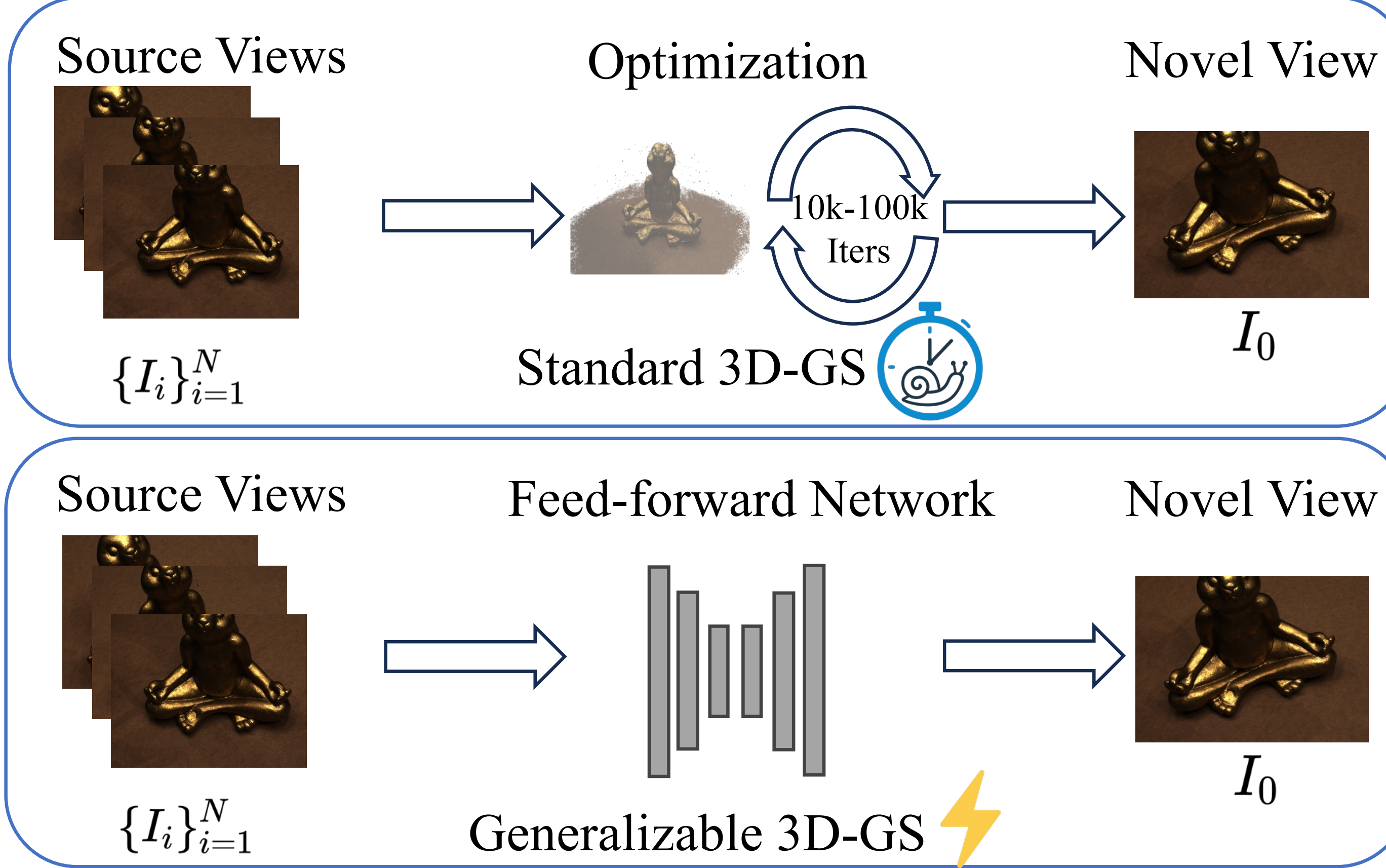
