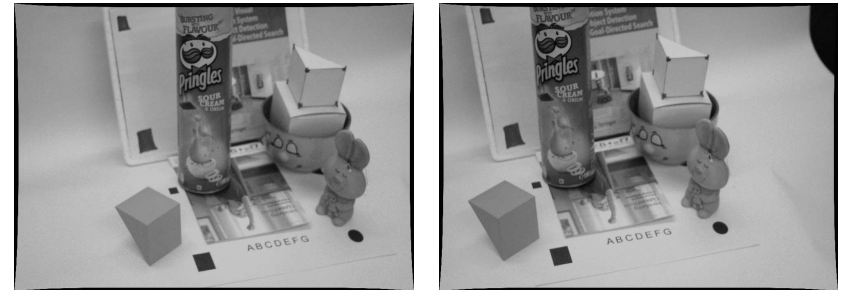


Binocular Stereo Introduction

Robert B. Fisher
School of Informatics
University of Edinburgh

Binocular Stereo System Introduction

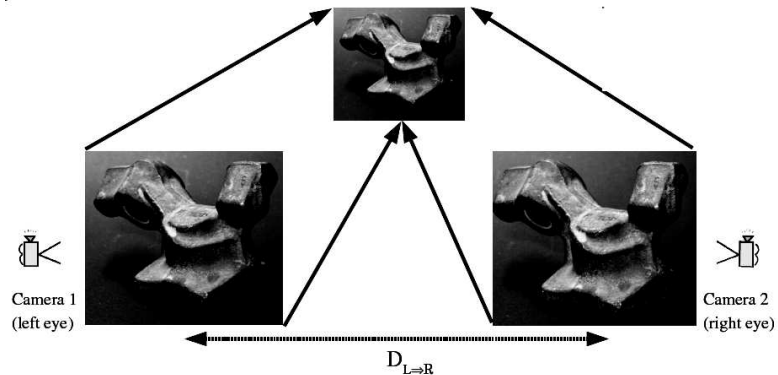
Is there a Wedge in this 3D scene?



Data a stereo pair of images!

3D part recognition using stereo

Binocular Vision



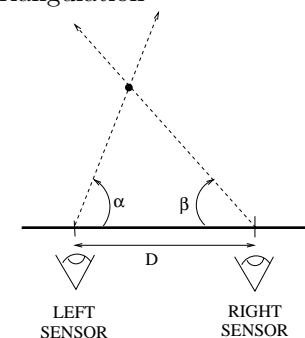
Given two 2D images of an object, how can we reconstruct 3D awareness of it?

Stereo

Goal: build 3D scene description (eg. depth) given two 2D image descriptions

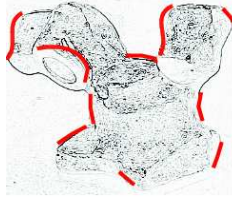
Useful for: obstacle avoidance, grasping, object location

Key principle: triangulation

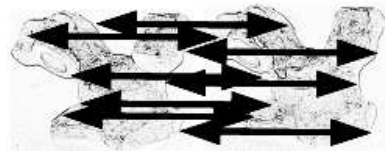


Stereo vision - a solution

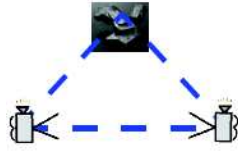
1) Feature extraction



2) Feature matching:



3) :

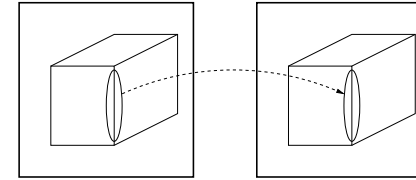


Possible image

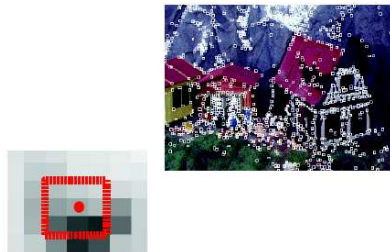
1) Edge fragments



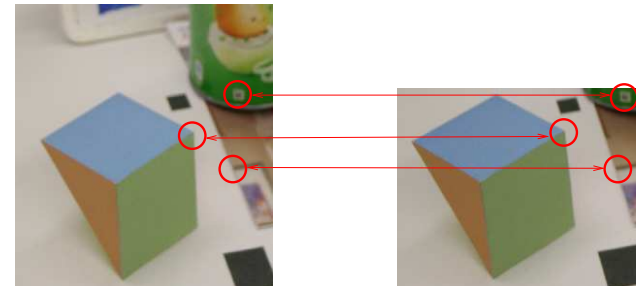
2) Edge structures (eg. vertical indoor lines)



3) General points (eg. SIFT)



4) Image intensity patches - in image



Larger features easier to match but harder to get and less dependable

Human visual system thought to work at edge fragment level

Stereo Recognition System Overview

1. Feature extraction:

Canny edge detector

RANSAC straight line finding

2. Feature matching:

Stereo correspondence matching lines

3. ? :

3D line feature position estimation

4. 3D object recognition:

3D geometric model

Model-data matching

3D pose estimation

What We Have ?

- Core steps in stereo: find features, match features, geometry
- Geometry trivial
- A variety of matchable features: points, edges, lines, patches