IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

Volume 11, Issue 2, February 2022

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.282

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 2, February 2022 ||

DOI:10.15662/IJAREEIE.2022.1102006

Wireless Controlled Robotic Arm by Using MFA Algorithm Advance in Electronics Engineering

T.Arun Kumar[1], U.Sivaranjani[2]

Assistant Professor, Dept. of ECE, Parisutham Institute of Technology & Science, Thanjavur, Tamilnadu, India[1]

Assistant Professor, Dept. of ECE, Parisutham Institute of Technology & Science, Thanjavur, Tamilnadu, India [2]

ABSTRACT: Human manipulation is important in creating a choice and in dominant an automation, significantly in unstructured dynamic environments. Robots have replaced persons in a very big variety of industries in troublesome things. The fundamental associate degree contradictory wants of a process square measure "Repetitive tasks and of High accuracy". The remote controlled robotic arm could act as an answer to such issues. This paper proposes associate degree innovative robotic arm that is controlled by a wireless mouse. The two servo motors square measure placed at the spheroid joint, one at the elbow, the opposite one at the wrist for the gripper. DC motors is programmed to rotate to a selected angle zero to a hundred and eighty degrees. Also, a wireless mouse could be a device that is incredibly wide used and any layperson has experience over its usage. Hence, we tend to engineered an arm for the automation, controlled by victimization wireless mouse.

KEYWORDS: Robot, Wireless mouse, Servo motor, DC motor, Microcontroller, ZigBee, MFA.

I.INTRODUCTION

Human manipulation is critical in creating a call and in dominant a mechanism, significantly in unstructured dynamic environments. Some ordinarily used human–robot interfaces [1] embody joysticks [2], dials [3], and robot–arm reproduction [4]. However, exploitation these mechanical contact devices for tele-operation tasks to manage the robot–arm movements. If the business most of the robots haven't any vision system, they only move following predefined ways, that they need learned antecedent, however no call is created by them, we are able to tell nearly no computer science is enforced in their management code.

Nowadays, the ordinarily used human-robot interface is that the contacting mechanical devices like joysticks and mechanism replicas. Human will simply merely move the wireless mouse and arm to finish the teleoperation tasks with these devices. However, these motions are mechanical. The operator needs to follow for a protracted time to govern the mechanism effectively. there's another quite human-robot interface, which might track the position and orientation of the operator's hand in real time, like magnetic force chase devices, mechanical phenomenon sensors and information gloves, conjointly employed in mechanism teleoperation space. However, as a result of the devices are contacting, folks encounter an equivalent drawback whereas exploitation them, the motion of the operator is unnatural.

Human hand management robotic arms are the very important a part of most the industries. A robotic arm performs numerous totally different tasks like fastening, trimming, selecting and putting etc in business. The most important advantage of those arms is that it will add venturesome areas and conjointly within the areas that cannot be accessed by human. several variants of those robots/robotic are offered or designed as per the necessity. Few variants are computer keyboard Controlled, Voice management, Gesture management, etc. However, most of the commercial robots are still programmed exploitation the everyday teaching method that continues to be a tedious and long task that needs technical experience. Therefore, there's a desire for brand new and easier ways in which for programming the robots.

II.EXISTING SYSTEM ANALYSIS

A human hand gesture command to regulate the robotic arm by moving left, right, up, down etc. and conjointly to select the required object and place them at the required location. The system has been categorized into the subsequent parts:-

