



IMPROVEMENT OF MOBILE OPERATED PICK AND PLACE END EFFECTOR

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Abstract: aim of this research is to get familiarized with the modern field of robotics and to find the technology. Here using the sophisticated emerging technology embedded system. Here a designed robot arm, controlled by a microcontroller and choose this design because it is the most common form of robot and find anywhere in industries like car. The driver circuits for these motors are to be controlled using 8051 microcontrollers with a control key panel. The movement is established using stepper motors. Pick and place robots are the small robots using for continuous purpose in the industries then let us go through something about pick and place robot by this project. The main advantage is the robotic arm movement is controlled by mobile phones.

Index Terms - 8051 microcontrollers, Pick and place robots, Stepper motors

INTRODUCTION

Robotics is the branch of technology that deals with the design, construction, operation, structural disposition, manufacture and application of robots and computer systems for their control, sensory feedback, and information processing. A robot is a mechanical or virtual intelligent agent that can perform tasks automatically or with guidance, typically by remote control. In practice a robot is usually a machine that is guided by computer and electronic programming. Robots can be autonomous, semi-autonomous or remotely controlled. The concept and creation of machines that could operate autonomously dates back to classical times, but research into the functionality and potential uses of robots did not grow substantially until the 20th century. Today, robotics is a rapidly growing field, as we continue to research, design, and build new robots that serve various practical purposes, whether domestically, commercially, or militarily. Many robots do jobs that are hazardous to people such as defusing bombs, exploring shipwrecks, and mine.

LITERATURE REVIEW

Korayem et al. presented the design of a robot for an assembly line, and the proposed robot is applied for one of the important stations in the assembly line. Kinematic and dynamic modeling, finite element analysis (FEA), quality function deployment (QFD), and failure mode and effect analysis (FMEA) are used in this paper. Ghayoumi et al. have performed the experimental test on Cartesian robot. They reduced correlation error applying a fuzzy model in stereo vision of a 3p robot. Azhdariet al. obtained a dynamic model for a two degree-of-freedom planar robot arm. The links of the arm, connected to prismatic and revolute joints, were considered to be flexible. They assumed to be fabricated from either aluminum or laminated composite materials. The model was derived based on the Timoshenkov beam theory in order to account for the rotary inertia and shear deformation. Callegari et al. presented a high-speed Cartesian robot produced by Campetella Robotic Center. This robot was characterized by good dynamic performances but was chosen by the producer for re-engineering that should allow it to meet even more advance targets. Ion performed some experimental tests on a waling robot in order to determine the condition of robot in static and dynamic stabilities. In this work, different methods of leg adjustments and body adjustments were integrated into the strategy also, they analyzed the possibilities of determination of the limit conditions for the stable displacement of the walking robots. Maddahi et al. proposed an algorithm for determination of load capacity of a redundant mobile robot and performed some experimental tests in order to determine the performance of robot. Also, they implemented some designed tests on a 4R pick and place robot including path tracking (kinematically) and determination of load carrying capacity (dynamically). Ismail et al evaluated the performance of an industrial robot under payload and various distances within the working envelope.

Relationship between the location and pay load versus repeatability were obtained. Jackson et al. addressed the issues that must be accounted to develop the architecture for robotics within the infrastructure. These issues are the basis for design decisions in developing robotic infrastructure systems. Baron and Tondu presented a deductive method for safety analysis. In order to apply this technique for a medical robot, they analyzed human safety factors by using FMEA and FTA, as well as obtained different failure modes and their effects on the human

3.1 Experimental Design

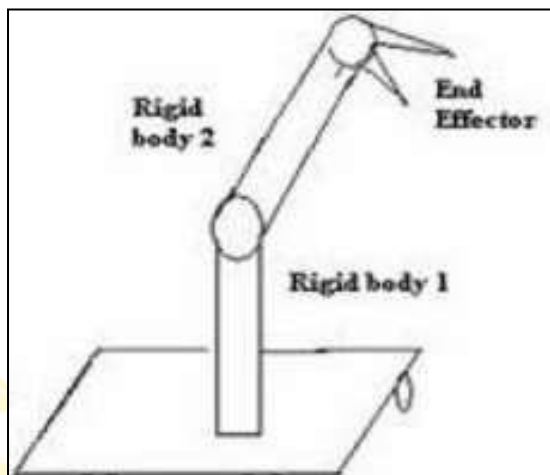


Figure 1: Experimental set up pick & place robot

In this work the power supply unit is used to regulate the supply voltage from +230V AC to +5V DC and PIC microcontroller. Microcontroller is an open-source computer hardware and software company, project and user community that designs and manufactures microcontroller-based kits for building digital devices and interactive objects that can sense and control objects in the physical world. The remote operation by user through Bluetooth via android application device. Opto-coupler, also called an optoisolator, photo coupler, or optical isolator, is a component that transfers electrical signals between two isolated circuits by using light. Opto-couplers prevent high voltages from affecting the system receiving the signal. Triac is a 4-layer, PNP in the positive direction and a NPN in the negative direction, three-terminal bidirectional device that blocks current in its “OFF” state acting like an open-circuit switch. Triac can conduct current in either direction when triggered by a single gate pulse. The loads can be turned ON/OFF remotely. The loads are operated by Arduino board through opto-isolators and thermistors using traces

