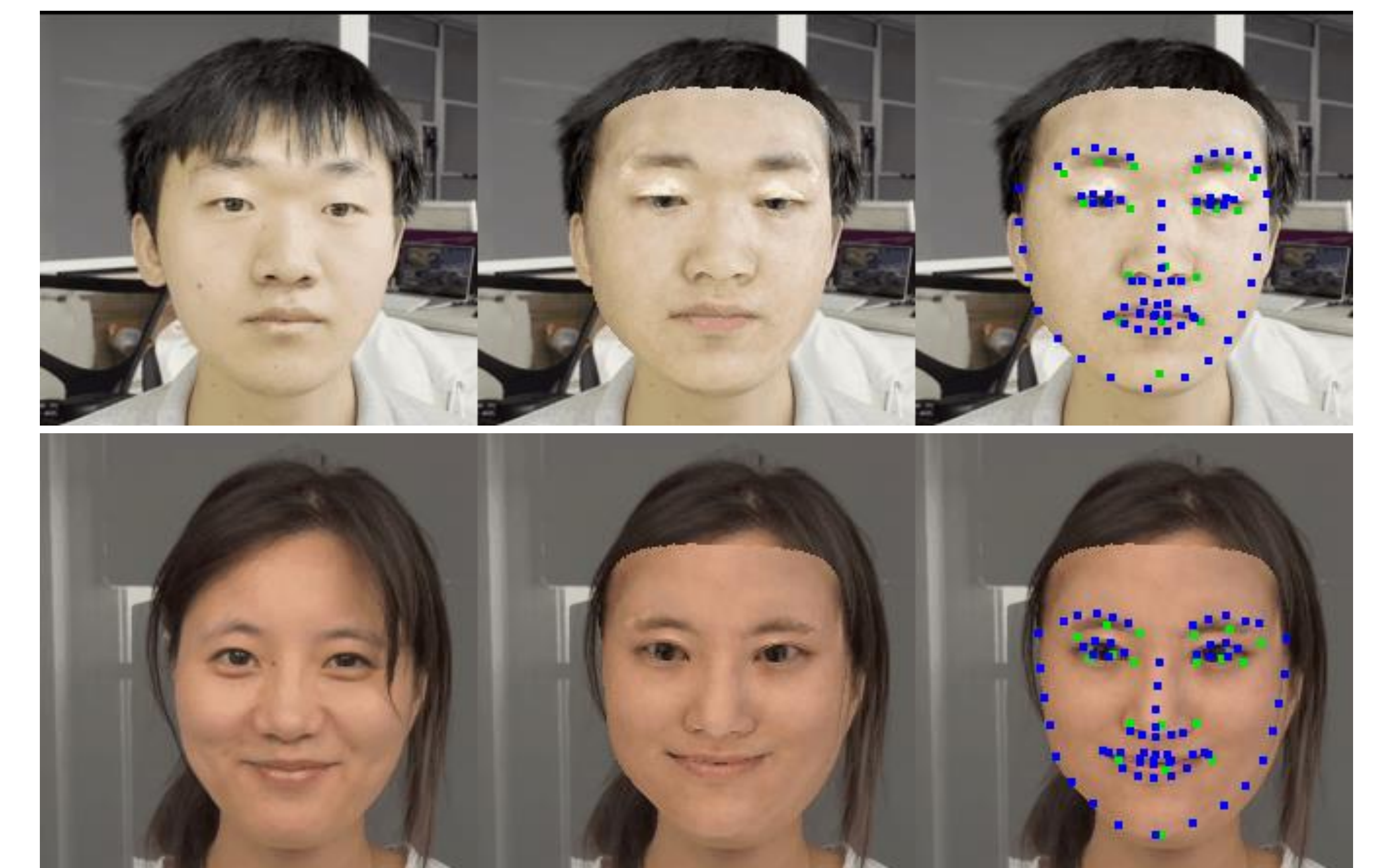


Infer pipeline for single image 3D face reconstruction

## CONCLUSION

- Fast!
- No Supervision!
- Accurate!

## RESULTS



## REFERENCES

- [1] Volker Blanz et al. A morphable model for the synthesis of 3D faces. SIGGRAPH. 1999.
- [2] Yu Deng et al. Accurate 3d face reconstruction with weakly-supervised learning. CVPR. 2019.