

# SWIGS: A Swift Guided Sampling Method

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## 1 Introduction

This supplement provides more details about the homography experiments in Section 4.3 of the submission, comparing our SWIGS method with four other approaches with respect to inliers and number of iterations required.

## 2 Homography Experiment: Extended Figures

The boxplots below (Figures I through X) show the percentage of inliers (left) and number of iterations (right) obtained from the homography estimation experiments (see Sec. 4.3). The homography estimation was executed 5000 times with a maximum number of 1000 iterations for each estimation. The algorithms reported are represented as follows:

1. SW: SWIGS (Our approach)
2. GN: GEN
3. SP: SPEC
4. BG: BLOGS
5. UN: UNIFORM

The number below the labels of the algorithms indicates the image index as in Fig. 9 in the main submission.

The feature matcher assigns a single reference keypoint for every query feature. Therefore, the number of image correspondences is exactly the number of query features. Table A presents the number of image correspondences while Table B presents the number of correct image correspondences (i.e., inliers) per sub-dataset and per descriptor. Note in Table B that SIFT produces more inliers (overall) than SURF, confirming that SIFT is a better descriptor.

Overall, observe how SWIGS (SW) performs comparable or better than the other methods, requiring fewer iterations than the other methods. Moreover, note that the plots show that there exist rare cases where the algorithms detected higher percentage of inliers. There exist cases where the plots show that the algorithms were not able to find the low number of inliers on image 6 of Boat and Graf datasets (see Figs. II, III, VII, VIII and compare with Table B). SWIGS maintains a more consistent and low number of iterations in comparison with the other methods, confirming that our approach can be fast.

Table A: Number of image correspondences.

Sub-dataset	Image Index				
	2	3	4	5	6
Bikes	780	681	646	663	621
Boat	2950	2173	1436	1307	1024
Graf	1827	1894	1697	1979	1558
Trees	4269	4065	3550	3169	2108
Wall	2434	2401	2488	2286	2286

Table B: Number of inliers for every image and per descriptor.

Sub-dataset	Image Index									
	SIFT					SURF				
	2	3	4	5	6	2	3	4	5	6
Bikes	631	528	459	416	343	609	488	407	348	263
Boat	204	12	28	188	2	194	14	22	149	0
Graf	52	70	7	12	0	58	73	9	30	3
Trees	1489	1255	888	693	381	927	780	462	271	114
Wall	1168	952	596	314	59	1145	817	451	216	39

