IAT 884

Workshop Week 9

Computer Vision

Computer Vision

Algorithms

Frame Differencing

Identifies differences between adjacent frames

Background Subtraction

Detects differences between each frame and an initial image of the scene's background

Brightness Thresholding

Detects differences in Luminosity between foreground and background

Brightness Tracking

Tracks the brightest spot in a video image.

Computer Vision

Other Techniques

Color Tracking

Identify and track a specific color

Blob Tracking

Identify regions in the image that are lighter or darker than surroundings

Fiducial Tracking

Track specific patterns representing individual objects

Face Recognition

Scan facial features to identify individual people

Computer Vision

Software Libraries

CV.Jit: www.iamas.ac.jp/~jovan02/cv/
Max/MSP/Jitter

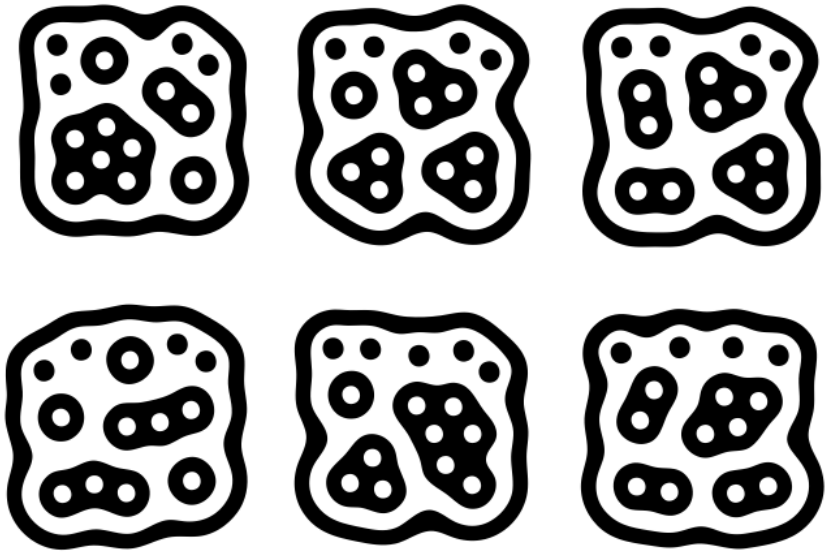
Myron: www.webcamxtra.sourceforge.net
Max/MSP/Jitter, C++, Processing, Python, Director

EyesWeb: www.eyesweb.org
Windows XP/Vista

OpenCV: sourceforge.net/projects/opencvlibrary
C, C++, Python, (Mac Port)

Computer Vision
Tabletop Applications

reacTIVision: reactivision.sourceforge.net/
Fiducial Tracking and Multi-Touch Surfaces



Computer Vision

Jmyron – Color Tracking Application

```
import JMyron.*;

JMyron m;
boolean showVideo = false; //used to turn video
background on or off
int[] colorA = {161, 74, 89, 90}; //first color to track.
int[] colorB = {40,110,20,90}; //second color to track.
```

Computer Vision

Jmyron – Set Camera Resolution

```
void setup(){
  int w = 320;
  int h = 240;
  size(w,h);
  frameRate(60);
  background(0);
  m = new JMyron();
  m.start(w,h);
  m.findGlobs(1);
  println("Myron " + m.version());
}
```

Computer Vision

Jmyron – GetPosition() Function

GetPosition(r,g,b,t)

This function gets called for each color you are tracking

Parameters: red, green and blue values of color to be tracked. Plus a threshold value.

Return Value: An array with the following information:

[0] = center X

[1] = center Y

[2 - 5] = rect coordinates (x,y,w,h)

Computer Vision

Jmyron – Drawing Bounding box and center point

```
noFill();
//set stroke color to match tracked color
stroke(colorA[0], colorA[1], colorA[2]);
rect( a[2],  a[3] ,  a[4],  a[5]);  //Draw bounding box
//set fill color to match tracked color
fill(colorA[0], colorA[1], colorA[2]);
noStroke();
ellipse(a[0], a[1], 20, 20); //draw center-point of box
```

Computer Vision

Myron_Box_Tracking_Array

1. Turn on Camera
2. Press ‘B’ to toggle video
3. Click on an object to identify its RGB values

Note: If you are having trouble with your camera it is probably a resolution issue. The correct resolution should be output when you run the program.

Computer Vision

In Class Activity

Implement a simple camera vision application using colored objects to trigger screen events. These events can be related to absolute positioning of objects, relative positioning in relation to each other, number of objects present, color of the object detected, or any other combination you can think of. Use the provided Myron code to work from.