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 2, February 2022 ||

DOI:10.15662/IJAREEIE.2022.1102006

•Camera
• Blob analysis technique
• Robotic arm and Hand gesture method

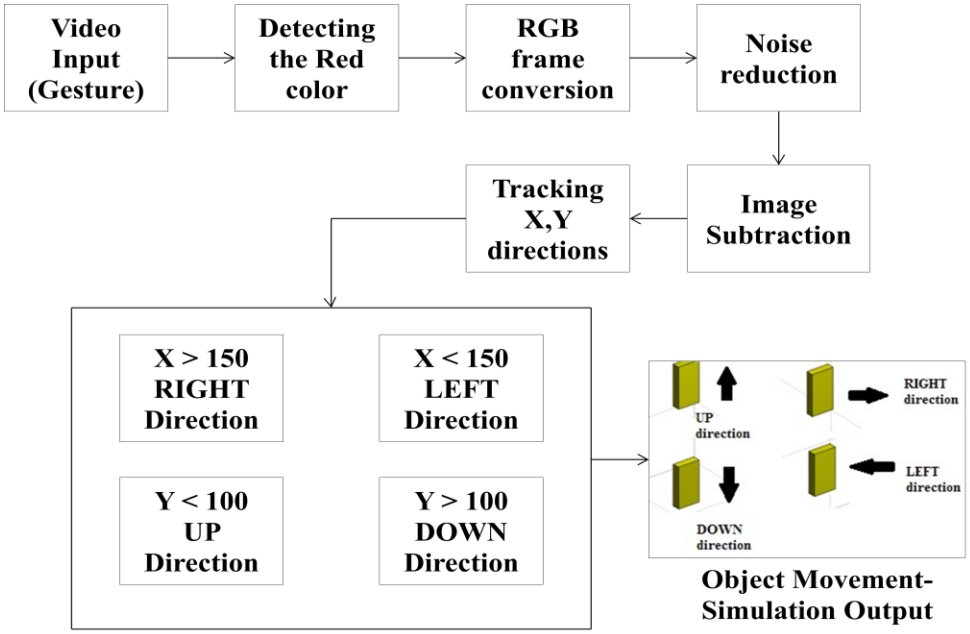


Fig. 1 System architecture

LQE ALGORITHMIC RULE

LQE (Linear quadrature estimation algorithm) is employed to estimate the state of Uzbekistan from a collection of buzzing and incomplete measurements, as a result of each gyroscope and meter have racket and stochastic process. LQE could be a random technique that estimates the state at time k from the state at time k − 1.It is also known as Kalman filter algorithmic rule.

There are 2 analyses in Kalman filter algorithm:

1. Object trailing and analysis
2. Merge split handling

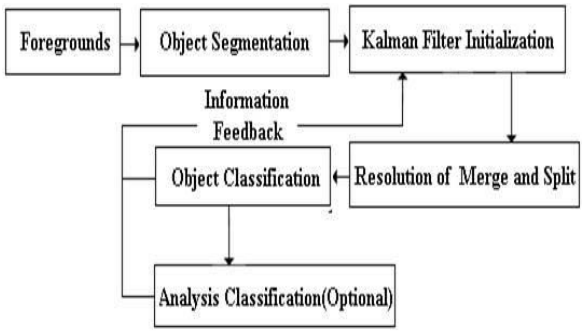


Fig.2 Object tracking and analysis

The Kalman filter was developed to unravel specific issues within the areas of rocket pursuit and autonomous or aided satellite navigation (e.g. Greek deity area program). Since the Kalman filter has found applications in many numerous areas, together with all sorts of navigation (aerospace, land, and marine), signal process and communication, atomic power plant methodology, demographic modeling, Etc.,