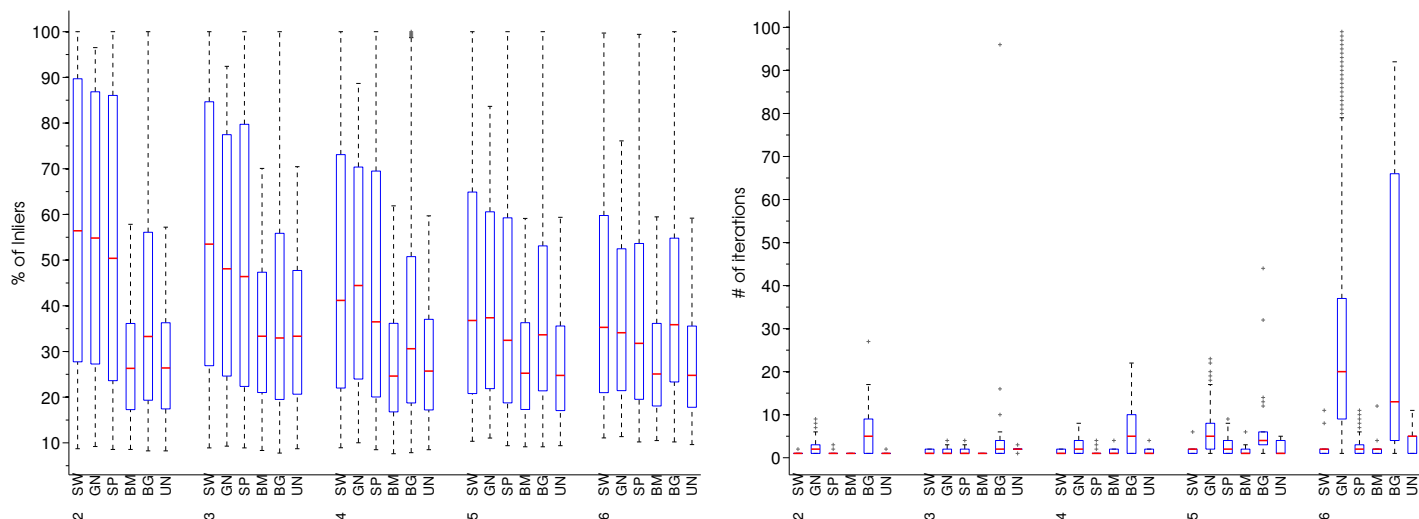


Figure I: Increasing Blur (Bikes dataset) and SIFT matches.

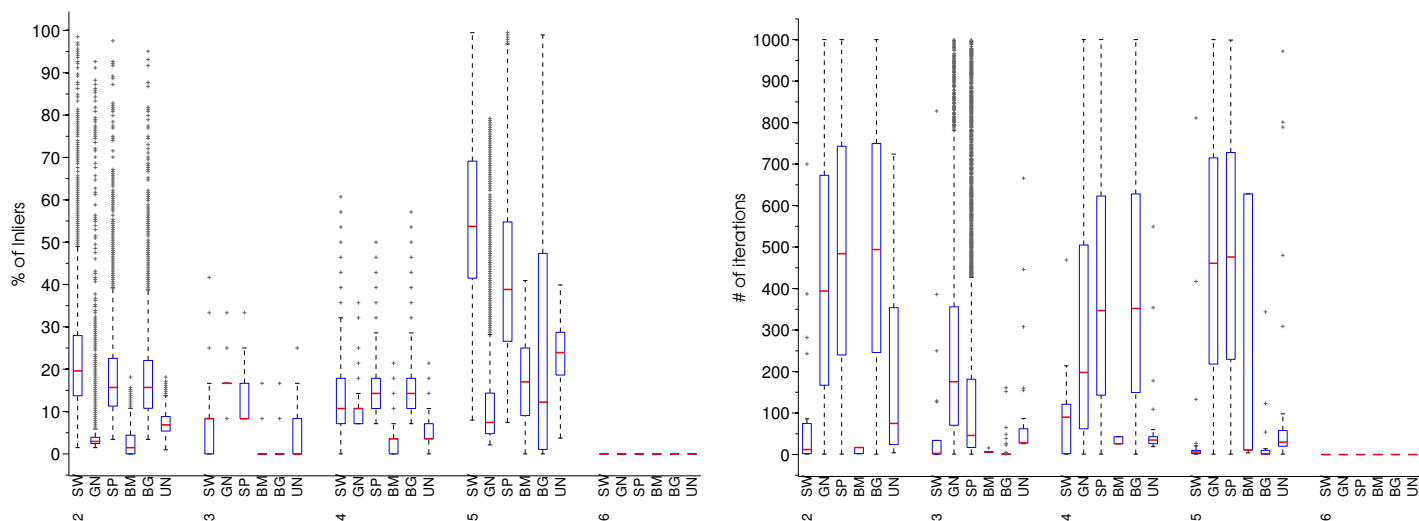


Figure II: Increasing Rotation & Scale (Boat dataset) and SIFT matches.

