

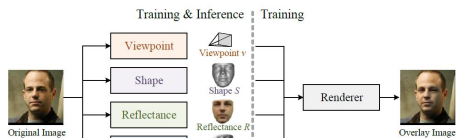
Self-Supervised 3D Face Reconstruction via Conditional Estimation

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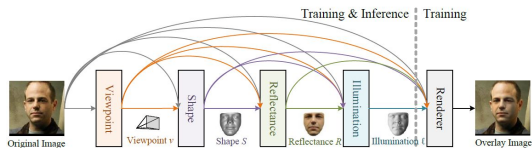
Introduction

- We address the problem of 3D face reconstruction from 2D single-view images with self-supervised learning.
- The general approach is based on autoencoder, where the 3D facial parameters are **estimated individually**, as illustrated in Fig. (a).
- We propose a **conditional estimation** (CEST) framework, which explicitly considers the statistical dependency of the 3D facial parameters, as illustrated in Fig. (b).



$$P(S,R,v,\ell|I) = P(S|I)P(R|I)P(v|I)P(\ell|I)$$

(a) Most existing methods assume conditional independence.



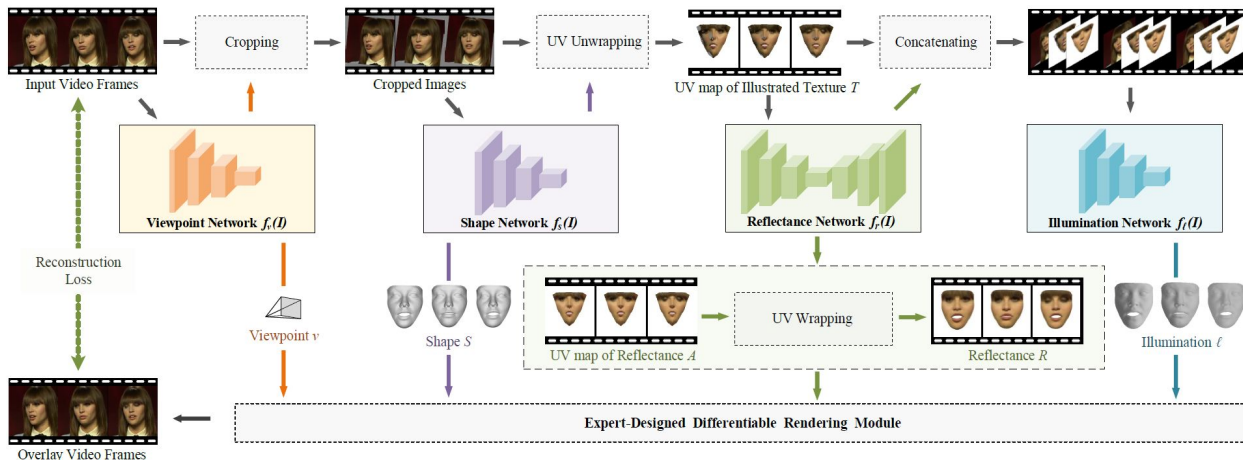
$$P(S,R,v,\ell|I) = P(v|I)P(S|I,v)P(R|I,v,S)P(\ell|I,v,S,R)$$

(b) The proposed CEST makes no assumption on dependency.

Methodology comparisons

	statistical dependency	fast inference
learning-based methods	✗	✓
optimization-based methods	✓	✗
CEST	✓	✓

Conditional Estimation Framework



Results