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 2, February 2022 ||

DOI:10.15662/IJAREEIE.2022.1102006

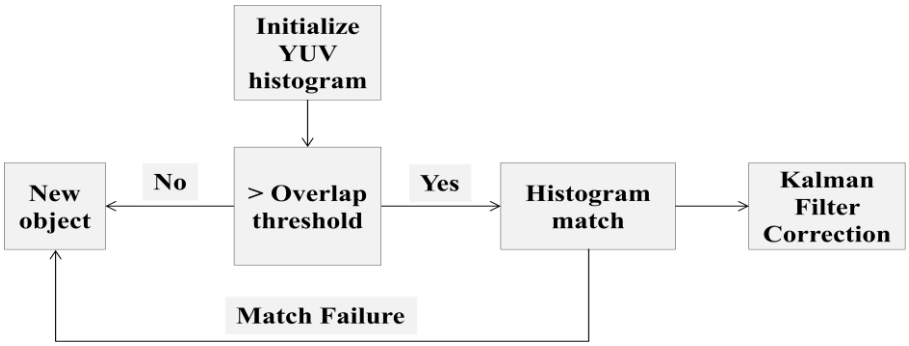


Fig.3 Merge split handling

The Kalman filter consists of 2 steps, the prediction and therefore the correction. The opening move is foreseen with the dynamic model and therefore the second step is corrected with the observation model. The LQE operate predicts the position of a moving object supported its past values. LQE is otherwise known as kalman filter. It uses a Kalman filter reckoner, a algorithmic filter that estimates the state of a dynamic system from a series of buzzing measurements. Kalman filtering encompasses a big selection of application in areas like signal process, pursuit objects, Navigation.

A. BLOB ANALYSIS

In the field of laptop vision, blob detection refers to gesture detection ways that are aimed toward police work regions in an exceedingly digital image that dissent in properties, like color, compared to areas close those regions. Informally, a blob extraction could be a region of a digital image during which some properties are constant or vary within a prescribed vary of values, all the points in an exceedingly blob are often thought-about in some sense to be almost like one another.

B. WORKING PRINCIPLE

During this project one issue was clear that a system goes to be developed which may capture a hand gesture performed by the user before of camera, this captured image is then processed to spot the valid gesture through specific algorithmic rule & execute the corresponding operation. The implementation of method is represented as follows:

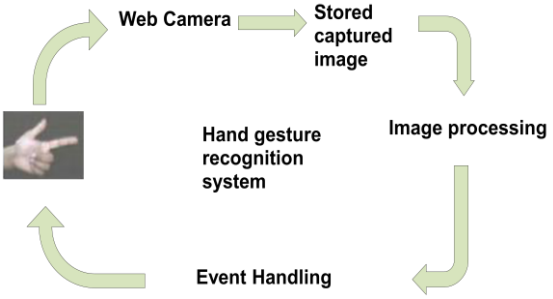


Fig.4 Interaction among the components

III. SYSTEM MODEL & WORKING

This project deals with the planning, and management of a robotic arm having options like quality, with accuracy and speed. A Robotic Arm, having Degrees of Freedom, is controlled by the eight functions, employing a Wireless Mouse. These eight functions are: x-y movements of mouse, left, right, arm up, arm down, forward, backward, pick & place its enforced exploitation an pic16f778a microcontroller board. This board controls the dc motors and conjointly responds to the mouse. These servo motors will rotate most one hundred eighty degrees.

The position of those motors is at:
1. Flat position: for horizontal movement of the arm.
2. Shoulder: for vertical movement of higher arm.
3. Joint: for vertical movement of lower arm.

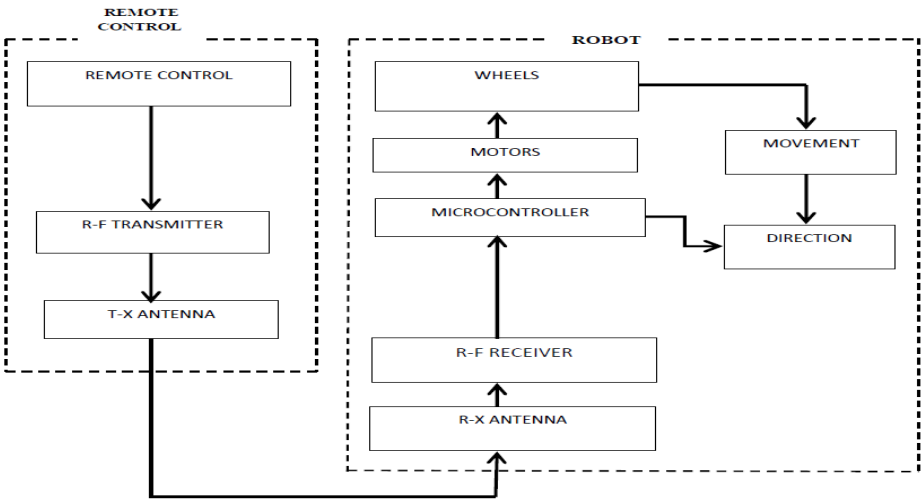
| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 2, February 2022 ||

