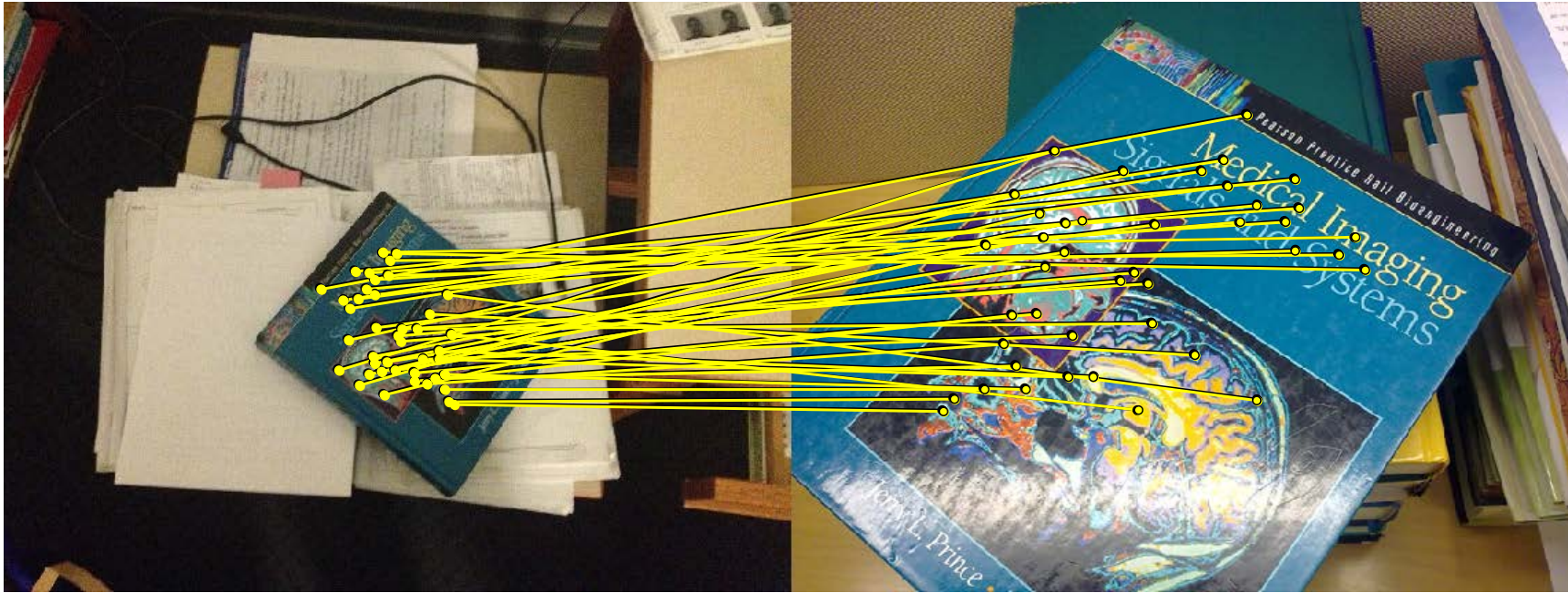


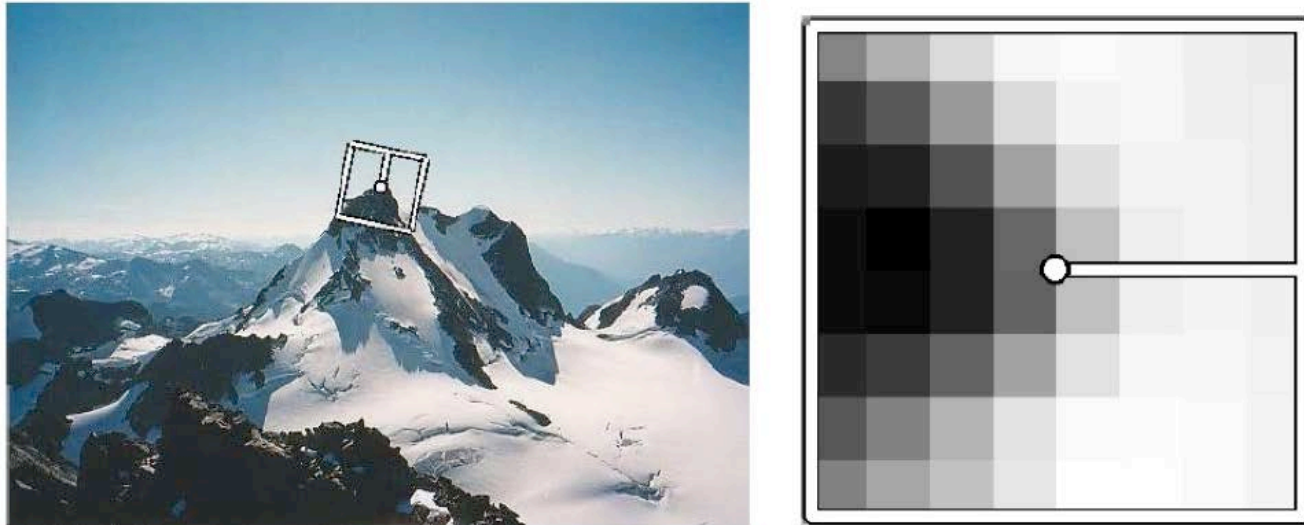
Feature descriptors



- Represent local pattern around a keypoint by a vector (“feature descriptor”)
- Establish feature correspondences by finding the nearest neighbor in descriptor space