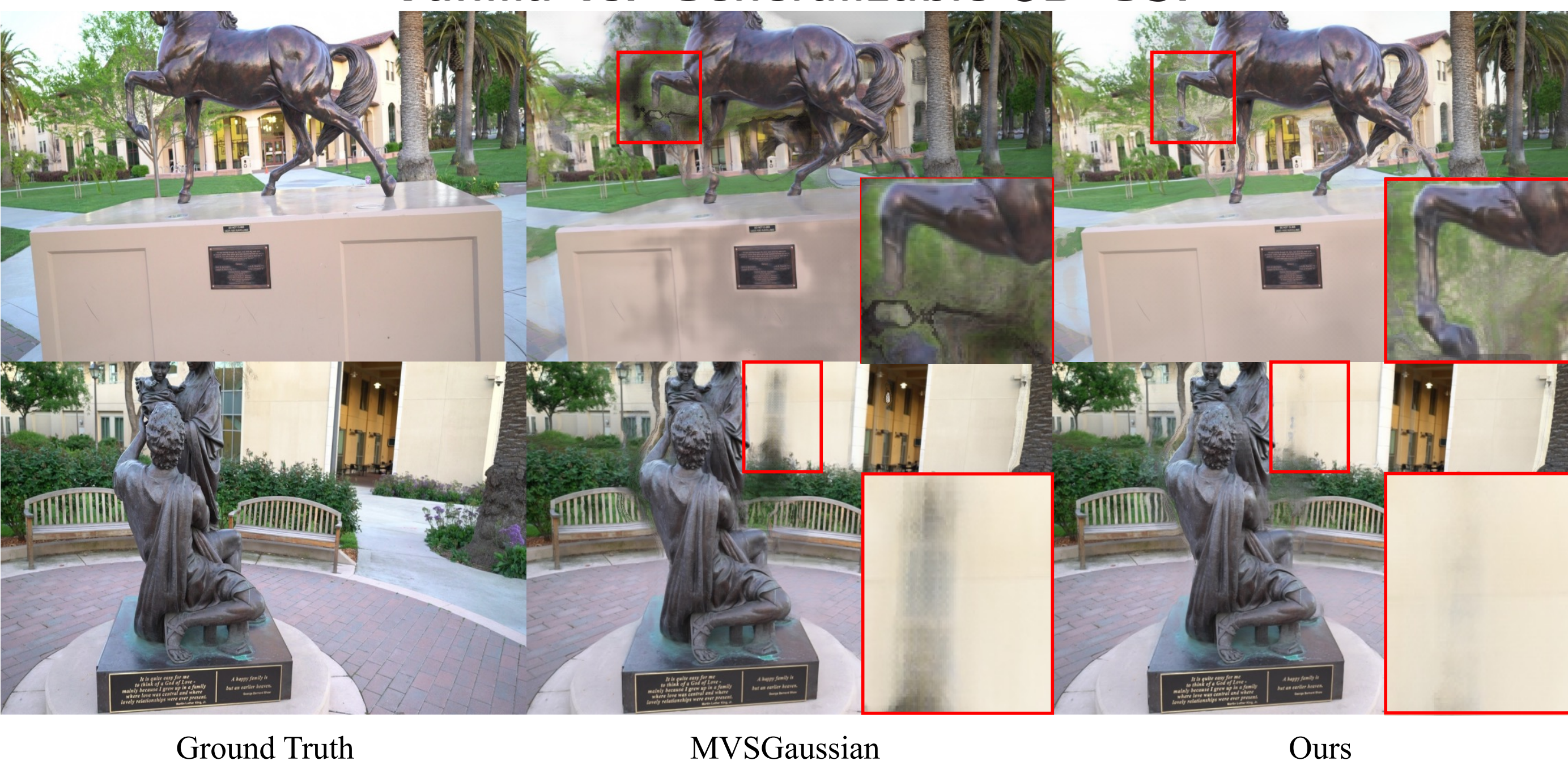


