ISSN No: - 2456 – 2165

Intelligent Robot using Hand Gestures Recognition

Charuta Ravindra Sutar
Dept. of Electronics and telecommunication,
Rajashri Shahu School College Of Engineering & Research
Narhe JSPM Technical Campus, Pune, India
sutarcharuta@gmail.com

Prof .S.S.Savkare
Rajashri Shahu School College Of Engineering & Research
Narhe JSPM Technical Campus, Pune, India
s.savkare13@gmail.com

***Abstract* — This paper presents the embedded system, used to discuss work done in the area of hand gestures recognition where focus is on intelligent approaches including soft computing based methods like artificial neural network ,fuzzy logic, genetic algorithms etc. Hand gestures recognition (HGR) is one the main areas of research for the engineers, scientists and bioinformatics. Hand gestures recognition is the way of human machine interaction and today many researchers in the academia and industry are working on different application to make interactions more easy, natural and easy to use without wearing any extra device. Hand gestures recognition can be applied from games control to robot control in which vision is enabled from virtual reality to smart home systems. The methods in the preprocessing of image for image segmentation and hand image construction also taken into study. Most researchers used fingertips for hand detection in appearance based modeling. Finally the comparison of various results given by different people. Hand gesture recognition system received great attention in the recent few years because of its many applications and the ability to interact with machine efficiently through human computer interaction. In this paper a survey of recent hand gesture recognition systems is presented. Key issues of hand gesture recognition system are given with challenges of gesture system.**

Keywords: **Hand gestures recognition (HGR).**

I. INTRODUCTION

The most prevalent use of robots now a days involves industrial robots in manufacturing lines. These robots are programmed through teach pendants to traverse through a pre-taught set of points to execute repetitive tasks. Industrial robots allow limited feedback from sensors, such as vision or force/torque sensors, through command trajectory modification (e.g., external alter in the val robot programming language) but they are not designed for human interaction. Even when external sensors are used, they are tailored for specific tasks, e.g., welding , filament winding , grinding , or drilling, and tied to specific platforms, e.g., Val or rapid these systems typically involve a single robot arm equipped with an end effector dedicated to a specific class of task industrial robots with many arms are not common due to their mechanical and system level complexity. When multiple arms jointly hold a load, in addition to the motion o f the load, the internal force within the load needs to be regulated; issues of synchronization and stability are even more severe, as the human operator needs to regulate both the force of interaction between the load and the environment. This paper presents a new approach for controlling robotic hand or an individual robot by merely showing hand gestures in front of a camera. With the help of this technique one can pose a hand gestures in the vision range of a robot and corresponding to this notation, a desired action is performed by the robotic system. Simple video camera is used for computer vision, which helps in monitoring gesture presentation. The approach consists of following measures: (a) A real time hand gesture formation monitor and gesture capture, (b) extraction of features, (c) gesture recognition using Pattern matching, (d) Command determination for shown gesture and performing action by robotic system. Real-time hand tracking technique is used for object detection in the range of vision. If a hand gestures is shown for one second, the camera captures the gesture. Object of interest is extracted from the background and the portion of hand which represents the gesture, is cropped out. Extracted hand gesture is matched with the stored database of hand gestures using pattern matching. Corresponding to the matched gesture, action is performed by the robot.

II. PREVIOUS WORK

Lee, C.H in his paper says that movement can be achieved using legs, wheels or other different mechanism. They have the advantage of consuming less energy and move faster than other type of locomotion mechanisms. Jae-Ho Shin etal used entropy analysis to extract hand region in complex background for hand gestures recognition system used maskable template based on a minimum distance between template and partial block of an input image for gesture recognition. Hongo et. al. has developed a system that can track multiple faces and hands by using multiple cameras to focus on face and gesture recognition. Ut-sumi ET. Al. detected hands using hand shapes model and tracked using extracted colors and motions. They also propose multiple cameras for data acquisition to reduce a occlusion problem. But in this process there incurs complexity in computations.

Another way is using the shape of the hand where the index finger from two different views in order to a locate exactly the pointing destination on a 2-dimensional workspace. An interesting description of inertial sensors and some innovative application of sensors have been discussed in gives an examination of the impact of individual sensor on the performance of a navigation system gives the design of a controller intended for tele-operation, which is capable of

ISSN No: - 2456 – 2165

controlling anthropomorphic robotic arm through a LAN or via the Internet Gesture recognition is the mathematical interpretation of a human motion by a computing device. Gestures recognition, along with facial recognition, voice recognition, eye tracking and lip movement recognition are components of what developers refer to as a perceptual user interface (PUI).

Review methods of recent postures and gestures recognition system presented as well. Summary of research results of hand gesture methods, databases, and comparison between main gesture recognition phases are also given.