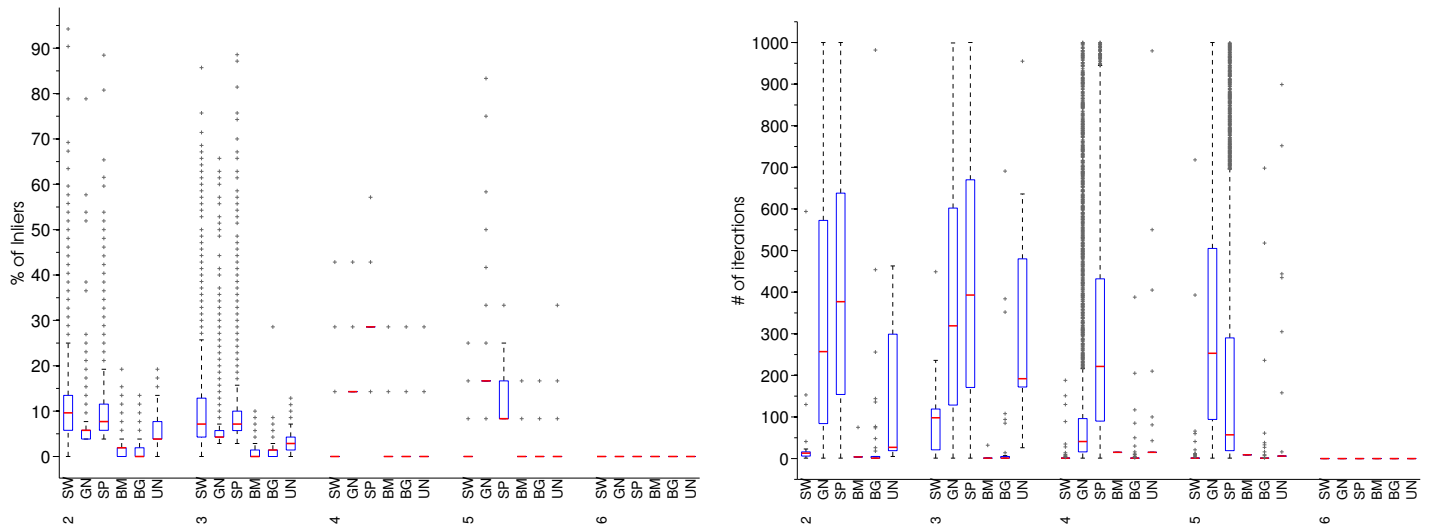


Figure III: Increasing Viewpoint (Graf dataset) and SIFT matches.

