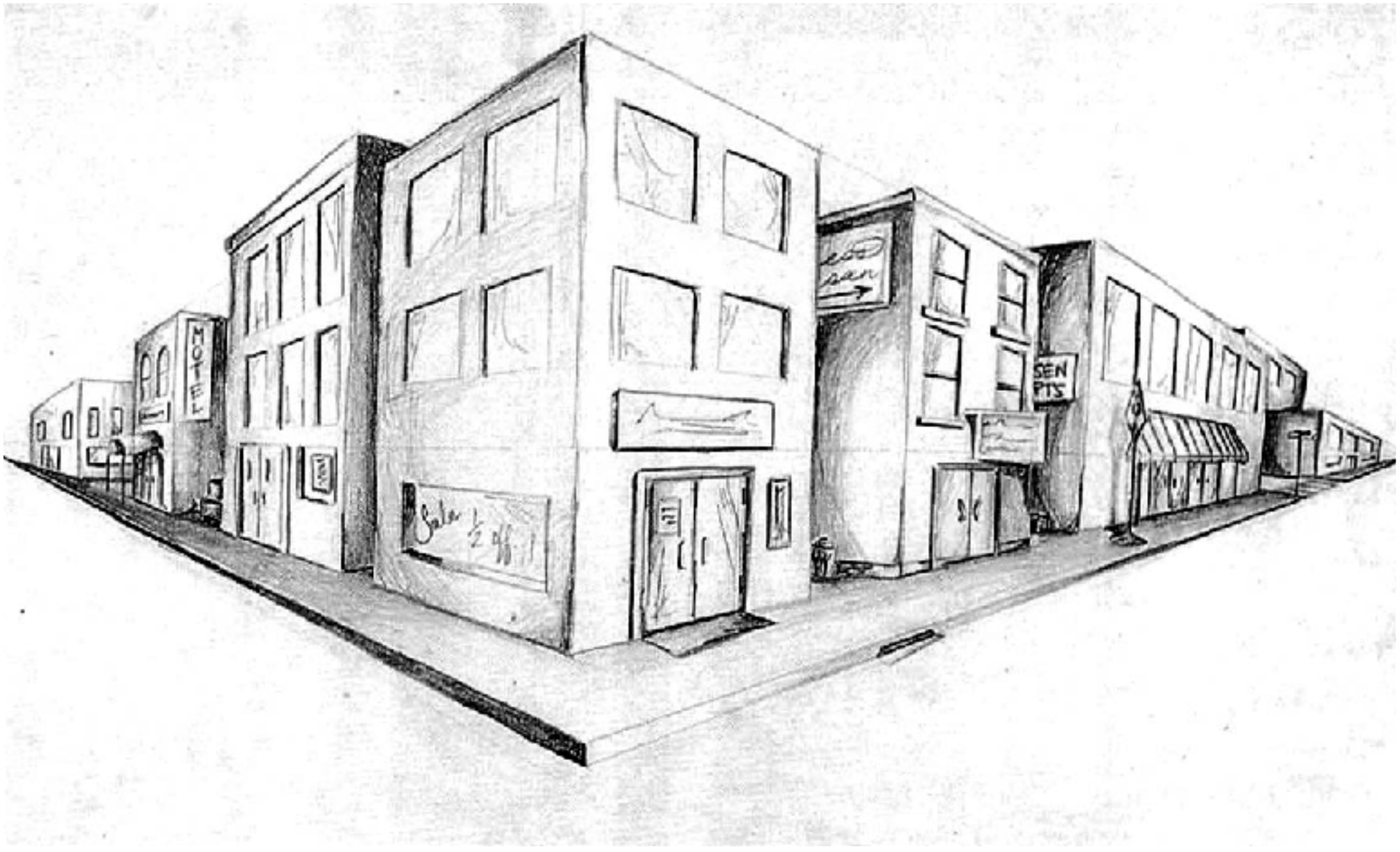


Detecting Corners

Computer Vision

Carnegie Mellon University (Kris Kitani)

Why detect corners?

Image alignment (homography, fundamental matrix)

