

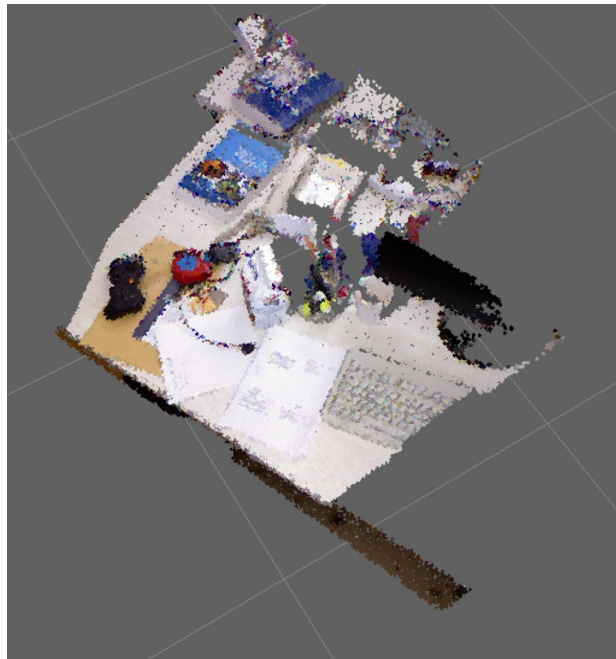
# RGB Point cloud registration using ICP with feature-based initial guess

**Alireza Ahamdi**

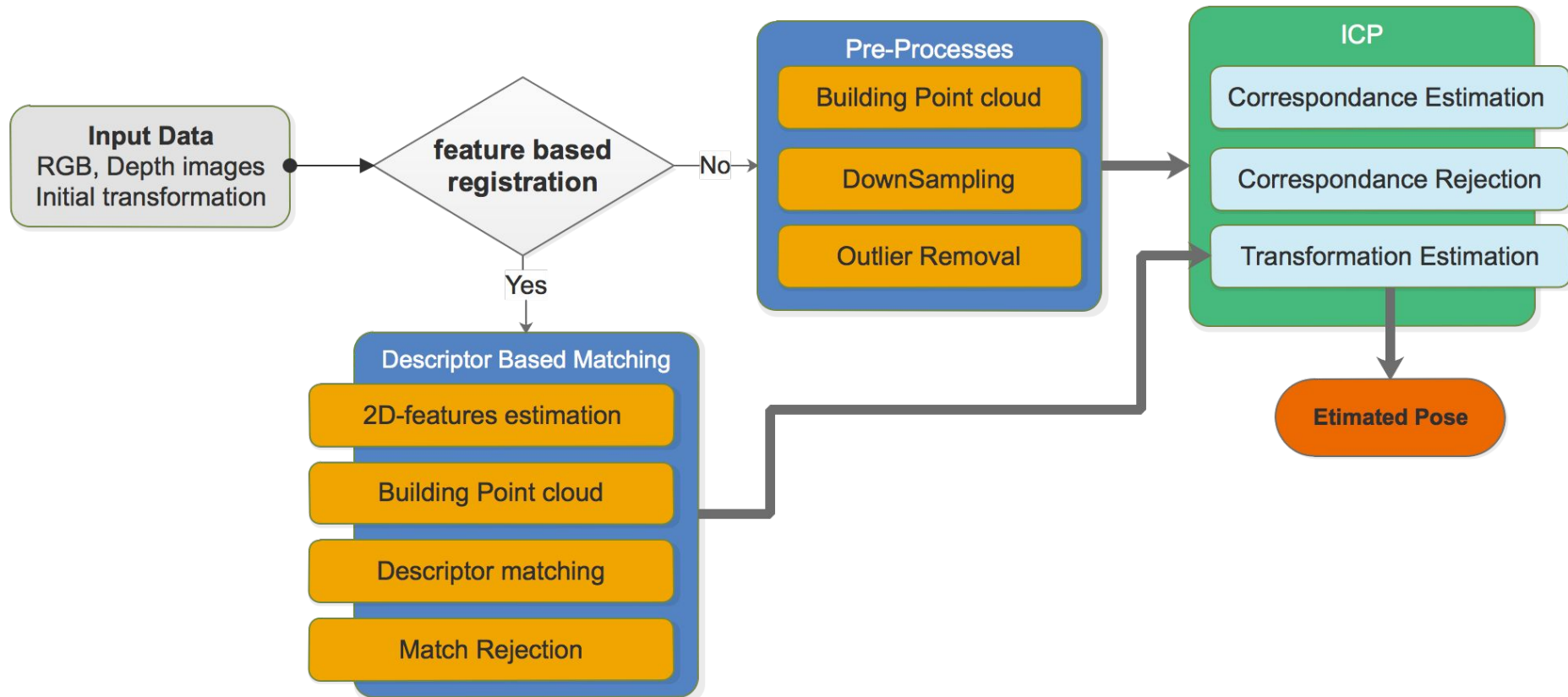
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# Problem

