

1. Challenge

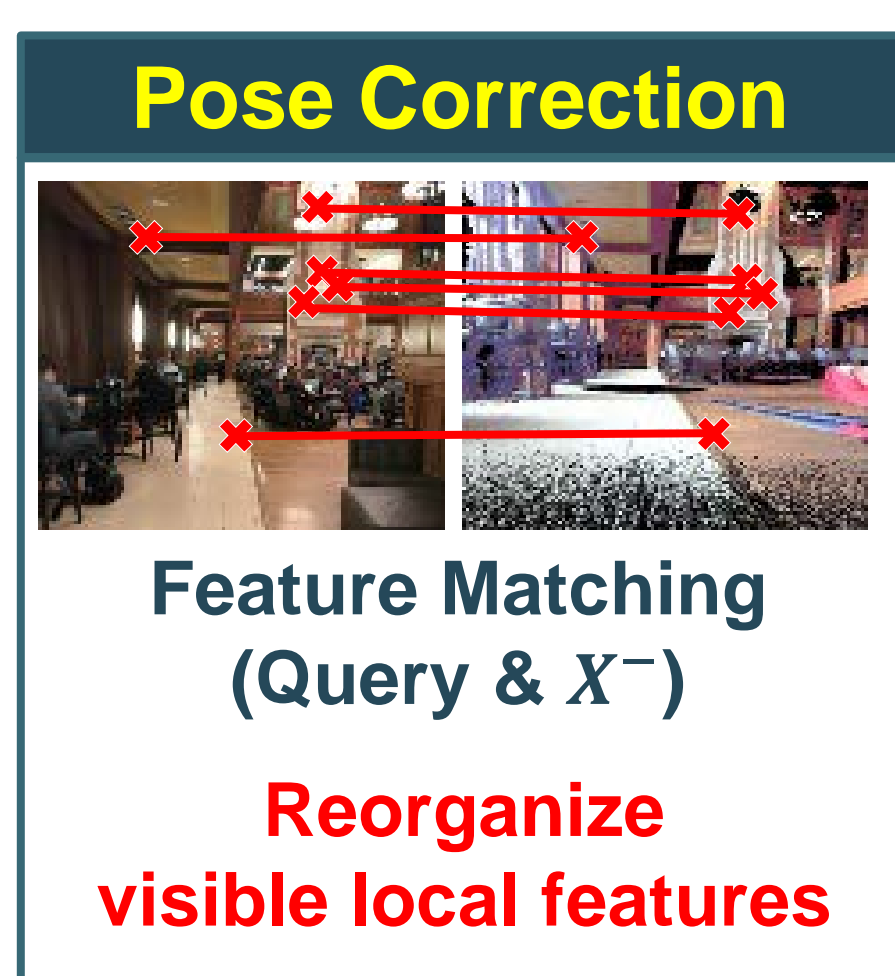
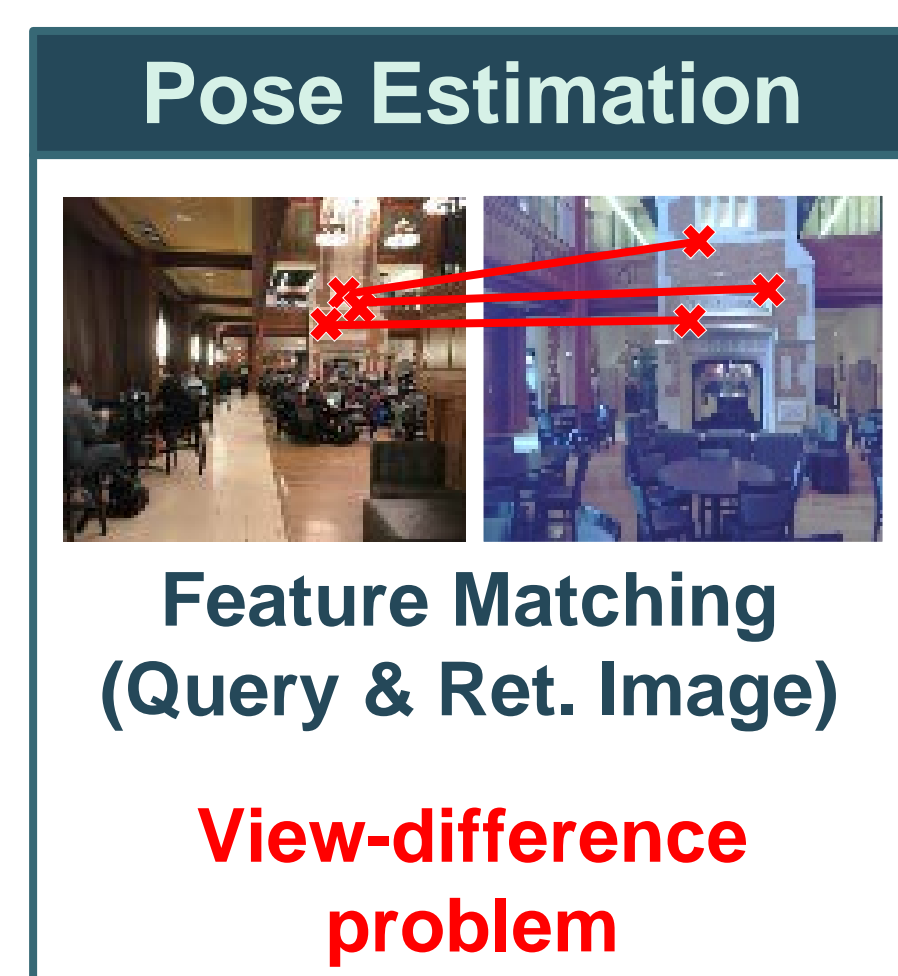
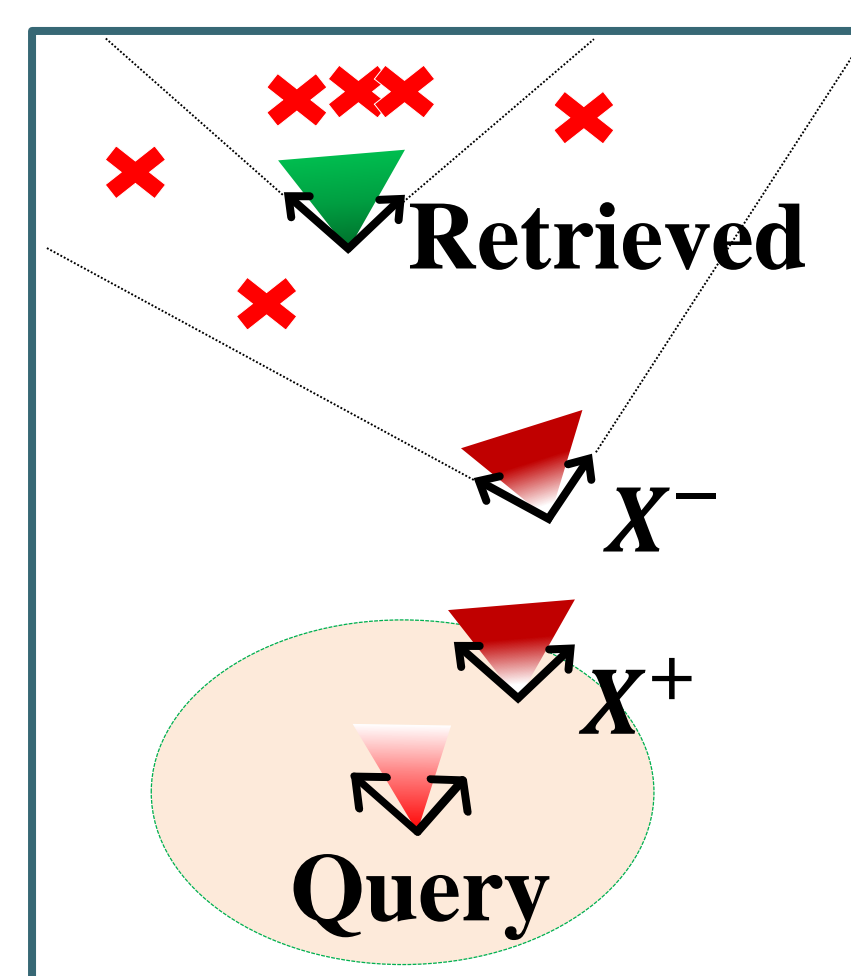
