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DN-4DGS: Denoised Deformable Network with Temporal-Spatial Aggregation for Dynamic Scene Rendering

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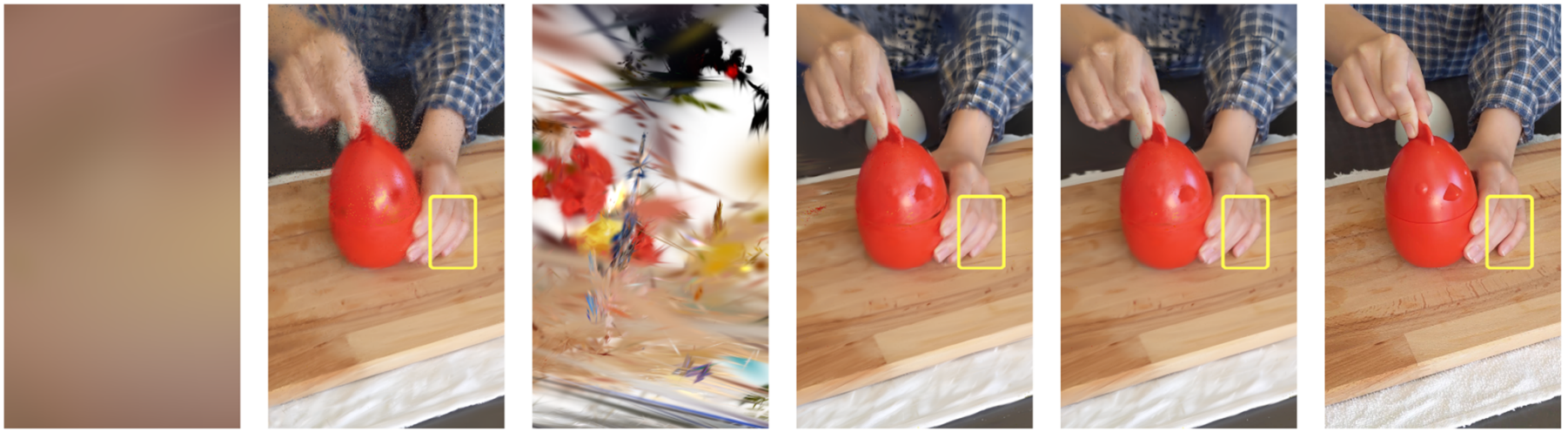
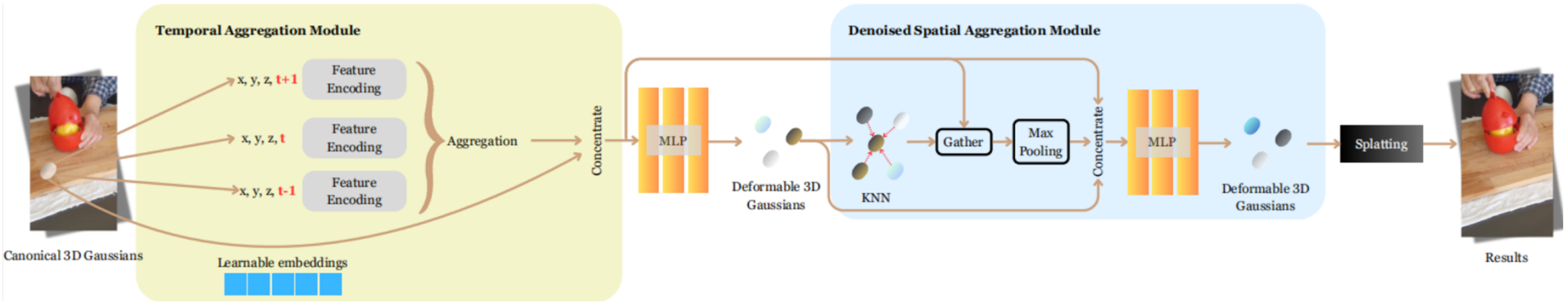
Problem statement



- Due to the presence of dynamic regions and the specific design of A (canonical 3D gaussians) + B (deformable network), canonical 3Dgaussians exhibit **significant noise**. This noise is inevitably **transferred to the deformable field** after the input xyz is passed through the deformable network.
- There is **a lack of feature aggregation for spatial-temporal information**, yet due to the presence of noise in canonical 3D gaussians' xyz, direct feature aggregation for spatial information would further **amplify noise**.

