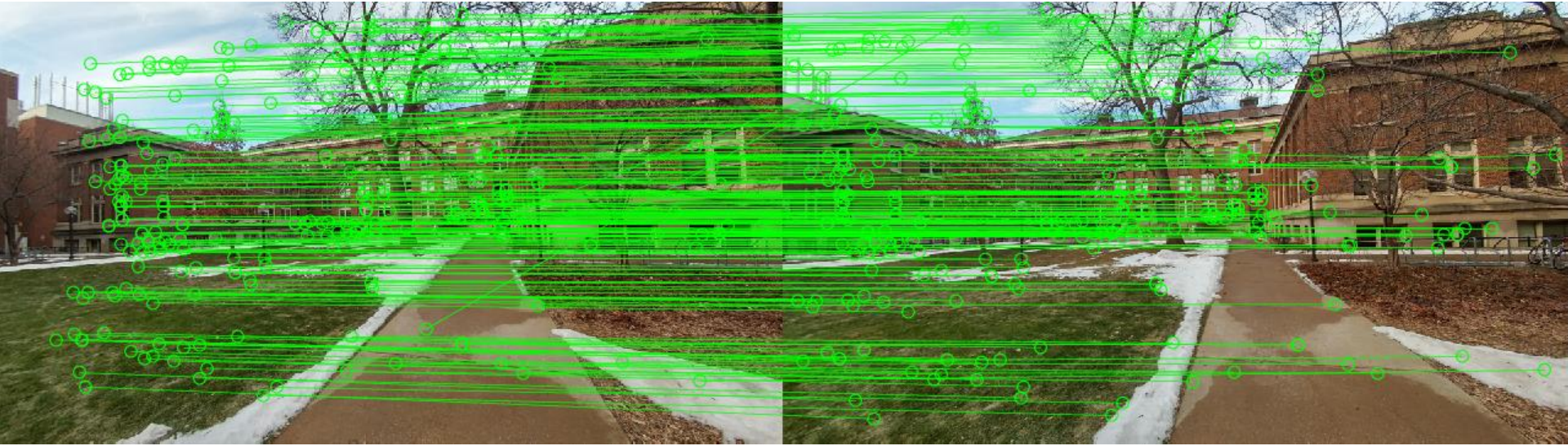
# Local Image Matching

Hyun Soo Park

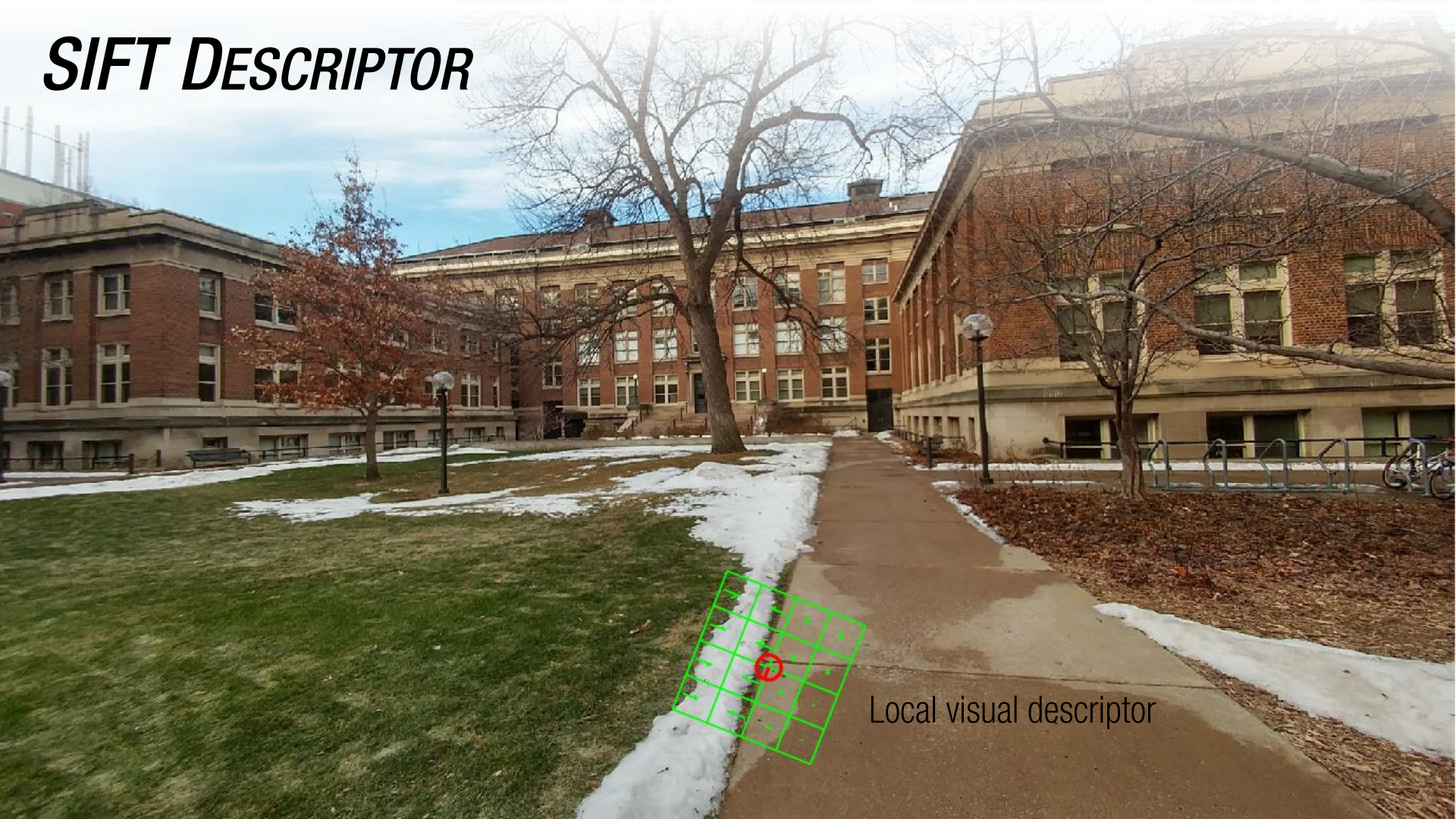
# RECALL: SIFT FEATURE MATCHING



# SIFT Descriptor

Local visual descriptor

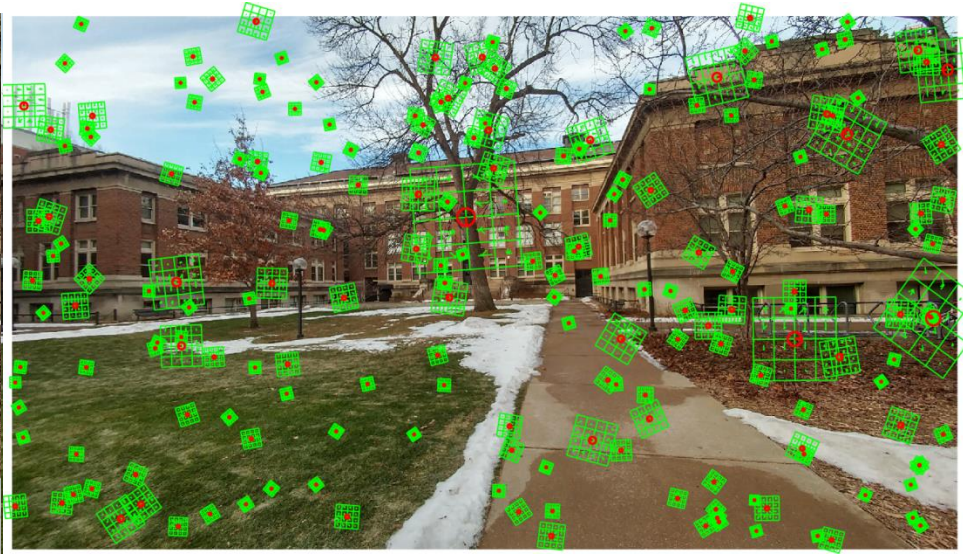
# SIFT Descriptor



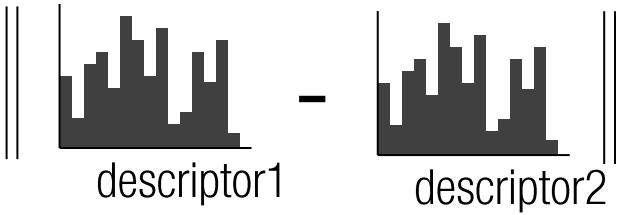
# Feature Similarity ~ SSD (Sum of Squared Distance)