Minimizing the distance between two point clouds or 3D reconstruction of the Environment.



# Method

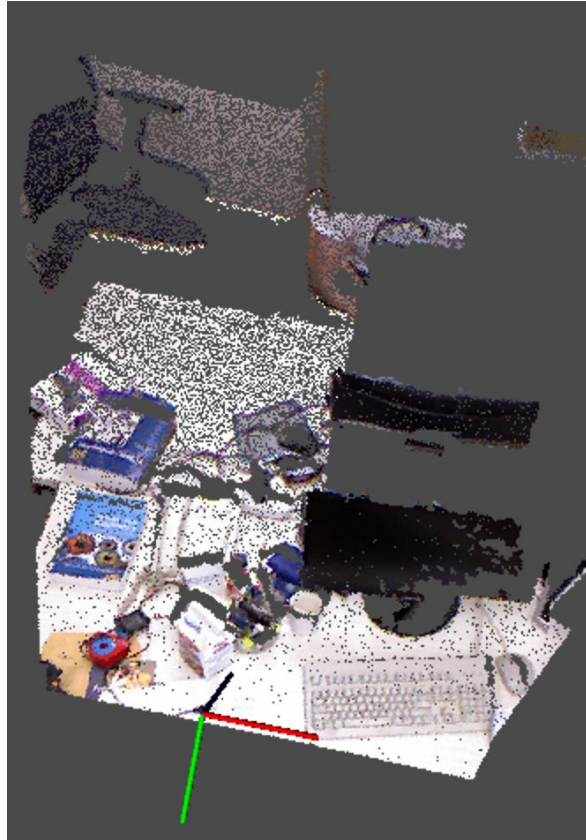