Contributions

Generalizable Gaussian Splatting aims to synthesize novel views for unseen scenes without per-scene optimization. We propose C^3 -GS, a framework that enhances feature learning by incorporating context-aware, cross-dimension, and cross-scale constraints.

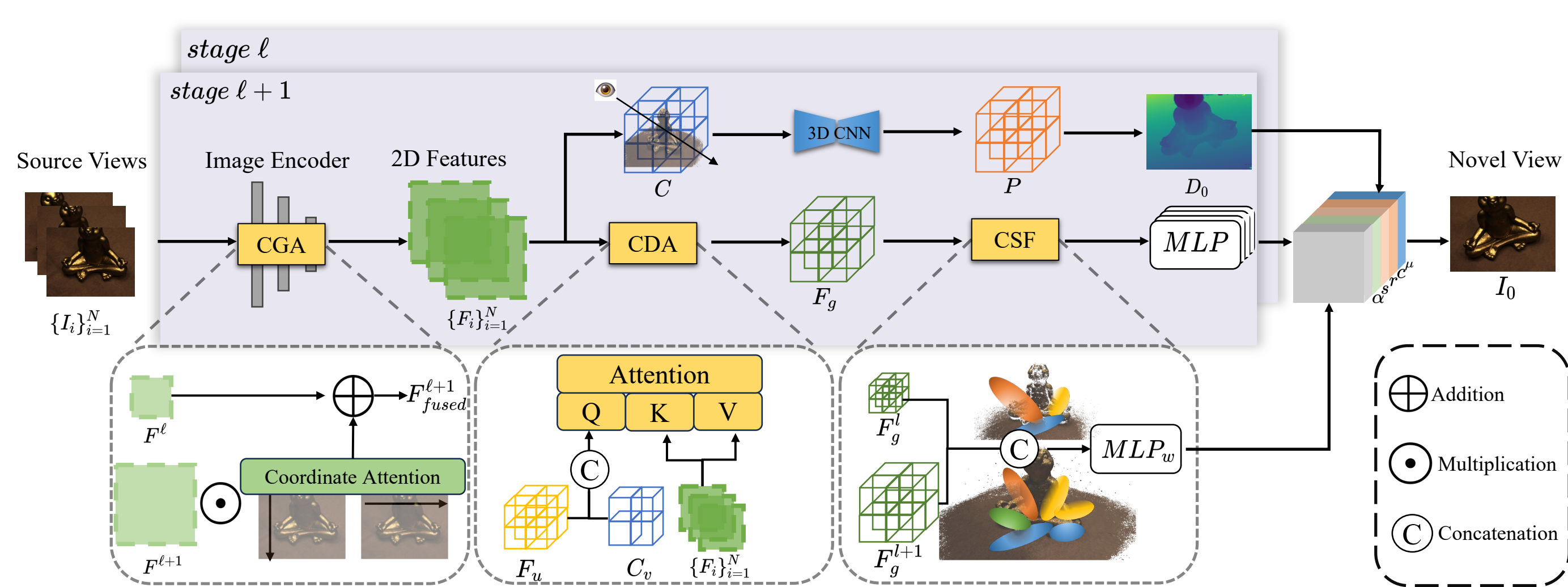


Vanilla vs. Generalizable 3D-GS.



Synthesized images on "Horse" and "Family" scenes.

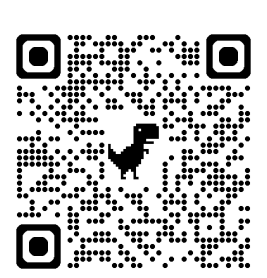
Pipeline



The overall architecture. The proposed method is a coarse-to-fine framework that estimates depths and Gaussian representations from low resolution ($stage\ l$) to high resolution ($stage\ l+1$).

- We propose **Coordinate-Guided Attention (CGA)**, which models the relative importance of spatial positions between features to capture long-range, feature-channel dependencies.
- We introduce **Cross-Dimensional Attention (CDA)**, to encode multi-view features for complete Gaussian representation. CDA enhances the interaction between 2D features and 3D scene information.
- We propose **Cross-Scale Fusion (CSF)**, which modulates the opacity of Gaussians across scales to enhance consistency. The output Gaussians are used to render the novel view I_0 .