$$\left\| \text{descriptor1} - \text{descriptor2} \right\| = 0$$

# NEAREST NEIGHBOR SEARCH



Feature match candidates



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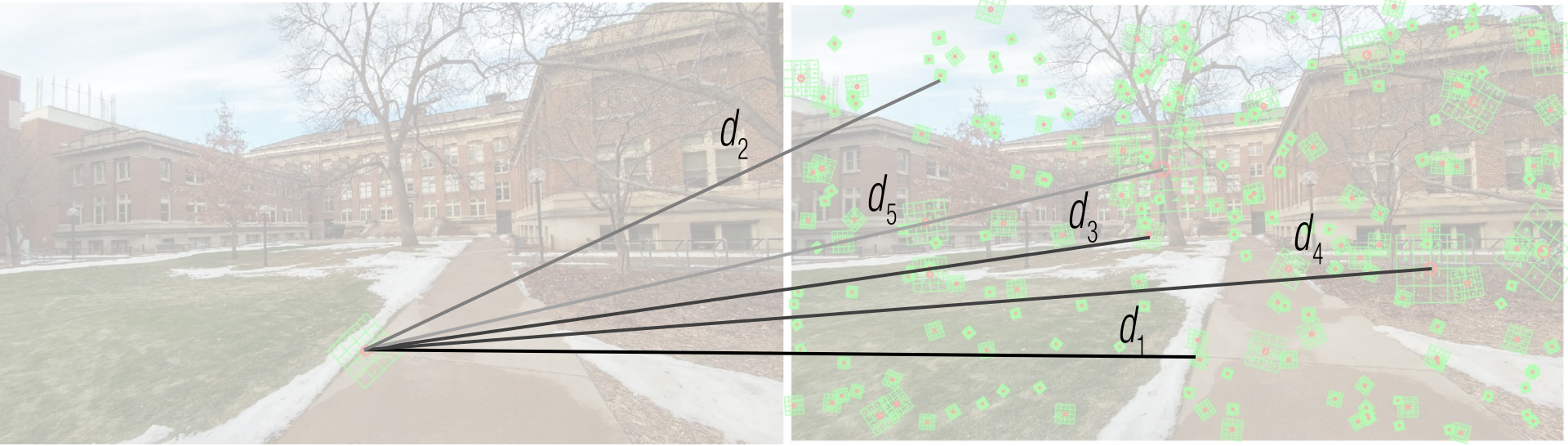
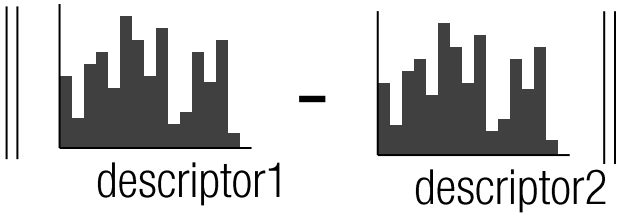
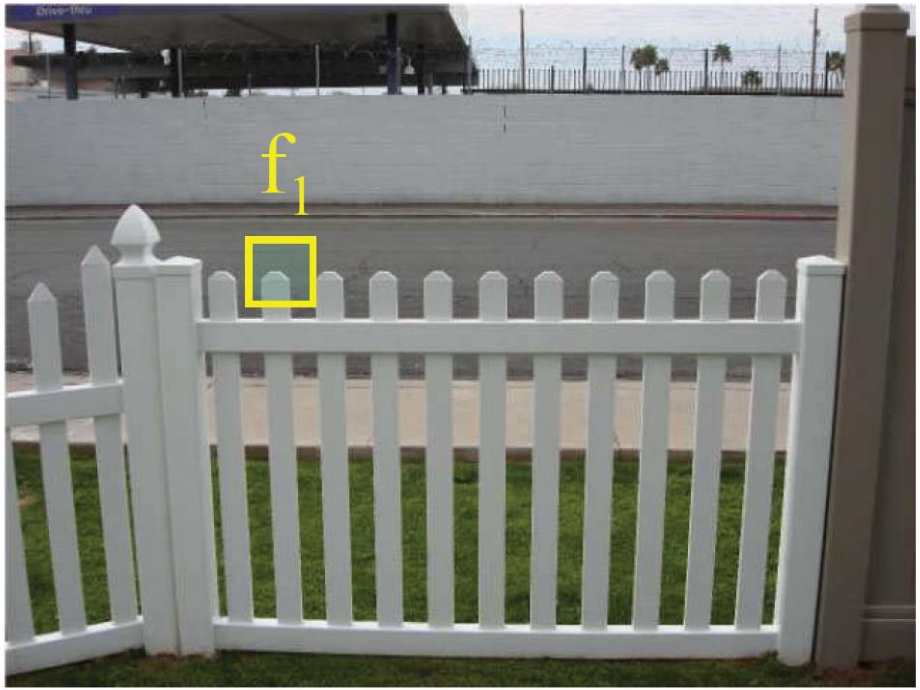
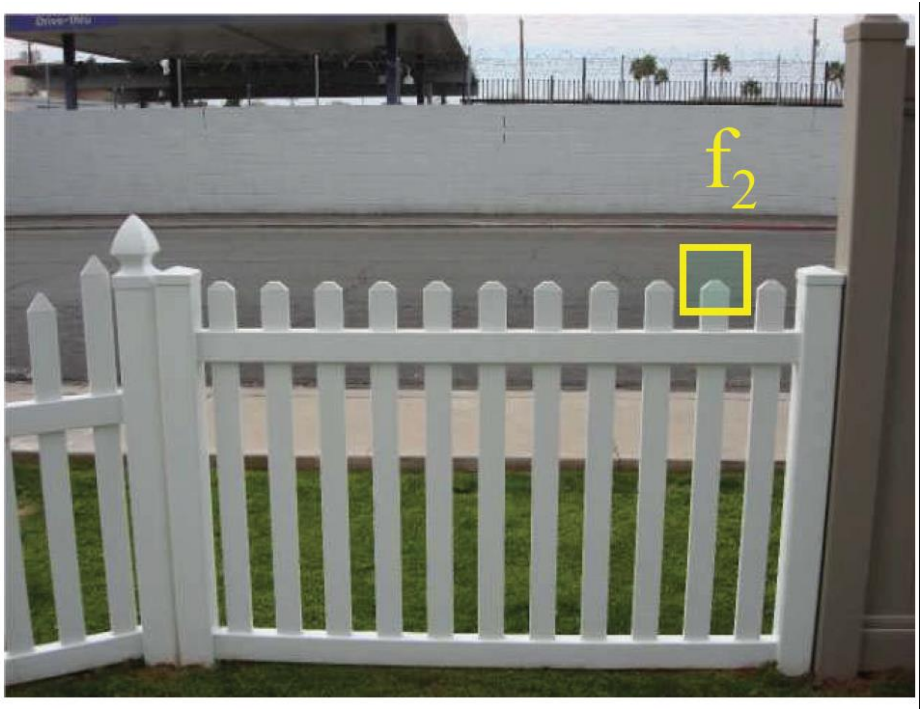