3D reconstruction

Motion tracking

Object recognition

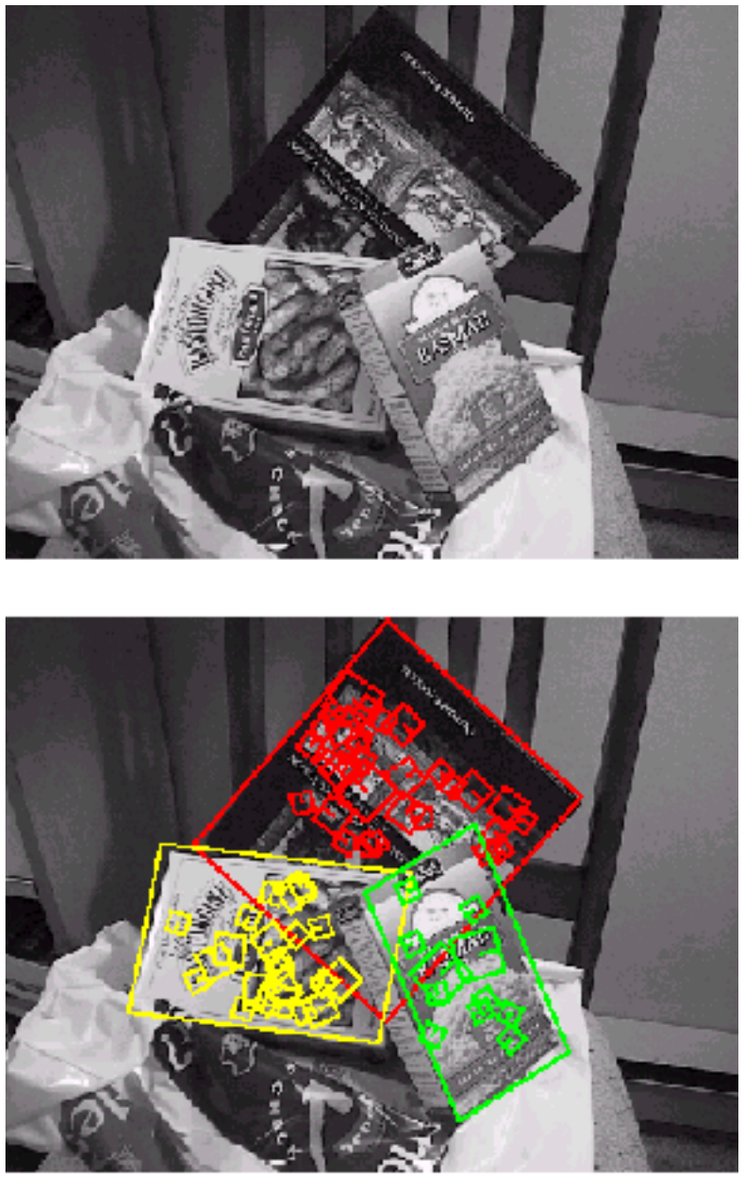
Indexing and database retrieval

Robot navigation

Planar object instance recognition

Database of planar objects

