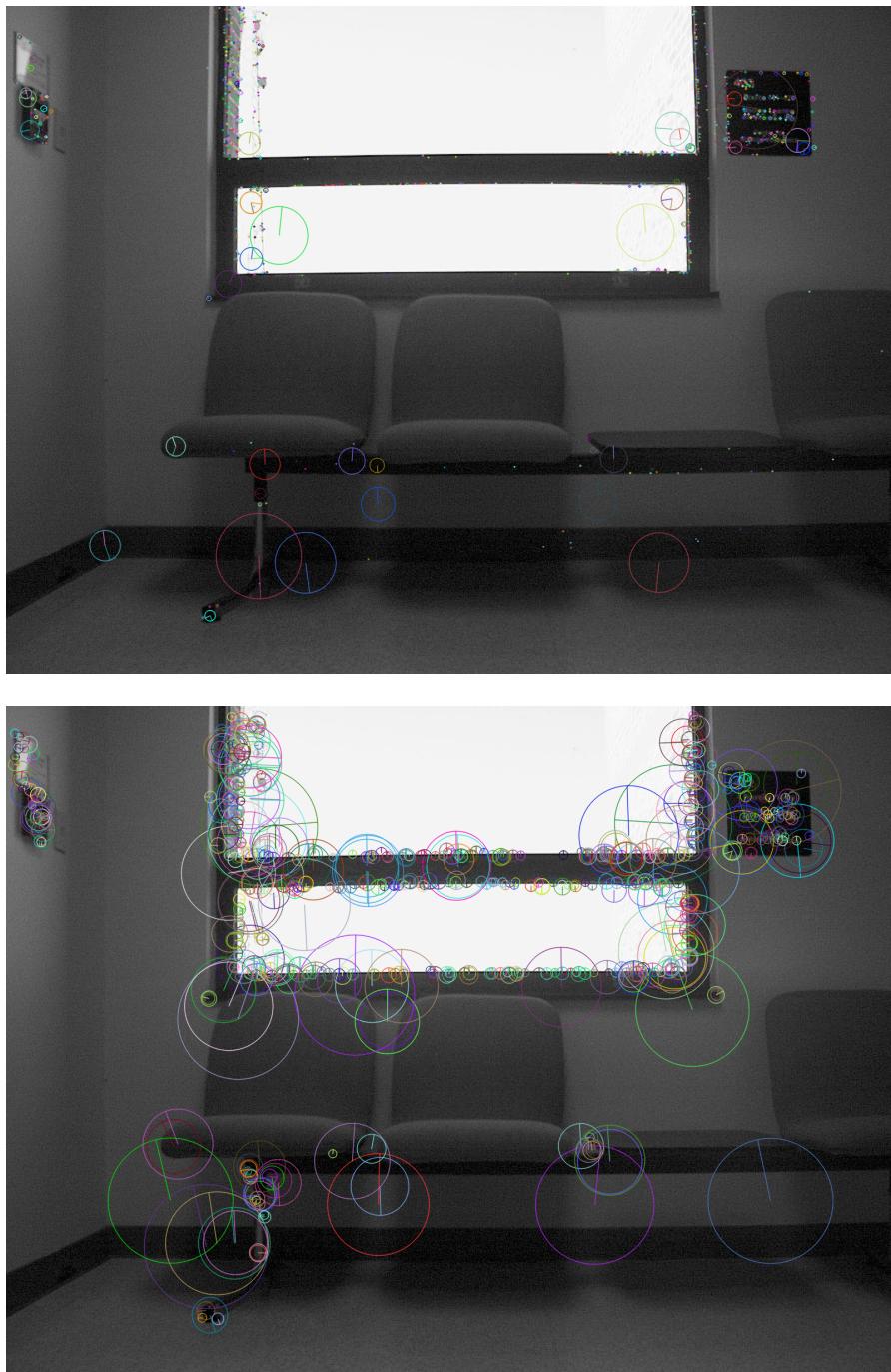


# Finding Matches

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## 1 KEYPOINTS



**Figure 1.1:** Keypoints

SIFT and SURF keypoint detectors.

SIFT and SURF features have many advantages over other features as local feature detectors

and descriptors. They are more invariant to rotation, scale and translation variations. And the descriptors built tend to be unique among the feature pool, which discriminate features from each other.