Feature match candidates



# FEATURE DISCRIMINATIVITY



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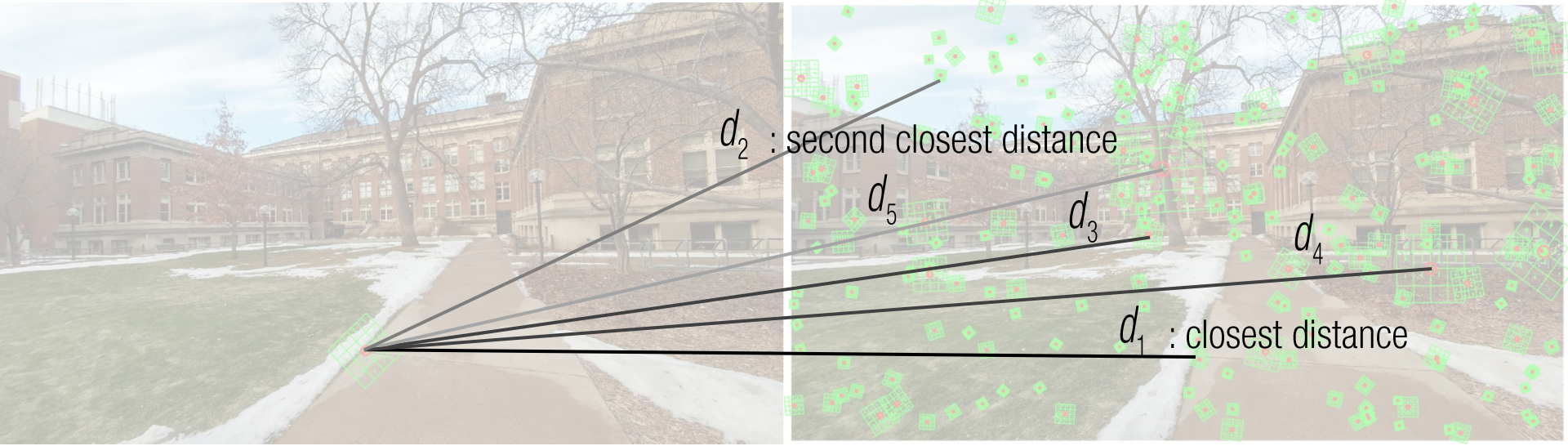
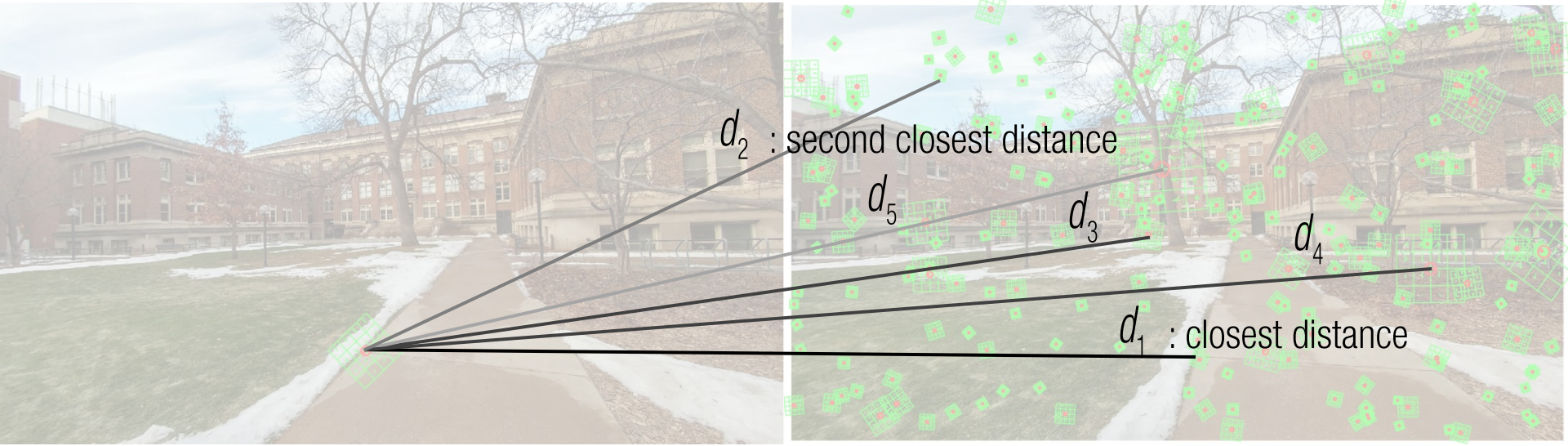



Feature match candidates

**Discriminativity**: how is the feature point unique?

# Feature Discriminativity

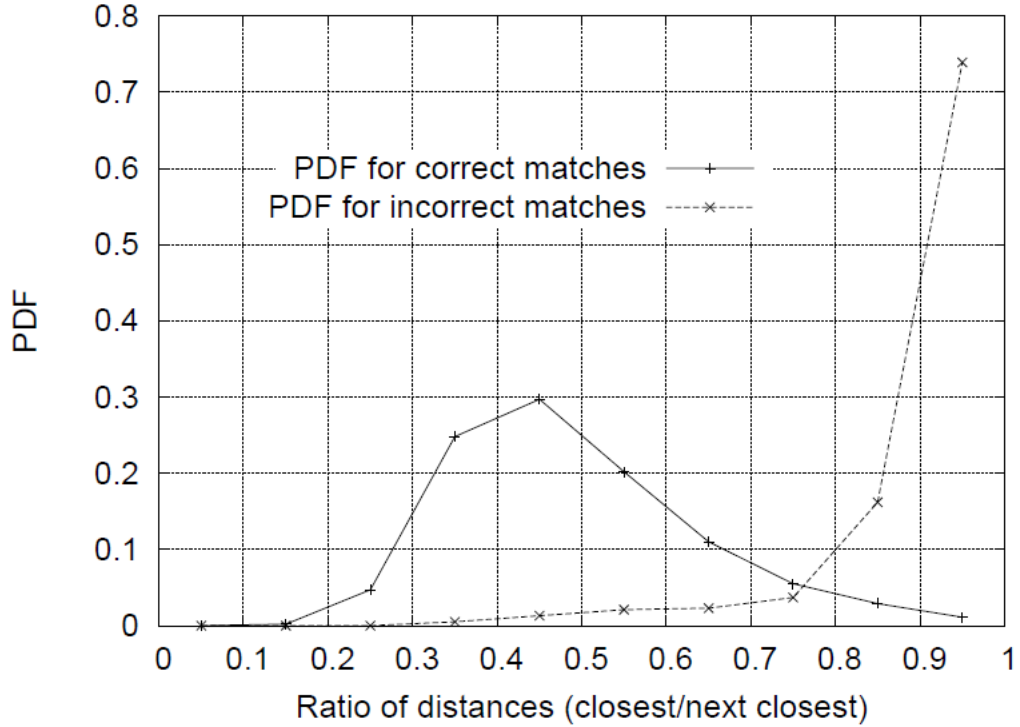



Feature match candidates

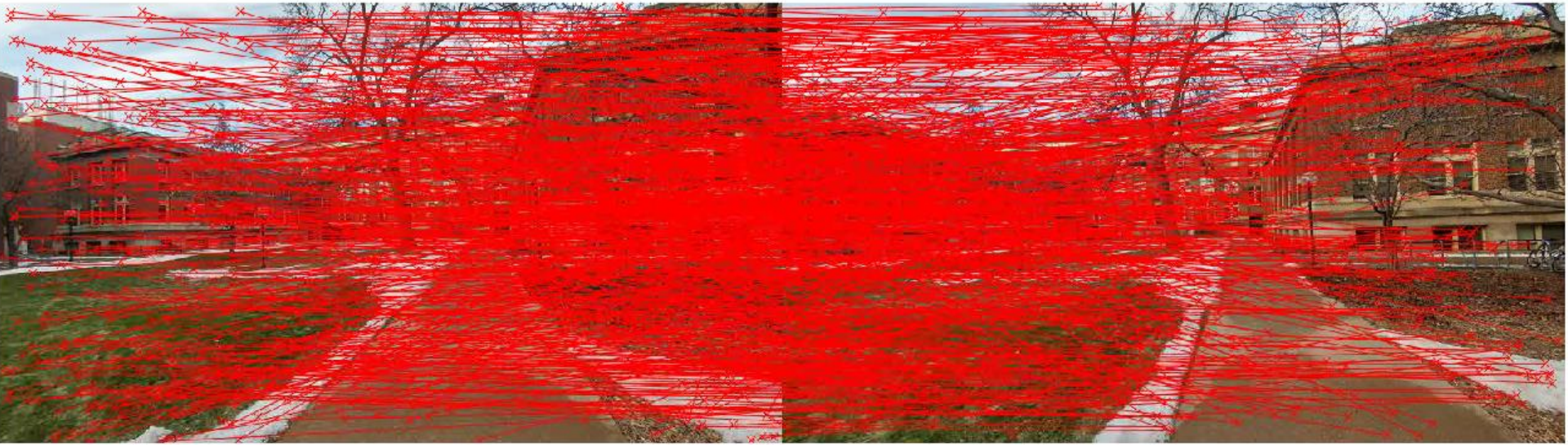
**Discriminativity**: how is the feature point unique?

