International Journal of Engineering Inventions
e-ISSN: 2278-7461, p-ISSN: 2319-6491
Volume 11, Issue 3 [May.-June. 2022] PP: 88-91

Robot trainer kit with stand lone servo controller

Mr.Darshan Chandrakant Patil
Student, Department of Mechanical Engineering Sharad Institute of Technology Polytechnic ,Yadrav.

Mr.Sushant Sunil Yamger
Student, Department of Diploma Mechanical Engineering
Sharad Institute of Technoloy, Polytechnic, Yadrav

Mr .Yasin Bashire Jamadar
Student, Department of Diploma Mechanical Engineering Sharad Institute of Technology polytechnic, Yadrav

Mr .Umar Faruk Mulla
Student, Department of Diploma Mechanical Engineering Sharad Institute of Technology Polytechnic Yadrav.

Mr. A.D.Patil
Guidance, Department of Mechanical Engineering Sharad Institute Of Technology Polytechnic, Yadrav, Maharashtra, India

Abstract—
Pick and place robots are usually mounted on a stable stand, strategically positioned to reach their entire work envelope. Advanced vision systems enable them to grasp and move objects on a conveyor belt, which can be used in a variety of different ways
Keyword: *(stair clambing, Dolly,hand trolley.)*

Date of Submission: 25-05-2022 Date of Acceptance: 05-06-2022

I. INTRODUCTION:

The first usage of the word 'robot' was in a 1921 Czech science fiction play – 'Rossum's Universal Robots' – by Karel Capek. The robots were artificial people or androids and the word was derived from the word 'Robata', a Czech word for slave. A question of perpetual interest is to define a robot. Since the beginning of the study of robotics, there has been some controversy in the definition of a robot. So long as the evolution of robotics continues, the definition of the robot will change from time to time, depending on the technological advances in its sensory capability and level of intelligence. However, the most widely accepted definition of a robot was given by the Robotic Institute of America (RIA) in 1979. Robotic manipulators resembling the human arm is known as robotic arms. They are constructed by a structure consisting of structurally robust links coupled by either rotational joints or translating joints. A robotic arm is thus a type of mechanically coupled or joined arm, run by programmable commands, with similar functions to a human arm. It may be the sum total of the mechanism links or may be part of a more complex sized robot. A typical robotic arm has the following components:

- Links and joints
- Actuators
- Controller
- End-effectors

A link is considered as a rigid body that defines the relationship between two corresponding joint axes of a manipulator. Manipulators consist of rigid links, which are connected by joints that allow relative motion of corresponding links. The links move to position with the end-effector. Actuators perform the same role the muscles perform in the human arm – they convert stored energy into movement energy. Actuators are used force to move a robot's manipulator joints. The three common types of actuators currently using in contemporary robots are pneumatic, hydraulic, and electrical actuators.

Electric motor-driven actuators perform smoother movements, can be controlled very accurately, and

are very reliable. However, these actuators cannot deliver as much power as hydraulic actuators of comparable mass. Nevertheless, for modest power actuator functions, electrical actuators are often preferred. The various types of electric motors used as actuators for robotic applications are direct current (DC) motors, stepper motors and servo motors. The controller is the main part that processes information and carries out instructions in a robot. It is the robot's 'brain' and controls the robot's movements. It is usually a computer of some type which is used to keep information about the robot and the working process and execute programs which operate the robot. It contains programs, data algorithms, logic analysis and various other processing activities which enable the robot to perform its intended function.

End-effector is a device at the end of a robotic arm, designed to interact with the open world. The exact nature of performance of this device depends on the application of the robot. Typical functions of the end-effector consist grasping, pushing and pulling, twisting, using tools, performing insertions, welding and various types of assembly activities. Thus, the major types of robot end-effectors are:

Grippers: Grippers are the most commonly used type of end-effectors. They can use different gripping methods (such as vacuum or use of fingers).

Material removal tools: These include cutting, drilling and deburring tools installed as robot tools.

Welding torches: Welding is a widely using operation in robotic application. Welding torches have become very efficient end-effectors that can be controlled in a sophisticated way for optimized welding.

