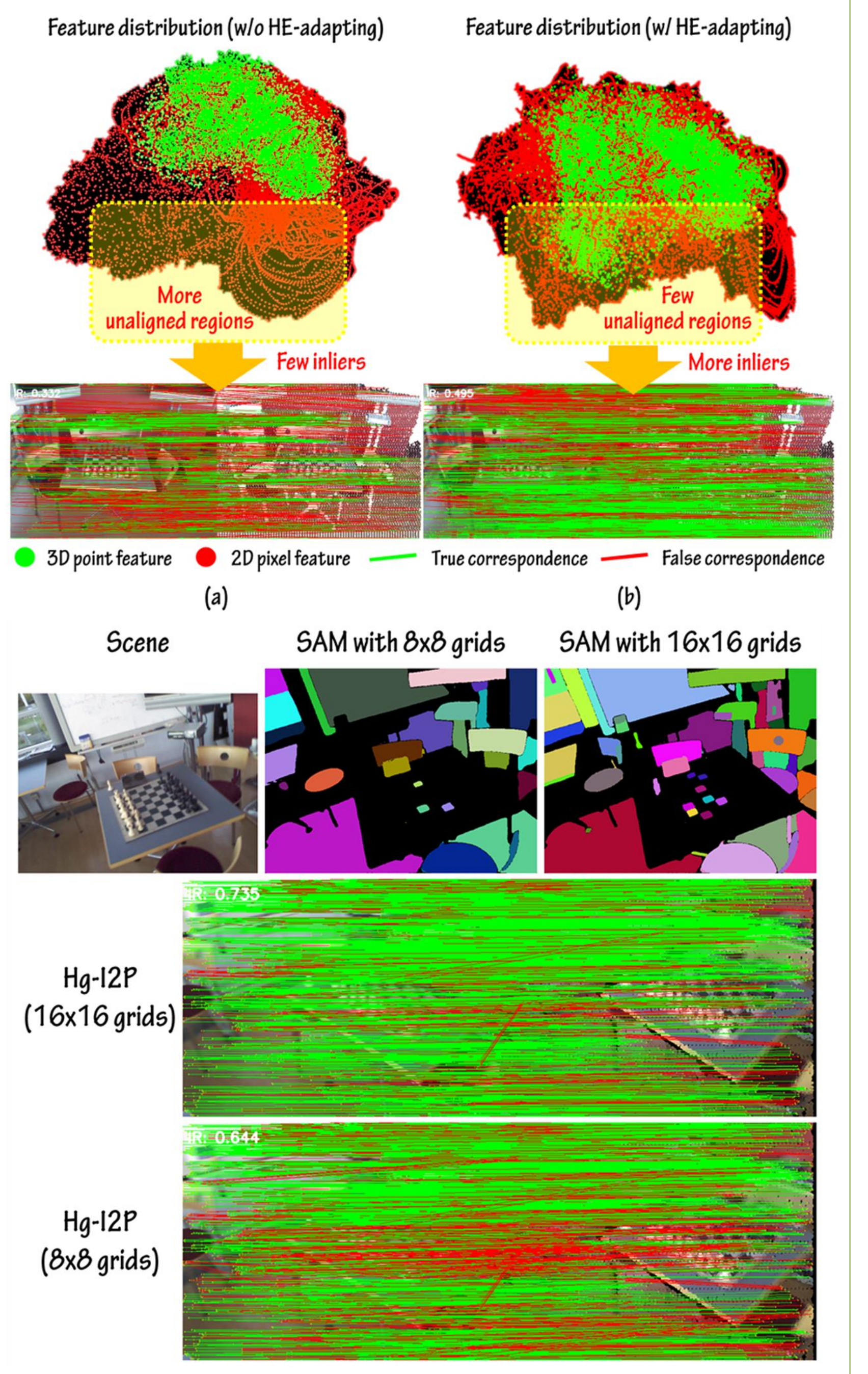


Results

IR	C→F	C→H	C→O	C→P	C→K	C→S	AVG
MATR	0.455	0.359	0.420	0.411	0.390	0.288	0.387
Top-I2P	0.491	0.427	0.455	0.461	0.437	0.327	0.433
MinCD	0.542	0.424	0.502	0.408	0.416	0.379	0.445
Hg-I2P [†]	0.547	0.467	0.492	0.520	0.475	0.332	0.472
Hg-I2P (Ours)	0.592	0.588	0.744	0.533	0.557	0.469	0.581
RR	C→F	C→H	C→O	C→P	C→K	C→S	AVG
MATR	0.537	0.167	0.759	0.581	0.612	0.214	0.478
Top-I2P	0.611	0.583	0.843	0.558	0.678	0.500	0.628
MinCD	0.671	0.250	0.869	0.574	0.619	0.571	0.592
Hg-I2P [†]	0.712	0.585	0.717	0.617	0.655	0.572	0.642
Hg-I2P (Ours)	0.726	0.500	0.949	0.681	0.631	0.512	0.667
IR	O→C	O→F	O→H	O→P	O→K	O→S	AVG
MATR	0.498	0.491	0.521	0.442	0.448	0.338	0.456
Top-I2P	0.512	0.494	0.532	0.466	0.462	0.353	0.469
MinCD	0.660	0.642	0.536	0.550	0.546	0.471	0.568
Hg-I2P [†]	0.526	0.521	0.537	0.486	0.491	0.408	0.494
Hg-I2P (Ours)	0.601	0.599	0.585	0.544	0.556	0.465	0.558
RR	O→C	O→F	O→H	O→P	O→K	O→S	AVG
MATR	0.660	0.556	0.417	0.395	0.636	0.286	0.491
Top-I2P	0.702	0.759	0.423	0.605	0.645	0.293	0.571
MinCD	0.769	0.726	0.250	0.681	0.810	0.643	0.647
Hg-I2P [†]	0.738	0.630	0.750	0.682	0.667	0.501	0.661
Hg-I2P (Ours)	0.846	0.781	0.583	0.638	0.768	0.523	0.690
IR	K→C	K→F	K→O	K→H	K→P	K→S	AVG
P2-Net	0.516	0.512	0.504	0.506	0.555	0.358	0.491
MATR	0.571	0.594	0.537	0.538	0.612	0.370	0.537
Top-I2P	0.626	0.619	0.627	0.631	0.643	0.433	0.596
MinCD	0.617	0.598	0.540	0.573	0.636	0.445	0.568
Hg-I2P [†]	0.645	0.677	0.651	0.602	0.686	0.448	0.618
Hg-I2P (Ours)	0.728	0.755	0.705	0.675	0.753	0.511	0.688
RR	K→C	K→F	K→O	K→H	K→P	K→S	AVG
MATR	0.872	0.778	0.667	0.723	0.698	0.500	0.706
Top-I2P	0.936	0.792	0.722	0.831	0.860	0.571	0.785
MinCD	0.846	0.904	0.683	0.798	0.872	0.786	0.814
Hg-I2P [†]	0.923	0.849	0.750	0.859	0.787	0.643	0.802
Hg-I2P (Ours)	0.969	0.890	0.833	0.869	0.702	0.857	0.853



Conclusion

In this paper, we proposed Hg-I2P, a heterogeneous graph-embedded image-to-point-cloud registration framework designed for robust and generalizable cross-modal alignment. The core idea is to introduce a heterogeneous graph that connects segmented 2D and 3D regions, enabling cross-modal feature interaction through heterogeneous edges and outlier suppression through graph-based projection consistency.

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