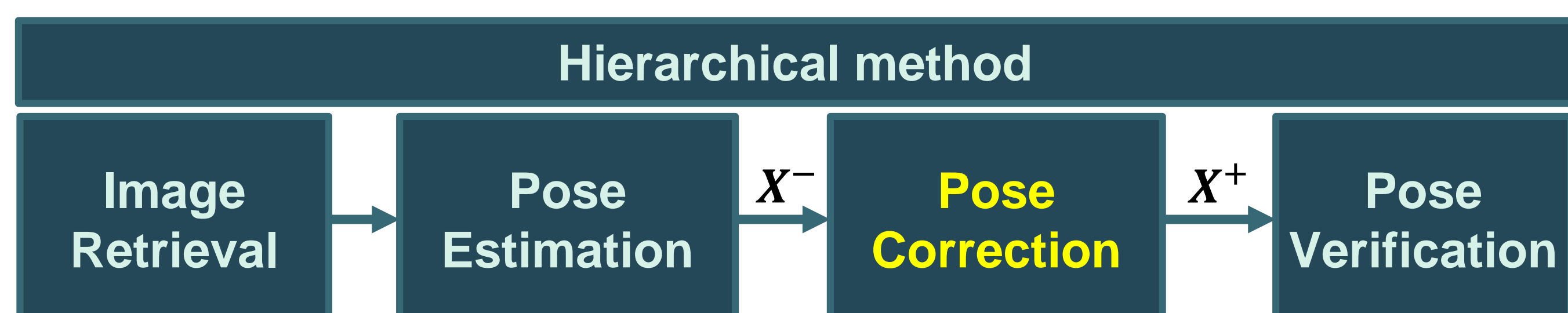
- Sparsity of camera locations when constructing the database of large-scale indoor spaces is difficult to avoid.