# DownSampling (Random)

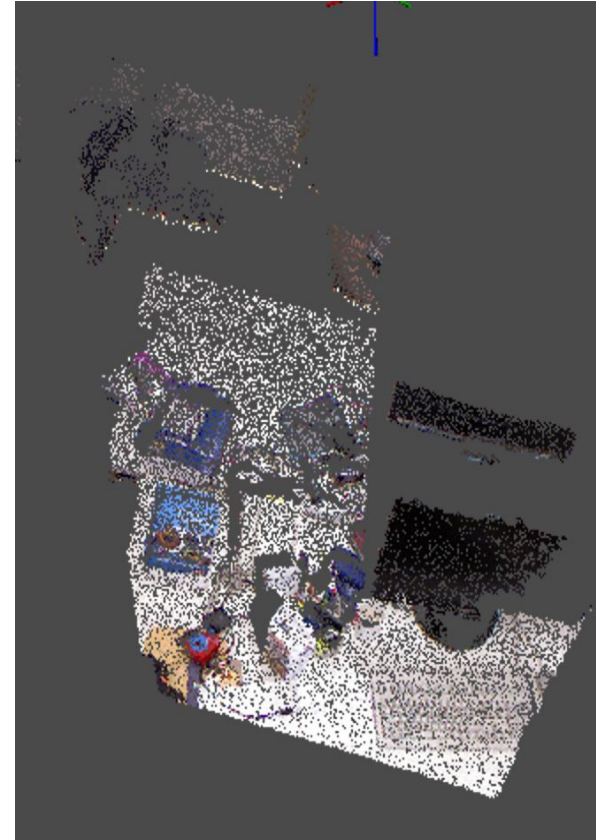
Original



50%

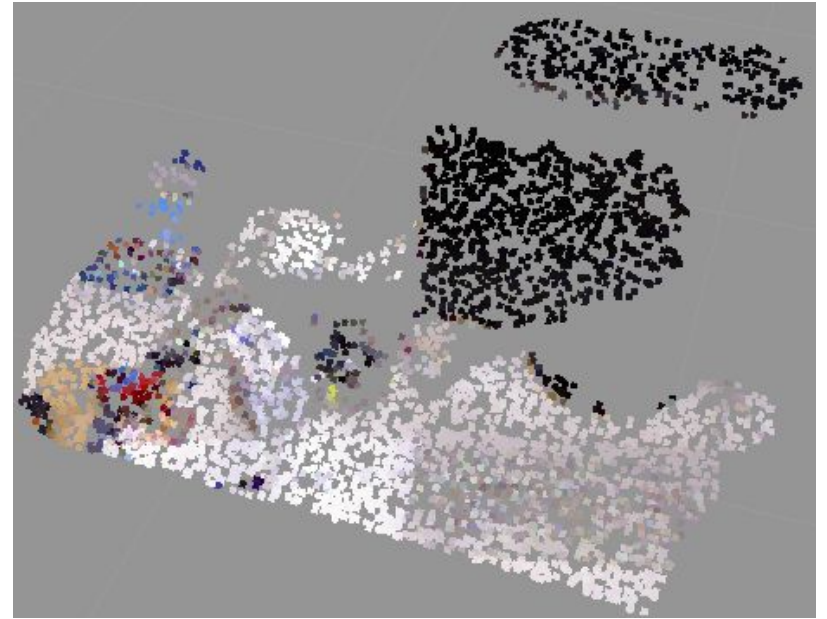
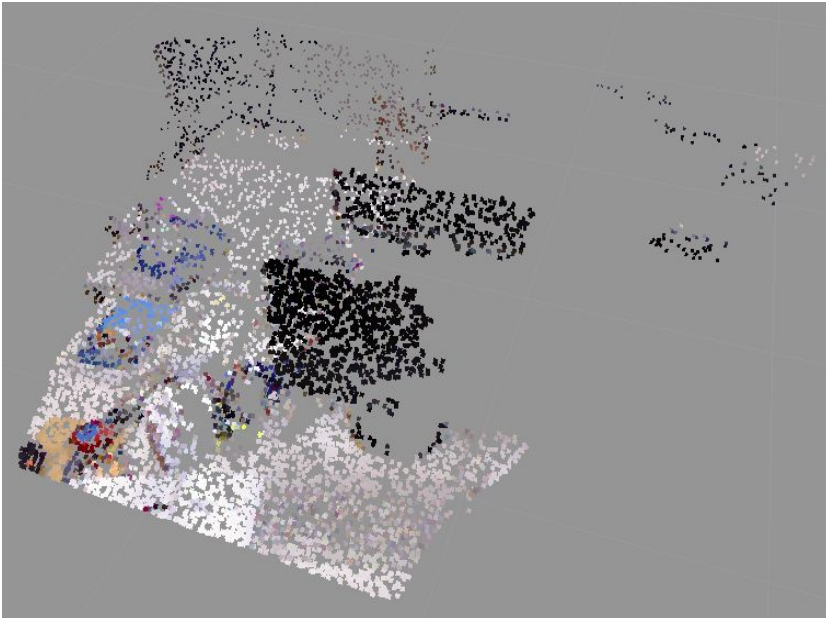