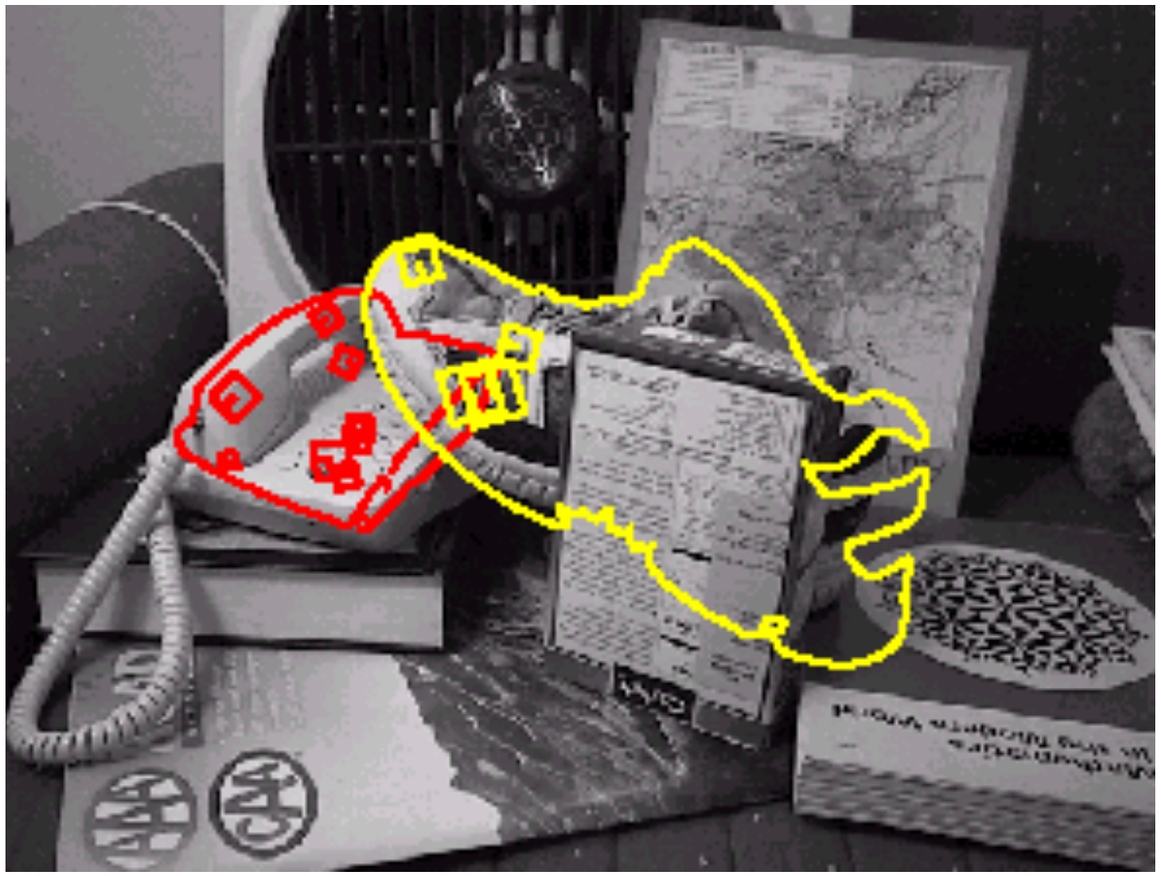
Instance recognition

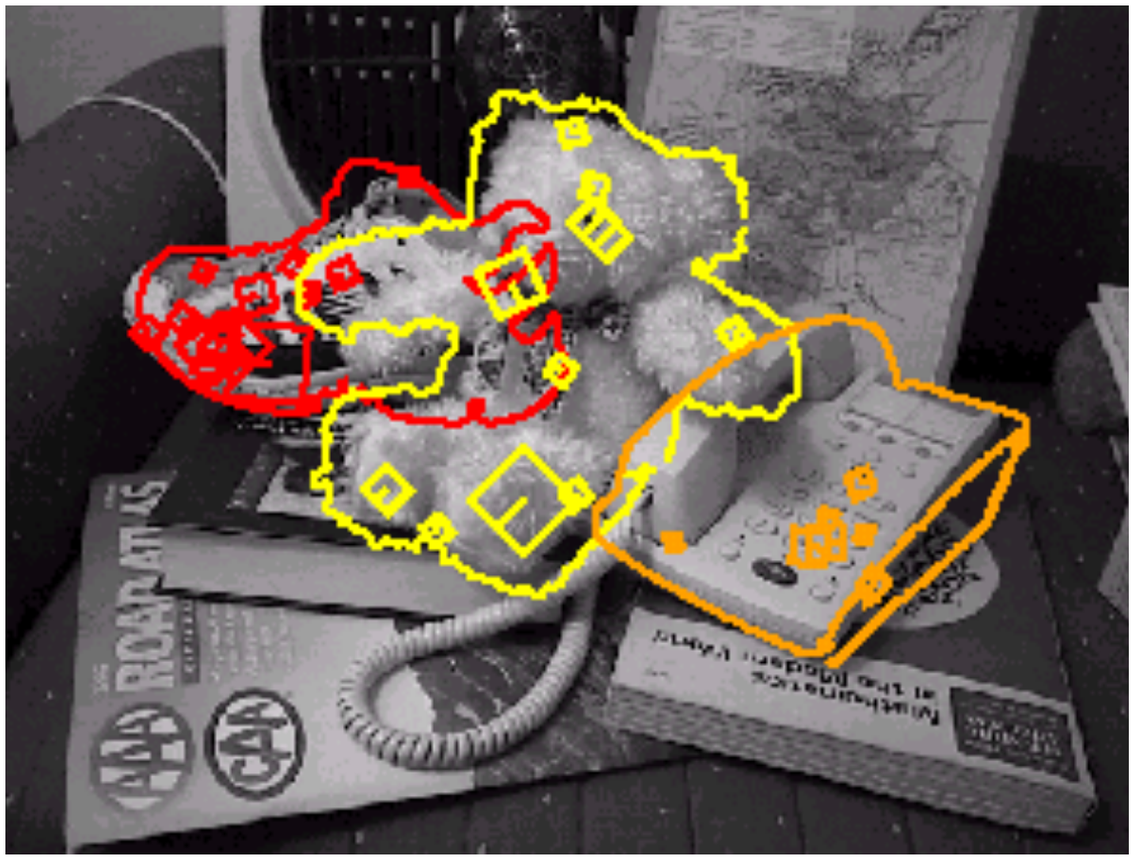


3D object recognition

Database of 3D objects

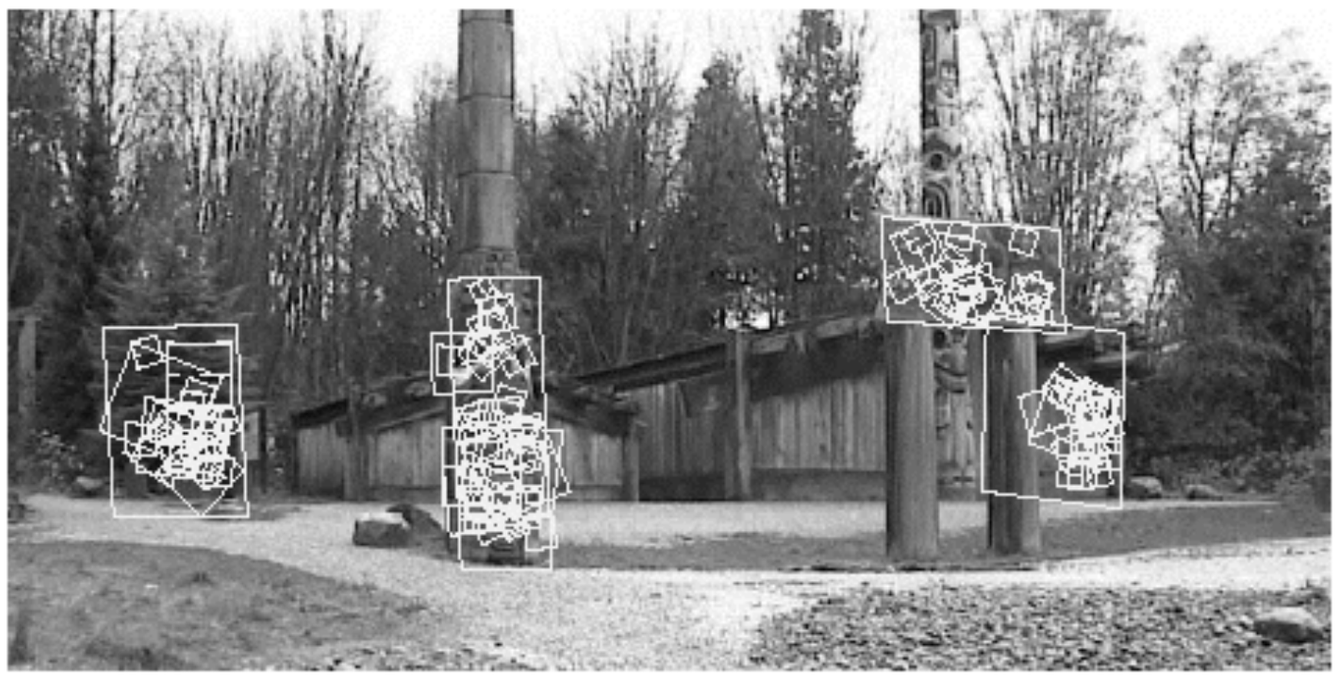
3D objects recognition



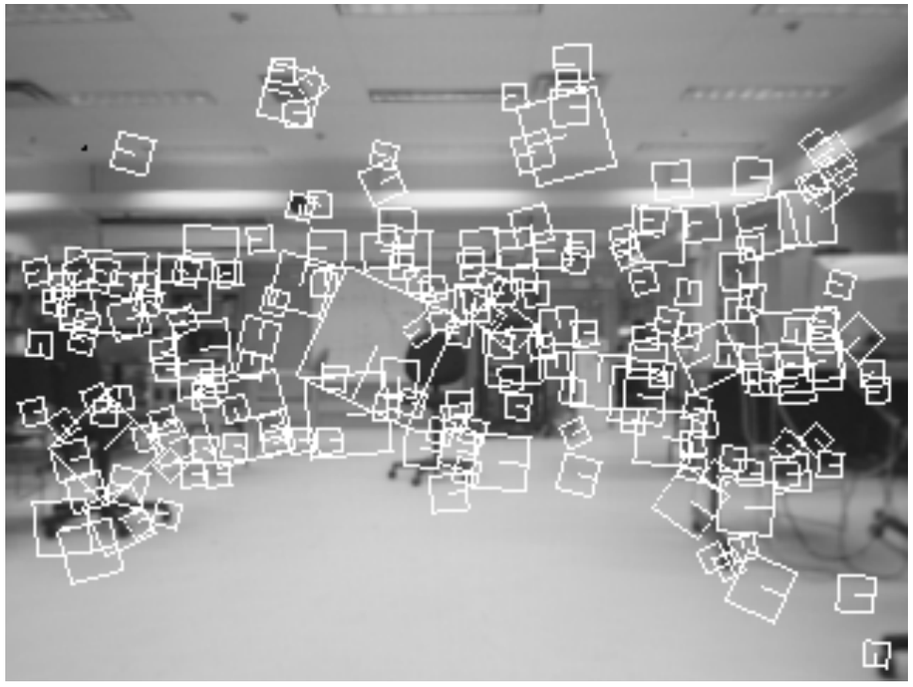


