# Introduction to Computer Vision

## CSE 6367: Computer Vision

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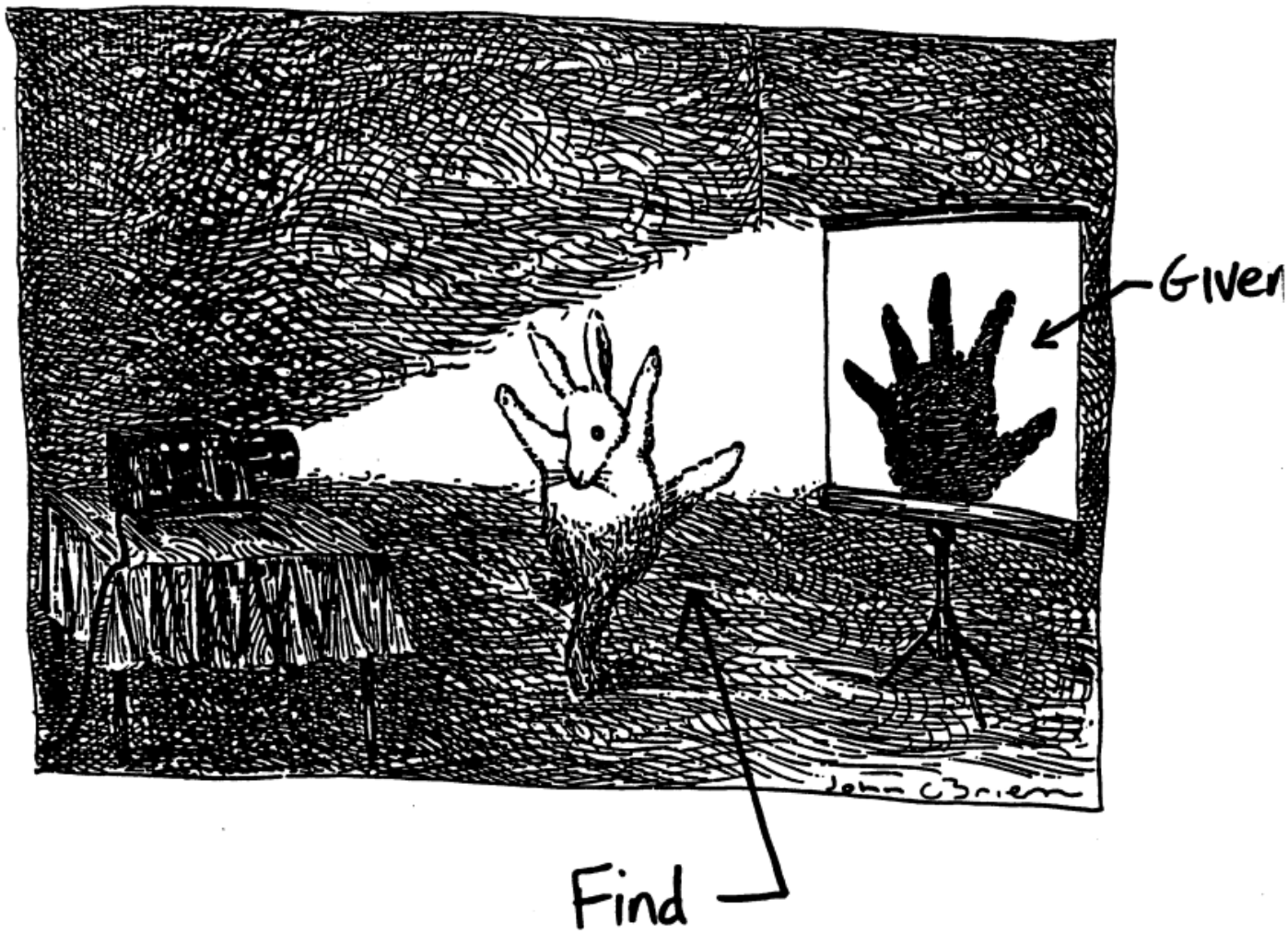
# The Computer Vision Problem



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- Greater understanding of human vision

# Properties of Vision

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- There are many different cues: multiple views (motion, texture, shading, etc.)

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- Light from different parts of the spectrum is decomposed into discrete red, green, and blue (RGB) color values that we see in an image

# Color

(a) RGB

(b) R

(c) G

(d) B

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- What do we know about the world from having many eyes, or more commonly our eyes are moving? (structure from motion)

# Building Rome in a Day

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- Filtering of the image is also performed at this stage, e.g. smoothing the image using a Gaussian kernel

# Edge Detection

# Finding Circles

# Finding Coherent Structure

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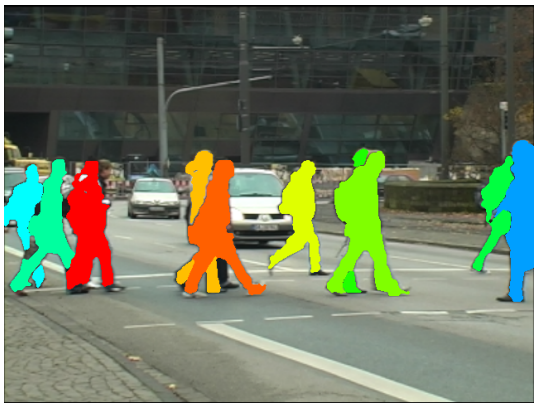
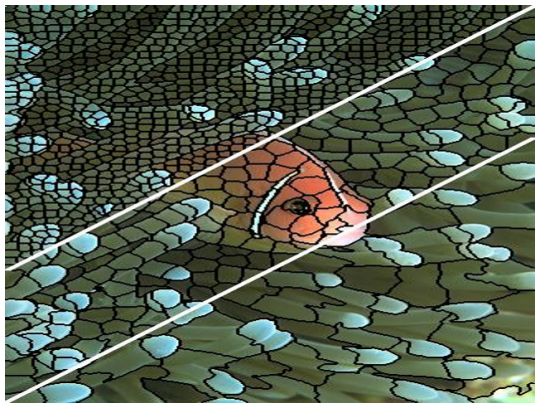
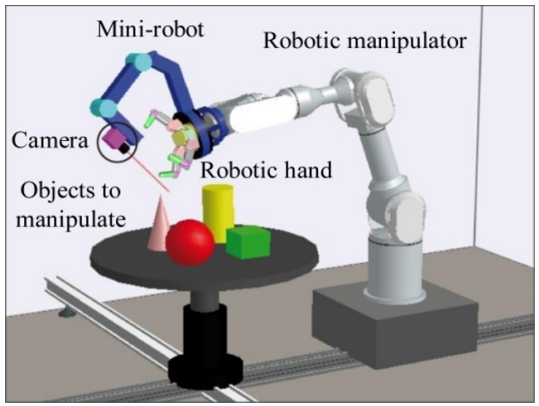
- These operations include segmentation (breaking images into useful pieces), tracking (keeping track of a moving object through a long sequence of views), etc.

# Segmentation





# Tracking


Mini-robot
Robotic manipulator
Camera
Robotic hand
Objects to manipulate

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- Furthermore, we can create hierarchical frameworks to recognize the scene in which the objects reside (i.e. scene understanding)

# Object Recognition

# Scene Understanding

# Summary

- Images provide both spectral and geometric information regarding the environment
- Computer vision can be split into low-level (image processing), mid-level (finding structure), and high-level (determining relations) operations