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A futuristic digital interface with a glowing Earth globe in the center. The interface is overlaid on a background of a person's hands reaching out towards the globe. Various data elements are visible, including a world map, a 'LOADING 100%' progress bar, 'MEDIA' and 'BUSINESS' labels, a 'NETWORK SEARCH' box, and several charts and graphs. The overall color scheme is blue and purple with white and yellow highlights.

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Prototype Model of Bluetooth Controlled Robotic Arm

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ABSTRACT: The design analysis of an Android Controlled —Pick and Place| Robotic vehicle has been presented in this paper. This work unravels the fact that man would always want to adhere to safety precautions at workplace and even in its environment, to be able to handle some specific tasks, like sending the robotic vehicle to hazardous environment to obtain samples for chemical analysis. It is a microcontroller-based control system which works in alliance with Android Application. It can be accessed by android application and the application can control the movement of vehicle as well as its robotic arms.

This system comprises of a Bluetooth module which work as the receiver for vehicle. This sends commands to the microcontroller which execute according to the signals received by Bluetooth. In this work, the design of a robot is presented which will move around in four directions and is equipped with gripper for pick and place operation. These operations will be controlled by a user-friendly interface present on operator's mobile phone. Depending upon the button clicked on the application, proper motional commands are given to robot by microcontroller. This project is in aimed to design and develop a mobile robot which can move according to the button pressed on App. This prototype can be employed in chemical industry for handling of chemical materials of hazardous nature, or for movement of heavy objects in any industry. This paper outlines the various stages of operations involved in the pick and place robotic arm. It is an automated material handling system is synchronizing the movement of robotic arm to pick the object moving on a conveyor belt. Nowadays various advanced robots are used in industries but still controlling is done manually or using processors likewise Arduino, microcontroller. But microprocessors have several disadvantages so these disadvantages can be overcome by PLC

Here Programmable logic and controller is used for controlling and operating robotic arm. All the various problems of this process have been analyzed properly and have been taken into consideration while programming and designing the pick and place robotic arm. In this paper we intend to ascertain the state of the art on multifingered end-effectors, also known as robotic hands or dexterous robot hands, and propose an experimental setup for an innovative task based design approach, involving cutting edge technologies in motion capture. After an initial description of the capabilities and complexity of a human hand when grasping objects, in order to point out the importance of replicating it, we analyze the mechanical and kinematical structure of some important works carried out all around the world in the last three decades and also review the actuators and sensing technologies used. Finally we describe a new design philosophy proposing an experimental setup for the first stage using recent developments in human body motion capture systems that might lead to lighter and always more dexterous robotic hands.

I.INTRODUCTION

Nowadays, robots are increasingly being integrated into working tasks to replace humans especially to perform the repetitive task. In general, robotics can be divided into two areas, industrial and service robotics. International Federation of Robotics (IFR) defines a service robot as a robot which operates semi- or fully autonomously to perform services useful to the wellbeing of humans and equipment, excluding manufacturing operations. These robots are currently used in many fields of applications including office, military tasks, hospital operations, dangerous environment and agriculture. Besides, it might be difficult or dangerous for humans to do some specific tasks like picking up explosive

chemicals, defusing bombs or in worst case scenario to pick and place the bomb somewhere for containment and for repeated pick and place action in industries. Therefore, a robot can be replaced human to do work. The word robot was derived from Czech word *robota* which means —a forced laborer¹ then later a well-known Russian science fiction writer Isaac Asimov coined the word robotics. From there on various different developments are being successfully done till date in the field of robotics in the form of teleported as the trend of the industry is moving from the current state of automation to robotization. Thus, the robot technology is advancing rapidly. Now a days the most commonly used robots in industry is a robotic manipulator or a robotic arm. Robotic arm is basically an open closed kinematics chain of rigid links interconnected by movable joints. The end of the arm is connected to the end- effectors. The end-effect or may be a tool and its fixture or a gripper or any other device to do the work. The end-effectors is similar to the human hand with or without fingers.

