MICRO-SERVO ROBOTIC ARM AND NETWORKING ARM

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ABSTRACT

In last few years the industrial and daily needed works are observed to be more attracted and implemented through automation via Robots. The system is so planned that it removes the human mistakes and human interference to get more definite work. There are many fields in which human interference is hard but the procedure below consideration has to be operated and controlled this leads to the area in which robots find their applications. This planned work is an outline of how we can use servo motor as a joints of a robotic arm and control it using potentiometer. Arduino UNO board is used to control the servo motors by programming and Arduino's analog input is given to potentiometer. This servo arm look like a robotic crane or we can convert it into robotic crane using some jerks. Robotic arm is one of the big projects in today's automation industries. Robotic arm is part of the electromechanical systems of today's fast growing industry. This project is a pick and place robotic arm. In the industrial level it can be used as in environment, which is either risky or not approvable. As the robot size is small, the physics that controls the way of operation, power uses, and control change excitingly, limiting how these devices work. This also include it's characteristics like its expansion, positioning, orientation, tools and object the arm can carry. This project is on making of robotic arm with less useful materials and its applications for small purposes.

1.0 INTRODUCTION

The word robot is came from the Czech word robot, which is meant by "The forced labor". Most common robot is the Robotic Arm, which is an electromechanical arm. Robots are progressively being designed to replace work load of humans, specially to perform the repetitive task. Most robots are designed to complete heavy and difficult tasks in industry. The robot can handle difficult and dangerous work which reduce the risk of human beings. This robotic arm is a type of mechanical model arm, it is programmed like a human arm so that it can work exactly as human arm works.

The robotic arm is generally made up of seven metal segment and joined by six joints. An industrial robotic arm using six joints are mostly like a human arm. The robotic arm has a shoulder, an elbow, and a wrist. The application of robotics field is mainly used in the field of research, laboratory based work, industrial work to automate procedure and eliminate the human risks. This paper is explaining the design of electromechanical structure of a robotic arm. According to this project, the limitations of human work should be solved. The human work contains many limitations likewise, laziness, less accuracy, time limits, less productivity, etc. In the industrial world, automation is one of the necessary elements for development. It helps to increase efficiency and productivity of work and reduce the need for humans.

2.0 LITERATURE SURVEY

- Humanoid robot arm for intelligent haptic interaction with environment by Dzmitry Tsetserukou, Naoki Kawakami, Susumu Tachi

  The paper concentrates on the development and control of the humanoid robot arm iSoRA, intended for operation in a dynamic unstructured environment. Optical torque sensors integrated into each joint enable measurement of contacting forces along the entire manipulator surface.

- Wireless Robotic Arm by Mastura binti Muhammed

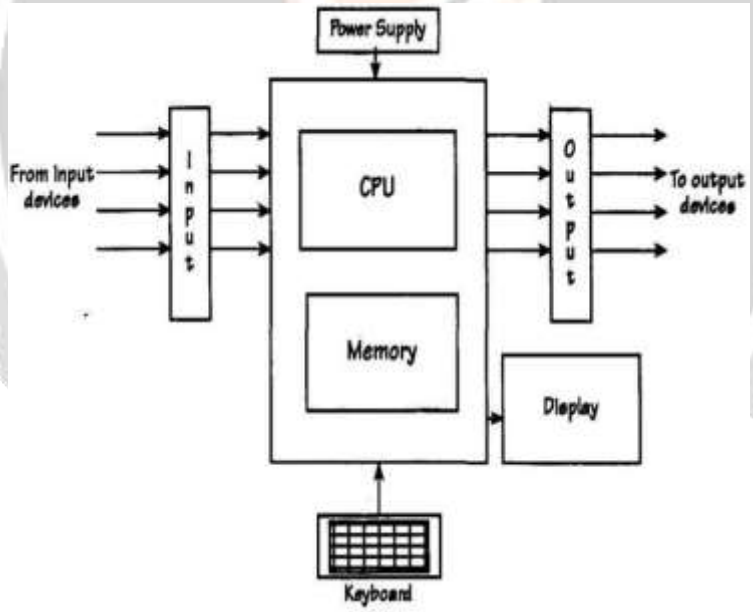
  A robotic arm that has five separate movements to grab or release, lift or lower, rotate wrist and pivot sideways controlled by five servo motors.

