Designing of Robotic Arm Control Using Labview

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Abstract : In Everyday's life there is a usage of Man power to pick heavy loads from conveyor belt in industries so this project is used to reduce the man power and increase efficiency of the work and as the robotic arm suggests it can pick heavy loads and can do work fast. In this there more advanced technology is used like MyRio so efficiency can be increased for the work in the Industries and programming is easy to understand in labview. This paper focuses on designing of Robotic Arm ,it tells about how we can make a Robotic arm hardware as well as on software. In other Coding languages which are difficult to understand to everyone who don't know how to code in c,c++,java etc. It will be easy to understand the program on labview.

IndexTerms - Labview hardware, MyRio, Servo motors high torque, connectors, mechanical structure.

I. INTRODUCTION

"Robotics" is the term practically defined as the design and utilization of robot systems for industry. Robots are usually preferred to use for performing hazardous, complicated as well as highly monotonous, and unpleasant jobs. These are installed in many workstations where ever heavy loads and hectic operations has to be perform such as material handling, different part assembly, various types of welding, different spraying, painting also can be used to placing small parts with accuracy etc[1]

Robots are defined by the nature of their movement. There are five important classifications of robots. They are described as follows

• Cartesian

• Cylindrical

• Polar

• Articulated

• SCARA

The first robotic arm to be used in an automobile industry was "UNIMATE" in GM motors USA in 1950s.[2].In this project there is robotic arm which can be used in the industries to ease the work and increase the efficiency of the work for picking heavy loads from conveyor belt easily. The servomotors were preferred because these are very sturdy with inbuilt encoders and having positional feedback for correcting position [3] The grip of the robotic arm is strong enough to grab the heavy load and this can be done in fast manner to increase efficiency of work and reduce man power. The software which is used in programming for the work is easy to understand and the new technology is used.

II. LITERATURE REVIEW

Mr. Rahul Shivaji Pol et al. [1].proposed Four DoF Robotic ARM using LabVIEW The aim of this research paper is to thoroughly elaborate designing, development and to implement steps involved to make a superior four degrees of freedom (DoF) robot ARM with control that is more organized and low expenditure. A four DoF robotic ARM is a kind of robot (part) usually programmable, with identical functions to a human ARM. The said robotic ARM is designed with four degrees of freedom to perform various associated tasks, such as material handling, shifting which can serves as an assistant for industry.

Gopalakrishnan R et al.[2] proposed Design and Control of 3-DOF Articulated Robotic Arm using LabVIEW and NI-myRIO This paper focus on designing and controlling an articulated 3-DOF robotic arm using LabVIEW and NI- myRIO. Nowadays Robots have been used in common places of manufacturing and making the tasks ranging complicated and expensive to be automated, since technology formulates LabVIEW is used to make the robot more precise and practical along with a hardware NI-myRIO. The three base, axis and wrist movements are obtained by using stepper motor and 2 DC gear motor. NI-myRIO is used to generate and accquire signals for controlling and processing, it has an inbuilt processor and FPGA and has many reconfigurable analog and digital pins.

Ansari et al.[3]proposed "Microcontroller based robotic ARM: Operational to gesture and automated mode". Published in: Electrical Engineering and Information & Communication Technology. . The servomotors were preferred because these are very sturdy with inbuilt encoders and having positional feedback for correcting position.

III. LABVIEW SOFTWARE

Labview Programming are called the virtual Instruments ,or the Vis, as their appearance and operation is like physical instrument's , such as Multimeters and oscilloscopes and this can also be used for virtually seeing the live projects working. Labview Virtual Instruments contain three components the front panel, the icon and the block diagram which are making easy for programmer to understand programming. In Labview the user interface is build by the programmer, or front panel with controls and indicators can be build. Controls are the knobs with push button and other type of input device. Indicators which are used to indicate there in the program LED and other Displays are used for this .After the User Interface, the code is added for using VIs to control the front panel Objects. The Block Diagram is made for the creating code in Labview Dialogue Box.

IV. MyRio

myRIO is a real time embedded for evolution. myRIO is basically a short of micro controller introduced by National Instrument (NI) , that is why it is sometime knows as NI myRIO. myRIO is a portable device abc students can easily use it for design and control of robots and may other system quit efficiently. myRio is shown in the figure 1.It operate on the frequency 667MHZ. myRIO has dual core ARM cortex A9 programmable processor. FPGA support in myRIO help student to design real life developing system and to solve real problem quit fast as compare to other microcontroller FPGA support we can avoid the complicated syntax used in C language and in many other. We just have to create logic instead of writing the complicated code with the proper syntax.

Figure1.   My Rio

V. SERVO MOTOR

A **servo motor** is an electrical device which can push or rotate an object with great precision. If you want to rotate and object at some specific angles or distance, then you use servo motor. It is just made up of simple motor which run through **servo mechanism**. If motor is used is DC powered then it is called DC servo motor, and if it is AC powered motor then it is called AC servo motor. We can get a very high torque servo motor in a small and light weight packages. Doe to these features they are being used in many applications like toy car, RC helicopters and planes, Robotics, Machine etc.