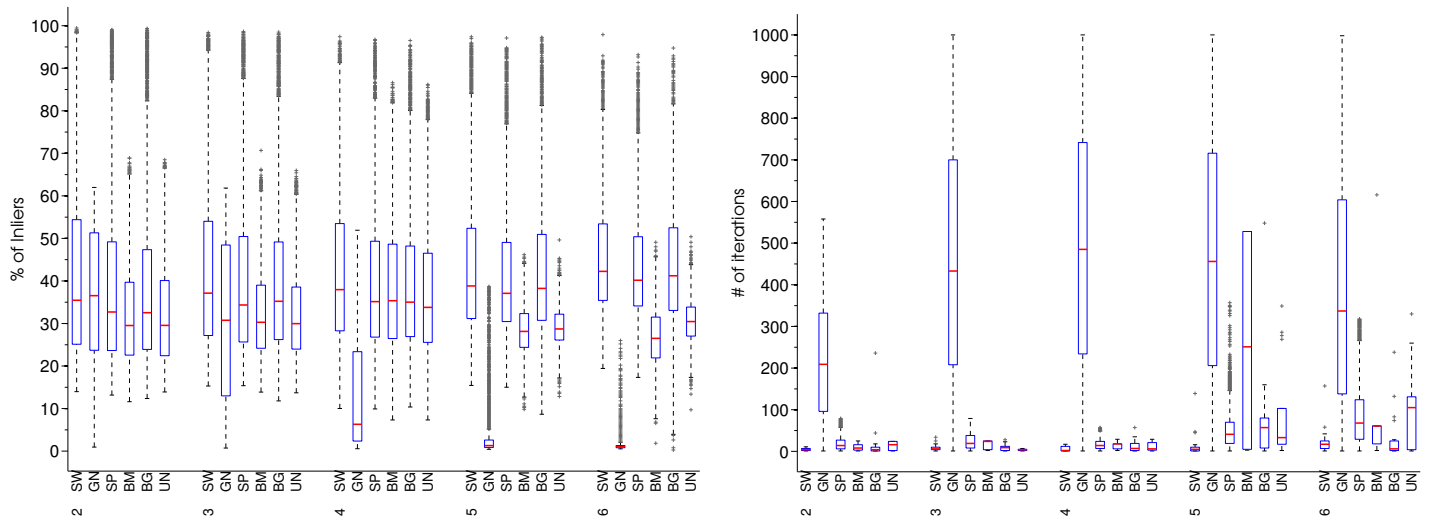


Figure IV: Increasing Blur (Trees dataset) and SIFT matches.

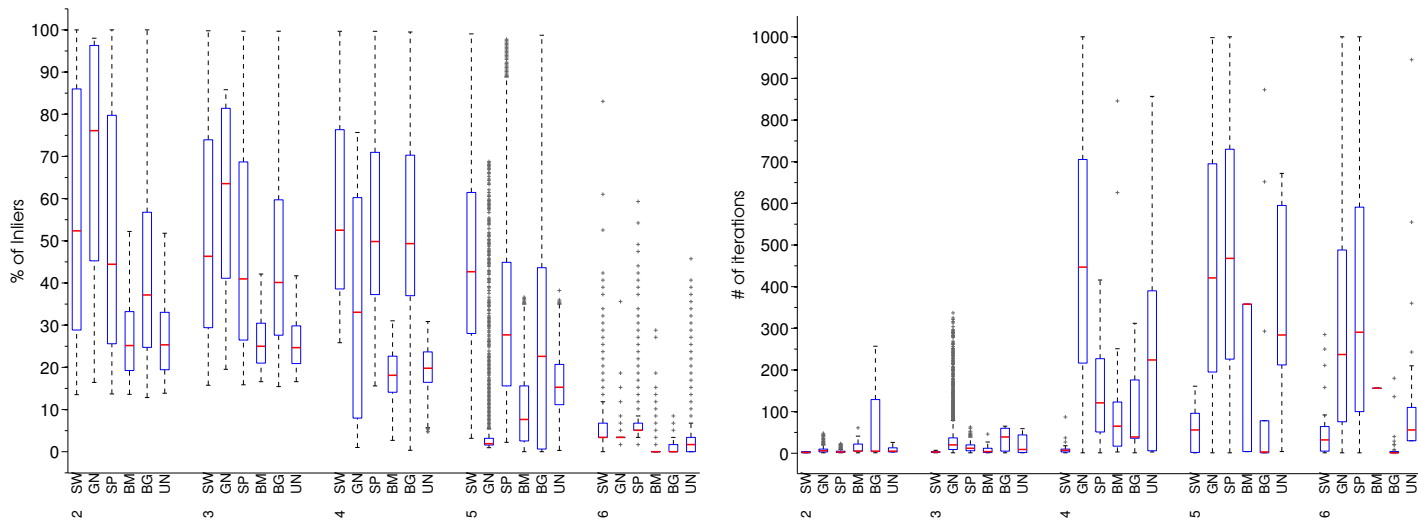


Figure V: Increasing Viewpoint (Wall dataset) and SIFT matches.