Recognition under occlusion

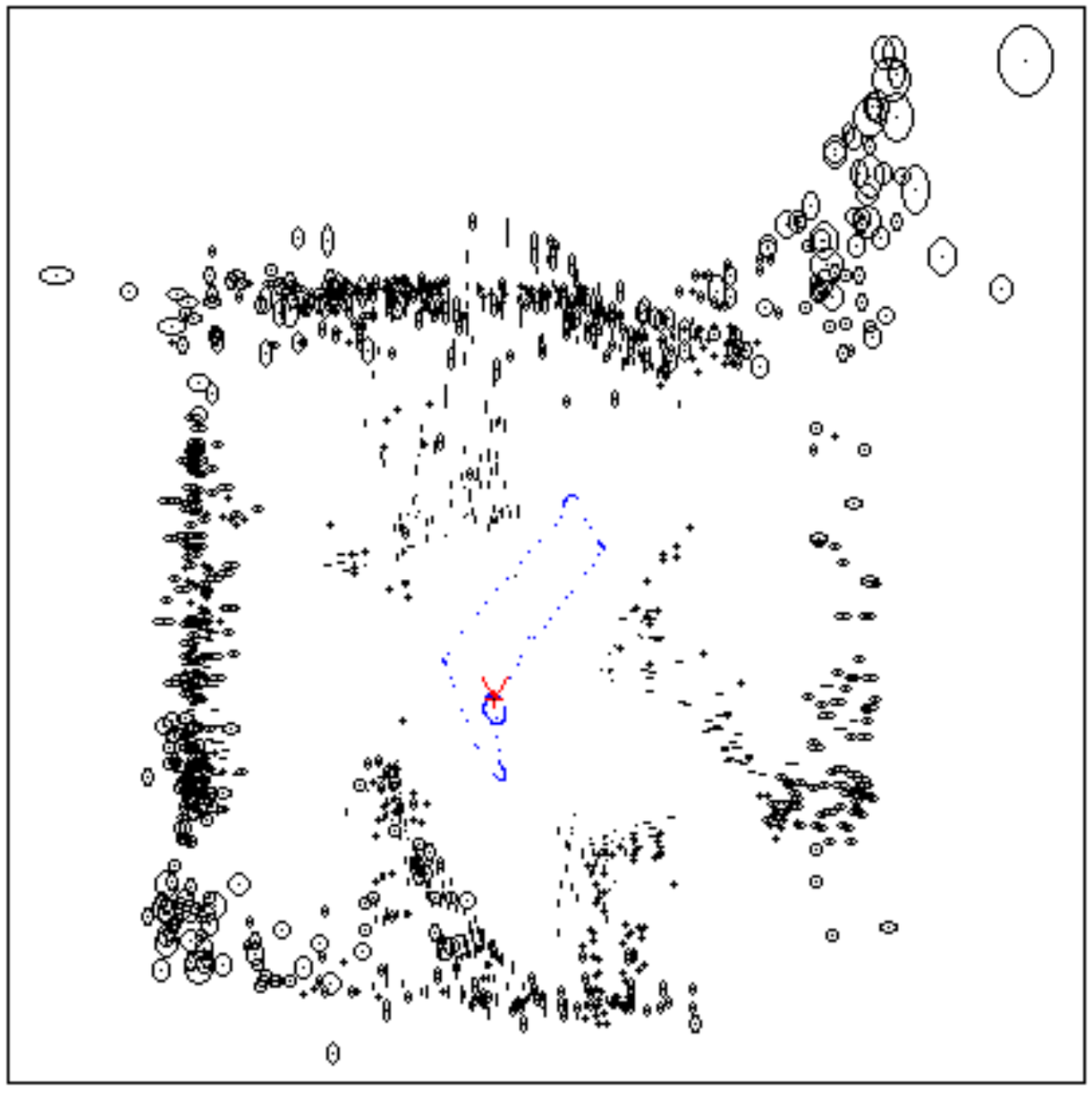
Location Recognition



Robot Localization



Map built over time



Example: Image Matching

How would you find corresponding points?

