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# AI BASED ROBOTIC ARM

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***ABSTRACT:*** *In this project for the control of an intelligent hand which can mimic the natural movement of the human hand. Implementing such intellectual hand finds its application in humanoid as well as personal robots. In this project vision-based interaction techniques are used to track the motion of the fingers and to extract the motion of the hand gesture accurately and promptly. Accuracy and effectiveness plays the key role for real time motion based applications. The robotic arm is one of the most widely used automation devices in the field of robotics science and technology. At present, the traditional manipulator control methods are mostly completed by preprogramming processing or command input from external devices. Such control methods are usually complicated and cumbersome are required operators to familiarize themselves with specific programming methods or according to different types of manipulators control instruction. The AI arm is controlled by the hand gestures of human hand by using the python open cv and Arduino board, there is no physical connection between the human hand and AI hand, while the human will gestures their hand in front of camera the open cv tracks the motions and sends to the AI arm without any delay due to the less delay in processing we can use the python open cv rather than the Matlab or else the open cv extract the motion from human hand and import into the AI hand.*

***Keywords:*** *Arduino uno, servo motors, buck converter, robotic hand, batteries.*

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## I. INTRODUCTION

Having The robotic arm is one of the most widely used automation devices in the field of robotics science and technology. At present, the traditional manipulator control methods are mostly completed by preprogramming processing or command input from external devices. Such control methods are usually complicated and cumbersome are required operators to familiarize themselves with specific programming methods or according to different types of manipulators control instruction**.** With the advent of accelerometers, a brand-new contactless somatosensory technology has been rapidly developed, showing a broad application prospect in the field of intelligent robots. The design of the robotic arm system better recognizes and senses changes in the human body, so as to achieve contactless control.

## II. LITERATURE SURVEY

[1] M. Georgi, C. Amma and T. Schultz, "Recognizing hand and finger gestures with IMU based motion and EMG based muscle activity sensing", Proceedings of the International Conference on Bio inspired Systems and Signal Processing, pp. 99-108, 2015.Session- and person-independent recognition of hand and finger gestures is of utmost importance for the practicality of gesture based interfaces. In this paper we evaluate the performance of a wearable gesture recognition system that captures arm, hand, and finger motions by measuring movements of, and muscle activity at the forearm

[2] P. Jung, G. Lim, S. Kim and K. Kong, "A wearable gesture recognition device for detecting muscular activities based on air-pressure sensors", IEEE Transactions on Industrial Informatics, vol. 11, no. 2, pp. 485-494, 2015.Recognition of human gestures plays an important role in a number of human-interactive applications, such as mobile phones, health monitoring systems, and human-assistive robots. Electromyography (EMG) is one of the most common and intuitive methods used for detecting gestures based on muscle activities. The EMG, however, is in general, too sensitive to environmental disturbances, such as electrical noise, electromagnetic signals, humidity, and so on.

[3] R. Sekhar, R. Musalay, Y. Krishnamurthy and B. Shreenivas, "Inertial sensor based wireless control of a robotic arm", IEEE International Conference on Emerging Signal Processing Applications, pp. 87-90,

2012.the development of a wireless motion sensing control unit, whose operation is based on inertial sensors, and extends its application to the control of an anthropomorphic robotic arm. Accelerometers and a gyroscope are used to measure the orientation of the users lower arm and this data is transmitted wirelessly to a receiver where processing is carried out. The robotic arm is programmed to mimic the movements of the users arm.

## III. IMPLEMENTATION

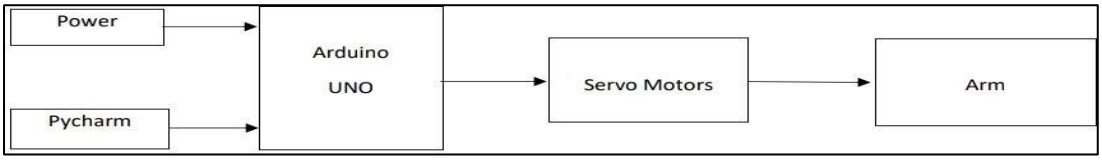



**Figure 1: Block Diagram**

The above block diagram shows the connections between the arduino and servo motors,the 9v dc power supply is applied from the buck converter to the servo motors through the batteries, the servo motors is attached to the printed robotic arm.The arduino is connected with 5 servo pins they are 9,10,11,13,12 and a buck converter is going to give enough power to arduino.the python programming in pycharn IDE is sends to the arduino UNO,then the particular movement is applied to the servo motors,then the servo motors is move the entire robotic hand.

