International Journal of Engineering and Advanced Technology (IJEAT)
ISSN: 2249 – 8958 (Online), Volume-9 Issue-5, June 2020

Cyborg using Labview for Temperature Sensor Handling

R. Saranraj, S. P. Richard, P. Vigneshwaran

Abstract:This paper discusses about the development of the robotic manipulator which is fully controlled using the Lab VIEW software and potentiometer. The Arduino Uno R3 microcontroller is used to execute the program and LIFA (LabVIEW Interface Arduino) software is used to control the robotic manipulator. This robotic manipulator is specially design for temperature sensor MI cable pick and place purpose. The manipulator can also be used for many applications in the automation field. The hardware of the robotic controller and the other design details are clearly presented in this paper.

Keywords: LabVIEW, Potentiometer, Arduino Uno R3,Servo motors, Manipulator.

I. INTRODUCTION

There are a couple of advances which will supersede individuals and human activities in coming years. Robots are proposed to be used in any way, shape or form yet these are using in sensitive circumstances like bomb recognizable proof, deactivation of various bombs, etc. Robots can take any form but in our paper design in the form of arm used for the multiple operation that they are mainly used in radioactive works. Here this robotic manipulator design for the welding and temperature sensor handling operation [5].

The manipulator is the mechanical devices which perform the movement operation based on the program upload in the Arduino interface with the LabVIEW software. The manipulator have linker and joint, that are made up of aluminium. The aluminium is lighter and strong metal, for the mechanical strength and stability of the manipulator. The parts of the manipulator designed using 3d printer [2]. The robotic arm give two ways of control, one is manual control and other one is Lab view control. The manual control based on the potentiometer connection, LabVIEW control based on the systematic control. The control may be different but operation of the arm is similar. The robotic arm parts are six servo motor, linker, joints, gripper, and Arduino Uno r3. If the robotic arm said to be manipulator it's fully control by LabVIEW software. For the manual operation control it require six potentiometer to operate the robotic arm.Technological growth and advancements are ruled by the industrial automation. Robotic manipulators have proven in all domains of scientific growth where they are put into application.

Revised Manuscript Received on May 15, 2020.
* Correspondence Author
R. Saranraj*, Assistant Professor/ EEE Department, K. Ramakrishnan college of Engineering, Trichy, India. Email: saranraj@krce.ac.in
S.P.Richard, Assistant Professor/ EEE Department, K. Ramakrishnan college of Engineering, Trichy, India. Email: richard@krce.ac.in
P.Vigneshwaran, Assistant Professor/EEE Department, K. Ramakrishnan college of Engineering, Trichy, India. Email: vigneshwaran@krce.ac.in

II. DEGREE OF FREEDOM

Level of opportunity is just level of rotation. The number of degrees of opportunity is equivalent to the all-out number of autonomous relocations or parts of motion [1]. Consider a robot arm worked to work like a human arm. A machine may work in a few dimensions. The degree of opportunity of a mechanical structure is the amount of free parameters that describe the setup. In particular, the body is permitted to change position as forward/backward (flood), up/down (throw), left/right (impact).

III. DESIGN THEORY

The robotic arm is used to manipulate the material without the direct contact. The application of these robotic arm is temperature sensor handling without damaging the sensitive part of the sensor. It also used for the welding operation. Based up on the operation require the program in arduino change. This Robotic arm also used for the automatic operation in industrial purpose.

IV. . TEMPERATURE SENSOR HANDLE

In this temperature sensor handling system mainly design for the temperature sensor manufacturing field. The robotic arm design with full secure and safe to handle the material. In the robotic arm gripper is specially design for sensitive material. In this robotic arm gripper have the rubber grommet for safe handle the temperature sensor.

V. DESIGN COMPONENTS

The components used in the construction of the robotic arm are of the specific configuration.

- Arduino Uno R3.
- Servo Motor.
- Linkers and joints.
- End effector.
- Sensor shield v5.0.
- Potentiometer.

A. *ARDUINO UNO R3*

Arduino Uno is a microcontroller board subject to the ATmega328 as shown in fig1.It has 14 mechanized information/yield pins (of which 6 can be used as PWM yields), 6 basic data sources, a 16 MHz terminated resonator (CSTCE16M0V53-R0), a USB affiliation, a power jack, an ICSP header and a reset button shown in fig 2. It contains everything expected to help the microcontroller; just interface it to a PC with a USB connection or power it with an AC-to-DC connector or battery to start.