$$\frac{d_1}{d_2} < 0.7$$

# FEATURE DISCRIMINATIVITY



# Nearest Neighbor Search w/o Ratio Test

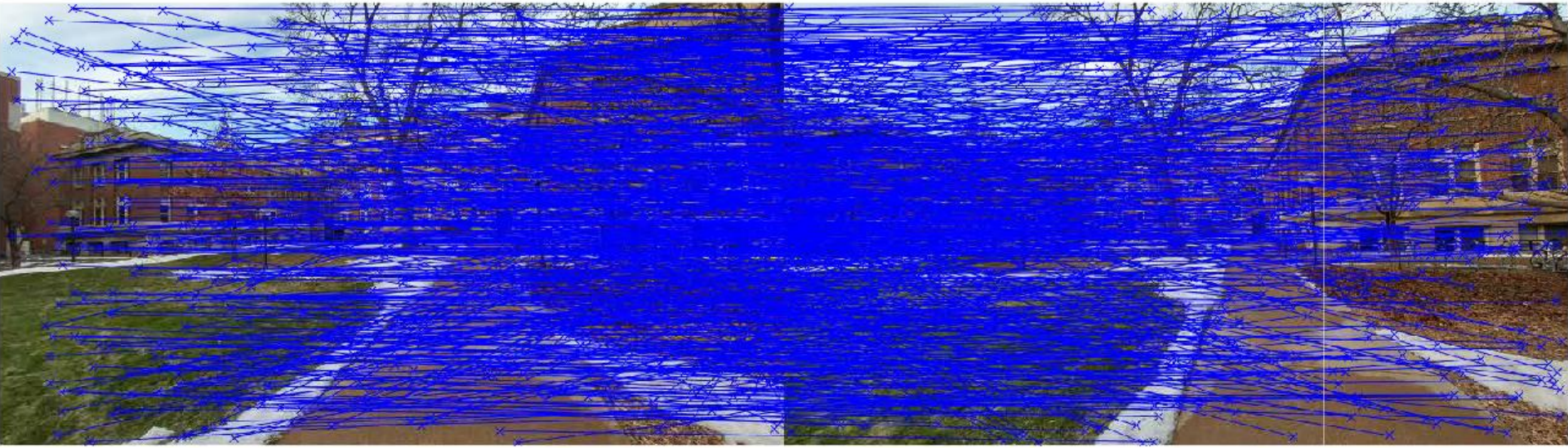


Left image→right image

# Nearest Neighbor Search w/ Ratio Test

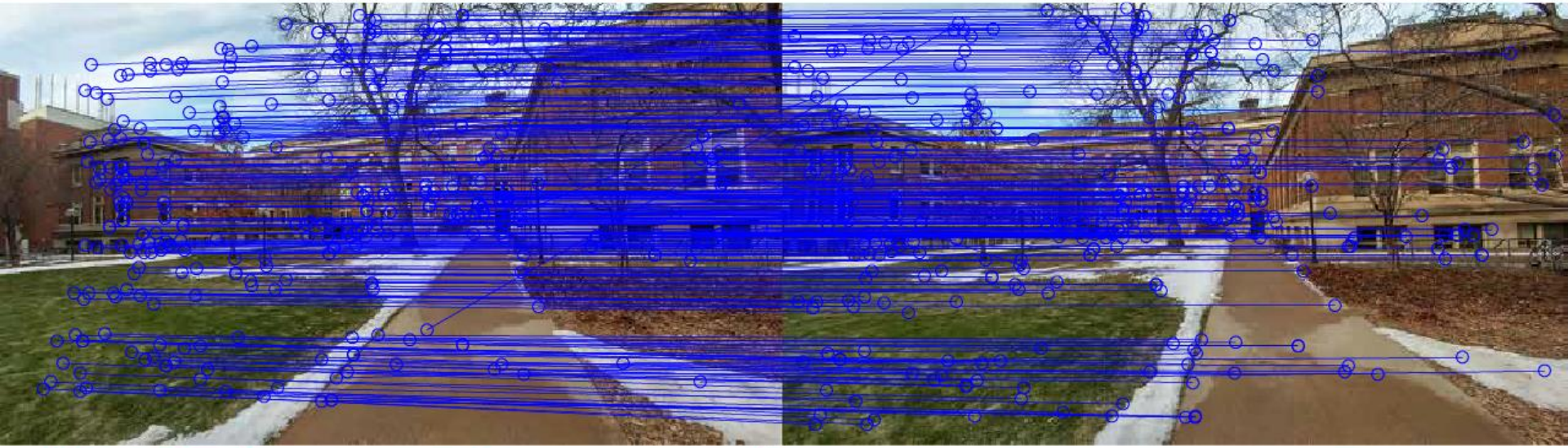
Left image→right image

# Nearest Neighbor Search w/o Ratio Test



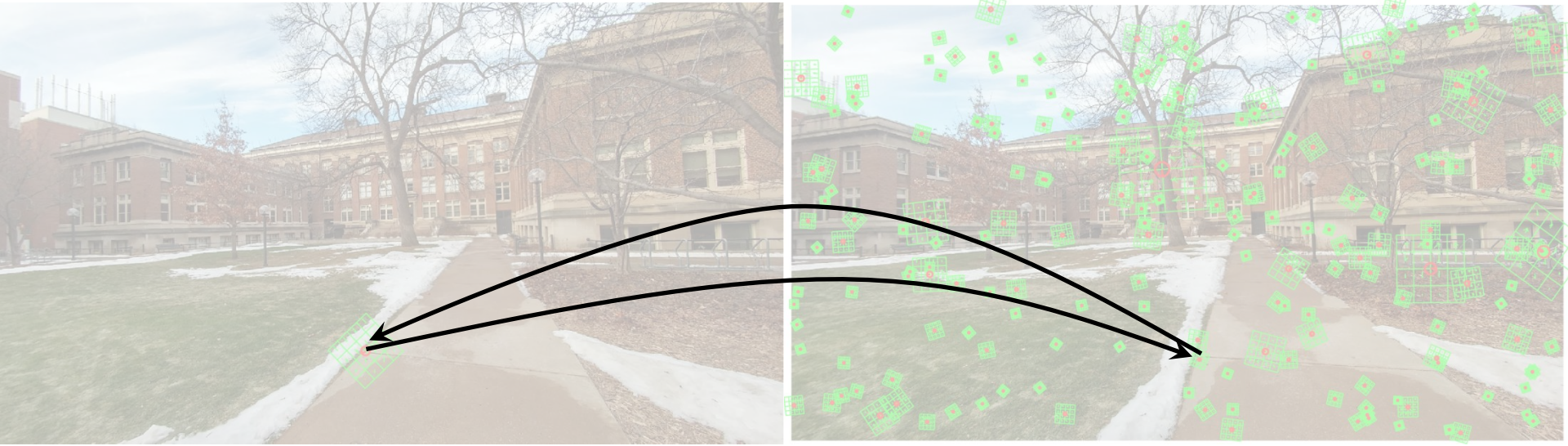
Left image←right image

# Nearest Neighbor Search w/ Ratio Test



Left image←right image

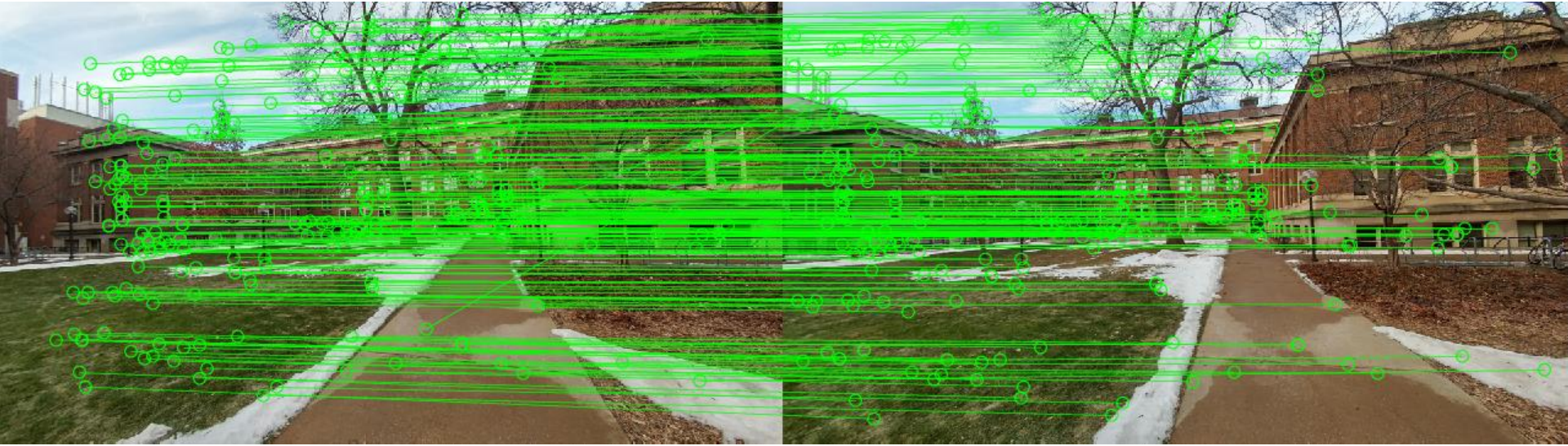