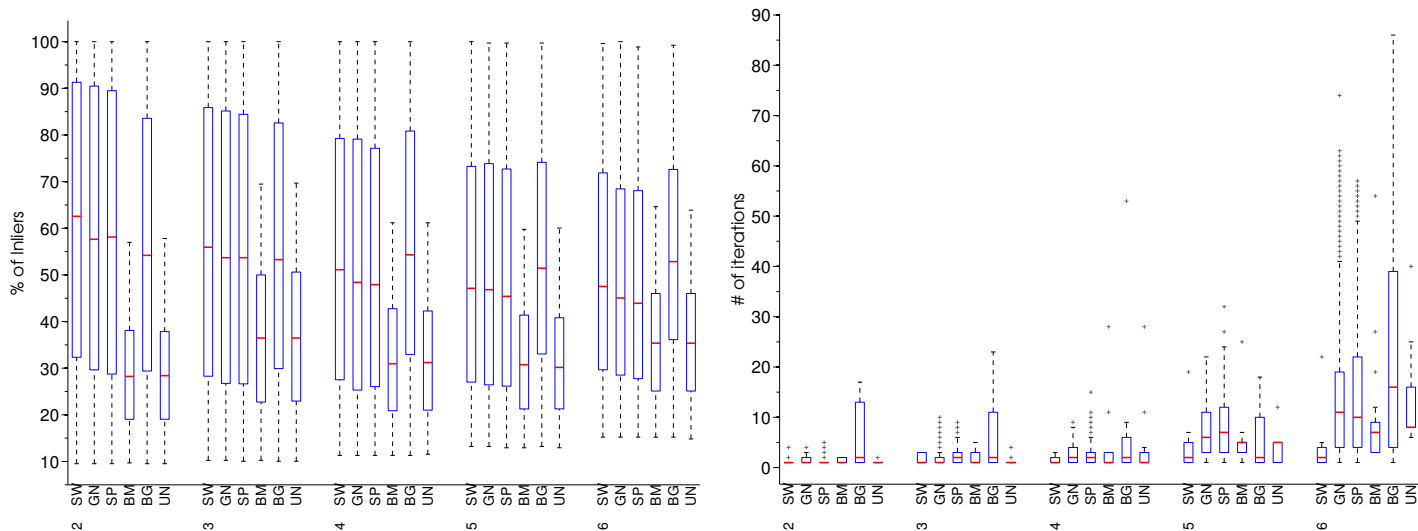


Figure VI: Increasing Blur (Bikes dataset) and SURF matches.

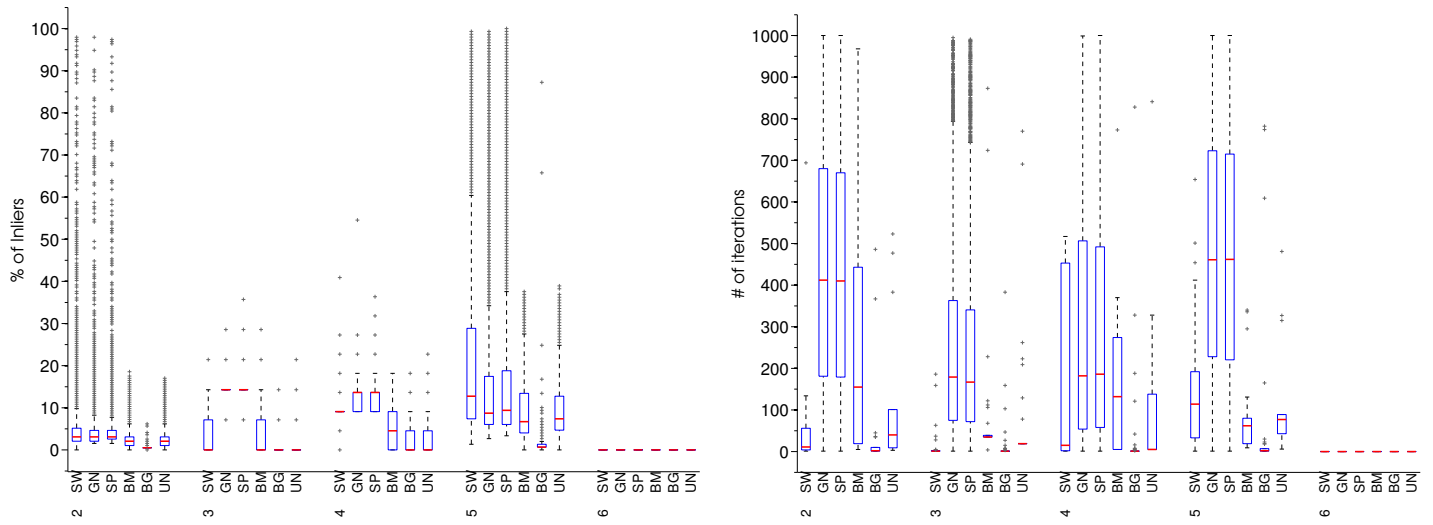


Figure VII: Increasing Rotation & Scale (Boat dataset) and SURF matches.