20%



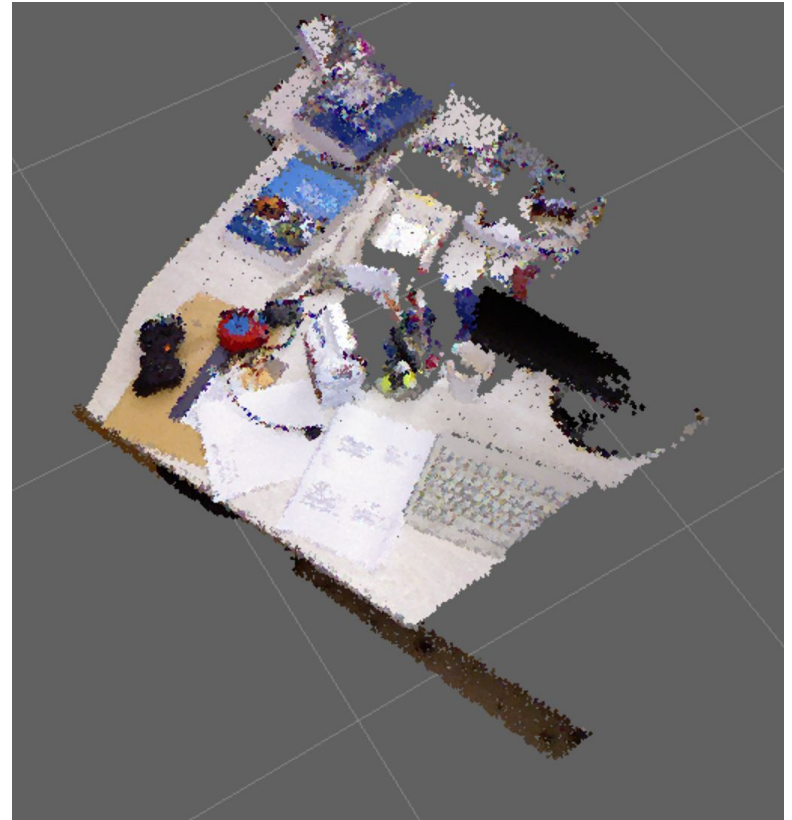
# Outlier Removal

1. Distant base filter (Correspondence Rejection)
2. Local density analysis



# Result(Point-to-Point ICP)

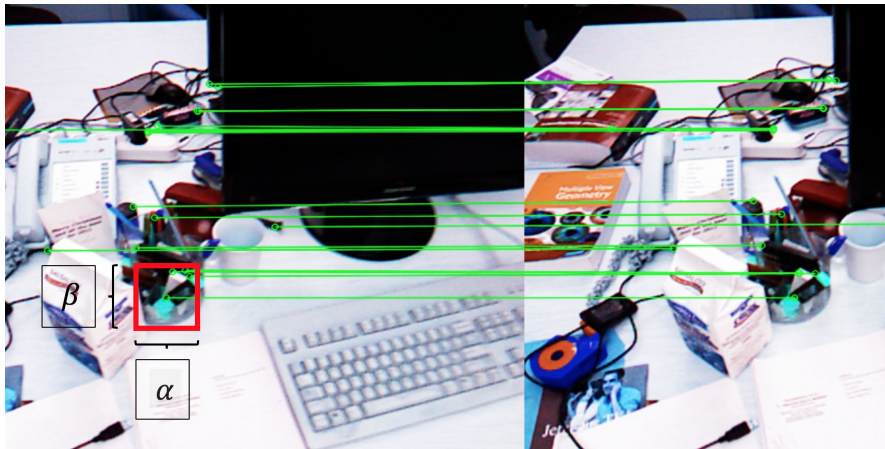
	Dataset 1		Dataset 2	
	RMSE	Trans. Er.	RMSE	Trans. Er.
Config A	0.0181 m	7.343 m	0.0174 m	5.764 m
Config B	0.0161 m	7.217 m	0.0183 m	6.943 m
Config C	0.0152 m	6.981 m	0.0159 m	6.563 m



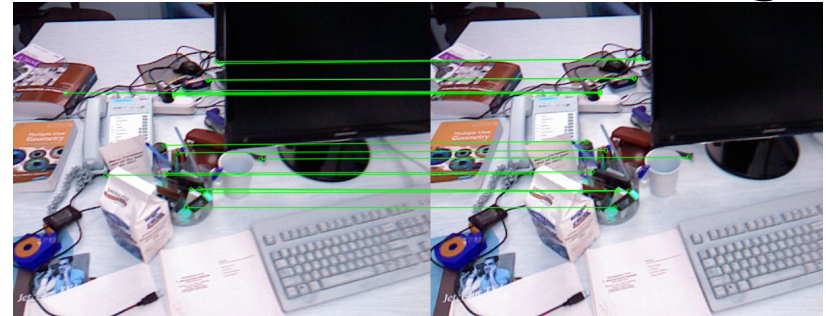


# feature based Registration

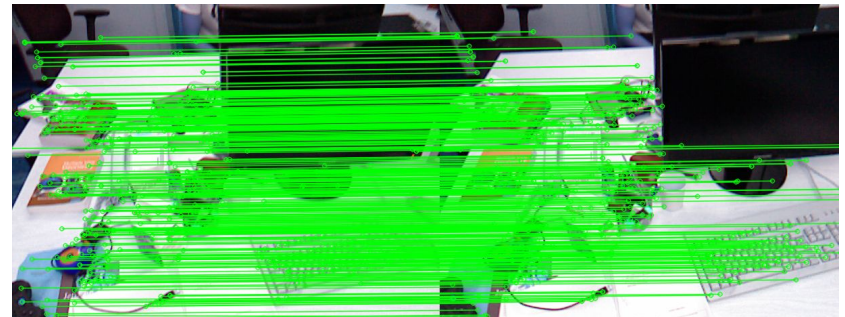
Filtering good matches  
by Window approach