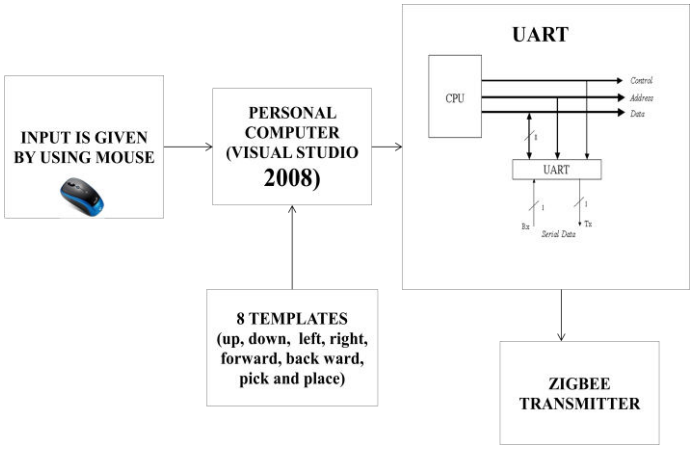
DOI:10.15662/IJAREEIE.2022.1102006

4. Wrist: for moving the articulationplanar in dextral and anticlockwise direction.
5. Grip position: for opening& closing of the palm.

The objective of this Robotic Arm is to simply transporting the objects, hold within the gripper, from one purpose to a different, with accuracy and speed. The most feature of this project is that it works with only one microcontroller board that replaces USB Host protect and Servo Motor Driver boards. This has reduced the general value of the project.



1) TRANSMITTER SECTION



2) RECEIVER SECTION

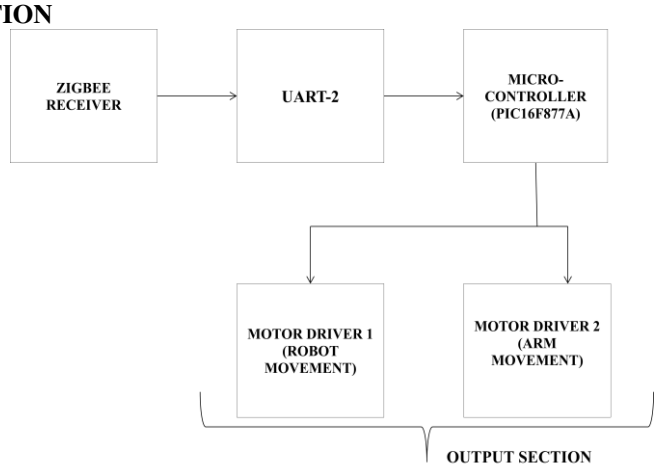


Fig.5 Data Flow and block diagrams for Transmitter and receiver section

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 2, February 2022 ||

DOI:10.15662/IJAREEIE.2022.1102006

C. WORKING PRINCIPLE:

From the wireless remote mouse management unit, the zigbee transmitter of 2.4 gigahertz transmits signals to the main board. every address/data input is set to at least one of the 2 logic states. The programmed addresses/data bits from the PICmicrocontroller square measure transmitted with R-F transmission. A transmitting antenna denoted as T-X Antenna then sends the signals via a receiving antenna R-X to the microcontroller PIC16F877 on the main board that decodes the signal to perform the suitable directions. For the mechanism unit, the Xbee receiver receives sent signals from the R-F receiver module at 2.4 rate the R-X antenna that the PIC16F877 microcontroller executes the directions transmitted from the programming language for programming that executes knowledge input needed for the motors (servo-motors) and executes directions for direction then movement of the mechanism. The motors (servo-motor) square measure controlled with necessary directions that modify the wheels of the motor automotive to move similarly because the robotic arm to move within the needed direction. The system knowledge flow sheet is as shown in Figure. With the management unit hopped-up and operating, the method of dominant the mechanism can proceed through the following: The remote user sends a command signal to the robot's receiver.