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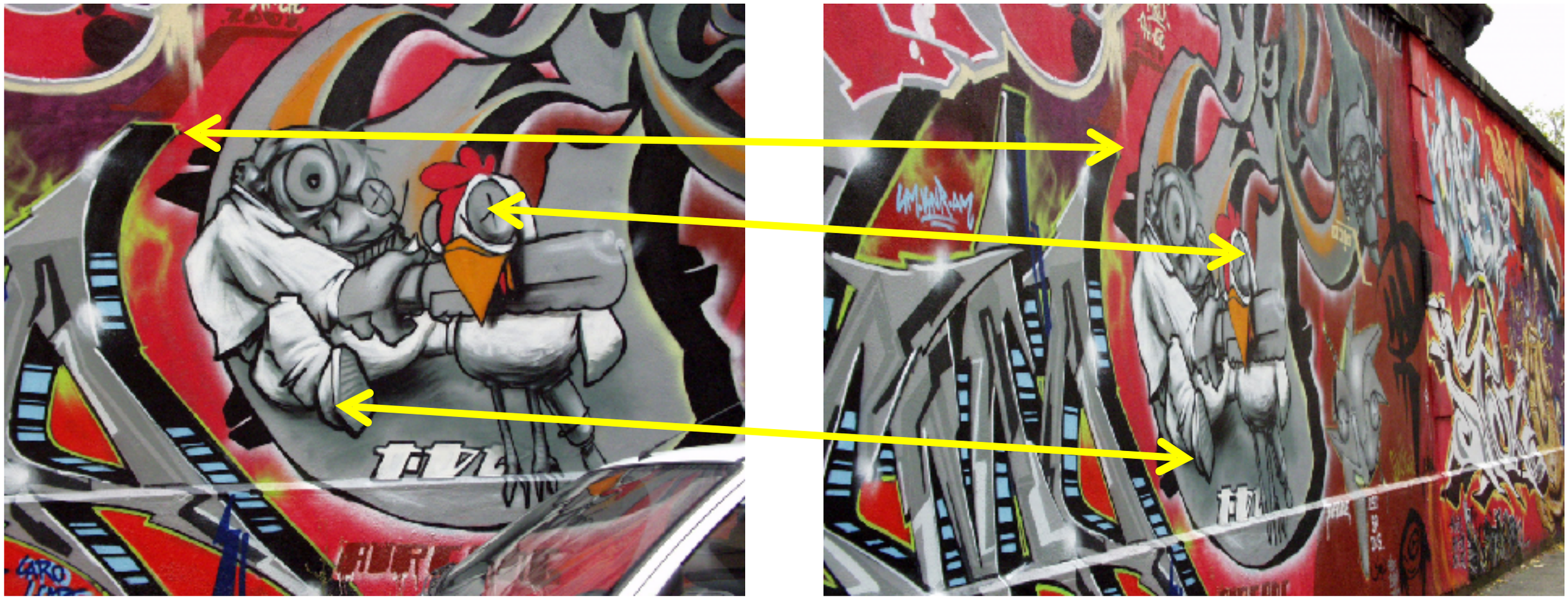
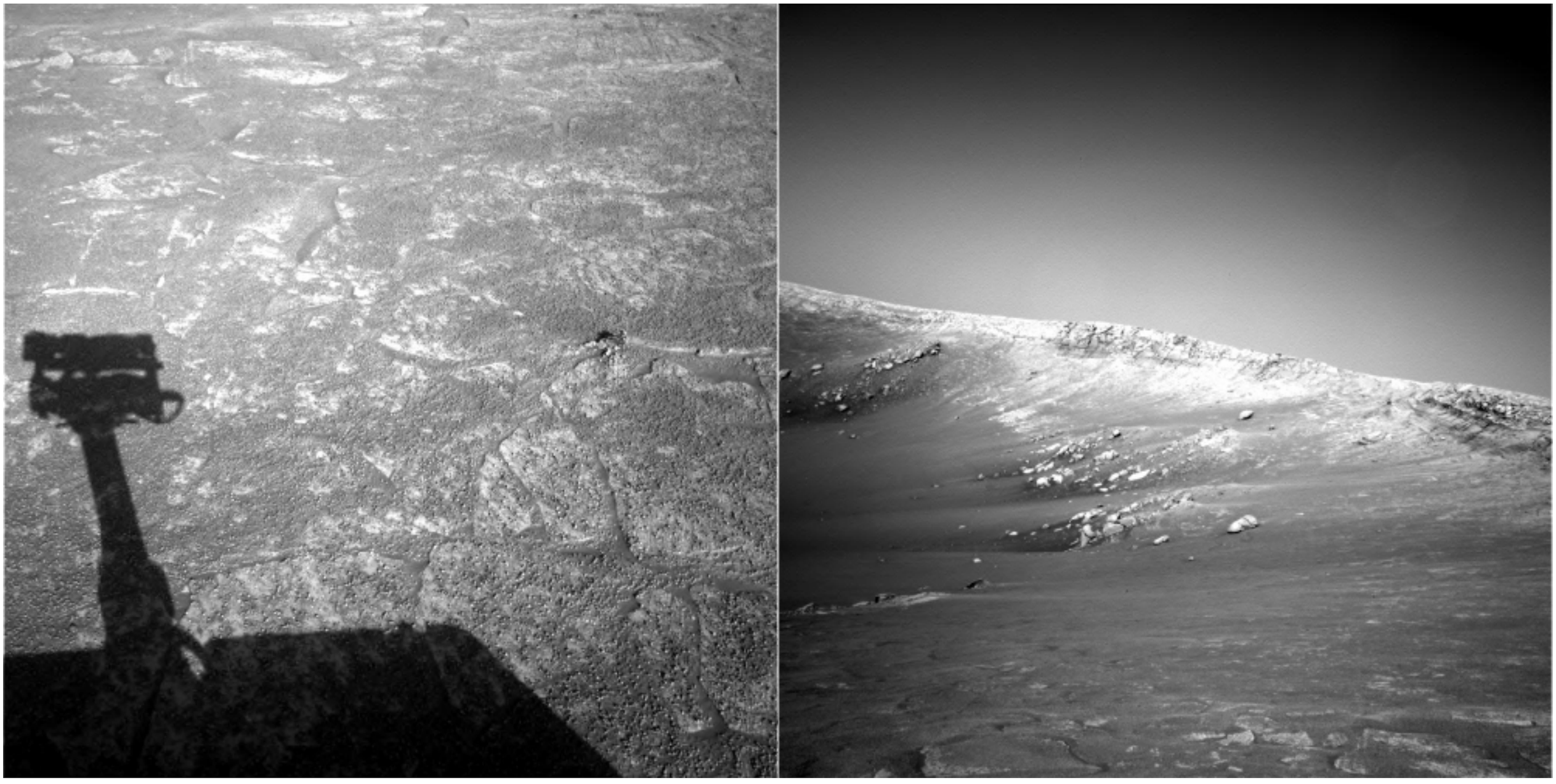
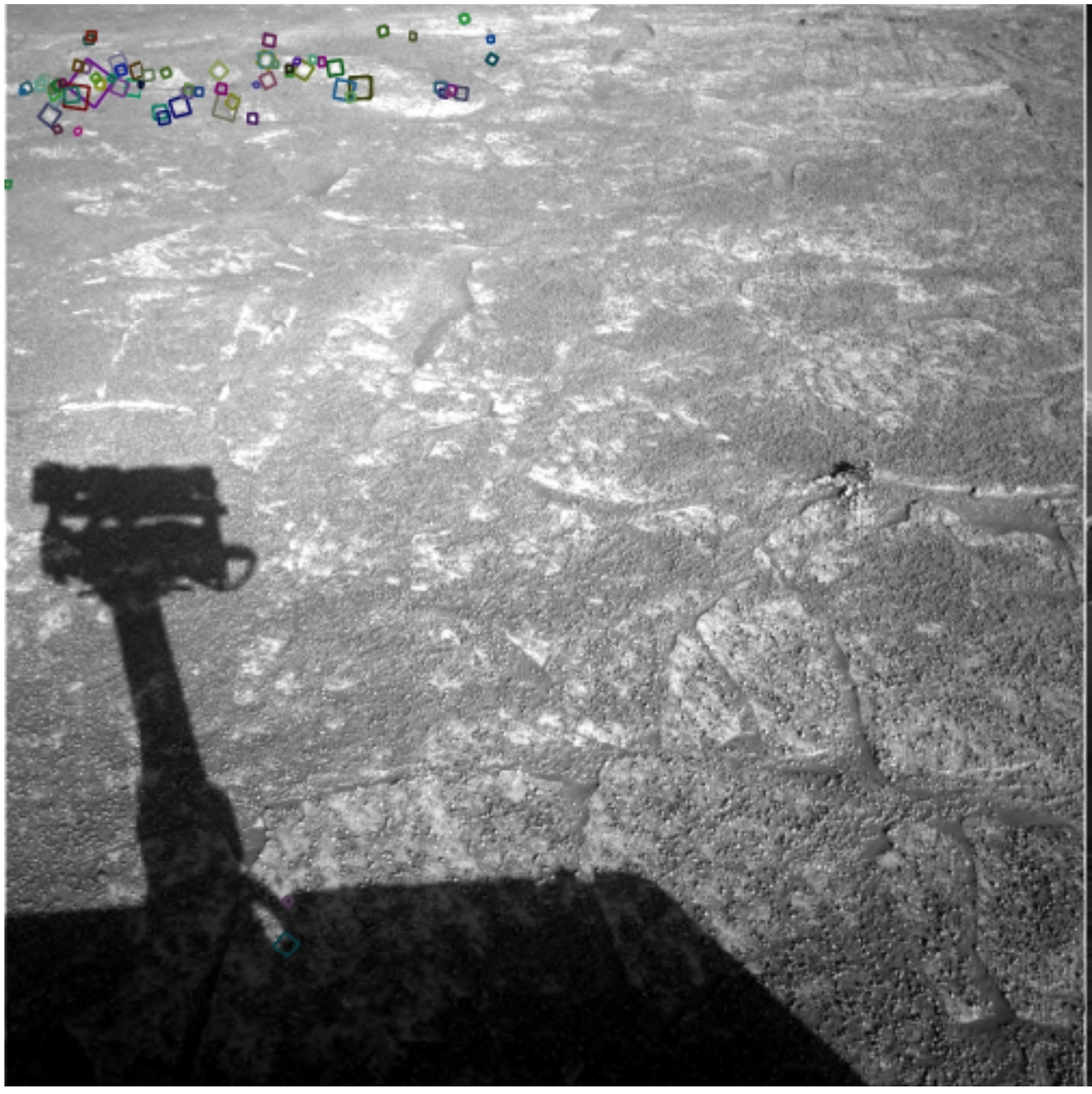