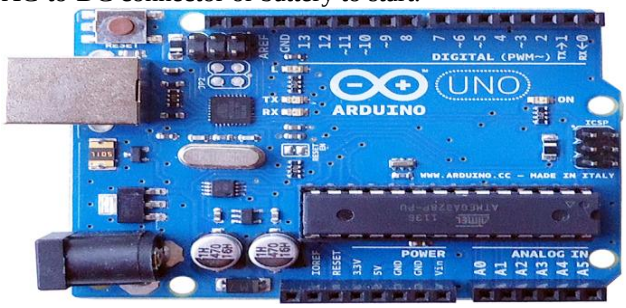

Fig. 1. Arduino Uno

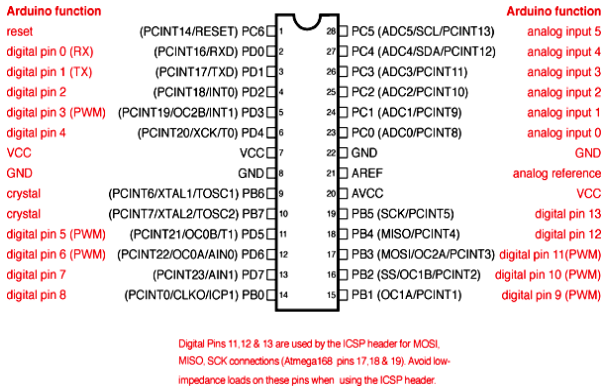

Fig. 2. Pin Diagram

B. *SERVO MOTOR*

A servomotor (or servo engine) is a straightforward electric engine, controlled with the assistance of servomechanism. There are some uncommon kinds of uses of an electric engine where the pivot of the engine is required for only a certain angle. This servos utilized in mechanical arm application dependent on the beat from the Arduino the servo activity done. In this automated arm servo pinnacle star MG995 is used [12]. Fig 3 shows the layout of MG995 tower pro device. For the rock solid activity these sort of servo utilized right now servomotor is a turning actuator or direct actuator that considers definite control of daring or straight position, speed and speeding up.

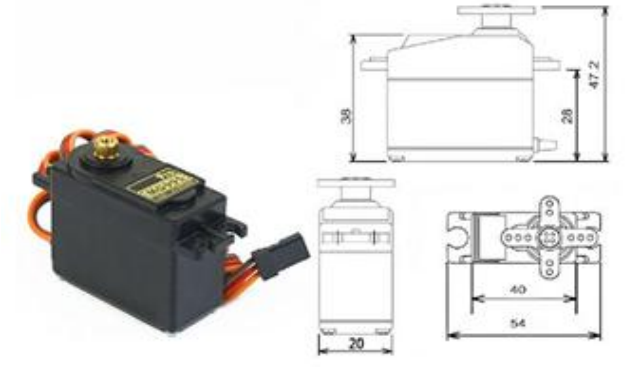

Fig. 3. Tower Pro MG995

C. *LINKER AND JOINTS*

In a robot, the relationship of different controller joints is known as Robot Links, and the coordination of in any event two association is called as Robot Joints. A robot association will be as solid material. A robotic arm linker and joints are made up of aluminium metal. These metal design by 3d printer. Aluminium is less weighted metal so the operation of robotic arm is easy.

D. *END EFFECTOR*

The end effectors consists of gripper. The gripper cover with rubber grommet. This rubber grommet help gripper to handle the sensitive part with care. This gripper also made by aluminum but the end of the gripper cover with rubber grommet as in fig 4.

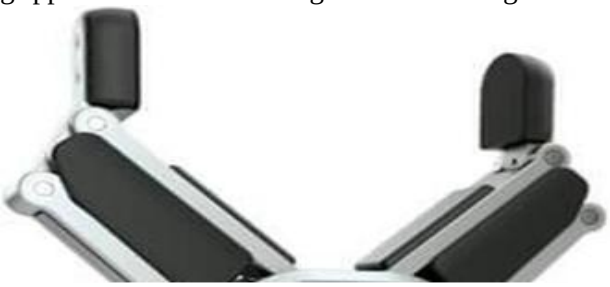

Fig. 4. Rubber Grommet Gripper

E. *SENSOR SHIELD V5.0*

Fig 5 shows the layout of sensor shield that permits fitting and play association with different modules like sensors, servos, transfers, catches, potentiometers.

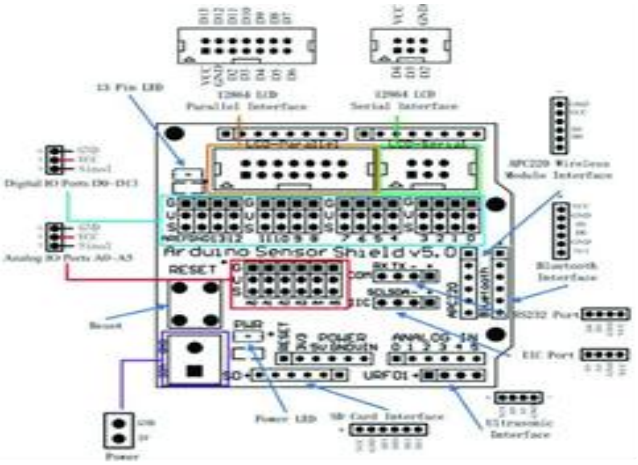

Fig. 5. Sensor Shield

F. *POTENTIOMETER*

A potentiometer is a three-terminal resistor with a sliding or turning contact that shapes an adaptable voltage divider. In case solitary two terminals are used, one end and the wiper, it goes about as a variable resistor or rheostat.

