OVERVIEW OF DUAL ARM TELE ROBOTIC SYSTEM BASED ON COLOR IDENTIFICATION AND RFID TAG

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ABSTRACT

Human rights issues that arise due to poor working conditions are becoming a significant problem in modern manufacturing systems. Industrial dual-arm robots are being developed to eliminate the effects of these social issues. A dual-arm robot can work in place of human workers. We present a system to achieve coordinated task-based control on a dual-arm industrial robot for the general tasks like color object sorting with tag sensing. It has advantages such as a single controller for both arms and human-sized body and arm.The researchers and companies are interested in the dual arm robot system because two-arm robot system has more advantageous than the traditional single arm robot system. Single arm robot has just one arm and it is impossible to behave like human who manipulates some object with the cooperation of the left and the right arms.

Keyword*: - robotic arm, microcontroller,sensor,Telerobot,dual-arm,motor.*

1.INTRODUCTION

This project presents a dual arm robotic application with color object and tag based sensing. The control of a robotic arm is very useful in the industry, because in today's consumer world only robotic arms can do all the tasks precisely and with high speed. The robotic arms need to be automated as much as possible, because this way, they can do even more tasks with less human intervention, which will lead to higher productivity. Mostly in the industry, robotic arms are blind; they don't have sensor vision system. Sensor vision system adds artificial lintelligence and more autonomy to a robotic arm. Mostly in the industry robotic arms are programmed previously, they know exactly all the movements which need to be executed. This way, the robotic arms are not very flexible for today's dynamic world. If the robotic arm has a sensor vision system added, than it can change its tasks during execution, this way there is no need to stop a production line. A sensor vision system can also make auto calibration for the robotic arm, this way the robotic arm can make small adjustments during execution, this way there is no need to stop the production line and this will save money and time.In this experiment a robotic arm detection and control method was made. The robotic arm has glued colored box sorter, the sensor has applied color filters and RFID tags read with readers. According inputs Dual ARM works. Multi-arm industrial robots and tele-robots are not common due to their mechanical and system level complexity. When multiple arms jointly hold a load, in addition to the motion of the load, the internal force within the load needs to be regulated for stable grasping while avoiding damaging the part. In the case of force-reflecting teleoperation, synchronization and stability issues are even more severe, since the human operator needs to regulate both the force of interaction between the load and the environment and the internal squeeze force in the load. Here in this project we are providing sensor based operation of sorting with dual arm.

2. LITERATURE SURVEY

1."Dual Arm Robot Manipulator and Its Easy Teaching System" 2009 IEEE International Symposium on Assembly and Manufacturing17-20 November 2009, Suwon, Korea 978-1-4244-4628-5/09/$25.00 ©2009 IEEE[4]

The dual arm robot manipulator has been developed and it easy teaching system has been developed also. The manipulator consists of two industrial 6-DOF arms and one 2DOFtorso and it was designed for the assembly automation of the automotive parts. Two-arm robot system has more advantageous than the traditional single arm robot system. But it is more difficult to teach the dual arm robot system. In this paper, the research results on the dual arm robot manipulator and its easy teaching system will be introduced.

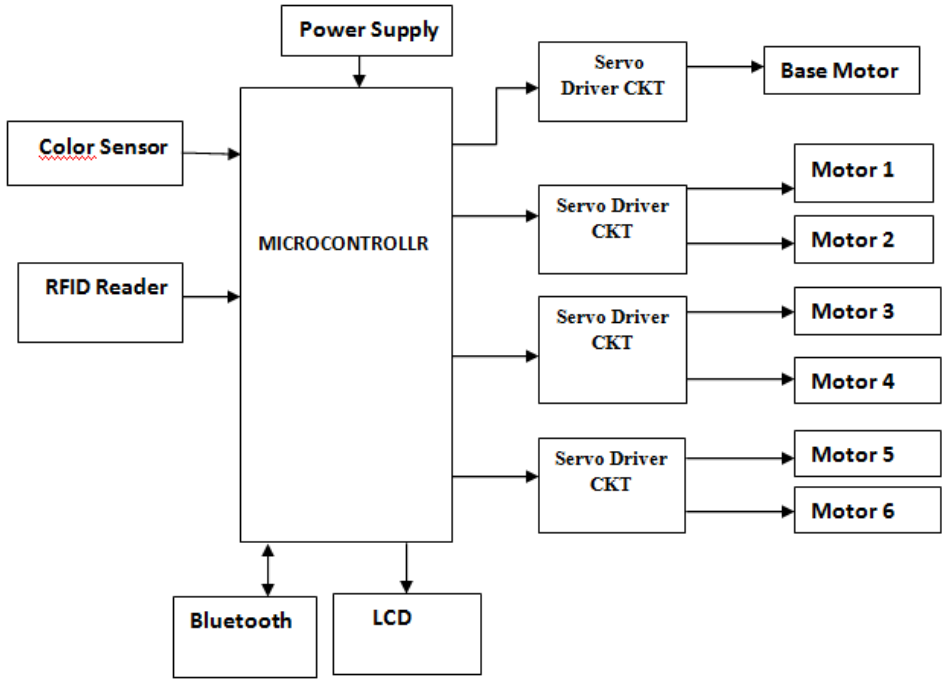
2. "A Sensor-Based Dual-Arm Tele-Robotic System" Daniel Kruse, Student Member, IEEE, JohnT.Wen, Fellow, IEEE, and Richard J. Radke, Senior Member IEEE, IEEE TRANSACTIONS ON AUTOMATION SCIENCE AND ENGINEERING, VOL. 12, NO. 1, JANUARY 2015