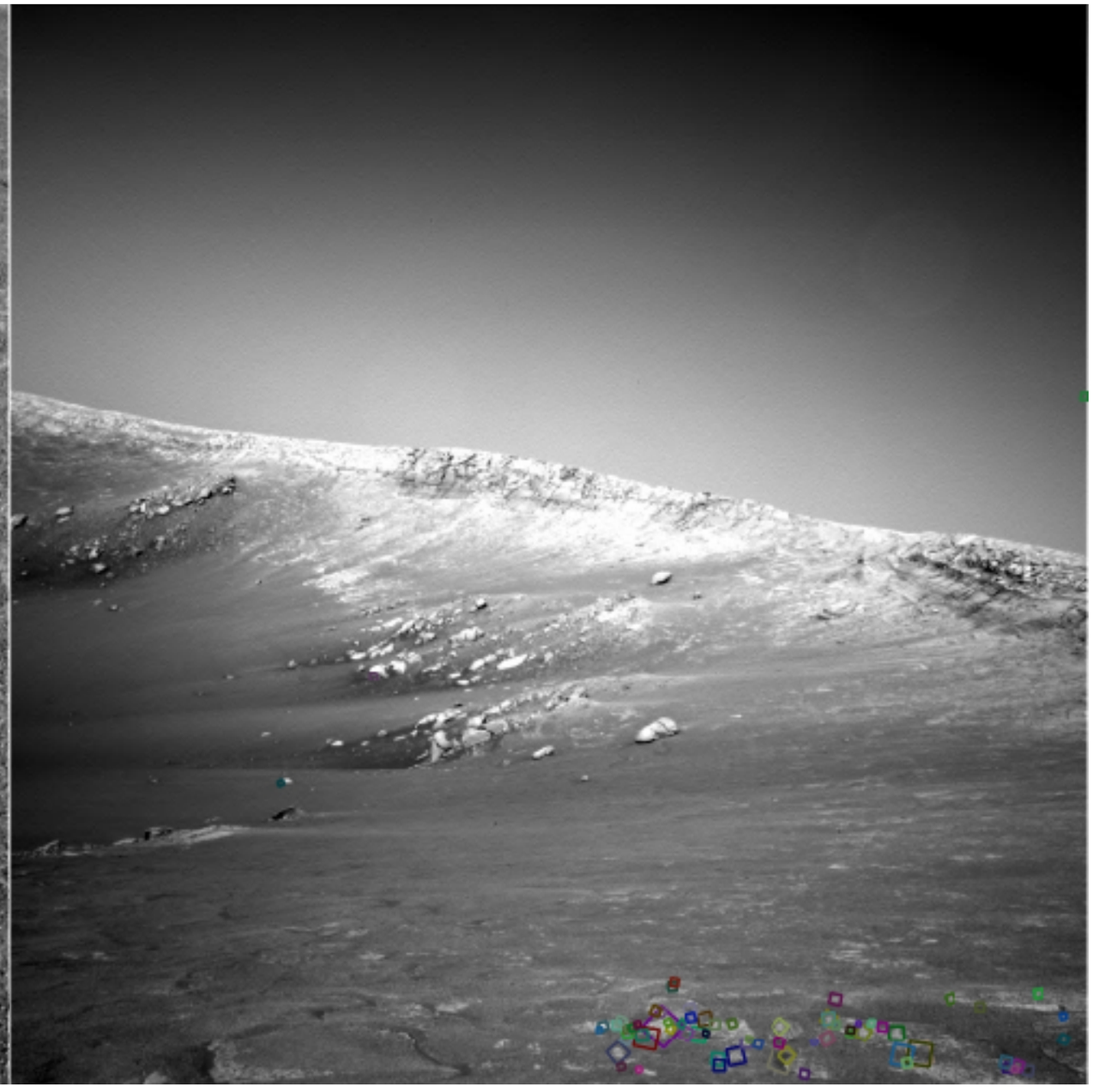
How would you find corresponding points?