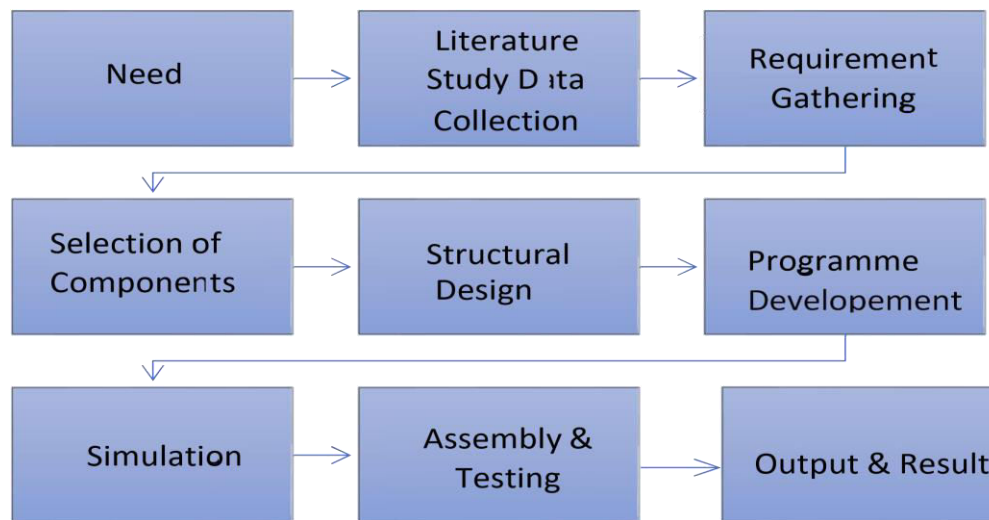


Figure 1: Block Diagram

II.LITERATURE REVIEW

¹M.Ciancietti, A.Arienti, B.M.Follador, B.Mazzalai, P.Dario - Probabilistic self- localization for mobile robots; IEEE Transactions on Robotics and Automation 16,1, 55-66, 2010. They get inspired by the octopus to and make an interesting model in robotics due to its high dexterity, variable stiffness and very complex behavior.

²S.Premkumar, K.Surya Varman, R.Ballamurgan - Design and Fabrication of Low-Cost Pick and Place Equipment, published in International Research Journal of Engineering and Technology (IRJET), Issue January 2021. Experimental aim is to collaborate the gripper mechanism and vacuum sucker mechanism working in single pick and place robotic arm.

³ M.Pellicciari, G.Berselli, F.Leali, A. Vergnano - A method for reducing the energy consumption of pick-and-place industrial robots, *Mechatronics*, vol. 23, no. 3, pp. 326–334, 2013. This paper shows the method for reducing the total energy consumption of pick and placed robotic arm. Firstly, electro mechanical models of both series and parallel manipulators are derived and then by means of constant time scaling, the energy optimal trajectories are calculated. It is seen that blowing down an operation as much as possible is not always beneficial. Energy consumption of given operation as a function of the task execution time. Future wor includes improvement of the motor model, development of online programming algorithms.

⁴ Mohd Ashiq Kamaril, Yusuff, Reza Ezucin Samin, Babul Salam, Kader Ibrahim - Wireless Mobile Robotic Arm, Published by *Procedia Engineering*, 2012. Paper presents the development of wireless mobile robot arm. Wireless ps2

controller is used to control the pick and place operation. The development of this robot is based on arduino mega platform. Analysis of speed, distance, load lifted by arm is done to know its performance. This robot expected to overcome the problem such as placing or picking object that is away from the user, pick and place hazardous object fast and easily.

⁵ H. Hagenah, W. Bohm, T. Breitsprecher, M. Merklein, S. Wartzack - Modelling, Construction and Manufacture of a Lightweight Robot Arm, Published by Procedia CIPR, 2013. This paper will show how modern materials as Cellular Titanium & Nano Crystalline Aluminium can be used to build advanced light weight robot arms. This paper will cover the definition of the product specification, the setting of a basic design and the optimization of this by means of topology optimization. This optimization requires an intelligent modeling to be able to investigate different initial setting and boundary conditions. Different innovative light weight construction materials and the corresponding manufacturing technologies are developing and analyzed.

⁶ Embedded Controller, Published by Procedia Engineering, 2012. The aim of study is to develop the and light weight actuator and applied into has flexible hose robot arm. In this paper, the Slavic master's degree height flexible control and the trajectory control of the robot arm are proposed. This robot arm has 3dof i.e. bending, expanding and contracting and Will be applied into has device for human wrist rehabilitation. In this paper the analytical model of year has flexible hose robot arm is proposed for slavic master's degree height control in trajectory control.

In summary, the work presented in this paper is built on previous research to explore how security of data stored on cloud relates to people's trust. While earlier work focused on data storage impacts people, we focus on its impact on the world wide acceptance of cloud.

III.METHODOLOGY OF PROPOSED SURVEY

The project contains 2 sections.

- 1)Robot (Receiver end)
- 2)Control section (Transmitting end)

The control section will be an Android cell phone which is having Bluetooth facility. The data to control the robot will be transmitted through the cell phone Bluetooth.

