Color based object detection & image segmentation

Michael C. Nechyba
September 8, 2003
Outline

- Feature space  RGB color
- Object  ball  detection
- Image segmentation  path detection
- C source code on w/sample files on web
Each pixel is represented as a 3-byte value RGB.
Object detection/segmentation

- Extract relevant features for object of interest color in our case
- Build statistical model of feature distribution for object:
  - Simplest statistical model: Gaussian
  - Over color space: 3D Gaussian
- For unknown pixel, use distance threshold from statistical model
Clean object detection

Original
Gaussian distance
Distance threshold
Median filtered
All blobs
Most likely blob
Gaussian training imag
Distance threshold slightly too high...

- **Original**
- **Gaussian distance**
- **Distance threshold**
- **Median filtered**
- **All blobs**
- **Most likely blob**

**Gaussian training imag**
Distance threshold way too high...

Original

Gaussian distance

Distance threshold

Median filtered

All blobs

Most likely blob

Gaussian training imag
Path segmentation example

Original

Gaussian distance

Distance threshold

Median filtered

Gaussian training image
Sample code available

- Stand alone C application:
  - http://mil.ufl.edu/~nechyba/eel6825/source_code.html

- Unix/Linux/MacOS X
  - Also MSWindows w/X server software

- Examples:
  - Object detection/localization
  - Path identification