# Bi-directional Consistency Check



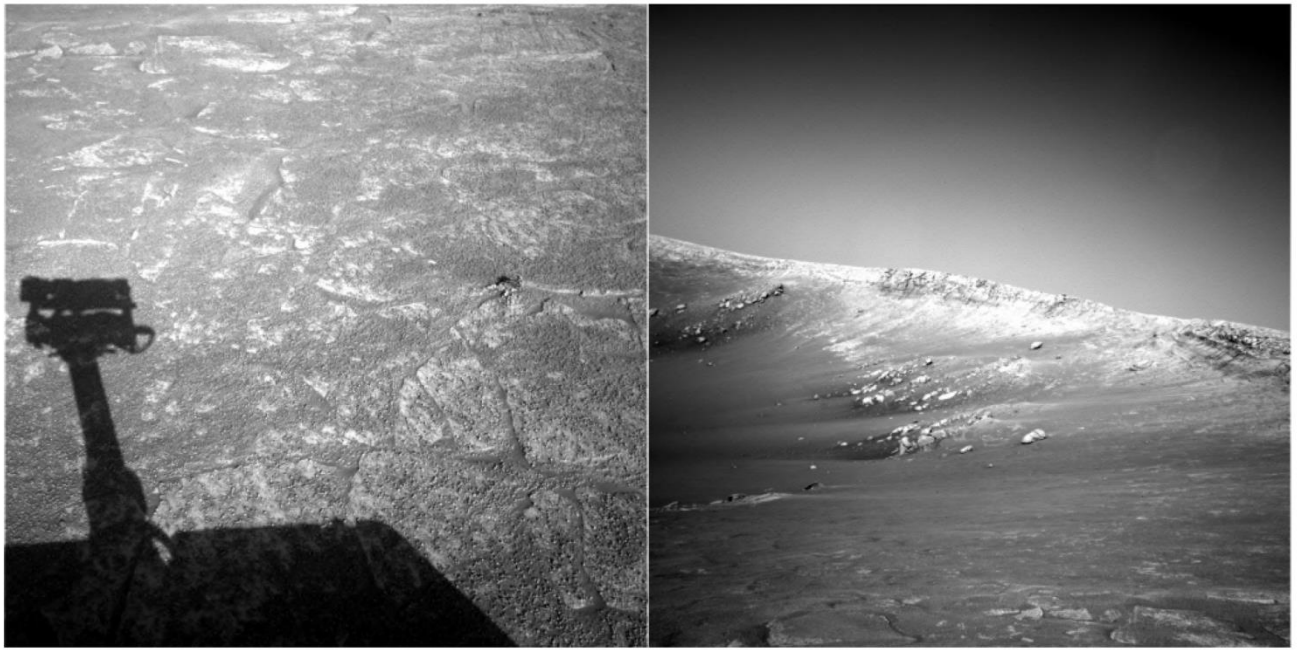
Feature match candidates

**Consistency**: would a feature match correspond to each other?

# Bi-directional Consistency Check

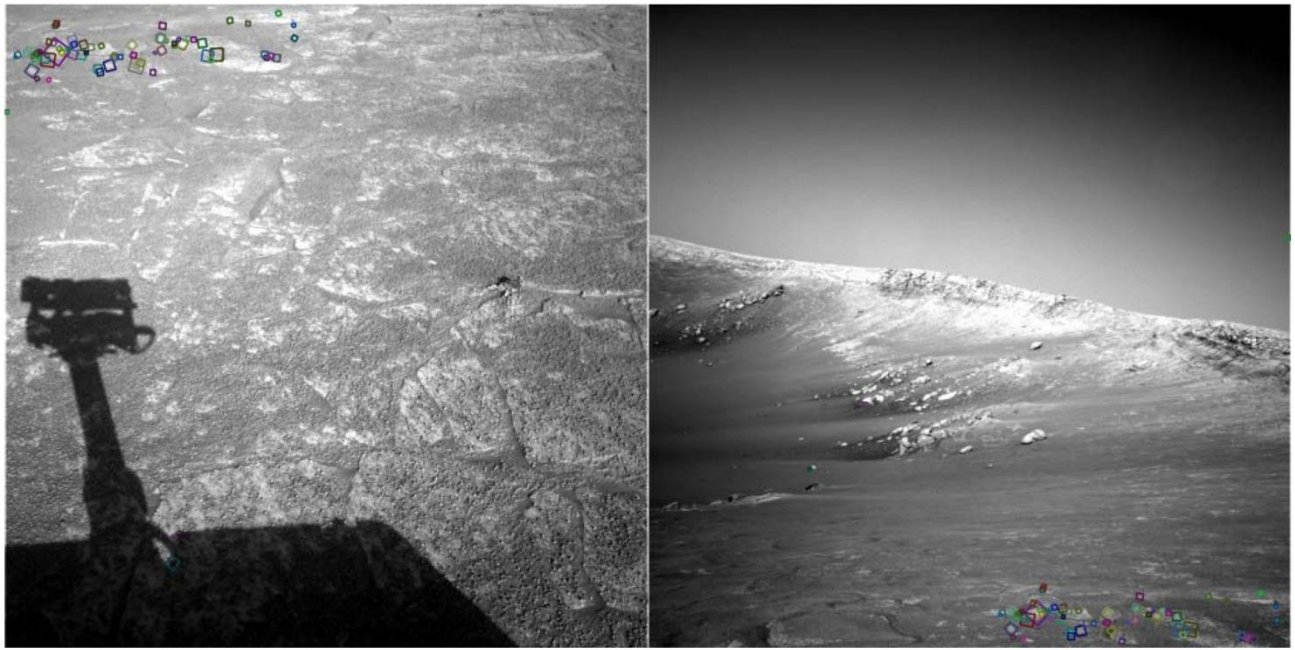


# SIFT Feature Matching



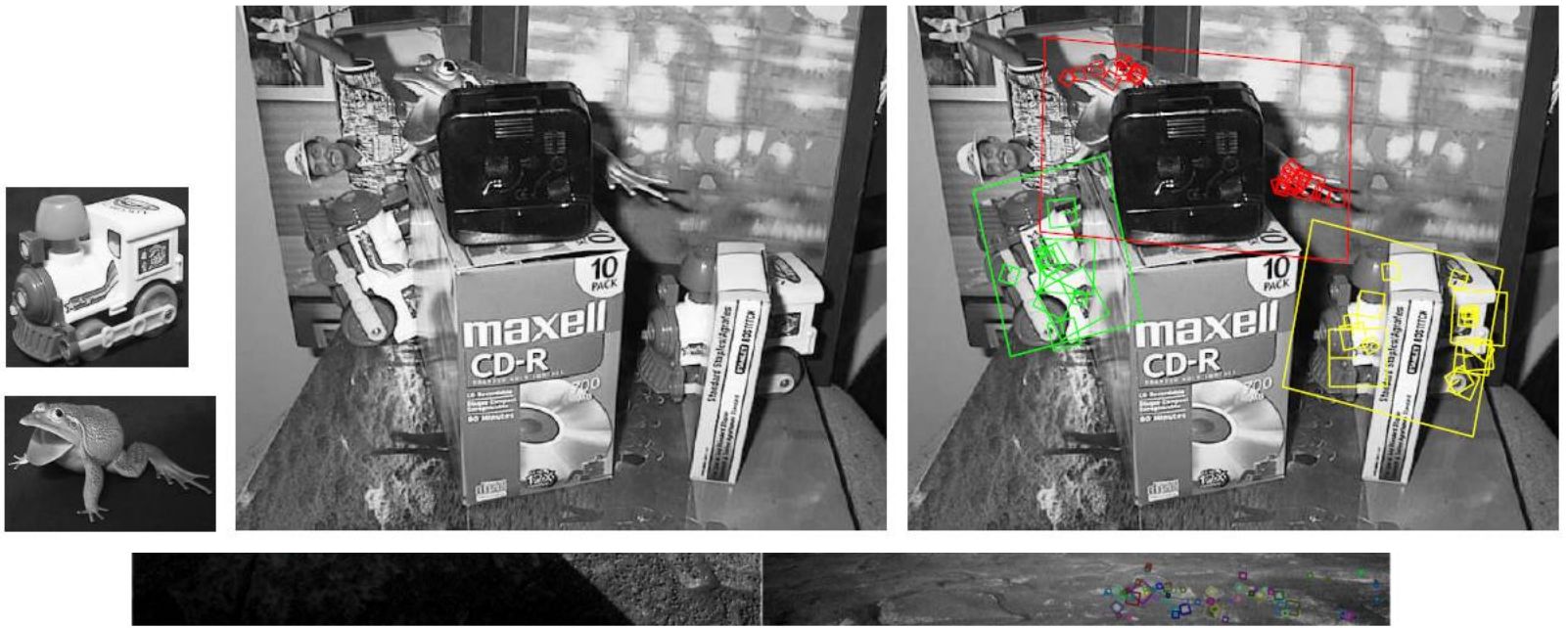
NASA Mars Rover images

# SIFT Feature Matching



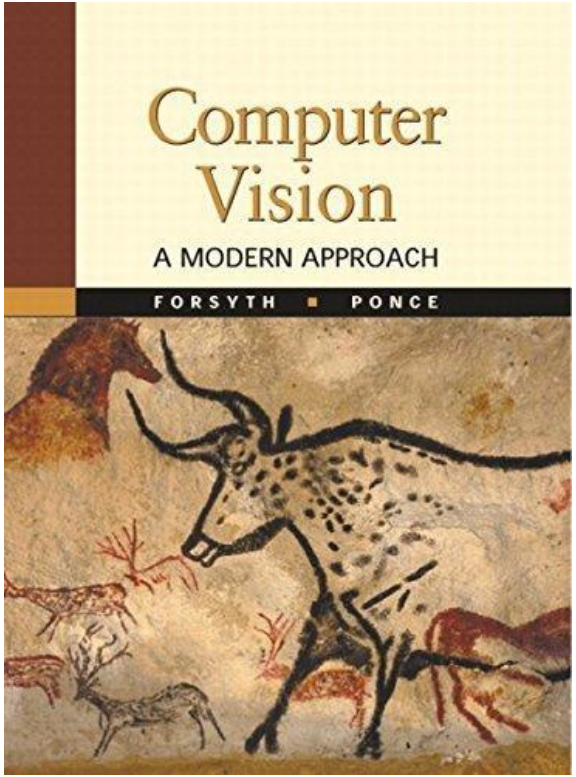
NASA Mars Rover images
with SIFT feature matches
Figure by Noah Snavely