There will be a Bluetooth module at the receiver end also. Both the Bluetooth should be paired each other. As soon as the data sent from the Bluetooth module at the transmitting end, it will receive at the receiver end. The microcontrollers compare the incoming data with the pre stored data and do the corresponding actions.

Bluetooth-controlled robotic arms typically require the following components and functionalities:

Robotic Arm:

The mechanical arm itself, equipped with motors or actuators to move its joints and end effector.

Microcontroller:

A microcontroller like Arduino or Raspberry Pi to control the movement of the robotic arm based on input received via Bluetooth.

Bluetooth Module:

A Bluetooth module (e.g., HC-05, HC-06) to establish communication between the robotic arm and the controlling device (e.g., smartphone, tablet, computer).

Power Supply:

Sufficient power supply to drive the motors or actuators of the robotic arm and power the microcontroller.

Bluetooth Control Interface:

A user interface on the controlling device (e.g., a mobile app) to send commands (like move, rotate, grip) to the robotic arm via Bluetooth.

Feedback System:

Optionally, sensors or feedback mechanisms to provide feedback to the user about the position and status of the robotic arm, ensuring precise control and safety.

Safety Features:

Considerations for safety features to prevent accidents or collisions, such as emergency stop buttons or obstacle detection sensors.

Programming:

Programming the microcontroller to interpret Bluetooth commands and translate them into actions for the robotic arm, along with any additional features like gesture control or predefined routines.

By meeting these needs, a Bluetooth-operated robotic arm can be a versatile tool for various applications, including manufacturing, research, education, and hobbyist projects.

IV. CONCLUSION AND FUTURE WORK

The project is built on a wired model. Now It developed to work on wireless communication, thus allowing the user to move in an even easier unrestricted manner. A clamper can be connected on the motor M6 which is allow the movements of the palm and allow picking and placing of objects. The microprocessor taken the input from the potentiometer and smoothen it and then generate the corresponding PWM signal itself to actuate the servo motors. Now this is prototype model it can be customized as per requirement.

The purpose of the project is to provide control of 4 axes moving robot arm design and this robot arm with a suitable microcontroller and Bluetooth module with an android application. The necessary theoretical and practical information for this purpose has been obtained and the necessary infrastructure has been established for the project.

Robots pick and place automation speeds up the process of picking parts up and placing them in new locations, while also increasing production rates. These pick and place robots are more accurate and do not fatigue while doing backbreaking or hard to maneuver movements that may be difficult for humans. The consistency, quality and repeatability of a pick and place robot system is unmatched. These systems are also versatile and can be reprogrammed and tooled to provide multiple applications for consumers.

The objectives of this project have been achieved which was developing the hardware and Software for a Potentiometer controlled robotic arm. From observation that has been made, it clearly shows that its movement is precise, accurate, and is easy to control and user friendly to use. The robotic arm has been developed successfully as the movement of the robot can be controlled precisely. This robotic arm control method is expected to overcome the problem such as placing or picking object that away from the user, pick and place hazardous object in a very fast and easy manner.

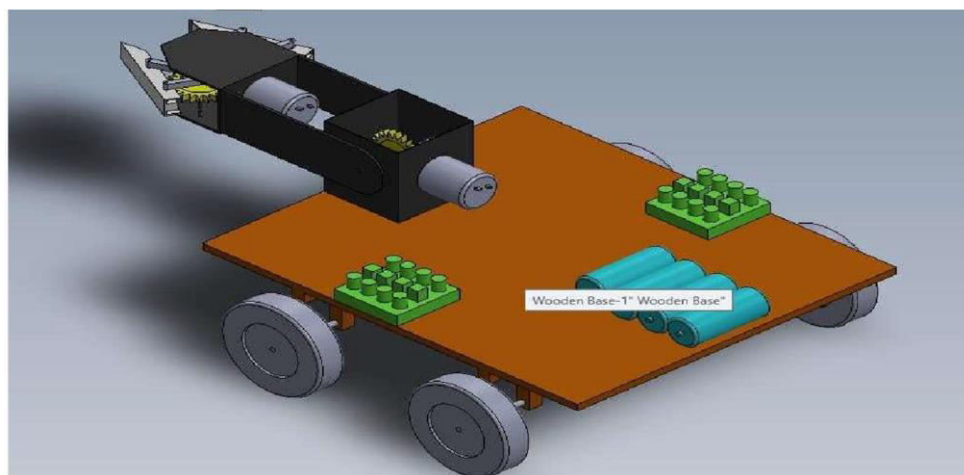


Fig- Prototype model

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