III. PROPOSED DESIGN

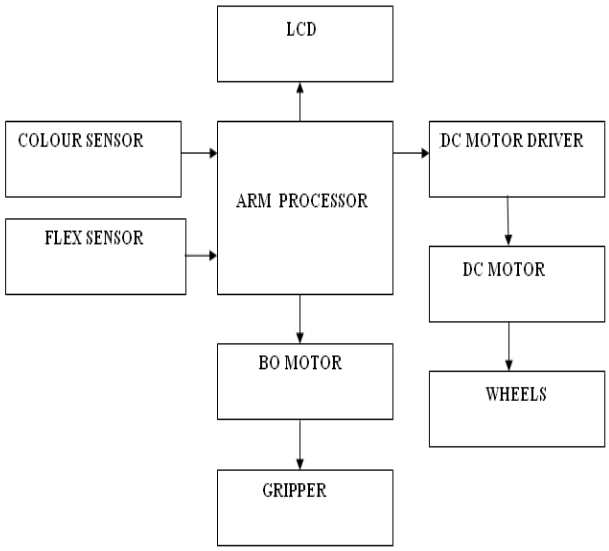

Fig1: Inelligent Robot using Hand Gesture Recognition

This project is an arm processor LPC 2148 based intelligent robot for hand gesture recognition. It is embedded with a flash memory of 32Kb-512Kb. Here we will be using a color sensor to find the colored object. The color sensor uses LPC2148 to control all its operations. The color sensor communicates with microcontroller using an I2C serial communication protocol. The robot is controlled by gesture recognition technique. For this purpose flex sensors are used. Movement of the robot is carried out by a 12 V DC motors which are driven by a dc motor driver IC L293D. Dc motor converts electrical energy into mechanical energy. Gear mechanism using a (BO) DC motor is used for pick and place. All micro-controller based Robots this type of DC motor can be used. The gripper module is state of robotic arm which can be used in various pick and place kinds of robots. It works on dc motor (9 to 12v dc). Change in rotation direction of the dc motor, generates jaw open close action gripping and holding of a objects are key tasks for robotic manipulators. The development of gripper able to pick up unfamiliar objects of widely varying shape and surface properties remains, however, challenging.

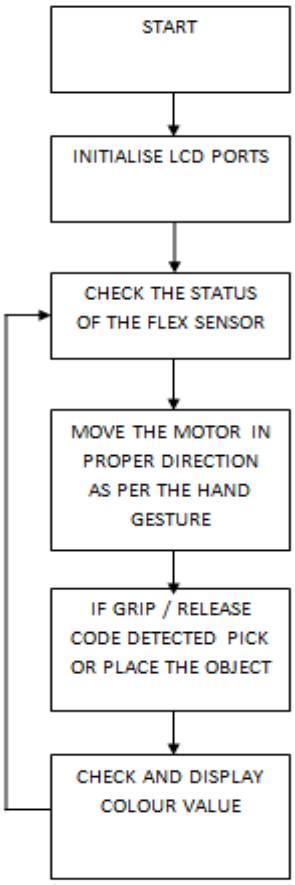

Fig2: Flowchart of system

IV. OBJECTIVE

Inelligent Robot using Hand Gesture Recognition mainly proposed for automation in industries. It reduces the manual work of labour working in the industries. This system saves tha time and hence in time delivery of the products is possible. Wheels are used for moving of the robot according to the instructions given by the LPC2148.

V. CONCLUSION

Up till now we have studied the basic information of the project. I have selected the required components for the project hardware design and completed with the circuit diagram for the hardware design. In remaining phase II, I have planned to implement the circuit diagram and hardware design of the project.

REFRENCES

[1] ABB Flexible Automation, *RAPID reference manual*, 2005. Design", Journal of Electronic Systems Volume 2 Number 2 June 2012.

ISSN No: - 2456 – 2165

[2] T.Olsson, M. Haage, H. Kihlman, R. Johansson, K. Nilsson, A. Robertsson, M. Bj¨orkman, R. Isaksson, G. Ossbahr, and T. Brog°ardh,"Cost-efficient drilling using Industrial robot with high-bandwidth force feedbacks," *Robotics and Computer-Integrated Manufacturing*, vol. 26, no. 1, pp. 24–38, 2010.

[3] N. Nayak and A. Ray, "An integrated system for an intelligent seam tracking in robotic welding. II. design and implementation," in *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 1898–1903, IEEE, 1990.

[4] E. Castro, S. Seereeram, J. Singh, A. A. Desrochers, and J. Wens, "A real-time computer controller for a robotic filament winding system," *Journal of Intelligent and Robotic Systems*, vol. 7, no. 1, pp. 73–93, 1993.

[5]A.Blomdell,G.Bolmsjo,T.Brogardh,P.Cederberg,M.Isaksso n, R. Johanssons, M. Haage, K. Nilsson, M. Olsson, T. Olsson, and A Robertsson, "Extending an industrial robots controller," *IEEE Robotics & Automation Magazine*, vol. 12, pp. 85–94, Sept. 2005.

[6] Unimation Incorporated, A Westinghouse Company, *User's Guide to VAL II Programming Manual, Ver. 2.0*, Aug. 1986.

[7] T. Brog°ardh, "Present and future robot control development: an industrial perspective," *Annual Reviews in Control*, vol. 31, no. 1, pp. 69–79, 2007.