- A Geometric Approach for Robotic Arm Kinematics with Hardware Design, Electrical Design, and Implementation by Kurt E. Clothier and Ying Shang

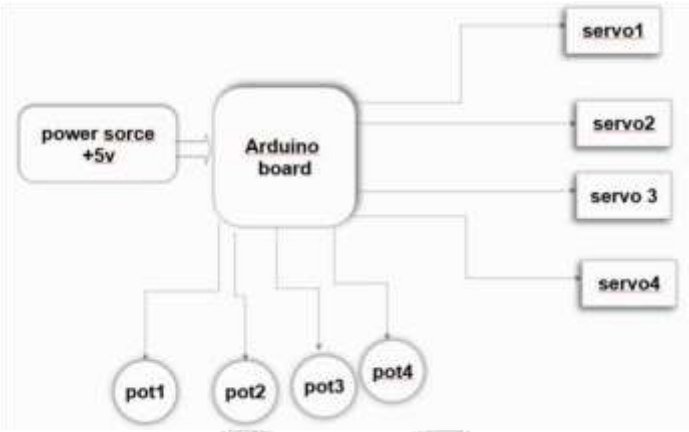
  A geometric approach to solve for the unknown joint angles required for the autonomous positioning of a robotic arm has been developed. This analysis is dependent upon the known lengths of each arm joint to joint link as well as the desired terminal position of the arm in the three-dimensional space of the arm's workable area with respect to arm base.

3.0 DESIGN GOALS

3.1 Block Diagram :

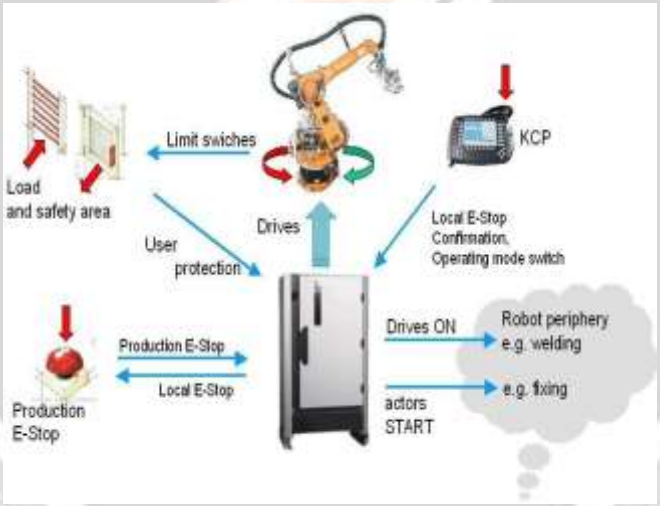


The overall aim of this project is to design and implement a complete system for a inexpensive two degree-of-freedom robotic arm. Elements used in designing a complete robotic arm include mechanical design and assembly; electronics elements design, assembly, and testing; and software programming. The exact electronic connection is shown in following figure.



3.2 Control state diagram of Reconfiguration :

The control of arm is already in an automated state, it is so powerful and intelligent system. It is potentiometer controlled robotic arm. It has a various type of commercial application. It has the power to automate the servo system in our field. It has basic knowledge. The state of servo is fully automated. Distribution of electronic system, and automated work can protect the whole system production line and limit switch add on extra feature with hydraulic system. The robot can be primarily used for load shifting like application of peak and place.



4.0 FUTURE WORK

firstly, the future work includes getting the high level force control loop software up and running in addition with the lower level PWM control in order to completely debug the functionality of the arm system. This software should be C code written using CodeWarrior that is either a modified version of Eduardo's ARMSerial.c or original code to implement the force control algorithm. It is also possible to write this code in Assembly if required.

Another future consideration is that the arm can be optimizable for easier mechanical engineering and manufacturing, not for easy force control. Therefore, revisions will probably be desirable for making the force control easier once testing is complete.

Additionally, a third degree of freedom at the shoulder joint would be a good addition, as well as building a second arm for mounting on the Platform.

CONCLUSION

The objective of this project was to fully automate the robotic arm, and it has full control on potentiometer system, It has full intelligent system, by network as well as analog control. It has fully tested with bit system and can be controlled manually and through network using blink application. We have succefully tested with a small automated system, for picking up and repeating the whole system through analog controlling. The idea to automate required high end power output, but the static servo can be able to do the job for the prototype modelling.

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