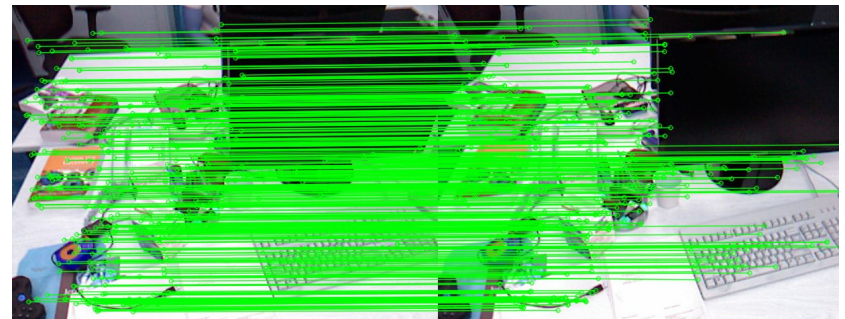
Distance based filtering



ORB

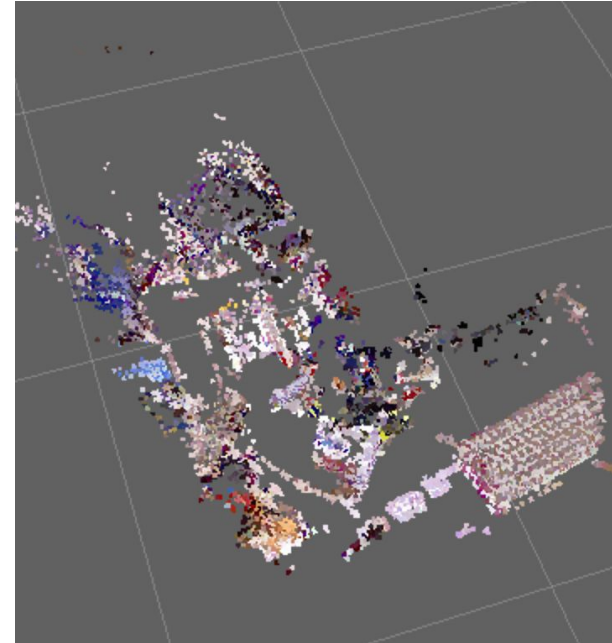
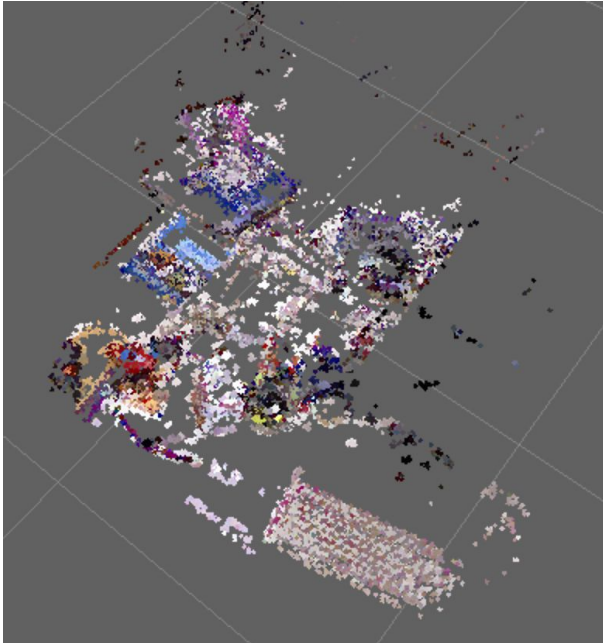


SIFT



SURF

# Mixed version



	RMSE	Trans. Er.	Run-time	RT-FLANN
SURF	0.012 m	4.796 m	0.387 s	0.414 s
SIFT	0.013 s	4.803 s	0.493 s	0.465 s
ORB	0.052 s	4.112 s	0.021 s	0.021 s