VI. WORKING

This works on labview which supports many hardwares interfacing with this software like for example my rio, Arduino etc. In this my rio is used as a interface for programming for working of this robotic arm .This Robotic Arm consists of 3 Servo motors which help it move up and down movement ,left and right movement and the hand movement so like this we have used motors at different places to make it work with the help of hardware the gripper and the hardware used in making the hand movements possible has a main role in it's working if there is a need to increase its efficiency the program can be used to set it's parameter. The Circuit Diagram is shown in figure 2 which has shown it how we can control it.
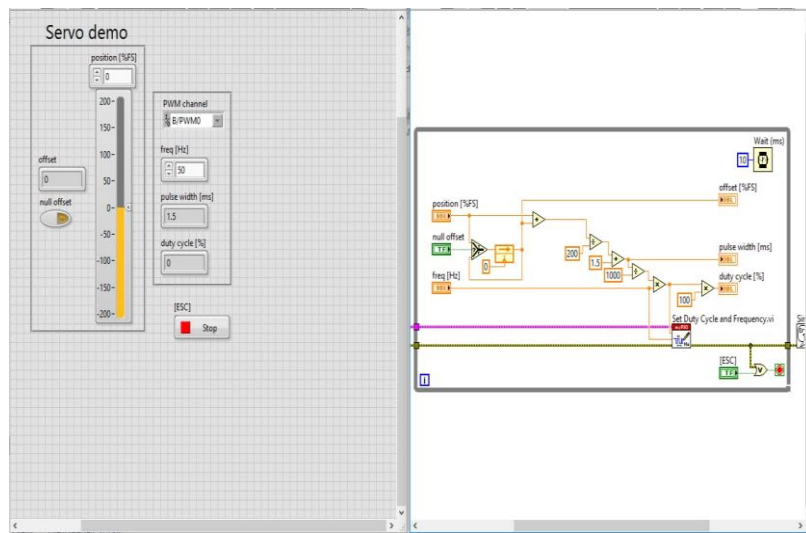
Figure2. Circuit Diagram

VII. RESULTS

The Paper gives a preview about the technology which is used finally the project is accomplished and in result we get that efficiency is increased when we use a robotic arm in place of robotic arm with a great technology which is easy to understand by workers ,the interface is so easy anyone who works at industry can use it easily and one or two workers can be used for this manpower will reduce in this case which gives industry to use the technology.

VIII. CONCLUSIONS

This project is made to help the industry for using new technologies and getting the heavy load picked by the machine itself by giving the command easily by using lab view, As it is easy to understand how to control so it can be controlled by the worker working in the industry .It makes the work easy and increases efficiency of doing the work by doing it at more fast than the normal worker is doing. So this paper will give an overview to those who are willing to learn about this new technology and want to work on this technology.

VII. ACKNOWLEDGEMENT

REFERENCES

[1]. Arutselvi.S, Sarah Maria Louis, Srinithi.S, "Monitoring and Control of Relative Humidity in Soil using LabVIEW," International Journal of Engineering Trends and Technology (IJETT) Volume 9 Number 10 - Mar 2014.

[2]. T. Bheema lingaiah, D.Hanumesh Kumar, C.Nagaraja, Solomon Woldet- sadik ,"Development of Humidity and Temperature Measurement Instrumentation System using Lab-VIEW", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 2, Issue 10, December 2013

[3]. Hosni Abu-Mulaweh, Indiana University-Purdue University-Fort Wayne, "The Use of Lab-VIEW and Data acquisition unit to Monitor & Control Air- Conditioning Processes", American Society for Engineering Educa- tion, 2007.

[4]. S. V. Devika, Sk. Khamuruddeen, Sk. Khamurunnisa, Jayanth Thota, Khalesha Shaik, "Arduino Based Automatic Plant Watering System", International Journal of Advanced Research in Computer Science and Software Engineering 4(10), Volume 4, Issue 10,October - 2014, pp. 449- 456.

[5]. Naveen Kumar R, Dr Prasad Krishna, "Low Cost Data Acquisition and Control using Arduino Prototyping Platform and LabVIEW", International Journal of Science and Research (IJSR), India Online ISSN: 23197064.

[6]. Diaa Mehdi Faris Mahmood Basil Mahmood, "Data Acquisition of Greenhouse Using Arduino", Journal of Babylon University/Pure and Applied Sciences/ No.(7)/ Vol.(22): 2014.

[7]. Sarah Maria Louis, S. Srinithi, "Monitoring of Relative Humidity of Soil Using LabVIEW", International Journal of Innovative Research & Development, Vol 3 Issue 3, March 2014.

[8]. http://www.ni.com/academic/students/learn-labview/environment/

[9]. http://www.ni.com/academic/students/learn-labview/execution-   structures/

[10]. "Mr. Rahul Shivaji Pol, Mr. S Giri, Ms. V Ghode, Mr. P Ghodake", Four DoF Robotic ARM using LabVIEW. Conference paper on September 2016, Research gate.Published on 11 Janruary 2018.

[11]. Ansari, M.J., Amir, A., Hoque, M.A: "Microcontroller based robotic ARM: Operational to gesture and automated mode". Published in: Electrical Engineering and Information & Communication Technology (ICEEICT), 2014 International Conference on. DOI: 10.1109 / ICEEICT .2014.6919045.

[12]. Ganesan A1, Nhizanth R2, Kamban S3, Gopalakrishnan R4", Design and Control of 3-DOF Articulated Robotic Arm using LabVIEW and NI-myRIO. DOI: 10.17148/IJIREEICE.2015.3342.