NASA Mars Rover images

Where are the corresponding points?

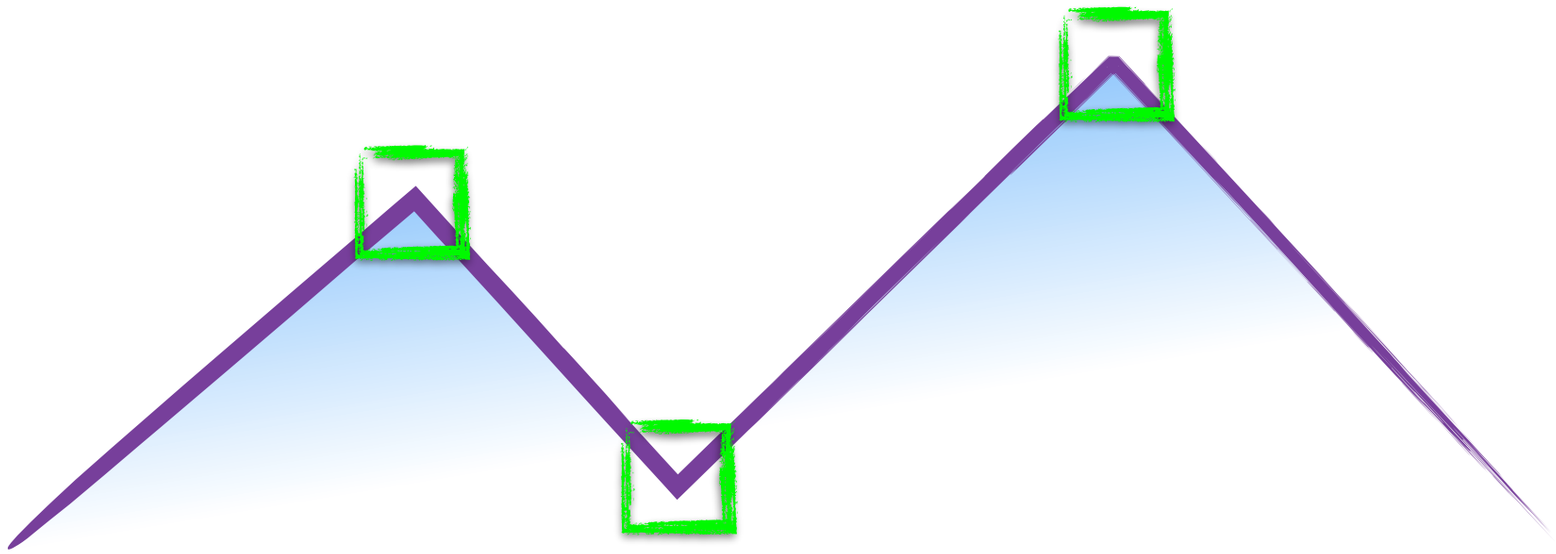




What type of features were you trying to match?

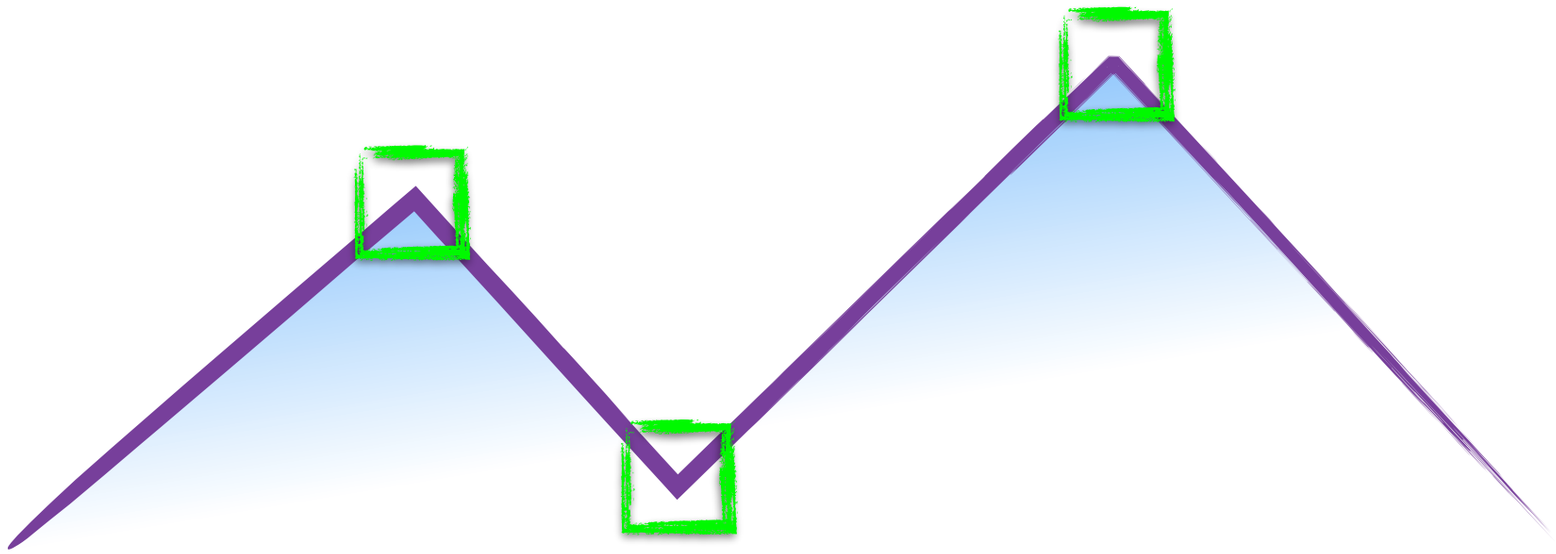
Explain to me your thought process.

How do you find a corner?



How do you find a corner?

