Project Proposal

Implementation of a Wireless Gesture Controlled Bot Using Image Processing

MOTIVATION

- Our motivation to work on this project came from the idea to change the perception of remote controls for actuating manually operated bot.

STATEMENT OF PROBLEM

- To help partially or fully disabled person who feels tough for them to drive vehicle.
- It will be a great help for the industries and factories workers where driving many machines manually can be dangerous.
- We can also use it as defence spy.
- By adding more gestures, we can handle all Computer operations like Cut, Copy, Paste and Undo etc.
- Control through facial gesture is a useful application of gesture recognition for users who may not physically be able to use a mouse or keyboard.

DETAILS OF RESEARCH WORK DONE

- WEBCAM

  Webcam is a video camera that feeds or streams its image in real time to or through a computer or computer network. When "captured" by the computer, the video streamed or image may be saved, viewed or sent on to other networks via systems such as internet, email as an attachment. Webcams are known for their low manufacturing cost and flexibility. Now-a-days, these are frequently used for video calling, live video conferences etc.

- IMAGE ACQUISITION

  For the signals to be send to the microcontroller, first, we have acquire images from the webcam of the laptop/computer. After these images are acquired, we can convert them into suitable formats and assign a code to them. Image Acquisition Toolbox lets us acquire images and videos directly into MATLAB

from PC-compatible imaging hardware. We can detect hardware automatically, configure its properties, preview an acquirement, and get images and videos. We can use a range of imaging devices from inexpensive Web cameras or industrial frame grabbers to high-end scientific cameras that meet low-light, high-speed, and other perplexing requirements. Collectively, MATLAB, Image Acquisition Toolbox, and Image Processing Toolbox provide a complete environment for developing customized imaging applications. We can acquire images and videos, visualize data and develop processing algorithms and analyzing techniques, and create graphical user interfaces.

- DECODER

HT12D[10], 212 series decoder is used which is capable of decoding information that consists of N address bits. It consists of 18 pins. Pin (1-9) connected to ground. Pin number 10,11,12,13 of decoder are connected to 10,15,7,2 of Motor driver respectively. A resistor of 47KOhm is connected to 15 and 16 number pin. Pin 17 is not connected. Pin 14 is connected to Data pin of 433MHz RF receiver module. It operates on 5V power supply to which 18 number pin is connected.

- RF Transmitter Module(TX)

The transmitter module is working on the frequency of 433MHz and is easily available in the market at nominal cost . In the circuit, vcc pin is connected to the + terminal. The data pin is connected to the HT12E (pin no-1) that is transmitted or we can say that encoded data. The next pin is GND that is connected to the ground terminal. Now the last pin ANT this is connected to a small wire as an antenna.

- RF Receiver Module (RX)

The RF receiver module will receive the data which is transferred by the gesture device. It is also working as similar to the transmitter module- Connect the +vcc pin to the 5volt terminal. Connect the ground pin to the ground terminal .The data pin is then connected to the HT12D (pin-2) .So that we can get the decoded 4 bit data.

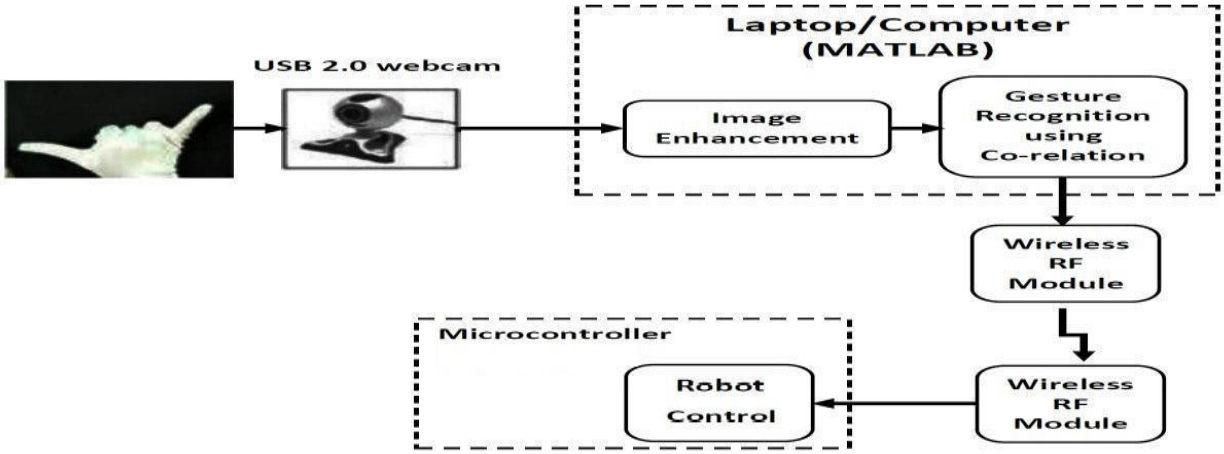
- MICROCONTROLLER

Microcontroller is used in an integrated circuit with a processor and other support devices like program memory, data memory, I/O port, serial communication interface etc. integrated together.

PLAN OF ACTION

- *METHODOLOGY*

The Proposed framework in which webcam is connected with the laptop and also the gesture recognition system running on it. A pair of wireless communication modules connected with the gesture recognition system and the robot controller respectively. The webcam is used to obtain the image data of the various hand movements. The acquired data is subjected to enhancement and processed further to make it fit for approximation with the gestures stored in the database. Then wireless module is used to send these different robot control commands corresponding to each gesture to the robot controller. Accordingly, the robotic arm will do actions according to different human hand gestures, thus human-robot interaction can be achieved. The gesture recognition system is developed with MATLAB tool.



Proposed System Framework

- *THEORY*

In this system, a gesture driven robotic vehicle is developed, in which the vehicle movements and manipulations i.e. handling and control depends on the gesture of the user. A camera reads the movements of the human body and communicates the data to a computer which sends signals to microcontroller and encoder circuit, It is further transmitted (transmitter section) by RF433 MHZ transmitter. In the receiver section, the RF 433 MHZ receiver holds down the received parameters and process with microcontroller and gives those parameters to the robotic vehicle so that it act accordingly to the gesture. The gesture recognition system is developed with MATLAB tool.

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GND that is connected to the ground terminal. Now the last pin ANT is connected to a small wire as an antenna .

While the RF receiver module will receive the data which is transferred by the gesture device. It is also working as similar to the transmitter module.

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EXPERIMENTAL SET UP

➢ *JUSTIFICATION THAT PROJECT WILL WORK*

By analysing the result obtained in few research papers, they could achieve a success rate of 80-85% of successful image recognition and implementation, thus we could expect our project to work if we follow similar methodology with our own enhancement to it.

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