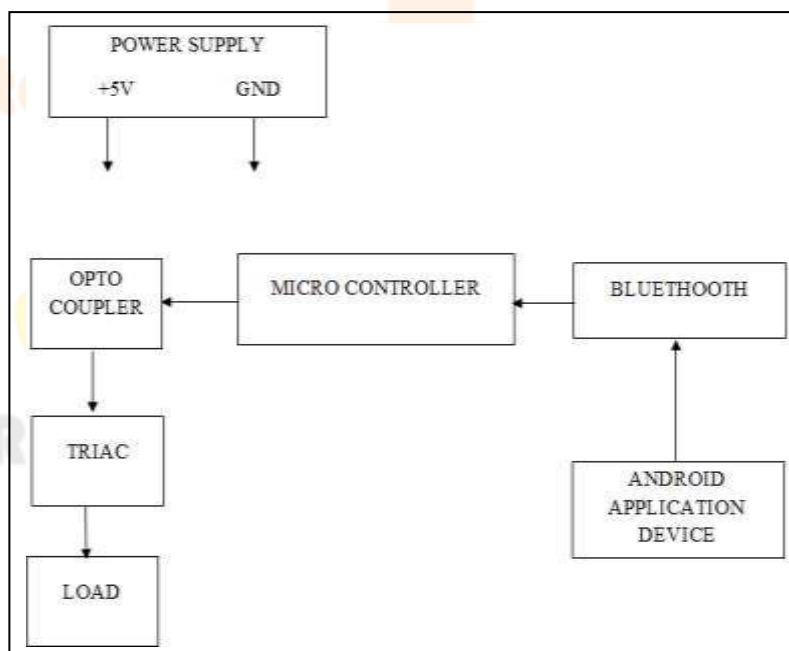


Figure 2: Block diagram of a proposed model circuit

In this project we use 230volt AC transformer. Its convert 12volt AC. This voltage is used to regulate the supply voltage from +12V to +5V with the help of regulator through the rectifier. Whenever Bluetooth connection is established the transmitter and receiver device are ready to perform according to the commands of the user. Arduino board receives the command through the RX pin and matches with the given programming code of the compiler and passes the appropriate command to the optoisolators. Smart phone sends ON/OFF commands to the receiver where loads are connected. The loads can be turned ON/OFF remotely. The loads

are operated by Microcontroller board through opto-isolators and thermistors using traces. One of the most common effectors is the gripper. In its simplest manifestation it consists of just two fingers which can open and close to pick up and let go of a range of small objects. Fingers can for example be made of a chain with a metal wire run through it. Hands that resemble and work more like a human hand.

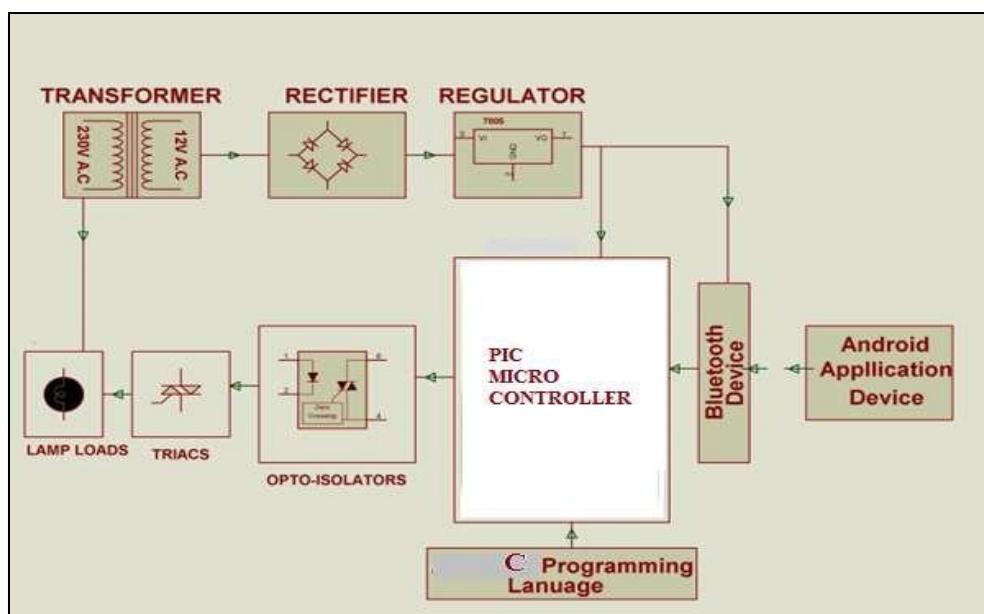


Figure: 3 Circuit Diagram

Result: This robot is used for pick the object in one place and place that objects in required places. Some industrial works are harmful for humans this robot is mainly used for reduce the risk process and consuming time and avoid labors. Human are tired for hard worksuch as assembly line, material handling etc. this robot does all those things it mainly reduces the manual work our robot is designed at low cost as well as high efficient one. This work is to give the way for providing bigger effective robot for industrial applications.

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