[Moravec 1980]



Easily recognized by looking through a small window

Shifting the window should give large change in intensity

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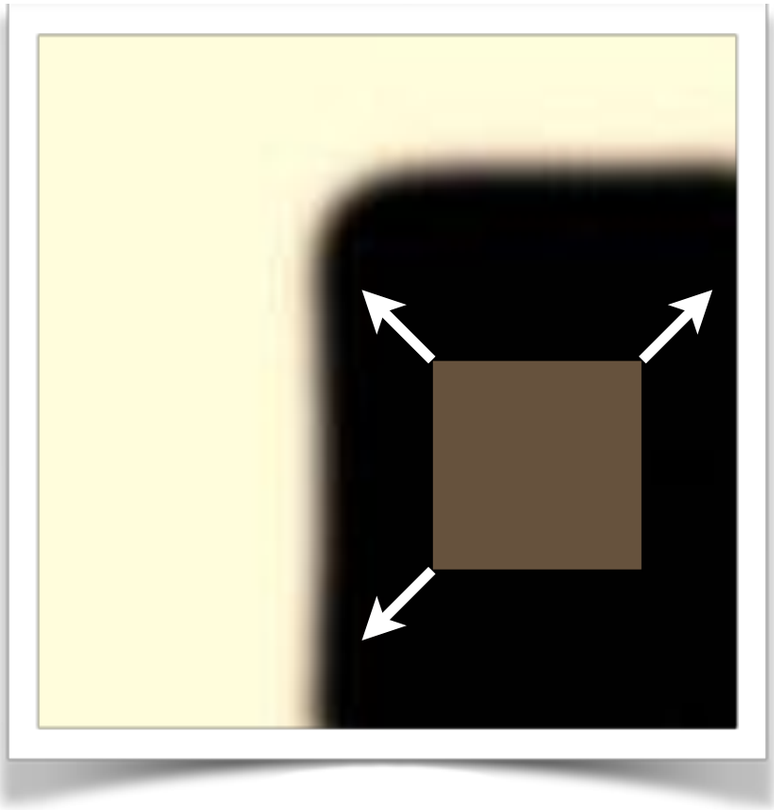
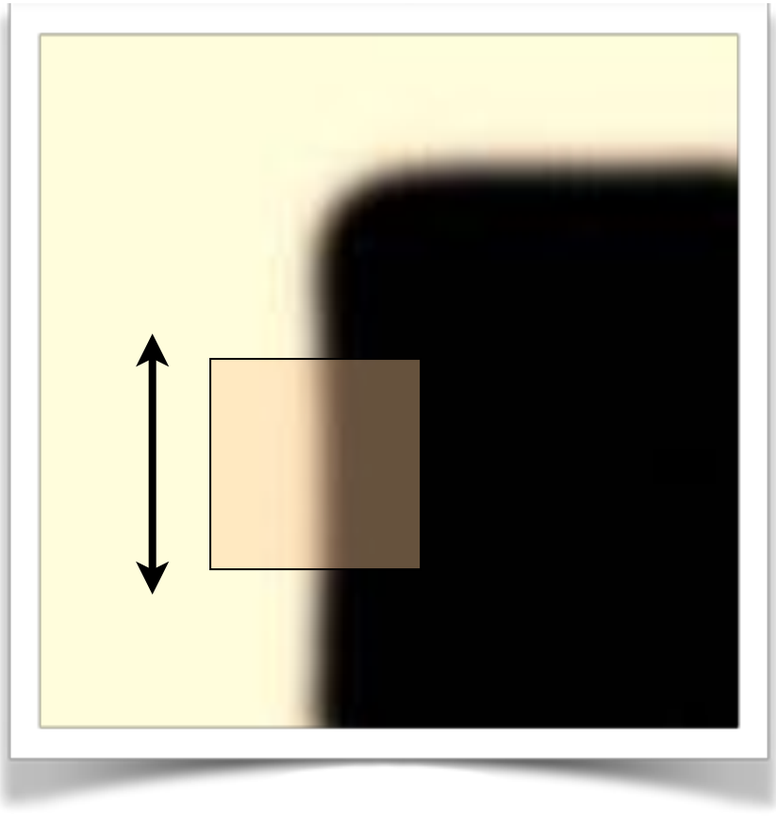
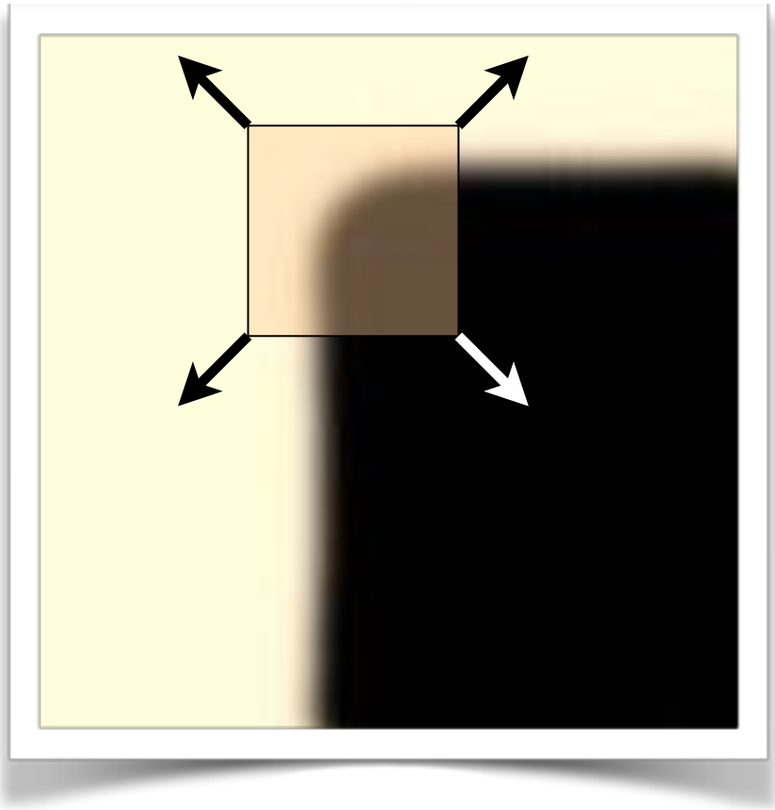


“flat” region:
no change in all directions



“edge”:
no change along the edge direction



“corner”:
significant change in all directions

[Moravec 1980]