

Applications

Sergey Tulyakov

Deep Fakes

Problem of Deep Fakes

A single model animates all images given only a single source image

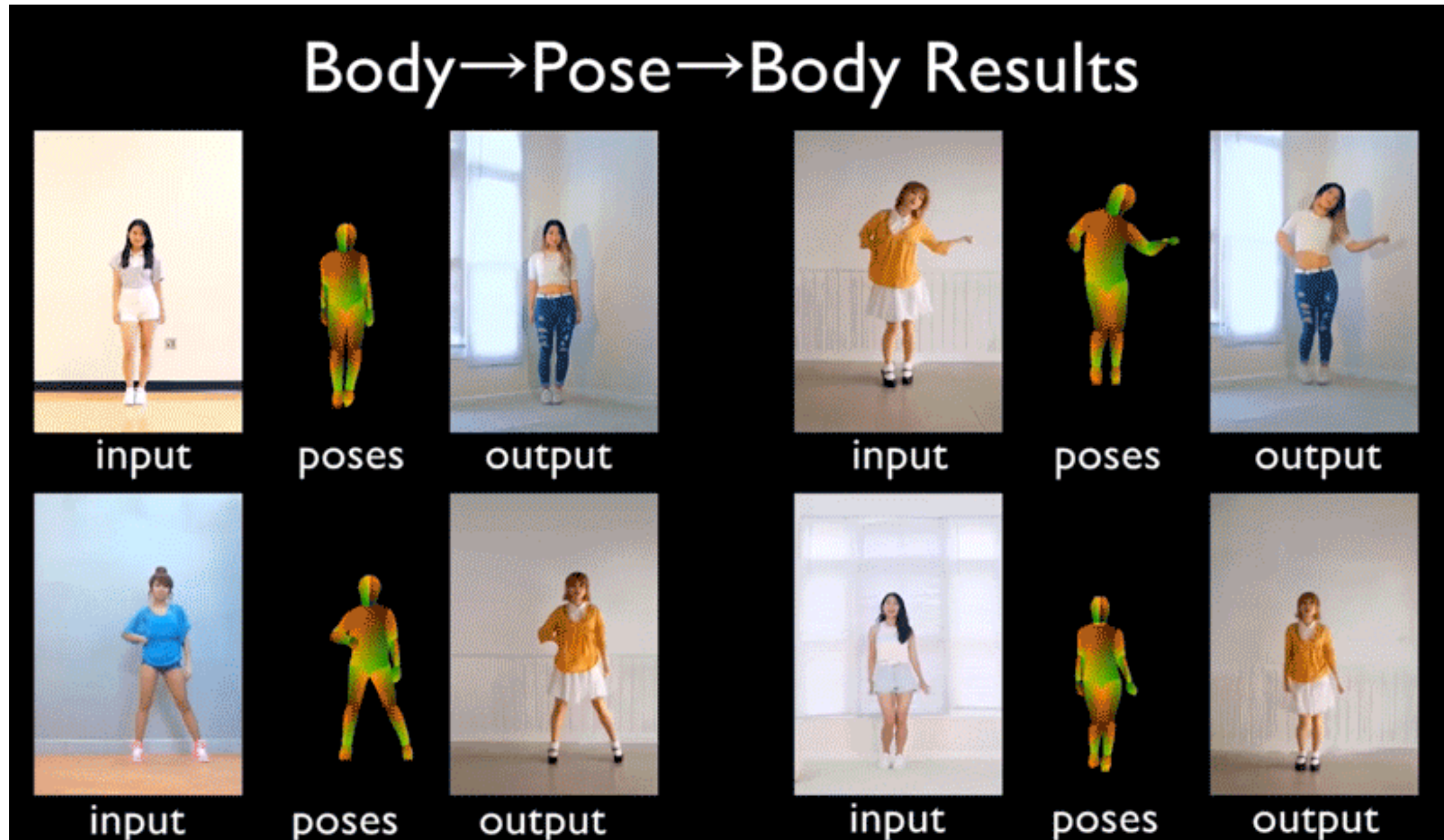
Driving video



Problem of Deep Fakes



Problem of Deep Fakes



Is there a Problem?