- Robot receiver receives the command signal sent from the user wireless device.
- Automaton receiver decodes the signal and sends the command to the microcontroller.
- Microcontroller problems command to robot's components like the wheels and motors for movement and direction severally.

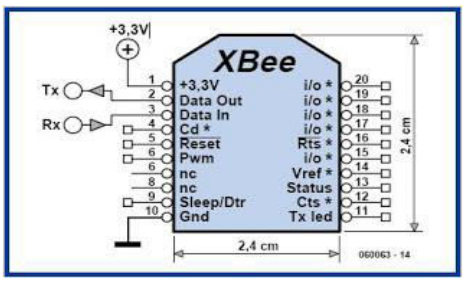


Fig.6 Zigbee Protocol pin configuration

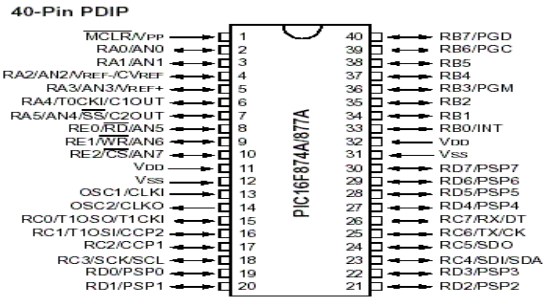


Fig.7 Pin configuration PIC16F877A

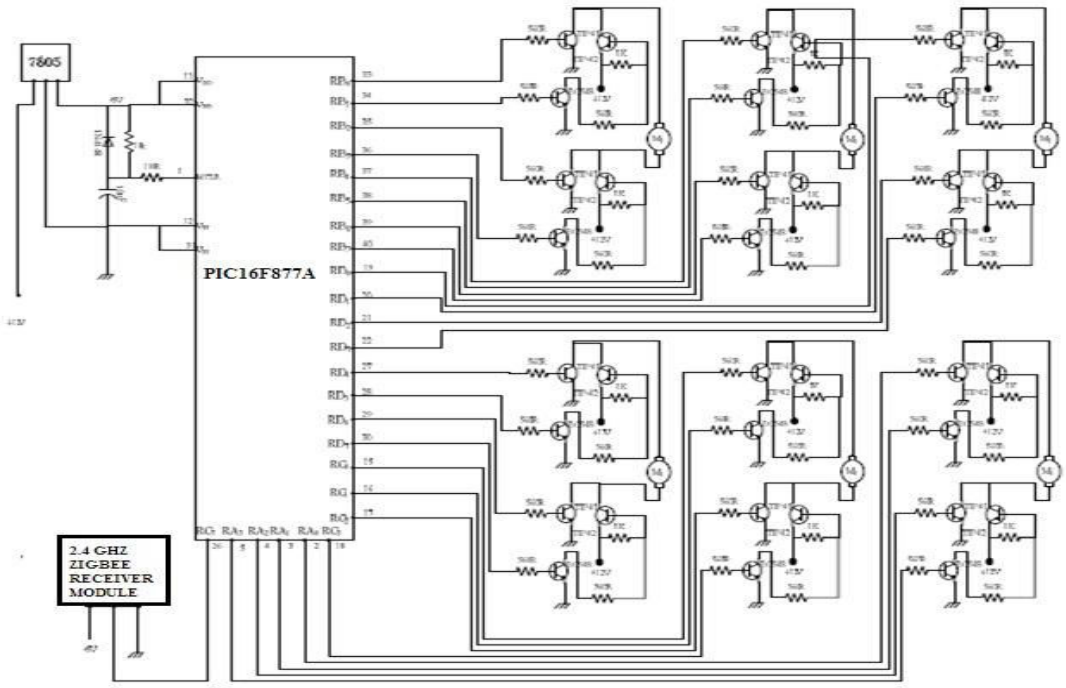


Fig.8 Circuit Diagram of PIC16F877A Microcontroller with power supply circuit

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 2, February 2022 ||

DOI:10.15662/IJAREEIE.2022.1102006

D. DC-MOTOR:

Servomotors are closed-loop devices. Given an indication, they alter themselves till they match the signal.Servos are utilized in radio management applications and vehicles.DC motors with gearing and a feedback system. The servo motor could be a motor that's driven associate degreed controlled by an electrical pulse generated by digital device. every pulse drives the servo motor by a fraction of 1 Revolution, referred to as the step angle. The actions of the servo-motors are enforced exploitation H-Bridge. AN H-bridge circuit that allows a voltage and applied across a load in either direction.