## 2 MATCHING

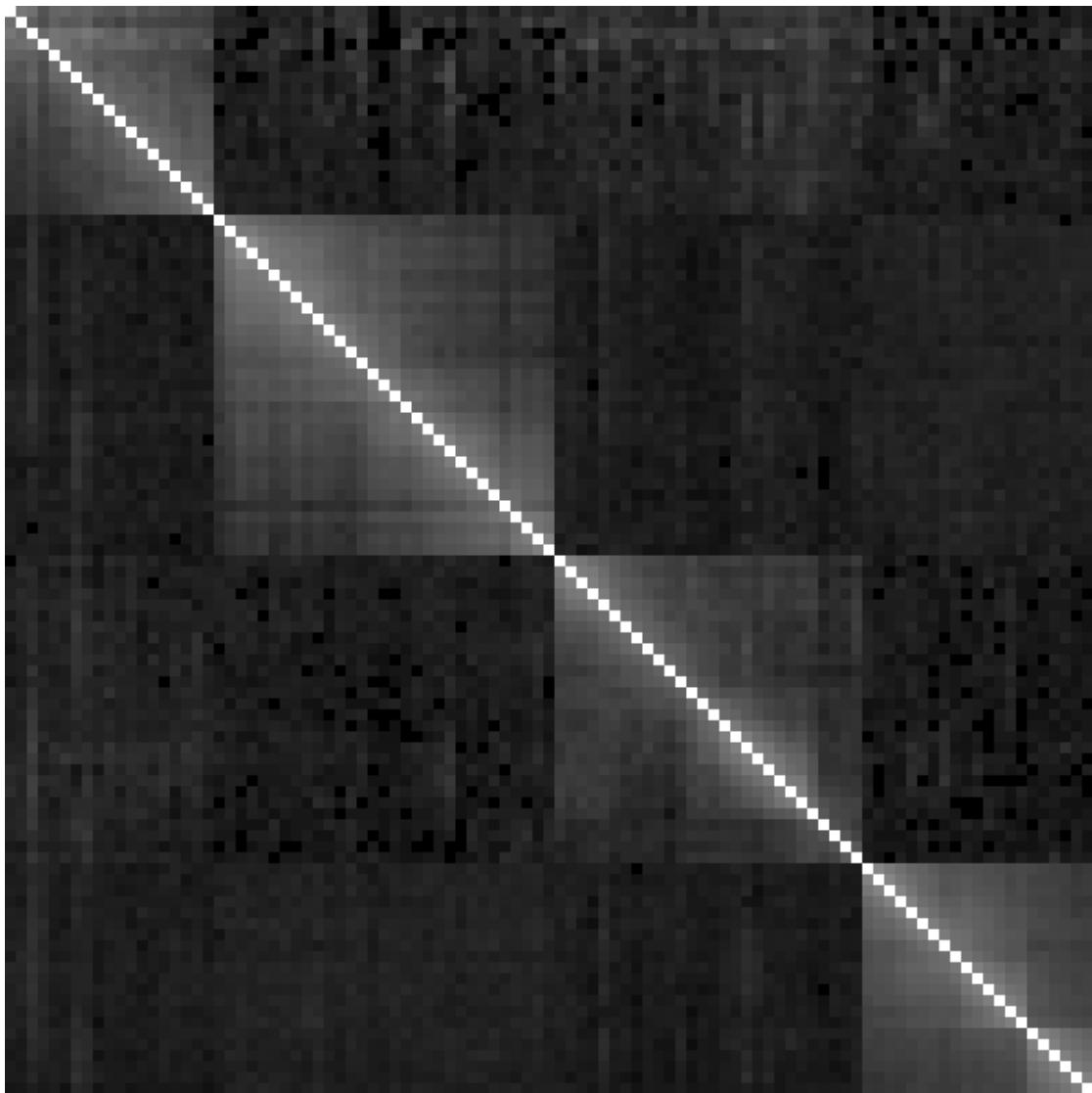




**Figure 2.1:** Matching

The experiments uses Second Nearest Neighbor test to filter the acceptable matches. Matched images shown above are aquired from applying KNN and second NN test, which opts out the candidate matches to which the second best match is very close.

### 3 ALLMATCHES



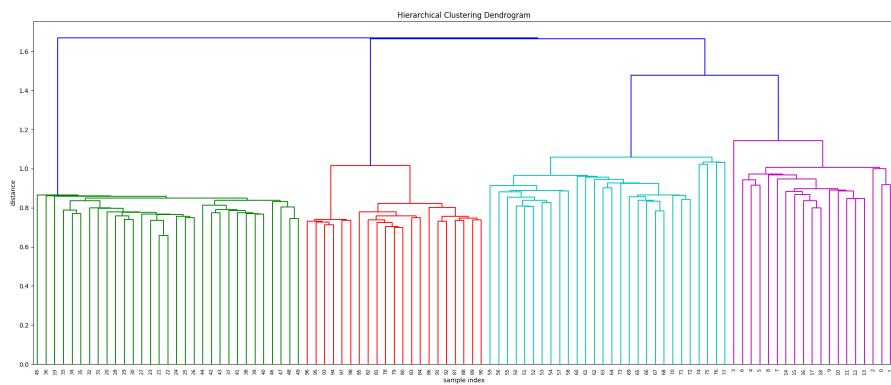
**Figure 3.1:** similarity map

Distance function corresponding to the match quality.

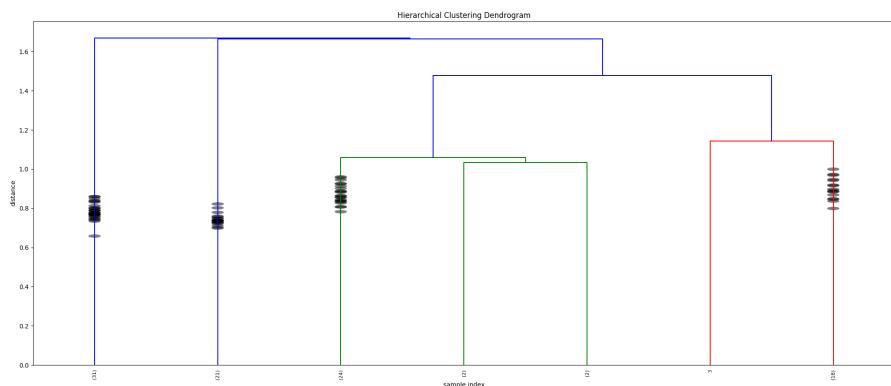
In order to make distance score more scattered along the range from 0 to 1. The following distance function is devised.

$$DistanceScore = \sqrt[3]{\frac{\# \text{of AcceptableMatches}}{\# \text{of CandidateMatches}}} \quad (3.1)$$

## 4 HIERARCHICAL CLUSTERING



**Figure 4.1:** Clustering Tree



**Figure 4.2:** Truncated Tree, 7 clusters