Link



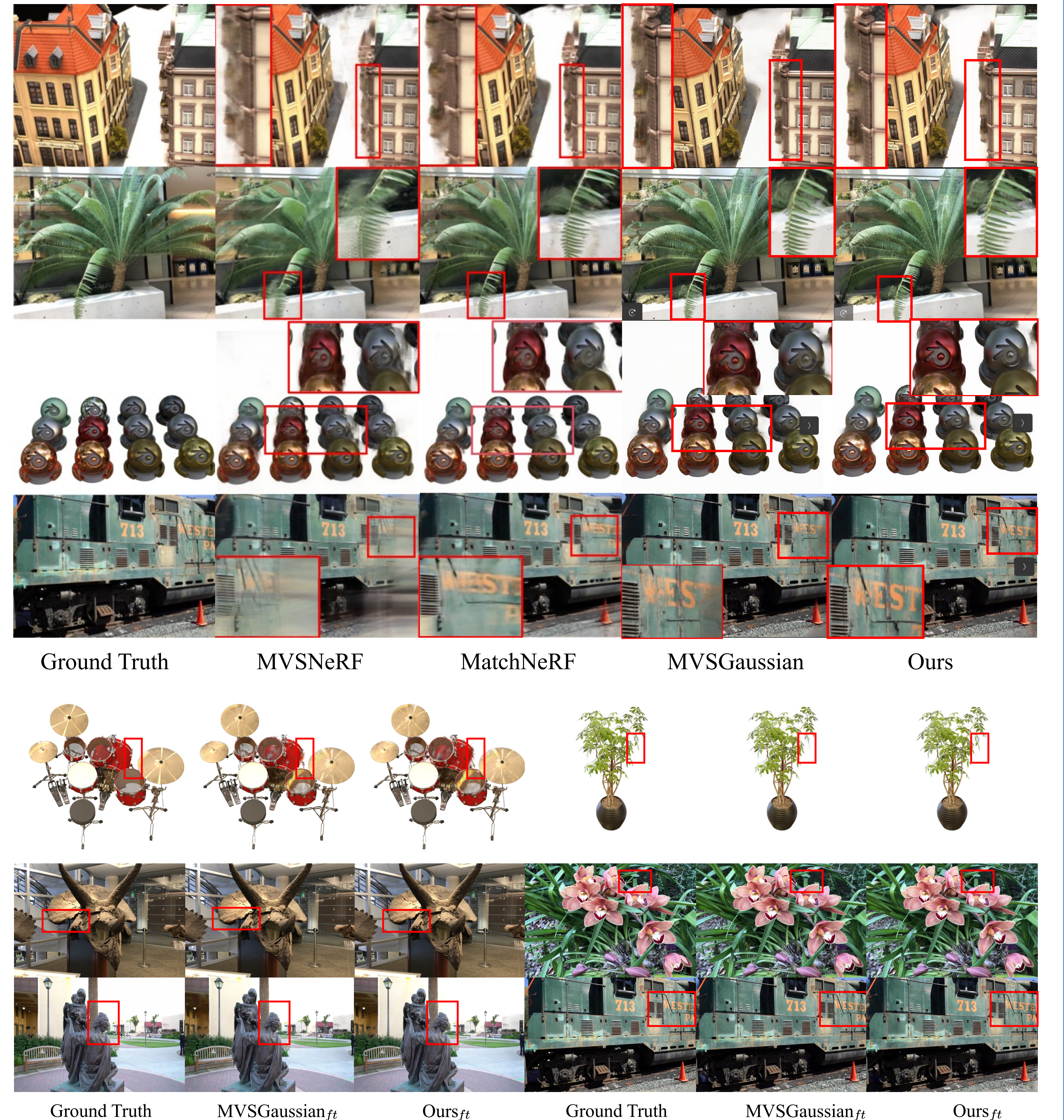
Code



LinkedIn

Scan the QR code for the full paper, code, and LinkedIn contact.

Qualitative Comparison



Qualitative comparison on DTU, Real Forward-facing, NeRF Synthetic, and Tanks and Temples datasets.