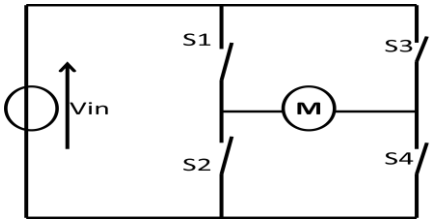


Fig.9DC motorFig.10 E-Bridge Circuit

TABLE I

DC MOTOR OPERATION

P1_0	P1_1	P1_2	P1_3	P1_4	Operation
1	0	1	0	1	Forward
0	1	0	1	1	Backward
0	0	1	0	1	Left
1	0	0	0	1	Right

P2_0	P2_1	P2_2	P2_3	P2_4	Operation
0	1	0	0	1	Arm down
1	0	0	0	1	Arm up
0	0	0	1	1	Place
0	0	0	0	1	Pick

E. ALGORITHMS OF SEA AND MFA

The x- and coordinate axis coordinates increase once the mouse moves right and down, severally. The coordinates are redefined supported screen resolution. The SEA(Simple and economical Algorithm) mechanically provides suggestions once a user moves the mouse to certain coordinates. X, Y current coordinates denotes the positions of the mouse supported by Resolution perform. MFA operate is developed for implementing an operate in applications with master's degree. Agree decision and Disagree call constants are found out for applications developed with sea to record the ultimate decision of the user and also the last coordinates of the mouse. Within the MFA(Multi factor authentication), Tolerence_Value denotes the threshold price set by users and X, Yicon denotes the coordinates of the target icon the user needs to click. When |X, Ycurrent- X, Yicon|, |Xcurrent- Xicon|, or |Ycurrent-Yicon| < Tolerence_Value exceed a predefined Tolerence_Value, the system mechanically providesnotifications and suggestions, given in Suggestion Message. Finally,applications will record the preference of the user and stores it within the information for coaching the information by implementing Record operate. coaching algorithms are developed in the future.

Fig. 11 Mouse coordinates settings for SEA and MFA

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 2, February 2022 ||

DOI:10.15662/IJAREEIE.2022.1102006

F. ADVANTAGES

Robotic arm is controlled by mouse, therefore it's several movements compared to the one controlled with standard remote. The Robotic Arm will cover a distance of over a foot in x direction with a hundred and eighty degrees rotation, permitting it to select up objects. The controls of the robotic arm are straightforward to know and implement. Another merits are easy kinematic model, simple to examine, sensible access into cavities and machine openings, and extremely powerful once hydraulic drives are used. The kinematic structure of the robotic arm permits us to position its gripper at any (x, y, z) location.

G. APPLICATIONS

1. Mechanical: The robotic arm will have a spread of applications in mechanical field. It may be used for welding at extreme temperature environment usually dangerous for others. it's employed by several automobile industries for transport, placement of automobile components.
2. Medical: Robotic arm finds variety of applications during this field. Surgeons use artificial robotic hands for playing surgeries requiring high preciseness and stability.
3. Space: Remote Manipulator System has robotic arms with several degrees of freedom, used for playing inspections by cameras and sensors hooked up at the gripper finish. These Robotic Arms may be autonomous or manually controlled.
4. Household: Robotic Arms aren't solely helpful in industries however additionally realize a spread of applications in house. employing a conductor mouse, they'll be accessed from a distance, therefore proving useful at house chores like cleansing, putting objects within the shelf, etc.

