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## DEVELOPMENT AND DESIGN OF HAPTIC ROBOTIC ARM FOR INDUSTRIAL PURPOSE

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### Abstract

This paper design and development of Haptic robotic arm which can be use for industrial purpose robots available in this generation are use in this generation are use in field isolated from the human society. These limit ability of robots for interaction and manipulation with human haptic robotic arm is the solution of the human society. Haptic robotic arm is the limitation objective of this is to design and develop the robot which recognize hand motion will be control by Haptic technology for virtual environment and human machine system without risking human life...haptic technology which takes advantage of sense of touch by the user it is one of the rapidly growing technology in collaboration of human and computer interaction use to create virtual environment.

**Keywords:** Haptics, robotic arm, transceiver module, virtual, environment

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## 1. INTRODUCTION

A special engineering science which deals with Designing modeling, controlling and robots' utilization is known as Robotics. Robots has become integral part of human life.

Haptic technology is one of the rapidly growing technology in collaboration of human and computer interaction use to create virtual environment. It's a feedback technology taken sense of touch by applying motion vibration and force Applied by user .

Robots available in this generation are use or motions to the user. This mechanical stimulation can be used applied by user haptic .

Can be divided into three areas of technology:

- A. Human haptics - the study of sensing human touch.
- B. Machine haptics - the design, construction, and the use of machines to replace human touch.
- C. Computer haptics - it is an algorithms and software which is associated with generating the touch and feel of virtual objects.

### 1.1 Robotic Arm:

It is a programmable robot manipulator ,with similar functions to a human arm.

It recognize hand motion which will be control by haptic technology for virtual environment and human .

The link of the manipulator is considered to form a kinetic chain. Robot arms can be controlled manually or autonomous and used to perform a variety of task

## 2. LITERATURE REVIEW

Design Analysis of a Remote Controlled "Pick and Place" Robotic Vehicle by B.O. Omijeh In this paper The design of a Remote Controlled Robotic Vehicle has been completed. A prototype was built and confirmed functional. This system would make it easier for man to unrivalled the risk of handling suspicious objects which could be hazardous in its present environment and workplace. Complex and complicated duties would be achieved faster and more accurately with this design.[01]

Robotics arm control using haptic technology by vipul j. Gohil .In this paper the system robotic arm based on real-world haptics. The primary goals of haptic guidance is to facilitate the learning of complex human motion skills by providing haptic cues that are helpful to induce desired movements. The proposed system is utilized to recognize the human motion..Large potential for applications in critical fields as well as for leisurely pleasures.Haptic devices must be smaller so that they are lighter, simpler and easier to use.Haptic technology allows interactivity in real-time with virtual objects.[02]

A Review on Robot Arm Using HapticTechnologyby Prof. A. Reshamwala, R. SinghIn this paper The proposed system is utilized to recognize the human motion. Controlling the robot arm using Haptic technology is discussed in this paper. The concept which is discussed here will be the implementation of 3-DOF based robot arm using less number of resources. The main focus of the implementation is going to be how it will be easily operated by disable people. As literature survey continues more advanced feature may be part of this implementation such as obstacle detection and how the concept of image processing will be used in robot arm is considered to be future work.[03]

Design And Operation Of Synchronized Robotic Arm By GoldyKatal ,SaahilGuptIn this paper propose The robotic arm can be designed to perform any desired task such as welding, gripping, spinning etc., depending on the application. For example, robot arms in automotive assembly line perform a variety of tasks such as welding and parts rotation and placement during assembly. The robotic arm can be designed to perform any desired task such as welding, gripping, spinning etc., depending on the application. For example robot arms in automotive assembly line perform a variety of tasks such as welding and parts rotation and placement during assembly.[4]

### 3. DESIGN AND DEVELOPMENT

Depending on the application. Our robotic arm manipulator can be used for various applications by changing the program of controller.By selecting appropriate capacity of motors, the arm will be capable to lift light loads, household application and heavy industrial loads.

#### Design of Robotic Arm:

On the basis of degree of freedom of the arm and the type of joints used, a robotic arm can be design in the following form.