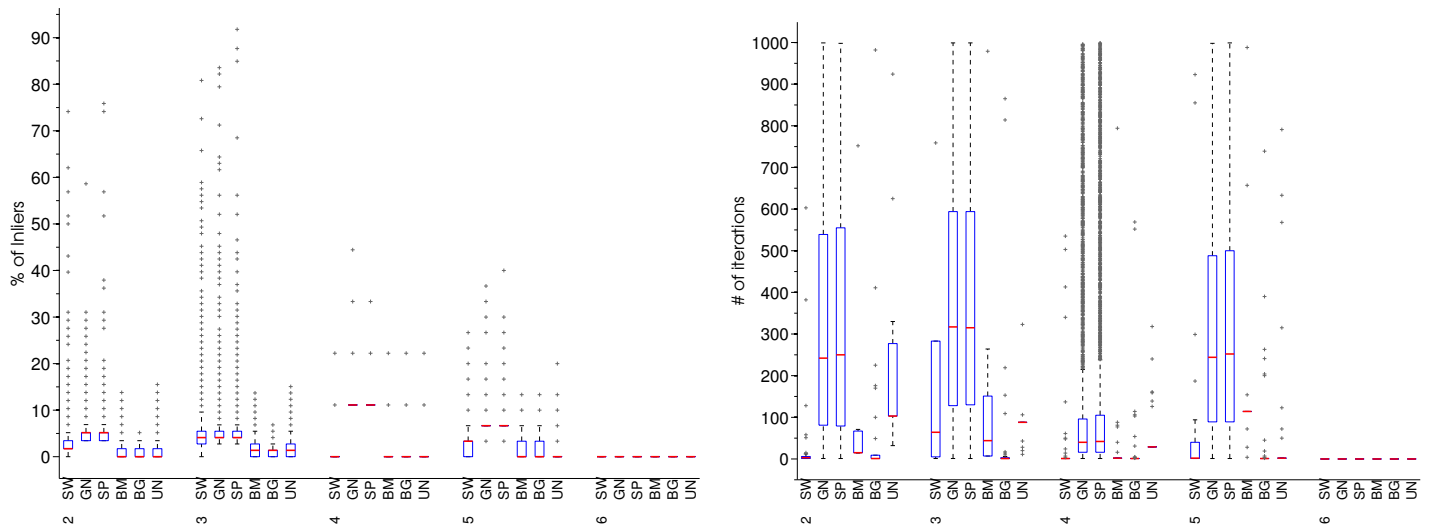


Figure VIII: Increasing Viewpoint (Graf dataset) and SURF matches.