IV. RESULT

In this experiment is analyzing human to manage robots using mouse. we tend to used sea and MFA primarily based approaches and enclosed the ensuing pictures and output. In center position the x, y worth is constant. For move up direction the coordinate axis worth is small and down direction the coordinate axis worth is hyperbolic. primarily based upon these values the gesture direction is displayed within the system and therefore the gesture is transmitted by exploitation zigbee protocol to the mechanism. based upon these eight directions the mechanism arm can move in corresponding tasks.

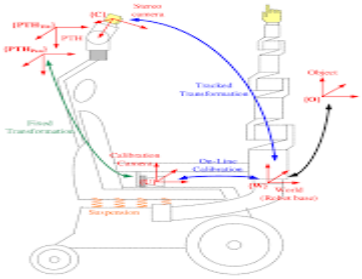


Fig.12 Structure of Robot Base

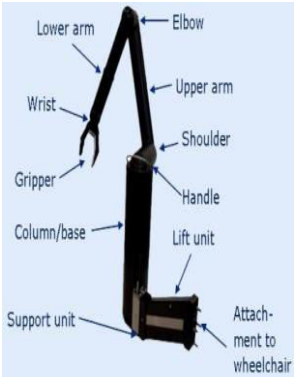


Fig.13 Structure of Robot Arm Position

Fig.16 Full Structure of a Robot

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 2, February 2022 ||

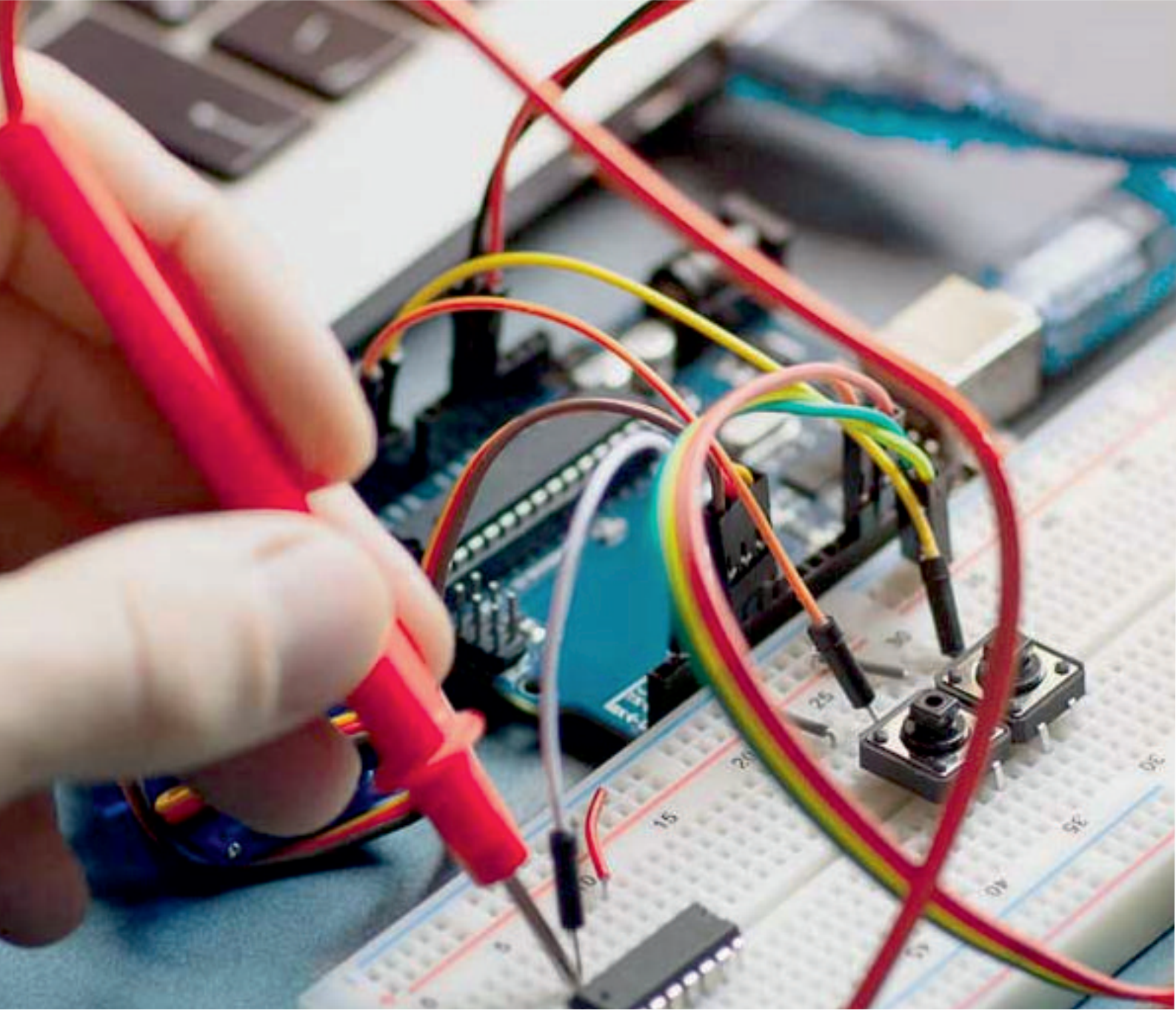
DOI:10.15662/IJAREEIE.2022.1102006

V. CONCLUSION

In this paper we've got planned a Mouse controlled Robotic Arm aims at providing help to trade further as domestic applications. we tend to gift a value effective, simple to work, and having smart vary, Robotic Arm. finally, we tend to propose an economical artificial machine, in flow with the recent developments within the artificial intelligence field. It will be improved more to upgrade the quality of living of citizenry.

REFERENCES

1. S. Hirche and M. Buss, "Human-oriented control for haptic teleoperation," Proc. IEEE, vol. 100, no. 3, pp. 623–647, Mar. 2012.
2. T. Ando, R. Tsukahara, and M. Seki, "A haptic interface 'Force Blinker 2' for navigation of the visually impaired," IEEE Trans. Ind. Electron., vol. 59, no. 11, pp. 4112–4119, Nov. 2012.