Dataset	# of Camera Locations	# of DB images	Area
7-Scenes	26,000	26,000	31.5m ³
12-Scenes	240,002	240,002	521m ³
M-site	720	25,920	12,557m²
InLoc	277	9,972	25,287m²

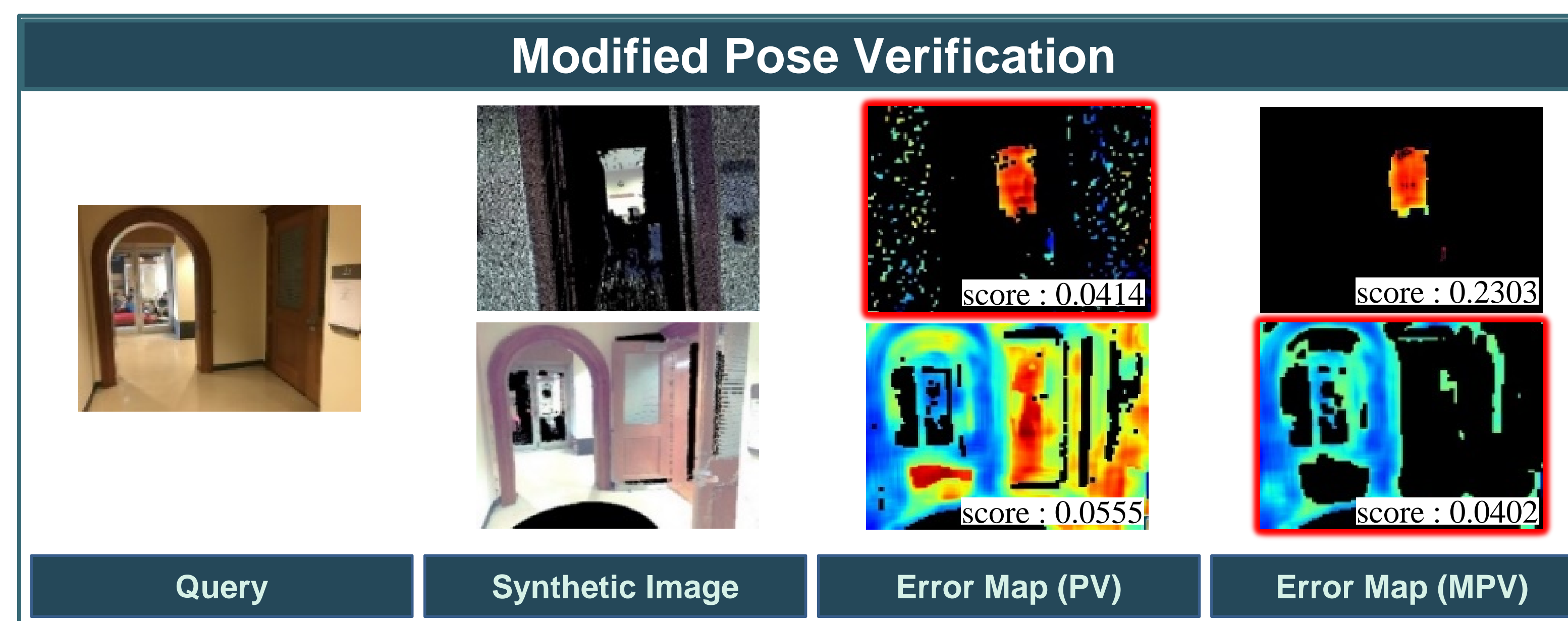
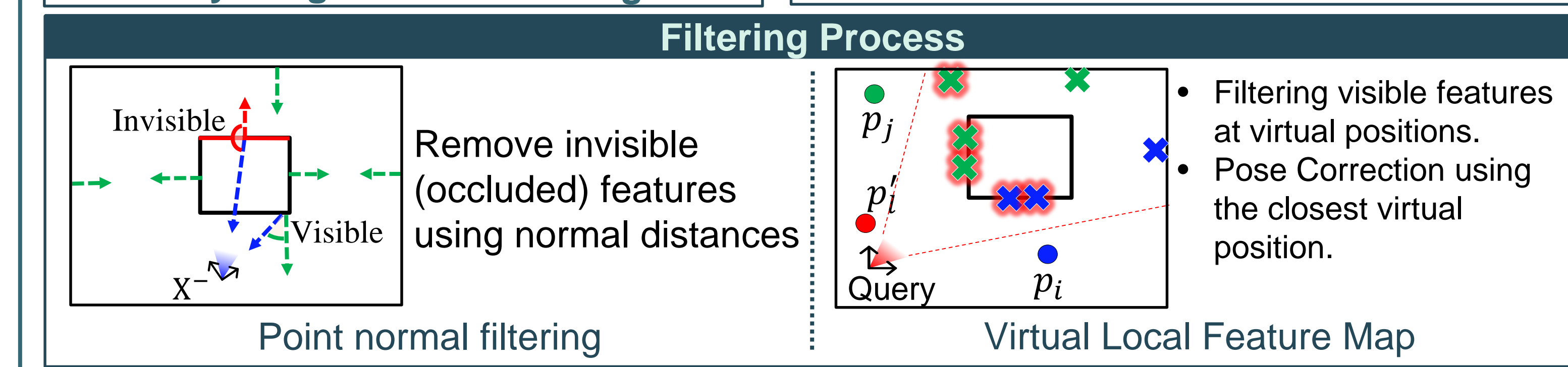
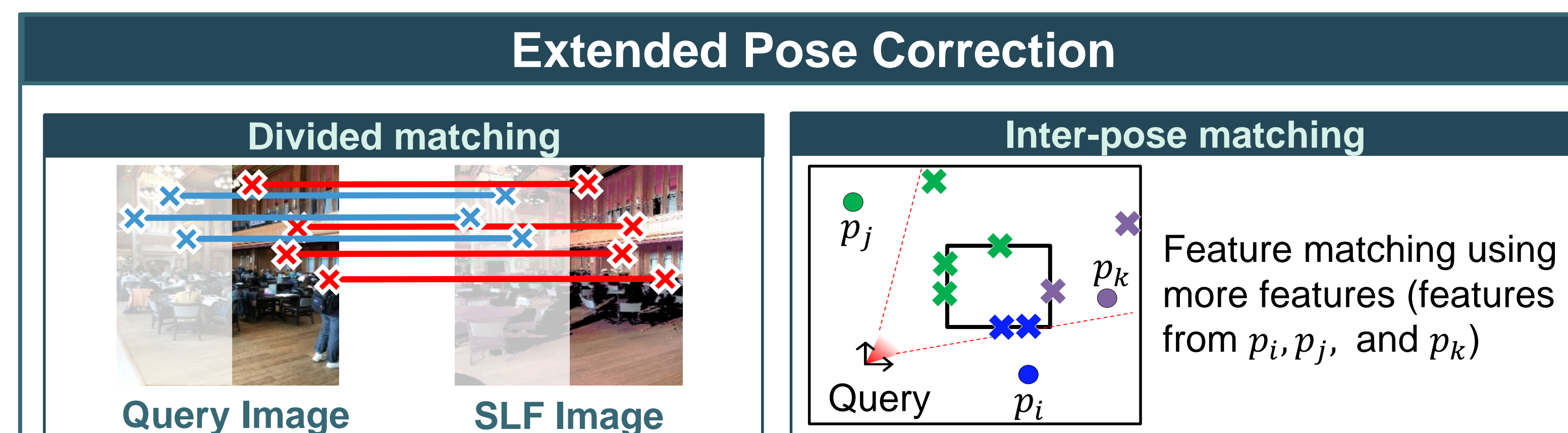
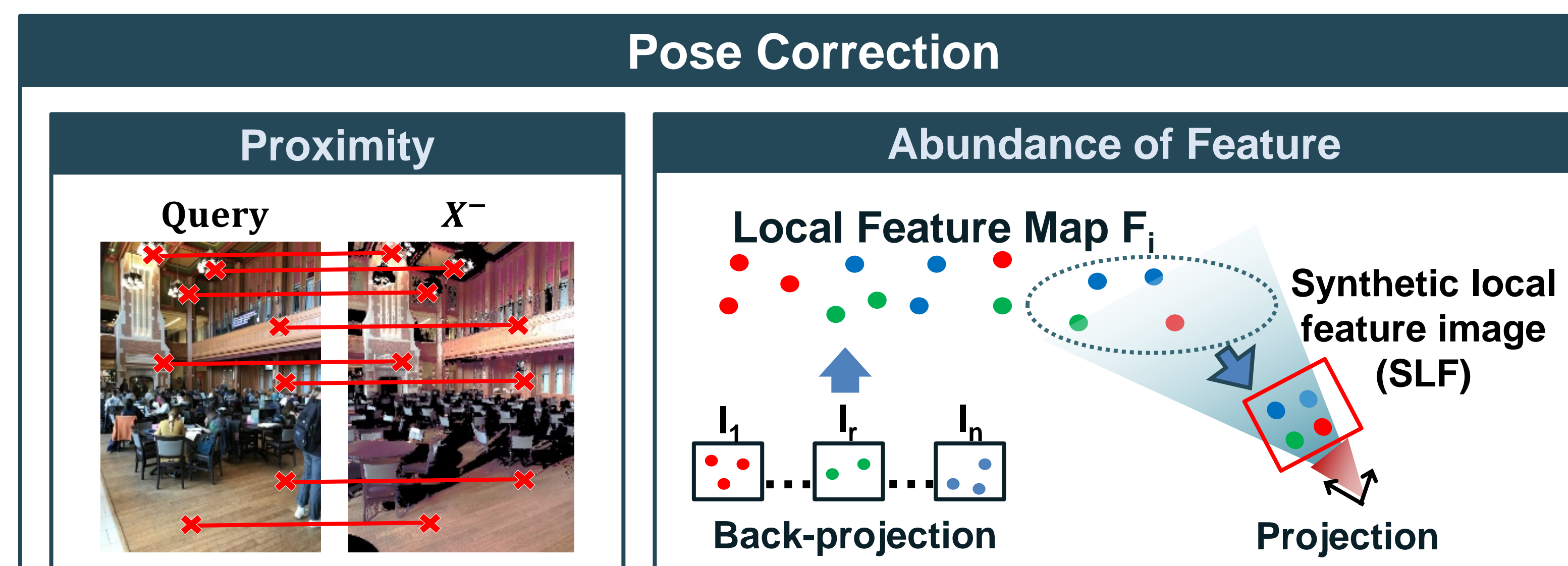
- View-difference problem exists: retrieved images may be captured far from the query pose
- Handling the sparsity issue for the accurate long-term visual localization is an open challenge, but it has not been discussed much yet.