Tool changers: Tool changers are used when many different end effectors need to be used in sequence by one robot. They are used to standardize the interface between the robot flange and the base of the tool. They can be manual or automatic

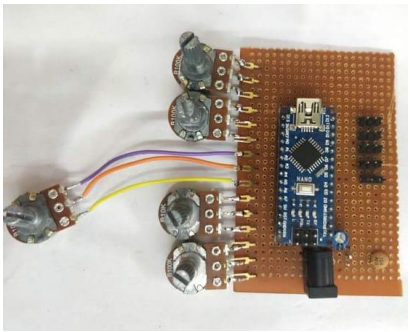
II. LITERATUREREVIEW:

1) John Iovine [1], in this book various aspects of designing a Robot is described. It deals with different types of Arm design, controlling techniques, vehicle design etc. ER. Rajput, in this book the operation and control of robots is discussed. Arduino cookbook, in this book details and methods of interfacing hardware components such as DC motor, Servo motor and RF Transmitter and Receiver is been discussed.3

The other references listed in the references section discusses similar concepts in its various fields such as color identification and segregation robot, robot for surveillance, pick and place robot controlled using android etc. in vehicles and different materials used for making rocker arm are studied in this project. Reasons for Failure of rocker arm are also discussed in this project.

III. METHODOLOGIES:

This work covers material selection, design, programming and fabrication of a basic robotic arm system. It also covers the implementation of the kinematics of the arm but does not consider the details of the derivation of the kinematic

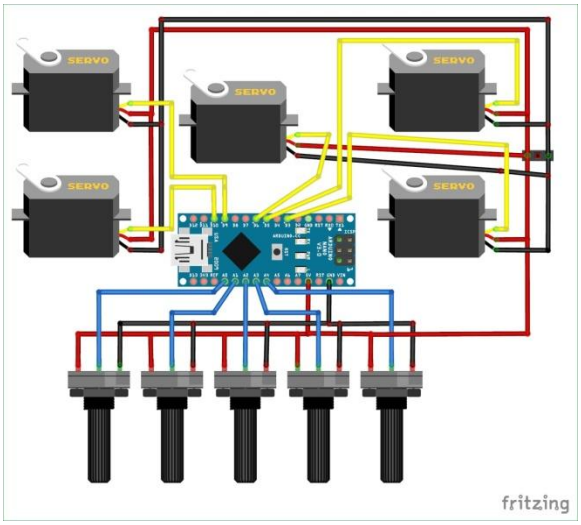


• select a suitable material for the fabrication of a 2-DoF robotic arm;
• Obtain suitable design parameters for the robotic arm;
• Create a 3-d model of a robotic arm based on the design parameters;
• Fabricate the robotic arm
• Calculate the torque required
• Calculate the power required.

The availability of a robotic arm that can be used for demonstrating and educational purposes in the Department of Mechanical Engineering will go a broad way in stimulating the interest of students in robotics. It will provide a tool to use for learning and experimenting with robotics. Students with a flair for programming can reprogram the robot to adapt it to different tasks. In this chapter covers the detailed design and method of construction of the robotic arm and its controller.

IV. PROBLEM IDENTIFICATION:

The pick and place robot being implemented to ease the process of sorting, process of moving heavy materials etc. Usually the transfer process of the heavy materials is being carried out, using man power and if the transfer process is repeated for a period of time, it can cause injuries to the operator. By using the particular robot the operator, will no longer have to bent and lift up heavy loads thus preventing injuries and increasing the efficiency of the work. Operator will make mistakes whether small or big in a while. In the industrial world, the industry cannot afford to take any kind of mistakes. As every mistake is costly whether interns of time, money and material.



V. PROPOSED WORK

It is proposed to carry out "Pick and place robotic arm" For this dissertation work, the proposed work is divided into the following phases.

Phase I:-
We will study/understand about the various machining process of the the rocker arm.
Phase II:-
To study about the process deviations observed.
Phase III:-
We will take the actions against observed problems during the machining the rocker alever.
Phase IV:-
We will calculate all required parts with respect to this machine i.e Fixture selection, design of fixture, machining operations, inspection methods etc..
Phase V:-
We will make our corrective actions against the problems.
Phase VI:-
We will monitoring the results of our actions and regularize it.

EXPENDITURE

Expected cost is around Rs. 10,000/- approx.

VI. CONCLUSION:

All the main points of the research work are written in this section. Ensure that abstract and conclusion should not same.

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