3. K. Kiguchi, S. Kariya, and K. Watanabe, "An exoskeleton robot for human elbow motion support-sensor fusion, adaptation, and control," IEEETrans. Syst., Man, Cybern., B, Cybern., vol. 31, no. 3, pp. 353–361, Jun. 2001.
4. J. Kofman, X. Wu, T. J. Luu, and S Verma, "Teleoperation of a robot manipulator using a vision-based human–robot interface," IEEE Trans.Ind. Electron., vol. 52, no. 5, pp. 1206–1219, Oct. 2005.
5. J. H. Park, Y. D. Shin, J. H. Bae, and M. H. Baeg, "Spatial uncertainty model for visual features using a Kinect sensor," Sensors, vol. 12, no. 7, pp. 8640–8662, Jun. 2012.
6. P.Vijaya Kumar, N.R.V.Praneeth And Sudheer, Hand And Finger Gesture Recognition System For Robotic Application - International Journal Of Computer Communication And Information System (Ijccis) – Vol2. No1. ISSN: 0976–1349 July – Dec 2010.
7. ShamsheerVermaB.Tech (ICE), BharatiVidyapeeth College of Engineering, New Delhi. Hand Gestures Remote Controlled Robotic Arm Advance in Electronic and Electric Engineering. ISSN 2231-1297, Volume 3, Number 5 (2013), pp. 601-606.
8. Luis M. Munoz and Alıcia Casals, Senior Member, IEEE, Improving the Human–Robot Interface Through Adaptive Multispace Transformation IEEE Transactions On Robotics, Vol. 25, No. 5, October 2009.
9. A Multimodal Interface to Control a Robot Arm via Web: A Case Study on Remote Programming R. Marín, Member, IEEE, P. J. Sanz, Member, IEEE, P. Nebot, and R. Wirz Department of Computer Science & Engineering. University of Jaume I E-12006 Castelló – SPAIN{rmarin,sanzp,pnebot}@uji.es.



INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 7.282

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

9940 572 462 6381 907 438 ijareeie@gmail.com

www.ijareeie.com

Scan to save the contact details