Robotic Arm

Controlled Through Image Processing

Idea:

The idea is to create a robotic arm which is as close to the human arm as possible and not to limit the arm to one set of task (as creating a robotic claw would do) .Also, the arm is to be controlled using Image Processing. Rendering it to be like the human arm is the basic aim of the project but, there is an underlying aim which is to expand the functionality of the arm once the basic model is created (like hammering anail into a wall for example).

Implementation:

The basic flowchart for imp,e ting the robotic arm (the different processes is as given under):
Webcam => Laptop => Xbee(TX)=> Xbee(RX)=> Arduino=> motors of arm

- Webcam captures the image
- The image processing occurs in the laptop (using processing as a software)
- Xbee(TX) to send the signal from the laptop to the robotic arm wirelessly
- Xbee(RX) recieves the signal and transmits it onto the micro-controllers(s)
- Arduino (Procceses the data and passes the output onto the motors which iis its input
- Motors act accordingly

• Week 1: Trying to figure out hand gesture recognition using image processing. Simultaneously, we'll start designing the mechanical portion of arm.

• Week 2: Once the image processing part is figured out, we'll start working on how to give inputs to the arm using our hand gesture (i.e. Help the program identify and distinguish different gesture).

• Week 3: Main focus on mechanical aspect of project. Try to assemble the mechanical portion of arm by the end of week.

• Week 4: Try to make the arm function by interfacing the program (the one which uses Image Processesing) and mechanical aspect (preferably by using PIC microcontroller)

• Week 5: If time permits, add more features, improve upon gesture recognition, Make the design more robust and make a finished product.

Materials Required:

1. 10 servo motors.
2. PIC microcontroller (AURUM board)/Arduino
3. ADXL 335(possibly)
4. acrylic
5. Xbee modules (sender + reciever)
6. Xbee shield

What do we expect to learn by the end of project????

- Image Processing (or a portion of it)
- More experience in working with microcontrollers
- Basics of Robotics