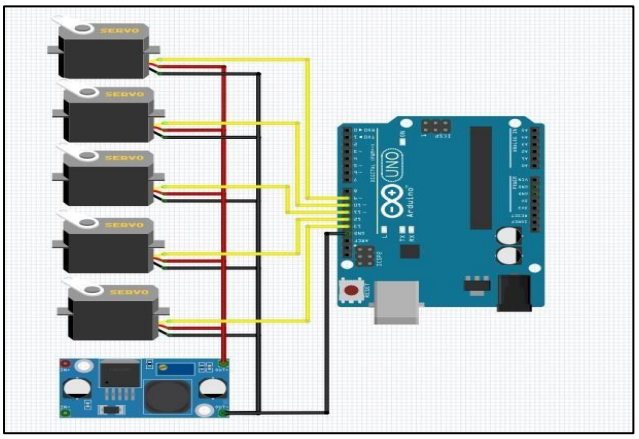
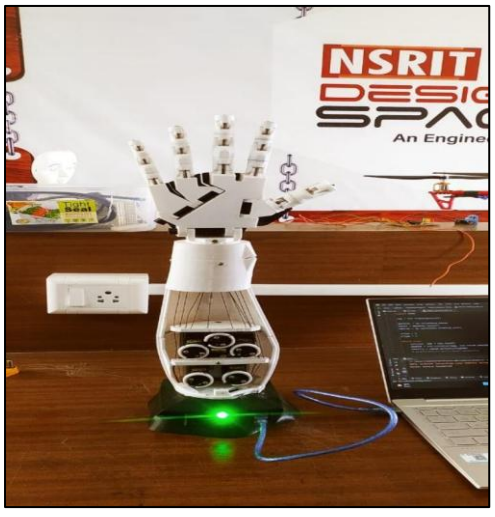


**Figure 2:circuit Diagram**

A 9V DC power supply is given to Arduino UNO,using batteries through buck converter. There are 5 servo motors are used in this project each motor is connected to the buck converter as well as to the arduino pins the entire motors is worked by using the arduino programming and python programming,the buck converter is converts the high power into required low power to the circuits.

## IV. RESULTS



The design of hardware components are done and processed by Arduino ATmega328. The software implementation is by Arduino IDE tool and python programming(open cv). Here are the figures of the results.

## V. CONCLUSION & FUTURE SCOPE

### 5.1 Conclusion

With the development of computer technology, robotics technology has also matured. It combines technologies from computers, electronics, machinery, and control and is widely used in military, industry, agriculture, medicine, education, scientific research, and other fields. It basically covers all aspects of people's lives. As a powerful productivity tool, robots play a huge role in improving production efficiency, optimizing production methods, and broadening the production environment.

### 5.2 Future Scope

There is no denying that Robotic technologies are all set to change the way things are done in the industries in which they are being implemented. Entrepreneurs are voicing a similar sentiment and are clearly optimistic about the use of Robotics in various industrial segments. Robotics is mainly capturing industries like manufacturing, pharmaceutical, FMCG, packaging and inspection. A bit of Robotics would also be seen in the technologies.

The other promising sectors are defence and education. World had come across PC revolution and mobile revolution in the recent past now it is the time for inevitable robotics. Considering that the global players, like Google, FESTO and Tesla are investing in Robotics along with substantial increase in amateur robotic enthusiasts, Opensource tools and platforms available for robotics, It is assured that significant development in this field will occur in another 5-10 years.

## REFERENCES

[1]. Chris Carter, Brian Dwyer, Rachel Lutsic, "Wireless User Controlled Robotic Arm", Central Michigan University, Mt. Pleasant, Jan 2008. They proposed a system which can be controlled by remote sensing technology.

[2]. Amithash E. Prasad, Murtaza Tambawala, "Human Controlled Remote Robotic Arm"(HCRRA). June 2011, this proposed system at which the robotic arm is completely controlled by remotely

[3]. N. Martel-Brisson & A. Zaccarin's ,"Moving Cast Gesture Replicating Robotic Detection from a Gaussian Mixture Gesture Replicating Robotic Model".09(2014)

[4]. In this proposed system a robotic arm is controlled by using latest technical software's. Such as pycharm, open cv. And regular software's like Arduino, python software's Artificial intelligence based robotic arm is the proposed system which does not involves remote sensing elements. which can mimic as a human with natural moments.