present a novel system to achieve coordinated task-based control on a dual-arm industrial robot for the general tasks of visual servoing and bimanual hybrid motion/force control. The industrial robot, consisting of a rotating torso and two seven degree-of-freedom arms, performs autonomous vision- based target alignment of both arms with the aid of fiducially markers, two-handed grasping and force control, and robust object manipulation in a tele-robotic framework. The operator uses hand motions to command the desired position for the object via Microsoft Kinect while the autonomous force controller maintains a stable grasp. Gestures detected by the Kinect are also used to dictate different operation modes. We demonstrate the effectiveness of our approach using a variety of common objects with different sizes, shapes, weights, and surface compliances.

3 *"*Raspberry Pi Based Dual-ARM Tele Robotic System with Live Video Streaming*"* SRI PALLAVI[1],M. NARESH[2], DR.M.NARSINGYADAV[3]ISSN2319-8885vol.05,Issue.41 November-2016,pages:8514-8518

The work is designed to develop a pick and place dual arm tele robotic vehicle with a soft catching gripper that is designed to avoid extra pressure on the suspected object (Like Bombs) for safety reasons. The robotic vehicle is android application controlled for remote operation. At the transmitting end using android application device, commands are sent to the receiver to control the movement of the robot either to move forward, backward, left, right, up, down, open, close, center motor rotate right and left. At the receiving end seven motors are interfaced to the raspberry pi processor where four of them are used for two arms and two gripper movement of the robot while the other two are for the body movement of the vehicle. The main advantage of this robot is its soft catching arm that is designed to avoid extra pressure on the suspected object for safety reasons. The android application device transmitter acts as a remote control that has the advantage of adequate range, while the receiver end Wi-Fi device is connected to the processor to drive DC motors via motor driver IC for necessary operation. Remote operation is achieved by any smart-phone/Tablet etc., with Android OS; upon a GUI (Graphical User Interface) based touch screen operation (App Name: TCP/IP Terminal).

3.BLOCK DIAGRAM



4.WORKING

The block diagram of the proposed system .It consists of an Microcontroller, RFID Reader, Color Sensor, 7 DC Motors with Servo Driver CKT and power supply. The dual arm tele robotic consists of robotic arm for pick and placed. The ARM is able to move along with RGB type of color object. It uses one motor for the based movement operation and 6 motors for ARM operation. The dual-arm tele robot uses 7 motors for the operation of the system, two for the operation of shoulder and 4 for the pick and place operation. The dual-arm tele robotic consists of an arm assembly with a jaw, which is only able to move in up and down direction. There are two motors are for the arm assembly, one forth up and down motion and other for jaw opening and closing. The maximum upward and downward motion is limited by mechanical joints. If color is matched and RFID tag also detected Robotic arm pick the objects and place it in particular axis that given in program. Here we also use LCD and Servo Driver for display and Motor Operation.

5.COMPONENTS USED

5.1 Microcontroller ATMEGA16

This section forms the control unit of the whole project.This section basically consist of microcontroller with its associated circuitry like crystal with capacitor,Reset circuitry,Pull up resistor (if needed) and so on.The microcontroller forms the heart of the project because it controls the devices being interfaced and communicate with the devices according to the program being written.

5.2 Servo Driver Circuit

This is the simple basic design of servo motor controller with pulse generator. It uses the CMOS IC 7555 in the Astable mode to generate pulses to drive the servo motor. The circuit can be suitably modified to get pulses of sufficient length.

5.3 *Color Sensor*

The color sensor product family provides red, green, blue and clear (RGBC) lightsensing for precise color measurement, determination, and discrimination. A SYNC input allows for greater accuracy by enabling the color sensing to be synchronized with an external event.

5.4 RFID Reader

A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader. RFID tags are used in many industries, for example, an RFID tag attached to an automobile during production can be used to track its progress through the assembly line. RFID-tagged pharmaceuticals can be tracked through warehouses; and implanting RFID microchips in livestock and pets allows for positive identification

5.5 LCD

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

5.6 Bluetooth HC-05

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication. This serial port bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband.

6. CONCLUSION

In this Project, an interface for a dual arm robot has been developed and it is introduced in this paper. It is simple interface and it is very useful to teach a cooperative motion of the two arms because the operator can easily teach a dual arm robot manipulator not only with the absolute motion reference but also with the relative motion reference with respect to the each other arm. The usefulness of the proposed robotic interface for a dual arm robot manipulator has been starts experiments using the below references.

7. REFERENCES

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