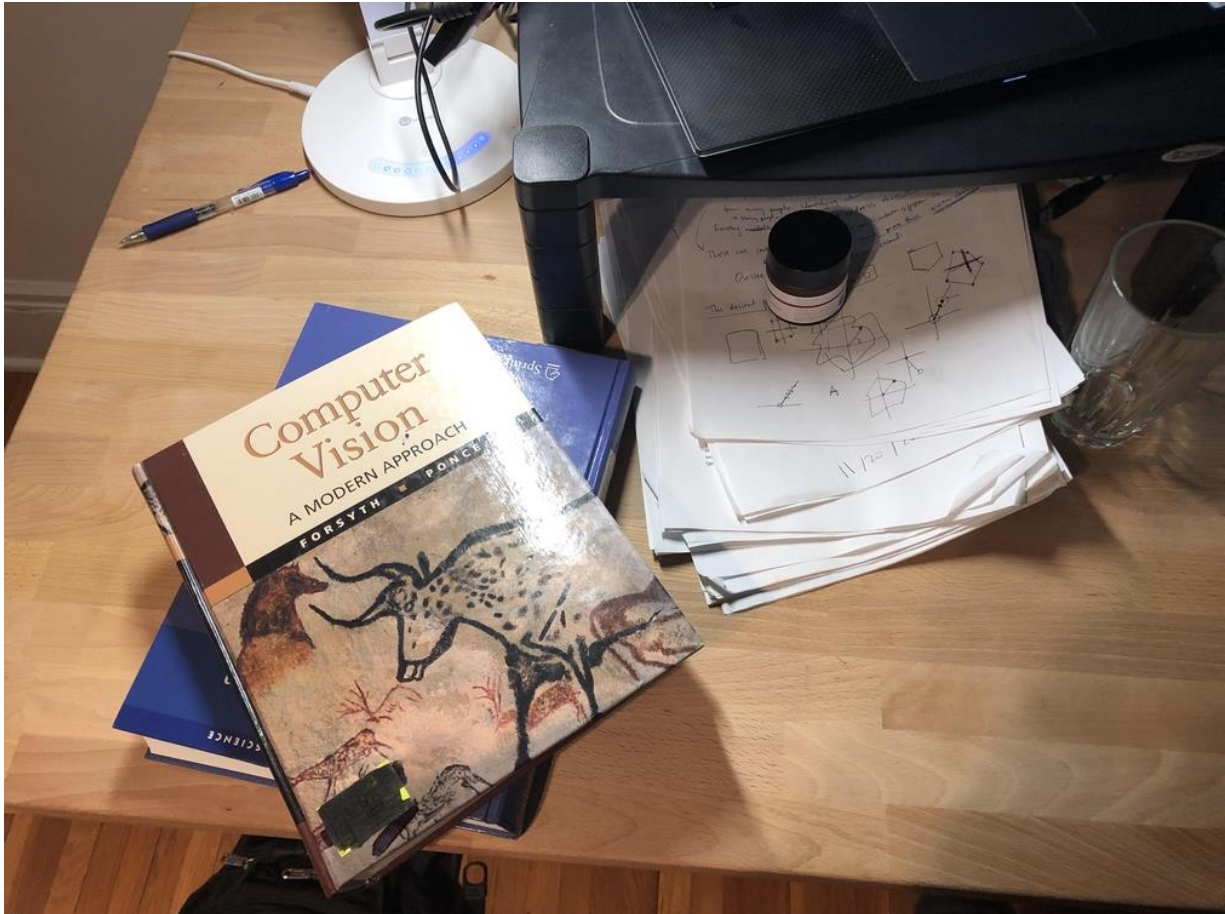
# SIFT Feature Matching



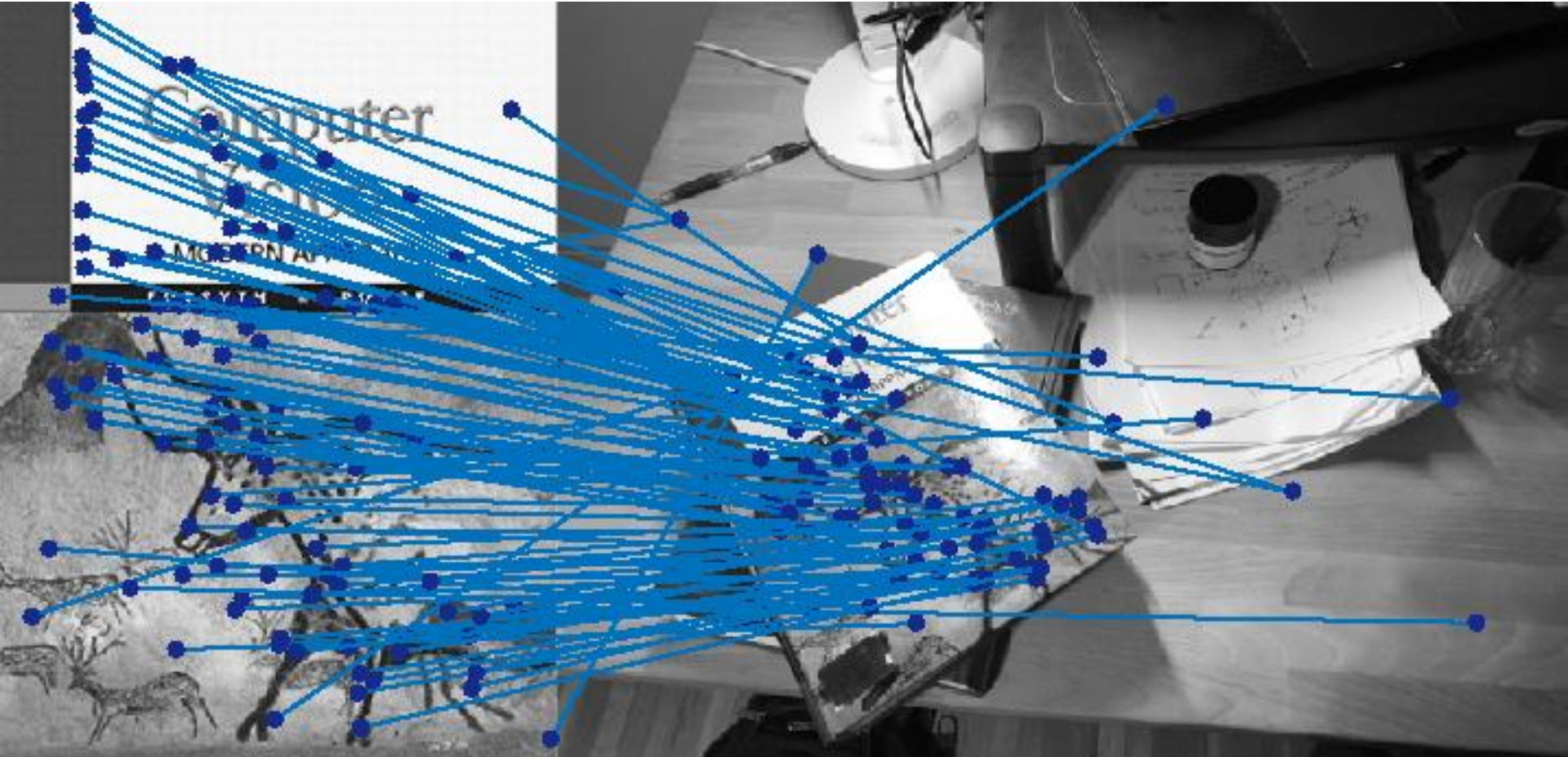

NASA Mars Rover images
with SIFT feature matches
Figure by Noah Snavely