Retrieval Number: D8201049420/2020©BEIESP
DOI: 10.35940/ijeat.D8201.069520
Journal Website: www.ijeat.org

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication

VI. SYSTEM CONNECTION

LabVIEW represents Laboratory Virtual Instrument Engineering Workbench. It is a structure plan stage and progression condition for a visual programming language from National Instruments. It is used to control the robotized arm with no manual contact with mechanical arm. LabVIEW joins a compiler that produces nearby code for the CPU stage. This aide's execution. The graphical code is changed over into executable machine code by a compiler. The LabVIEW sentence structure is painstakingly actualized during the modifying strategy and gathered into the executable machine code when referenced to pursue or saving. Fig 6 show the implementation of front panel. Using these panel the movement of the robotic arm control.

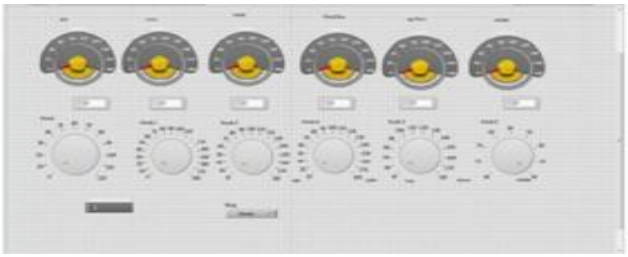

Fig. 6. Front Panel Setup

Fig 7 circuit connection consists of six servo motor (MG995) and potentiometer, using these potentiometer we also change angle of the servos, each servo connected with separate potentiometer. This circuit for manual operation of servos. This potentiometer is used for the manual control of robotic arm. In the absence of lab view software this control is useful.

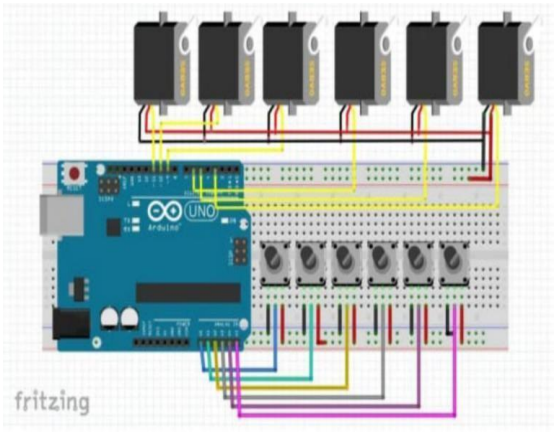

Fig. 7. Potentiometer Servo Connection

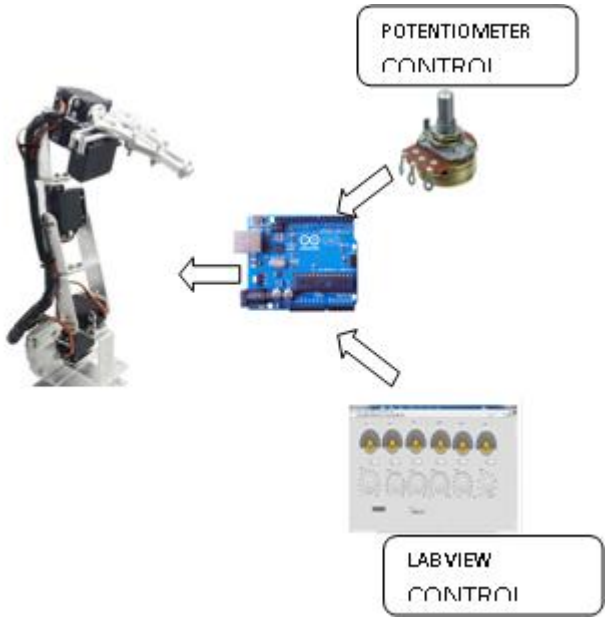

Fig. 8. System setup

VII. CONCLUSION

The mechanical arm could be utilized in the modern segment when interfaced with an appropriate controller. This arm can be utilized in completely mechanized modern division for the most part in the field of temperature sensor manufacturing. Based upon the application require the automated arm activity can be change. It likewise utilized in the field of welding and cutting activity.