Contribution

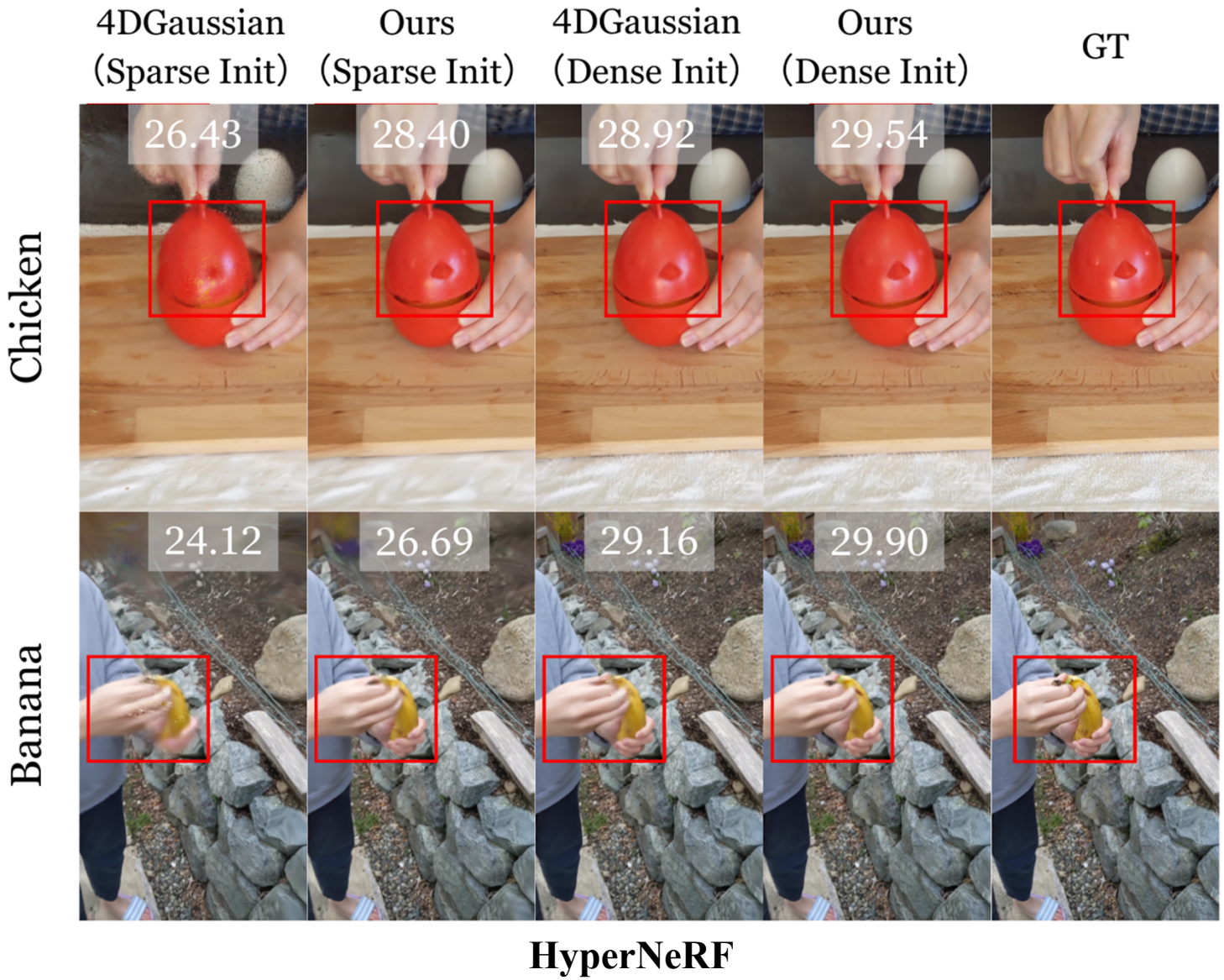


- We promose the **Noise Suppression Strategy**, which can change the distribution of the coordinates of the canonical 3D gaussians, suppress noise and generate a more precise deformation field.
- We promose the **Decoupled Temporal-Spatial Aggregation Module** to aggregate information from adjacent points and frames.

Comparison


4DGaussian
Ours
GT
Coffee Martini
Flame Salmon
coffee_martini
PlenopticVideo

Comparison


4DGaussian (Sparse Init)
Ours (Sparse Init)
4DGaussian (Dense Init)
Ours (Dense Init)
GT
Chicken
Banana
26.43
28.40
28.92
29.54
24.12
26.69
29.16
29.90
HyperNeRF

Comparison

HyperNeRF

Comparison

Figure 13: **Qualitative comparisons on NeRF-DS Dataset.**

Thanks!

https://github.com/peoplelu/DN-4DGS