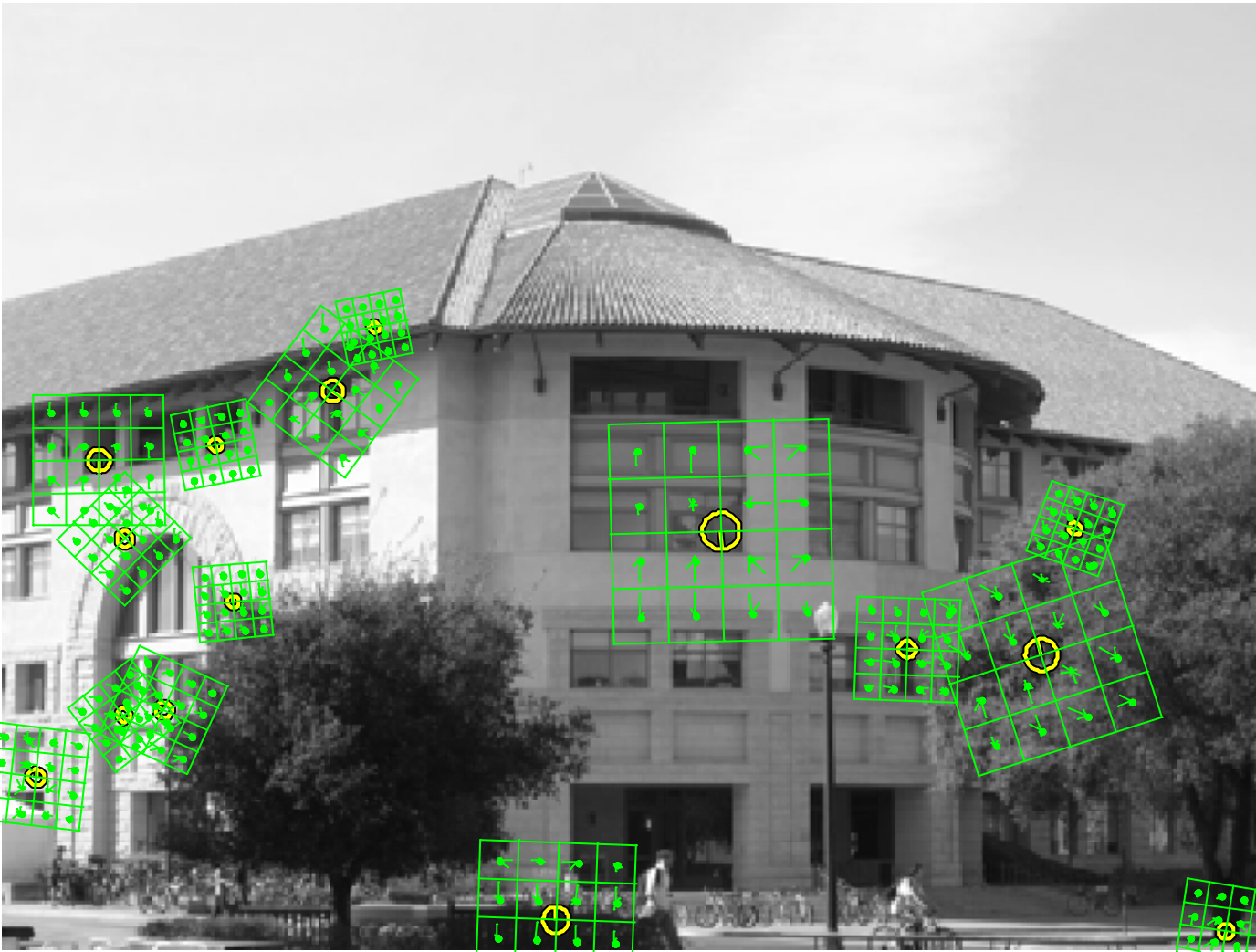


Scale/rotation invariant feature descriptors



- Scale invariance: extract features at scale provided by keypoint detection
- Rotation invariance:
 - Detect dominant orientation
 - Average gradient direction
 - Peak detection in gradient direction histogram
 - Rotate coordinate system to dominant orientation
 - Multiple strong orientation peaks: generate second feature point

SIFT descriptors



- SIFT - Scale-Invariant Feature Transform [[Lowe, 1999, 2004](#)]
- Sample thresholded image gradients at 16x16 locations in scale space (in local coordinate system for rotation and scale invariance)
- For each of 4x4 subregion, generate orientation histogram with 8 directions each; each observation weighted with magnitude of image gradient and a window function
- 128-dimensional feature vector