How New is the Problem?

ation is as old as photography

Fonda Speaks To Vietnam Veterans At Anti-War Rally



Actress And Anti-War Activist Jane Fonda Speaks to a crowd of Vietnam Veterans as Activist and former Vietnam Vet John Kerry (LEFT) listens and prepares to speak next concerning the war in Vietnam (AP Photo)

(a) Spliced Image



(b) Authentic Image

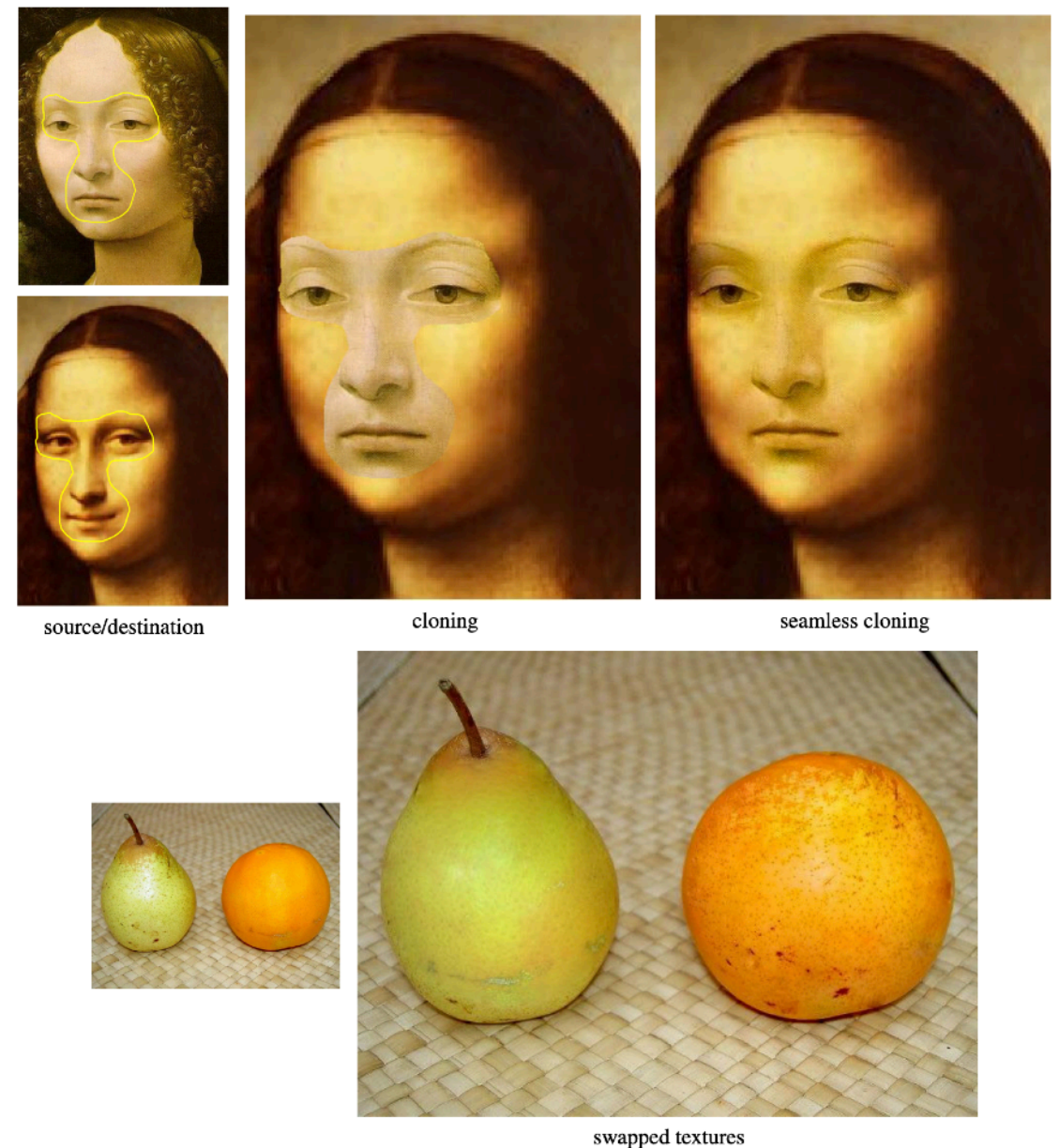
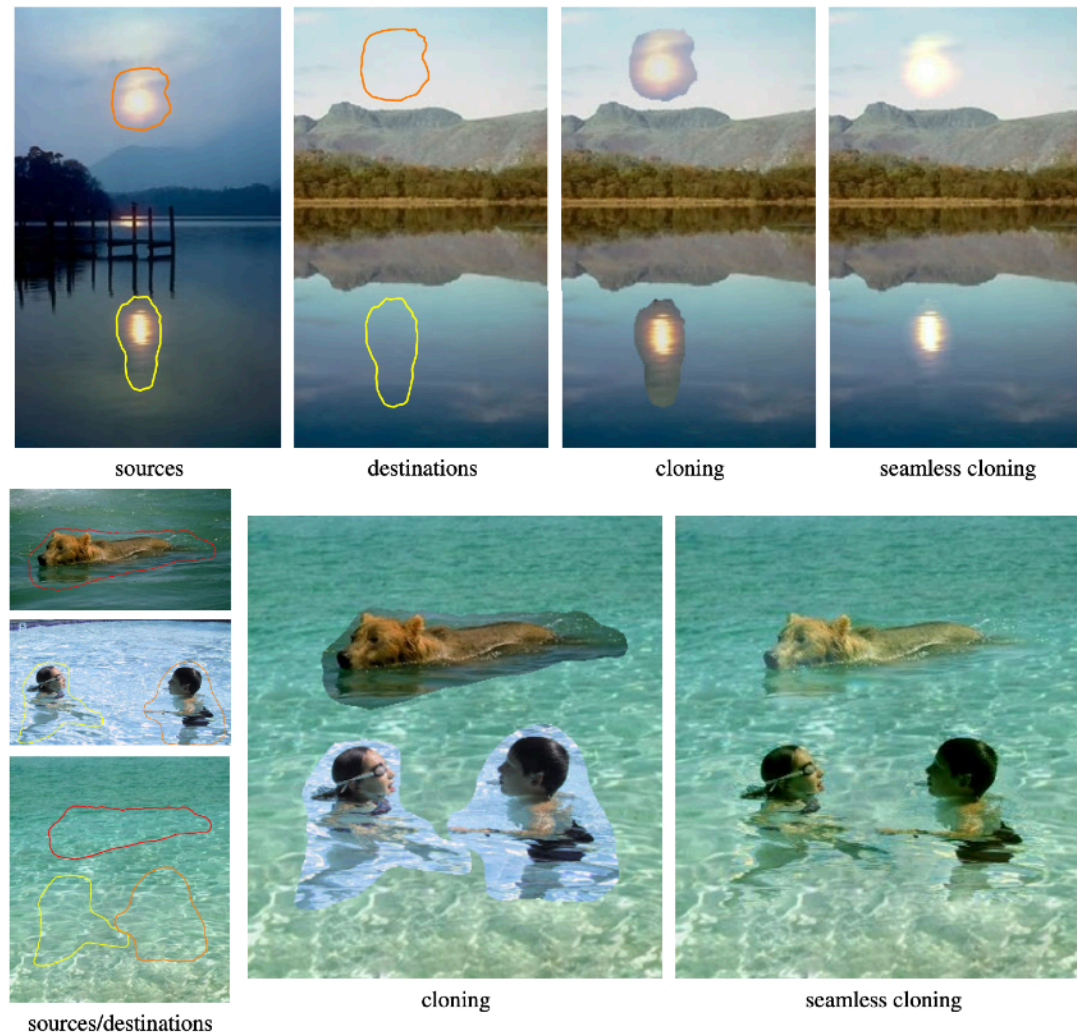