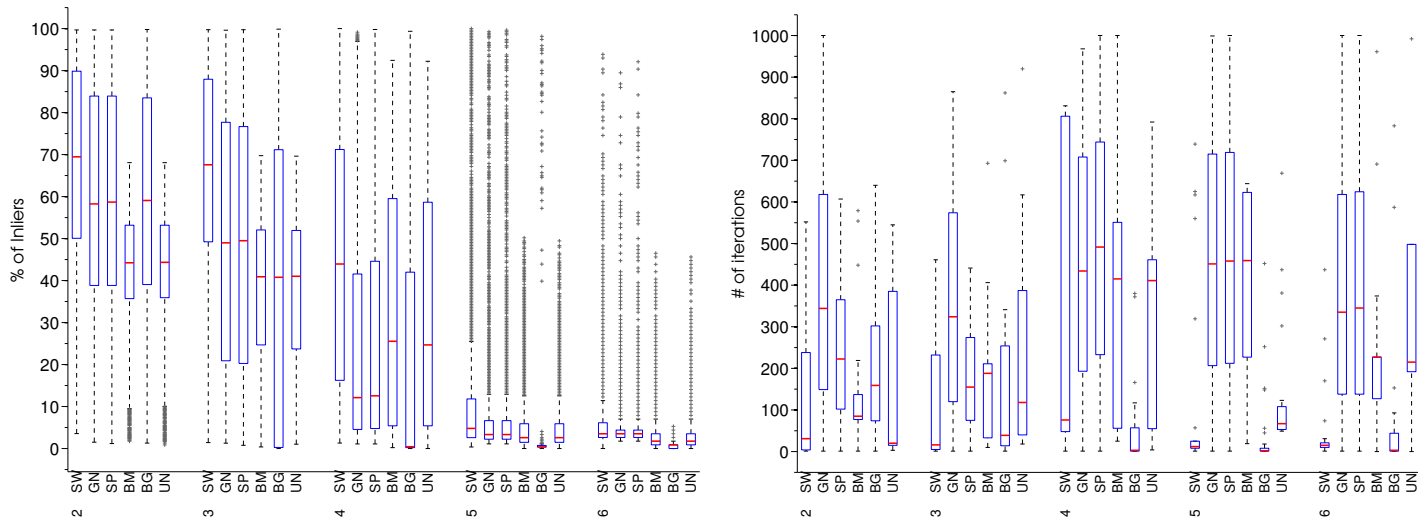


Figure IX: Increasing Blur (Trees dataset) and SURF matches.

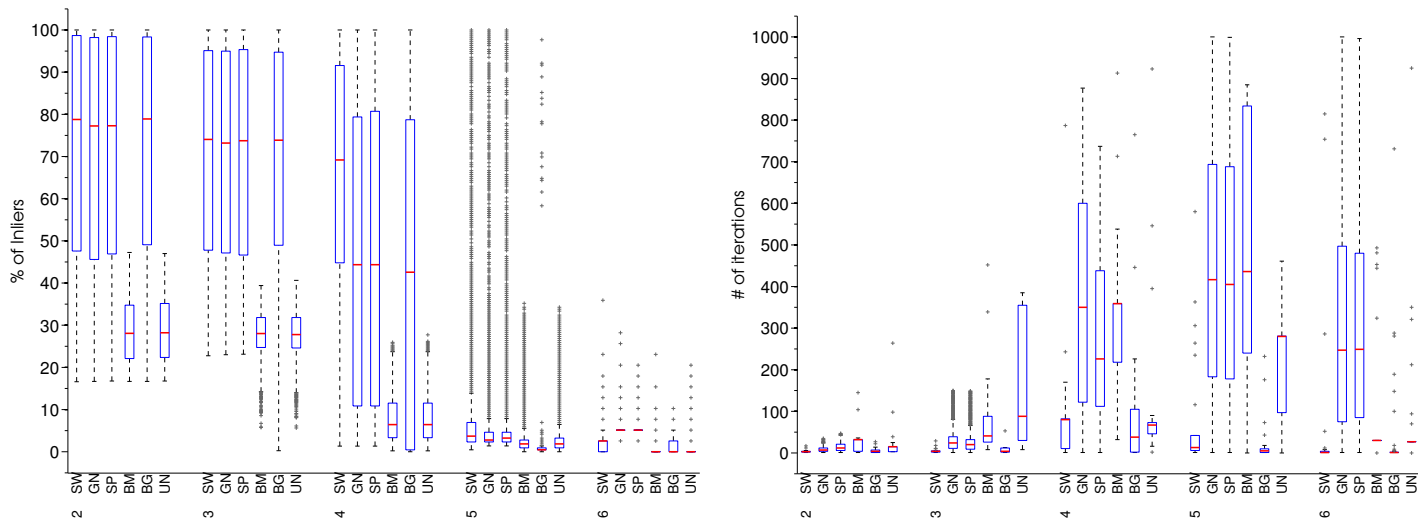


Figure X: Increasing Viewpoint (Wall dataset) and SURF matches.