

**Design and Manufacturing of Pick & Place Robotic Arm**

Gear based Robotic Arm

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Abstract — A robotic arm is a robotic manipulator, usually programmable, with similar functions to a human arm. Human pick the things without thinking about the involved steps. In order for a robot or a robotic arm to pick or place something, someone has to tell it to perform different tasks in a particular form moving the arm, to rotating the “wrist” for movement of “fingers”, so we can control each joints through the computer interface. Many types of robotic arms are there, but the most common type of robotic arm can control by either hydraulic or pneumatic system. Other way is less known to control the robotic arm by using of gears. Aimed of project is to develop a pick and place robotic arm with a soft catching end effectors that is designed to avoid extra pressure on the object.

Keywords- Gripper mechanism, robotic arm, manipulator, Gearing mechanism, End effector

I. INTRODUCTION

Robotics is nothing but the branch of science and technology related to robots, and their design, manufacturing and structure deposition. Robotics is related to the electronics, mechanics, and software. In other words the robot is a mechanical device with links and joints, guided by sensors and driven by actuators and controlled through programmed software, to hold and operate parts, resources, equipment and machine for performing a variety of everyday jobs in range of work surroundings.

The study and understanding “Robotics” is interdisciplinary with mechanical in the domain and other stream similar to electrical, electronics and computer, organism the additional and necessary for the engineering robot to be flexible, well-organized and exact in process. The links and joints are to be designed for strength and rigidity through static and dynamic force analysis. While the electric motors and hydraulic/pneumatic actuators produce robot motion. The requires positions are computed through transformations. The electronics contributes in the shape of control system to strictly equal the required productivity with the achieved amount produced. The computer programs add flexibility for performing variety of jobs executed by the robotic manipulators. The software programs with the developed algorithms, controls and sensing systems make the robot to possess intelligence to carry out jobs with in the work envelope, defined by the movements (degree of freedom) given to links. The motion of the links is translator and/or rotary explaining the configuration and category of a robotic manipulator.

In this highly developing society time and man power are critical constrains for completion of tasks in large scales. The automation playing important role to save human effort in most of the regular and frequently carried works. One of the main commonly performed works is picking and placing of jobs from source to destination. Nearby day manufacturing is more and more turn in the direction of computer based mechanization mostly because of the need for increased output and release of end goods with consistent quality. The inflexibility and generally high cost of hard automation systems, which have been used for automated manufacturing tasks in the past, have led to a broad based interest in the use of robots capable of performing a variety of manufacturing functions in a flexible environment and at lower costs. The use of industrial robots characterizes some of contemporary trends in automation of the manufacturing process. A robotic arm is a robotic manipulator, usually programmable, with similar functions to a human arm. Servo motor is used for joint rotation. However, present day industrial robot also exhibit a monolithic mechanical structure and closed system software architecture. They are concentrated on simple repetitive tasks, which tend not to required high precision.

II. AIM AND OBJECTIVE

The main objective of this research work is to study the fabrication of the project which is completely works as per design.

The project interfaces are,

1. Design module
2. Manufacturing module

A. Main Objectives are

- Robotic Arm perform pick and place operation
- Design arm
- Easy to controlling
- Gear Selection
- System is compact and easily movable
- Initial cost should be less

III. WORKING PRINCIPLE

A typical robotic arm is made up of several metal segments, joined by joints. To controls the robot by rotating individual motors connected to each joint. Motor shaft is connected to gear mechanism frame is fixed already, as gear rotate each joint of the robotic arm get start to rotate. In our project we provide motor at each joint for pick purpose. We used gripper so, any kind of shape can be pick up easily.

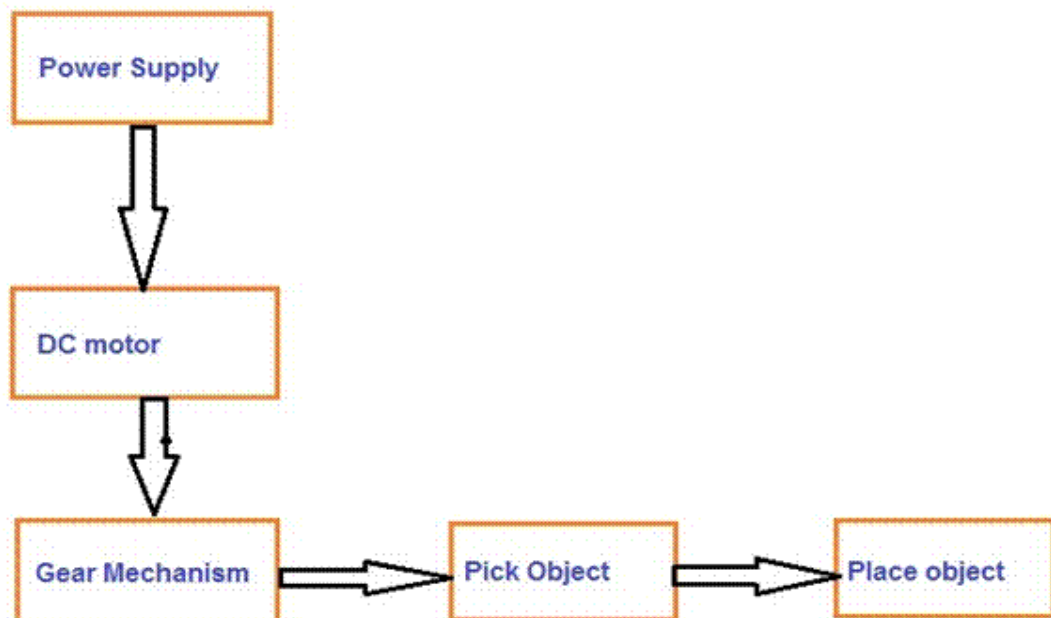


TABLE.1

IV. STRUCTURE

The frame will fabricated first so that other components could be attached as they will be completed. The lowest level of the chassis was welded first, and then the vertical members will be welded on by sighting along the chassis. Our whole project will be set on the structure only. This is the main part of the project.

A machine structure is a fixed constructed object which functions as part of some mechanized process or which performs mechanized processes independently. The various types of machine structures may differ vastly from each other in appearance. These do not include structures built to shelter or enclose machinery; the machinery must be inextricably linked to the structure's form



FIGURE 1.

V. CONCLUSION

The popular concept of a robot is of a machine that looks and works like a human being. The industry is moving from current state of automation to Robotization, to increase productivity and to deliver uniform quality.. In some configurations, links can be considered to correspond to human anatomy as waist, upper arm and forearm with joint at shoulder and elbow. At end of arm a wrist joint connects an end effector which may be a tool and its fixture or a gripper or any other device to work. Here how a pick and place robot can be designed for a workstation where loading and packing of lead batteries is been presented. All the various problems and obstructions for the loading process has been deeply analyzed and been taken into consideration while designing the pick and place robot.

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