# Object Recognition

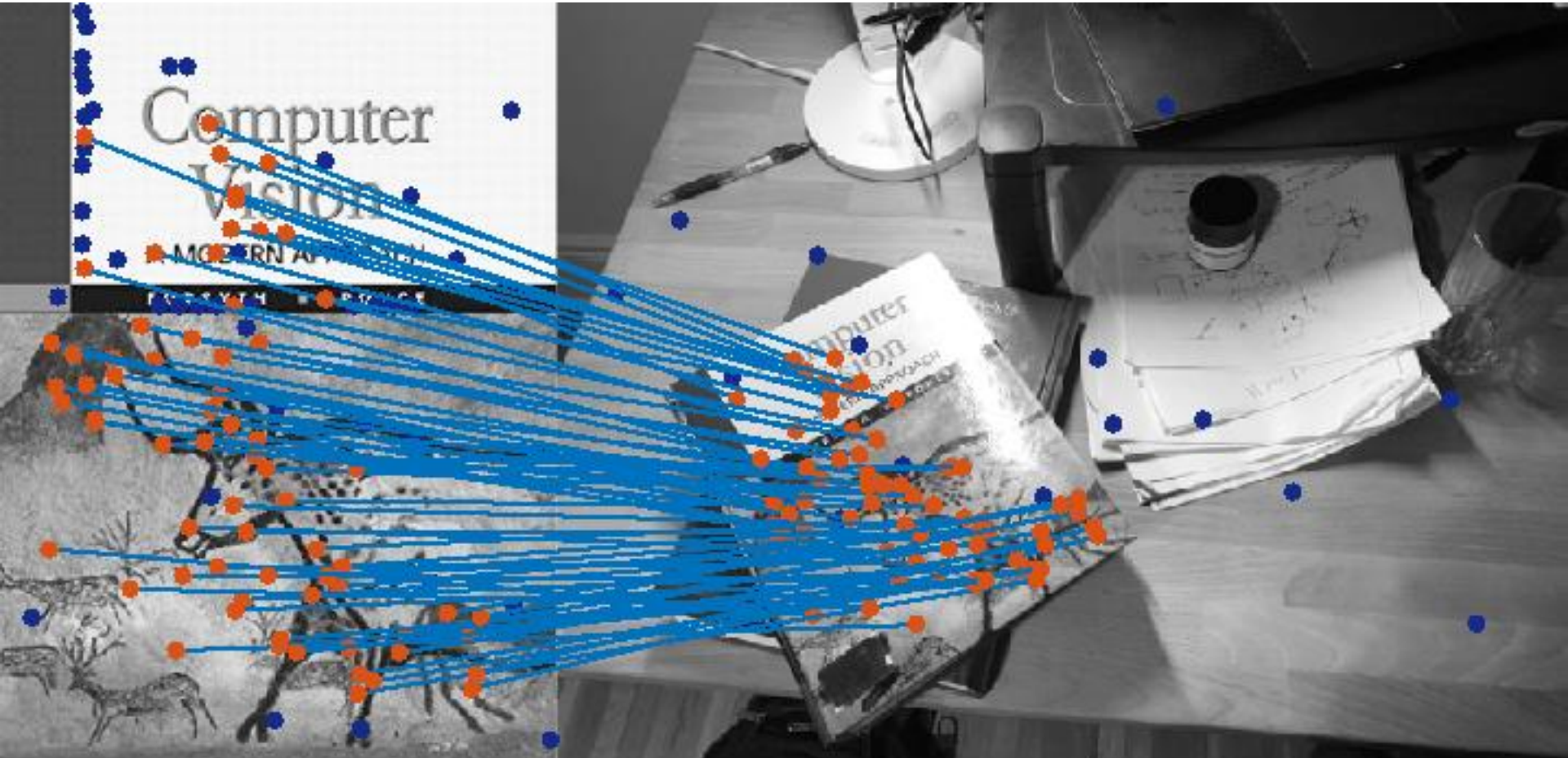


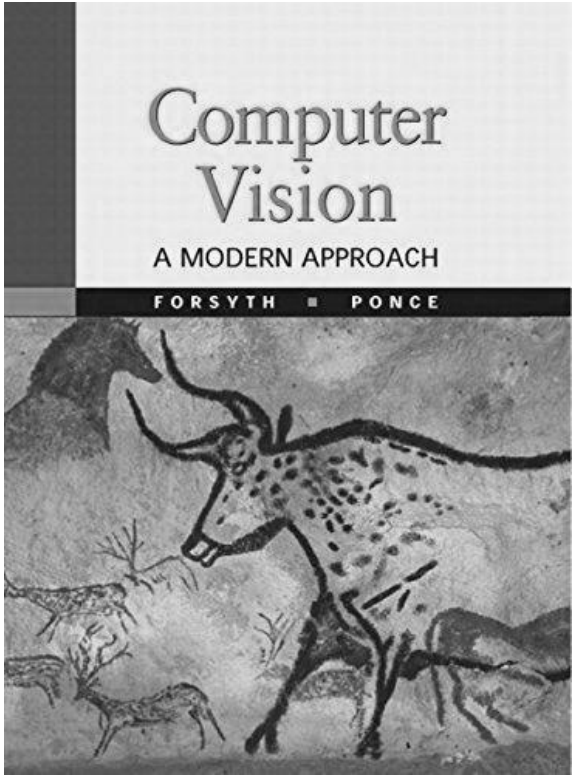
# Local Feature Matching

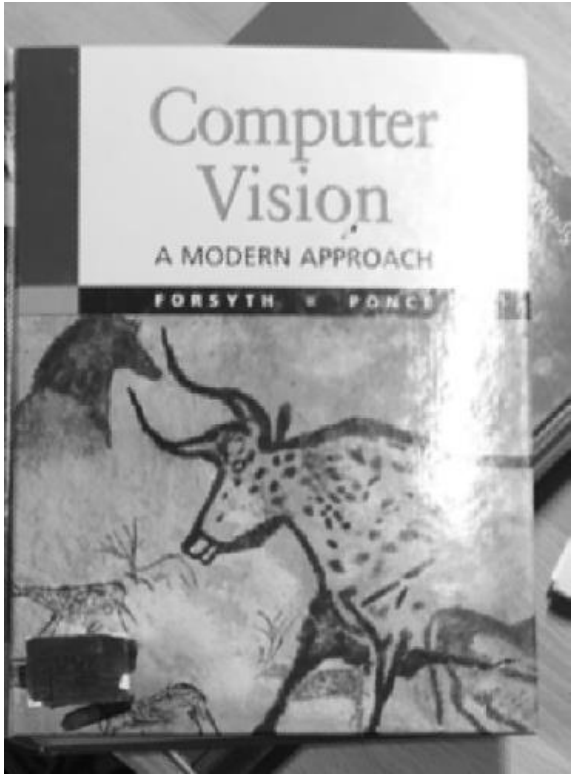


# ROBUST FILTERING



# IMAGE