Quantitative Comparison

Method	2-view			3-view			Novel view		
	PSNR \uparrow	SSIM \uparrow	LPIPS \downarrow	PSNR \uparrow	SSIM \uparrow	LPIPS \downarrow	Abs err \downarrow	Acc(2) \uparrow	Acc(10) \uparrow
MVSNeRF	24.03	0.914	0.192	26.63	0.931	0.168	-	-	-
MatchNeRF	25.03	0.919	0.181	26.91	0.934	0.159	-	-	-
PixelSplat	14.01	0.662	0.389	-	-	-	-	-	-
MVSplat	13.94	0.473	0.385	14.29	0.508	0.370	-	-	-
MVPGS	17.55	0.823	0.147	20.65	0.877	0.099	-	-	-
MVSGaussian	23.83	0.918	0.121	27.03	0.959	0.084	-	-	-
Ours	24.27	0.936	0.113	27.87	0.962	0.077	3.79	0.832	0.943

Generalization on DTU dataset.

Depth on DTU dataset.

Method	Views	Real Forward-facing			NeRF Synthetic			Tanks and Temples		
		PSNR \uparrow	SSIM \uparrow	LPIPS \downarrow	PSNR \uparrow	SSIM \uparrow	LPIPS \downarrow	PSNR \uparrow	SSIM \uparrow	LPIPS \downarrow
MVSNeRF	2	20.22	0.763	0.287	20.56	0.856	0.243	18.92	0.756	0.326
MatchNeRF	2	20.59	0.775	0.276	20.57	0.864	0.200	19.88	0.773	0.334
MVSplat	2	15.32	0.370	0.422	12.59	0.665	0.282	16.35	0.490	0.355
MVPGS	2	18.53	0.607	0.280	-	-	-	16.33	0.687	0.373
MVSGaussian	2	22.58	0.817	0.192	23.56	0.929	0.122	21.05	0.830	0.222
Ours	2	22.32	0.818	0.201	23.83	0.930	0.109	21.58	0.832	0.221
MVSNeRF	3	21.93	0.795	0.252	23.62	0.897	0.176	20.87	0.823	0.260
MatchNeRF	3	22.43	0.805	0.244	23.20	0.897	0.164	20.80	0.793	0.300
MVPGS	3	19.91	0.696	0.229	-	-	-	18.60	0.607	0.467
MVSGaussian	3	23.87	0.856	0.169	25.31	0.943	0.098	22.70	0.872	0.187
Ours	3	23.97	0.857	0.167	26.14	0.946	0.079	23.30	0.879	0.178
MVPGS	4	21.28	0.750	0.180	-	-	-	20.27	0.679	0.371
MVSGaussian	4	24.01	0.864	0.175	24.81	0.938	0.106	21.85	0.860	0.209
Ours	4	24.16	0.867	0.174	25.29	0.941	0.087	22.35	0.866	0.204

Generalization on Real Forward-facing, NeRF Synthetic, and Tanks and Temples datasets.

Ablation Study

Method	Views	CGA	CDA	CSF	PSNR \uparrow	SSIM \uparrow	LPIPS \downarrow	DTU		
		✓	✓	✓	PSNR \uparrow	SSIM \uparrow	LPIPS \downarrow	PSNR \uparrow	SSIM \uparrow	LPIPS \downarrow
baseline	-	-	-	-	27.03	0.959	0.084	-	-	-
No.1	✓	-	-	-	27.07	0.959	0.084	-	-	-
No.2	-	✓	-	-	27.34	0.959	0.084	-	-	-
No.3	-	-	✓	-	27.31	0.960	0.080	-	-	-
No.4	✓	✓	-	-	27.42	0.960	0.078	-	-	-
No.5	✓	-	✓	-	27.58	0.960	0.079	-	-	-
No.6	-	✓	✓	-	27.79	0.961	0.077	-	-	-
No.7	✓	✓	✓	-	27.87	0.962	0.077	-	-	-

Ablation studies on the combination of modules on DTU dataset. "Ours*" denotes identical training and testing views.