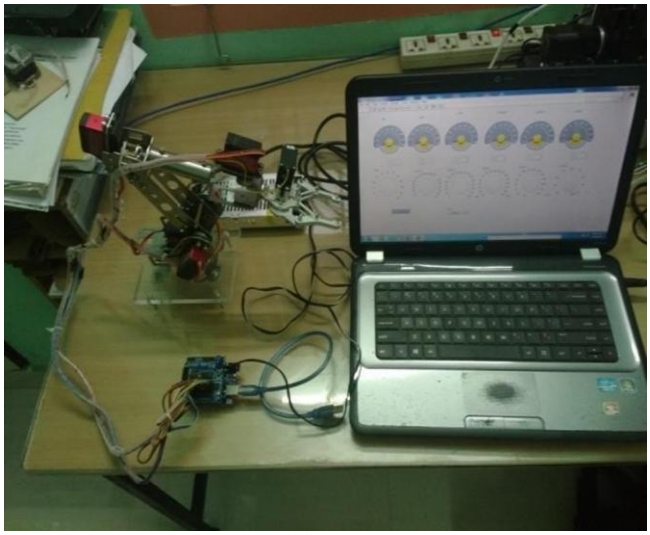

Fig. 9. Hardware setup

REFERENCES

1. GoldyKatal, Saahil Gupta, ShitijKakkar, "Design andoperation of Synchronized Robotic Arm ", International Journal of Research in Engineering andTechnology, eISSN: 2319-1163 | pISSN: 2321-7308.
2. A.Elfasakhany, E. Yanez, K. Baylon and R. Salgado,"Design and Development of a Competitive Low-CostRobot Arm with Four Degrees of Freedom", Modern Mechanical Engineering, 2011, 1, 47-55,doi:10.4236/mme.2011.12007 Published November 2011.

3. Elias Eliot, B.B.V.L. Deepak, D.R. Parhi& J. Srinivas, "Design & Kinematic Analysis of an Articulated Robotic Manipulator", International Journal of Mechanical and Industrial Engineering (IJMIE) ISSN No. 2231-6477, Vol-3, Iss-1, 2013.
4. A.Subramaniya siva, N.Vinothini, S.Sathiesh kumar "Piezoelectric based electric energy generation from Sound energy" IJSTR vol 9, issue 4, 2020.
5. S.Pachaiyappan, M.MichealBalraj, T.Sridhar, "Design and Analysis of an Articulated Robot Arm For Various Industrial Applications, IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN: 2278-1684, p-ISSN: 2320–334X PP 42-53.
6. Durgadevi. A, Priyadarshini. S.A, Anbumozhi. R, 2017, 'Control of continous stirred tank reactor using neural network based predictive controller', Imperial Journal of Interdisciplinary Research, vol.3, no.9, pp. 316-321
7. Manivasagam Rajendran, Saranraj Rajendran "Wind turbine manufacturing supply chain "IJSTR vol 9, issue 3 ,2020.
8. Titus Sigamani, Ram Prakash Ponraj "Modified Multi level boost inverter for hybrid energy systems" IJSTR vol 9, issue 4 ,2020.
9. R.Illango, T.Santhosh Kumar, S.Sathiesh kumar "Load flow & transient stability analysis for IEEE5 bus system using UPFC" IJSTR vol 9, issue 4 ,2020.
10. Dhayalini.K & Priyadharshni S.A, 2017 MEMS multisensory based intelligent damage detection for wind turbines International Journal of Computer and mathematical sciences Vol.6, No.11,pp181-189
11. R.Saranraj, P.Vigneshwaran ,C.Dinesh Kumar "Domestic LPG monitoring and regulating Systems using IOT"IJREAM vol 5,issue 12,2020
12. Dhayalini.K & Mukesh.R, 2018, Deterioration and non-deterioration waste separation using pick and place published in IEEE Xplore Digital Library, pp: 96-99.

AUTHORS PROFILE

R.Saranraj is currently working as **A**ssistant professor in K.Ramakrishnan College of Engineering (autonomous), Tamilnadu, India. He has more than 4 years of teaching experience and 3 years of industry experience as an Quality Engineer. He is an active member of IEEE. He certified as level II engineer in NDT Testing .He has published papers in various Engineering domains. His research interest includes Uncertainty calculations of temperature sensors , control systems, multilevel inverters, Renewable energy sources, IOT and soft computing Techniques.

S.P.Richard is currently working as an Assistant Professor in K.Ramakrishnan College of Engineering(autonomous), Tamilnadu, India. He has more than 8 years of teaching experience and is an active member of IEEE. He has published papers in various Engineering domains. His research interest includes Data Analytics for renewable energy systems, Sensing and Monitoring systems.

Vigneshwaran Perumal is currently working as an Assistant Professor in K. Ramakrishnan College of Engineering (autonomous), Tamil Nadu, India. He has more than 8 years of teaching experience and is an active member of ISTE & IEI. He has published papers in various Engineering domains. His research interest includes MEMS & Power Electronics for renewable energy