(c) Authentic Image



How New is the Problem?

Not new...image manipulation is as old as photography



Hays, James, and Alexei A. Efros. "Scene completion using millions of photographs." SIGGRAPH'2007

How New is the Problem?

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Original Image

Input

Scene Matches

Output



Original Image

Input

Criminisi et al.

MS *Smart Erase*

Wilczkowiak et al.

Our algorithm

Hays, James, and Alexei A. Efros. "Scene completion using millions of photographs." SIGGRAPH'2007

How New is the Problem?

So not new...but simplicity is new



CREATING GOLLUM

naturevideo

A Solution?

Deep fake detection tools need to be made simple!

Humans can detect 53.5% of manipulated images



Wang, Sheng-Yu, et al. "Detecting Photoshopped Faces by Scripting Photoshop." ICCV'2019

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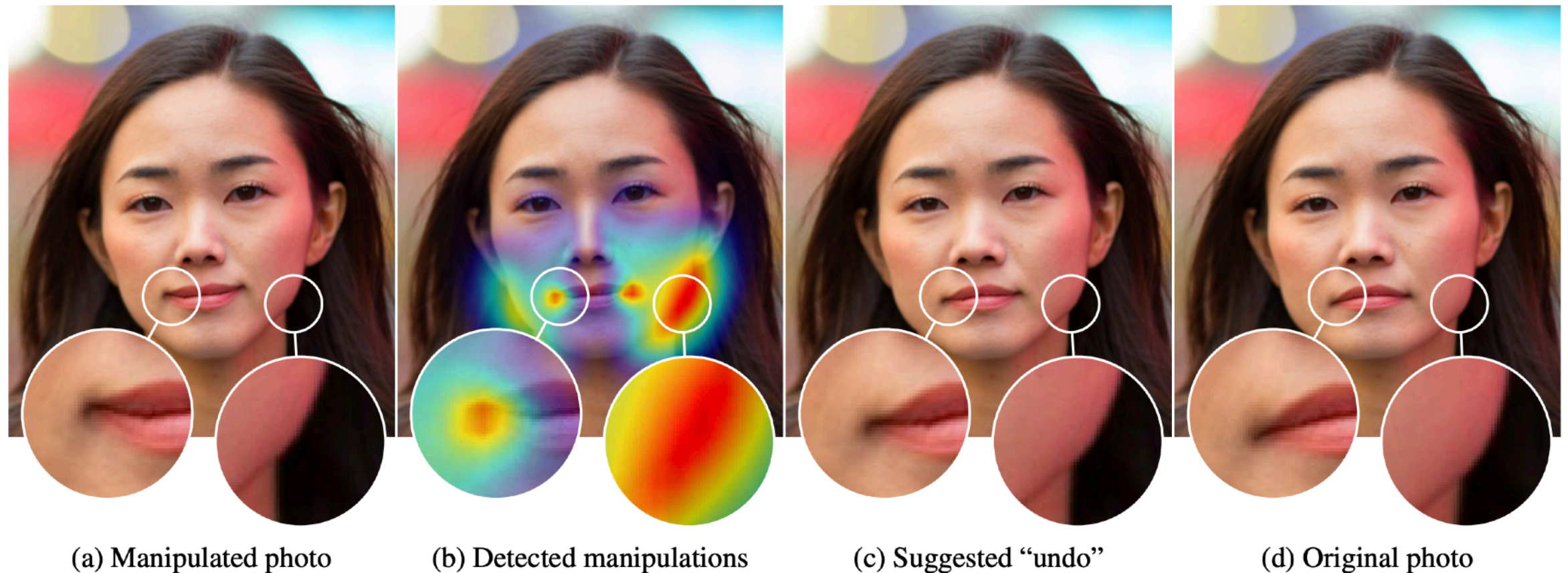
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Detecting Deep Fakes

