

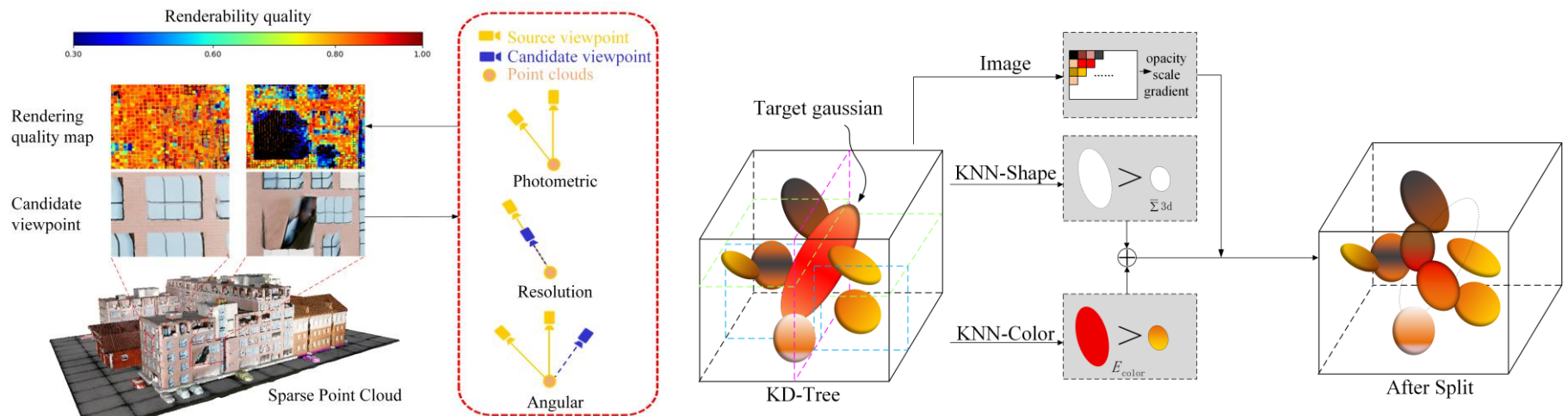
RFG-GS: Renderability Field Guided High-Fidelity Reconstruction for 3D Buildings

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Problems & Ideas

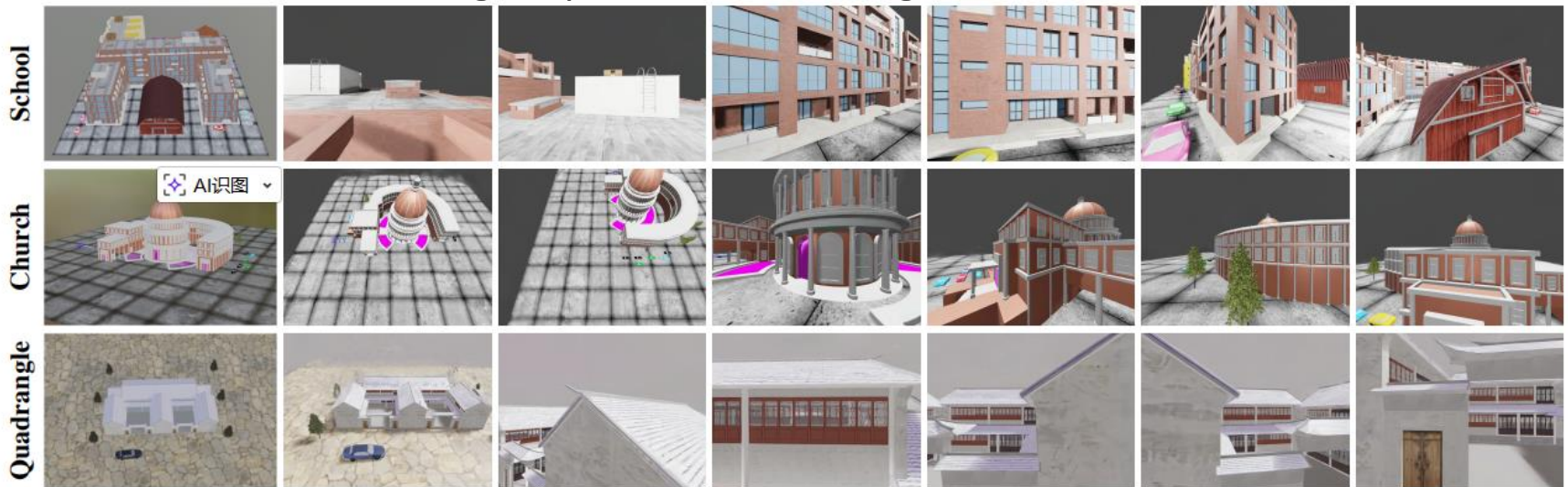
- Problems of 3D reconstruction with UAVs:
 - Effective coverage cannot be achieved when collecting data for buildings with complex structures.
 - The reconstruction method of 3D-GS overly relies on the information of the original view and is not strong in structural optimization.
- Ideas: A proactive scanning framework combining “structural scanning -- fine reconstruction” is proposed for unknown complex buildings.



Specific improvement methods. On the left: Evaluate the candidate viewpoints using measurability rather than coverage; On the right: The adaptive density control for 3D-GS uses the color and shape of the Gaussian sphere as the factors for splitting determination.

Main Contributions

- Contributions:
 - A proactive scanning framework combining “structural scanning -- fine reconstruction” is proposed for unknown complex buildings;
 - A scanning viewpoint selection strategy guided by a renderability field is developed;
 - A Gaussian sphere splitting mechanism in 3D-GS training is optimized by partitioning the Gaussian model into blocks using a KD-Tree and applying the KNN algorithm to evaluate shape and color differences between the target sphere and its neighbors.



User-specified

Renderability-guided Generation

The renderability-guided scene generation results are presented in comparison with user-specified views across different categories.