APPENDIX A
CREATE TRAINING CORRESPONDENCE SETS WITH DIFFERENT INLIER RATES

For each training pair with the initial correspondence set $\mathbf{C}^{tra}$ obtained by SIFT, we describe how to generate 81 training correspondence sets whose inlier rates are precisely controlled at 0.1, 0.11, 0.12, ..., and 0.9, respectively. Consequently, there are 4698 (= 58×81) training correspondence sets in total. These training correspondence sets are used to train the SVM-based classifier to be used for determining the inlier sets of all candidate LCD image pairs quickly.

Among the three datasets used, only the VGG dataset provides the ground truth inlier sets for all image pairs. Therefore, we first need to generate the ground truth inlier sets for all image pairs in the RS dataset. For every ground truth-free training image pair (I_i, I_j) in the RS dataset, we perform the traditional RANSAC method with 10^8 iterations on the initial correspondence set $\mathbf{C}$, which is obtained by performing SIFT on (I_i, I_j), to obtain the ground truth inlier set of (I_i, I_j).

Furthermore, for each training image pair (I_i, I_j), we explain how to create 81 image pairs whose inlier rates are precisely controlled at 0.1, 0.11, 0,12, ..., and 0.9. Without loss of generality, for the image pair (I_i, I_j), suppose the obtained ground truth inlier correspondence set $\mathbf{C}^{gt}$ is with the inlier rate 0.356. To generate the ground truth correspondence subset $\mathbf{C}'$ whose inlier rate is controlled at 0.1, we can randomly discard a subset $\mathbf{S}$ from $\mathbf{C}^{gt}$ to control the inlier rate of the generated correspondence set $\mathbf{C}'$ $(= \mathbf{C}^{gt} - \mathbf{S})$ at 0.1 $(= \frac{|\mathbf{C}^{gt}-\mathbf{S}|}{|\mathbf{C}-\mathbf{S}|})$. By the same argument, we can create the 25 ground truth correspondence sets with the inlier rates 0.11, 0.12, ..., and 0.35, respectively. To generate the ground truth correspondence subset $\mathbf{C}'$ with the inlier rate 0.36, we can randomly discard a subset $\mathbf{S}$ from the outlier set $\mathbf{C} - \mathbf{C}^{gt}$ to control the inlier rate of $\mathbf{C}'$ $(= \mathbf{C} - \mathbf{C}^{gt} - \mathbf{S})$ at 0.36 $(= 1 - \frac{|\mathbf{C}-\mathbf{C}^{gt}-\mathbf{S}|}{|\mathbf{C}-\mathbf{S}|})$. By the same argument, we can create the 54 ground truth correspondence sets with the inlier rates 0.37,0.38, ..., and 0.9, respectively. Consequently, for each image pair in the RS, VGG and New College datasets, 81 training correspondence sets can be created. For the collected 58 training image pairs, we can create 4698 (= 58×81) training correspondence sets in total.