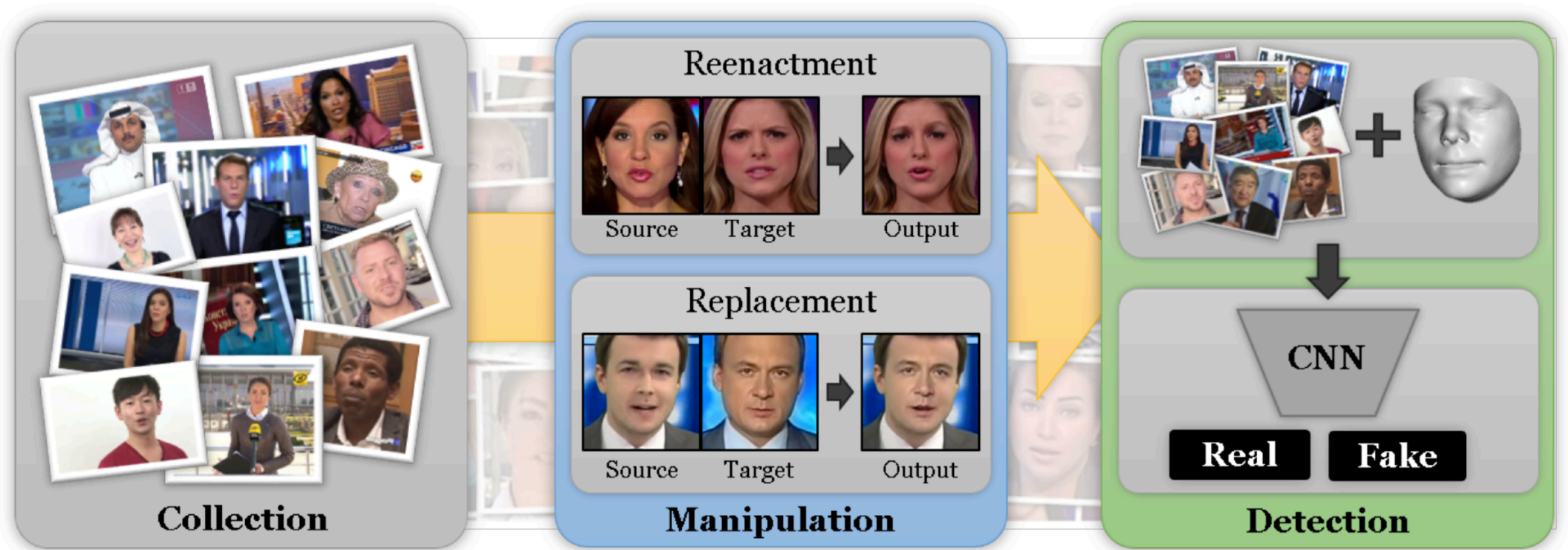
Training Data: use photoshop Face-Aware Liquify tool



Wang, Sheng-Yu, et al. "Detecting Photoshopped Faces by Scripting Photoshop." ICCV'2019

FaceForensics++

Uses Deep Fakes, Face2Face, FaceSwap and Neural Textures



Rössler, Andreas, et al. "Faceforensics++: Learning to detect manipulated facial images." ICCV'2019

Future of Deep Fake Detection

- Algorithm independent methods
- Image and video watermarking
- Algorithm + detection methods
- Liveliness detection