FuSta

Hybrid Neural Fusion for Full-frame Video Stabilization

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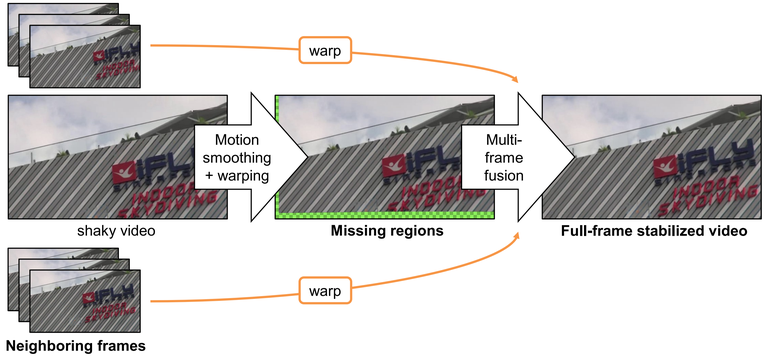
alex04072000.github.io/FuSta

2021 ICCV OCTOBER 11-17 VIRTUAL

1. Fusing multiple frames:

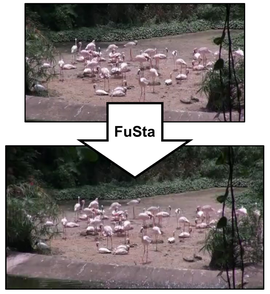
- Our problem:
  - Inputs: multiple aligned frames with missing regions
  - Output: fused frame



- Applications:

Video completion

FOV expansion

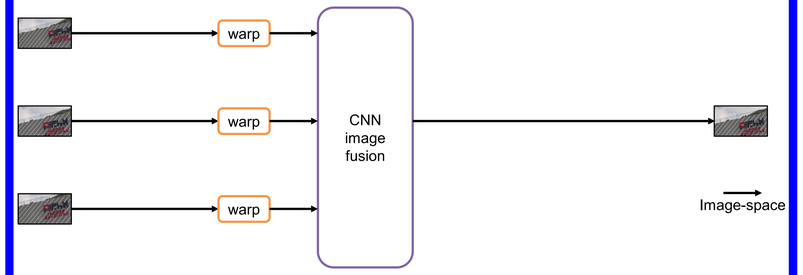


View synthesis

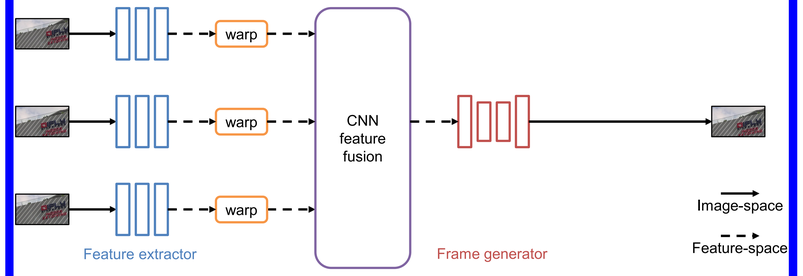
- State-of-the-art full-frame video stabilization
- Agnostic to motion smoothing techniques
- Hybrid-space neural fusion for full-frame video stabilization

2. Design choices for fusing multiple frames

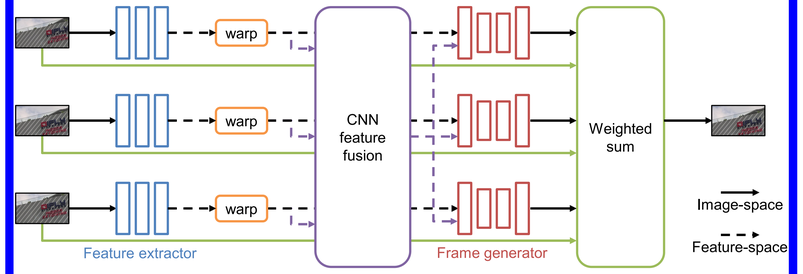
- Image (late fusion): Sharp contents ✓ Visible artifacts ×



- Feature (early fusion): Alleviates artifacts ✓ Blurry results ×



- Hybrid fusion (proposed)
  - **Robust** to flow inaccuracy ✓
  - Produces **sharp** output frames ✓



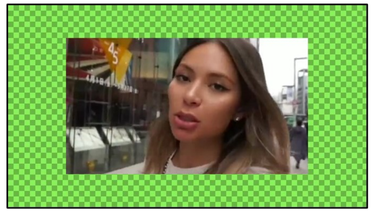
3. Results: State-of-the-art Full-frame Video Stabilization

- FuSta does not suffer from aggressive cropping of frame borders and renders stabilized frames with significantly fewer artifacts.

Input

FuSta

Adobe Premiere Pro 2020



Aggressive cropping of frame borders ×

DIFRINT

Artifacts ×

- FuSta achieves the **best average score** with **no cropping** for all the videos

	NUS				Selfie				DeepStab			
	C ↑	D ↑	S ↑	A ↓	C ↑	D ↑	S ↑	A ↓	C ↑	D ↑	S ↑	A ↓
Bundle	0.84	0.93	**0.89**	0.78	0.68	0.82	0.85	0.84	0.76	0.91	0.84	**0.56**
L1Stabilizer	0.74	0.92	**0.89**	0.88	0.75	**0.92**	0.85	0.84	0.74	0.92	**0.85**	0.70
StabNet (online method)	0.66	0.88	0.82	1.02	0.70	0.78	0.83	0.83	0.65	0.86	0.80	0.80
DIFRINT	**1.00**	**0.96**	0.83	0.87	**1.00**	0.87	0.85	0.72	**1.00**	0.94	0.78	0.78
Yu and Ramamoorthi, 2020	0.86	0.91	0.85	0.88	0.78	0.79	0.87	0.77	0.82	0.92	0.81	0.72
Yu and Ramamoorthi, 2018	-	-	-	-	0.85	0.91	**0.88**	0.76	-	-	-	-
Adobe Premiere Pro 2020	0.74	0.82	0.87	0.84	0.71	0.80	0.84	0.79	0.73	0.87	0.83	0.78
FuSta	**1.00**	**0.96**	0.85	**0.77**	**1.00**	0.87	0.87	**0.64**	**1.00**	**0.96**	0.81	0.64