2. Goal

- Handle the sparsity issue and enhance visual localization accuracy in large-scale indoor spaces by adding a pose correction step in hierarchical visual localization.



3. Approach



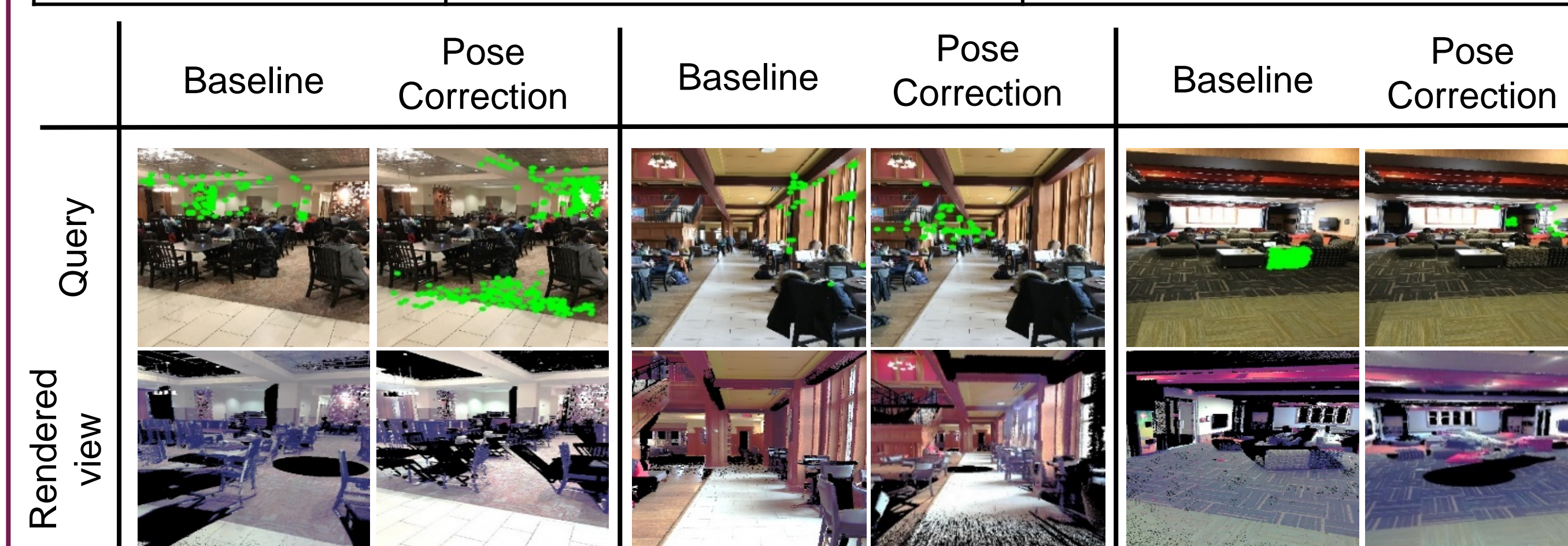
4. Experimental Result

- Evaluation Results for InLoc Dataset.

Error (10°)	DUC1			DUC2		
	0.25m	0.5m	1.0m	0.25m	0.5m	1.0m
InLoc	40.9	58.1	70.2	35.9	54.2	69.5
HfNet	39.9	55.6	67.2	37.4	57.3	70.2
SuperGlue	46.5	65.7	77.8	51.9	72.5	79.4
Baseline (3,000)	53.0	76.8	85.9	61.8	80.9	87.0
Ours (3,000)	59.6	78.3	89.4	71.0	93.1	93.9
Ours (4,096)	60.6	79.8	90.4	70.2	92.4	93.1

- Evaluation of the Pose Correction.

Error (10°)	DUC1			DUC2		
	0.25m	0.5m	1.0m	0.25m	0.5m	1.0m
Baseline (10)	56.1	76.8	88.4	65.6	82.4	85.5
PC (10, 10)	58.1	76.8	89.4	67.2	90.1	92.4
PC (20, 10)	58.6	76.8	89.4	67.9	90.1	92.4



5. Conclusion

- First work to address the sparsity problem and propose pose correction to resolve the problem.
- Propose extended pose correction and verify improvements in accuracy.
- Propose modified pose verification module.
- A new state-of-the-art in the public benchmark dataset.
- Project page: <https://github.com/JanghunHyeon/PCLoc>