- Cylindrical robot
- Cartesian robot
- Articulated robot

- scara
- Spherical robot
- Cartesian robot

It's the kinematic structure of a robot arm made of three mutually perpendicular prismatic joints. The wrist center position of a Cartesian robot can be described conveniently by three Cartesian co-ordinates which are associated with the three prismatic joints. The work-space of a Cartesian robot is a rectangular box. Mechanical design of this robot arm is based on a robot manipulator having similar functions to a human arm .link joint, actuator, sensors, and controller are the different parts of robotic arm.

Actuator :

It is a device that causerotory joints to rotate or drive prismatic joints to slide along their motion axes.

Power Supply:

Dc power source is commonly used to supply a stable voltage to the small robots .batteries are relatively cheap, small and easy to use.

Micro controller :

It produces pulses which are required by the servo motors in orders to generate a motion to make the robotic arm functioning.

Short list of electrical component included:

- Servo motor
- Voltage regulator
- Micro servo motor
- Connecting wire
- Capacitor
- Arduino UNO
- Breadboard

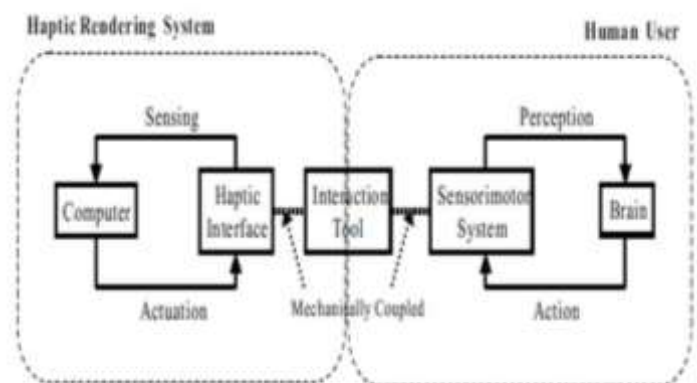


Fig-1.Haptic rendering system

## 4. WORKING

### 4.1 Transmitter:

This gadget hysteries over the users hand like a glove. Which consists of an accelerometer sensor, which detects activities of user Hand. analog output detected is sent wirelessly through Zigbee and then to Receiver.

### 4.2 Receiver Robotic Arm:

Received analog output is changed to digital using AVR controller and used to maneuver the Arm. This is achieved by using servo motors in the joints of the arm. This array is placed on a affecting base, which will help us scheming the robot from a remote position.

### 4.3 Accelerometer:

Sensor used for measure hastening of a stirring or vibrate body.

### 4.4 LCD:

LCD is 16×2 display, it display the accelerometer output. AVR At mega 16 Controller: It performs along to digital alteration of information process the data and provide the analogous PWM (Pulse Width Modulated) signal to servo motors and DC motor driver signals.

### 4.5 Zig-Bee:

Used for wireless transmission and reception of data.

### 4.6 DC Motor:

Used for driving Base wheel arrangement

### 4.7 Servo Motor:

It is used for the movements of Robotic arm. Camera: this are Mounted on the Robot for controlling and observing motive



Fig-2.Haptic Robotic Arm

### 4.8 Arduino :

Arduino is an open-source electronic platform based on easy-to-use hardware and software. Arduino boards are able to read inputs—light on a sensor, a push button on a board—and to send outputs by controlling lights, motors, and other physical outputs. Arduino boards and associated parts were conceived at the Interaction Design Institute in Milan, Italy. It is used as an easy-to-use tool for fast prototyping.

## 5. CONCLUSION

Hardware of this project was successfully executed under due Guidance of our in-charge and showed successful results. The Results obtained from working of this project have shown that The synopsis proposes the system robotic arm based on real-world haptics.

As compared to most other projects based on sort versatility in terms of detecting the object and selecting a physical feature of By adopting this design in every industry which requires sorting functionality industry, etc. productivity can be increased greatly utilize his for some more important.

## 6. FUTURE SCOPE

In this project we are using brain signals to control and command the haptic robotic arm. This could be prove very beneficial to the handicapped persons. This can be useful in handling hazardous objects such as nuclear Weapons. Robotic arm can allow to portability and navigation by situating on a mobile platform with 4 wheels, In further development. Universal gripper can lift different shapes of objects that is why its design is interesting. Robotic arm can communicate with operator with the help of networking.

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