

Human Gesture Recognition for Real-Time Control of Humanoid Robot

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Abstract : There are technologies to control a humanoid robot in many ways. But the use of Electromyogram (EMG) electrodes has its own importance in setting up the control system. The EMG based control system helps to control robotic devices with more fidelity and precision. In this paper, development of an electromyogram based interface for human gesture recognition for the control of a humanoid robot is presented. To recognize control signs in the gestures, a single channel EMG sensor is positioned on the muscles of the human body. Instead of using a remote control unit, the humanoid robot is controlled by various gestures performed by the human. The EMG electrodes attached to the muscles generates an analog signal due to the effect of nerve impulses generated on moving muscles of the human being. The analog signals taken up from the muscles are supplied to a differential muscle sensor that processes the given signal to generate a signal suitable for the microcontroller to get the control over a humanoid robot. The signal from the differential muscle sensor is converted to a digital form using the ADC of the microcontroller and outputs its decision to the CM-530 humanoid robot controller through a Zigbee wireless interface. The output decision of the CM-530 processor is sent to a motor driver in order to control the servo motors in required direction for human like actions. This method for gaining control of a humanoid robot could be used for performing actions with more accuracy and ease. In addition, a study has been conducted to investigate the controllability and ease of use of the interface and the employed gestures.

Keywords : electromyogram, gesture, muscle sensor, humanoid robot, microcontroller, Zigbee

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