WARPING



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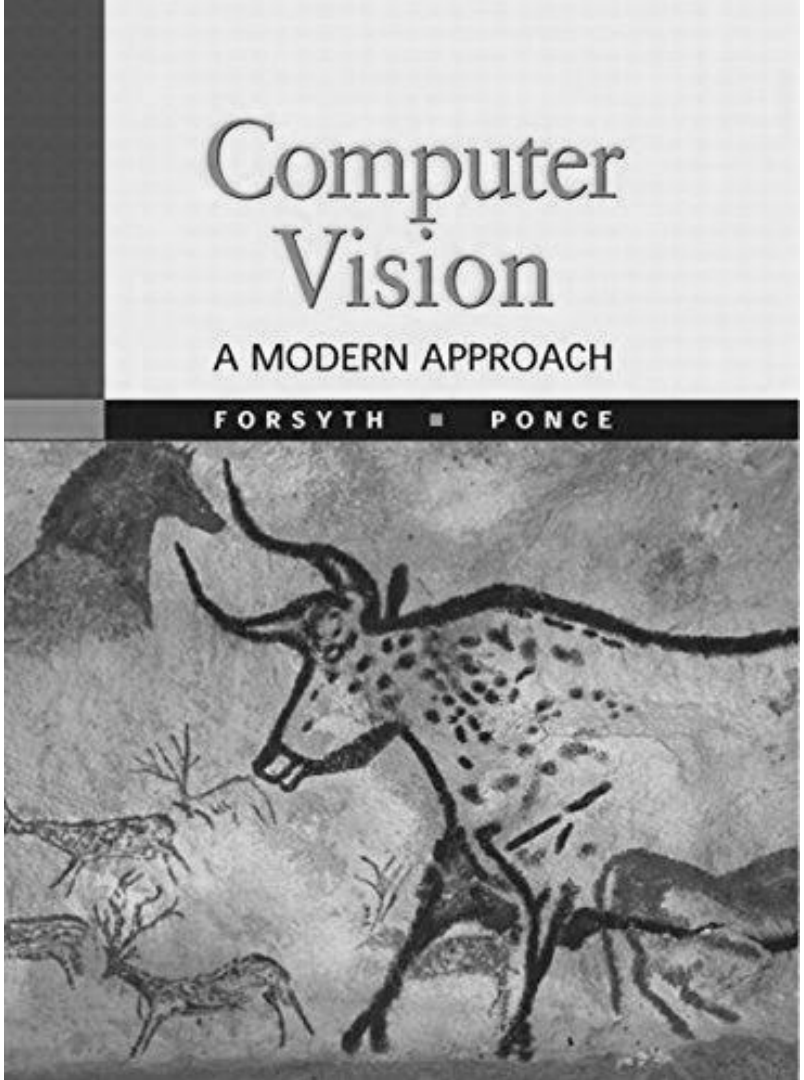
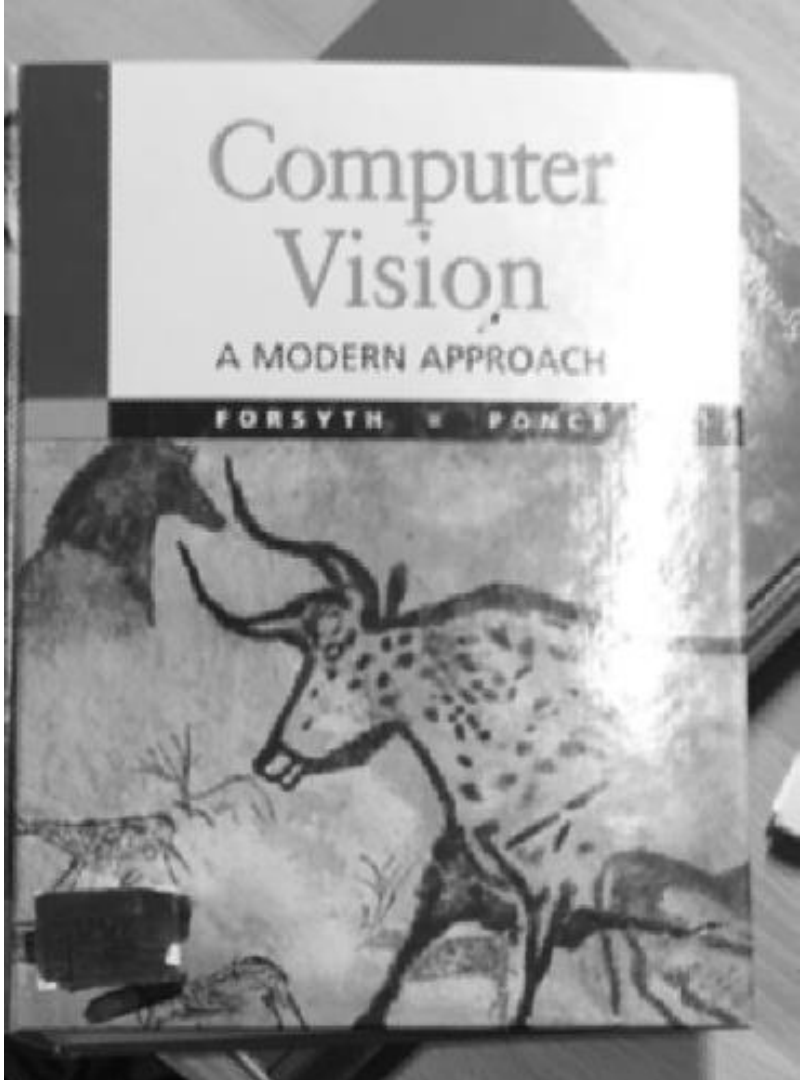
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