A

Project Report

On

"Pick & Place Robotic Arm Using Arduino"

Submitted by

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Submitted to

Savitribai Phule Pune University, Pune

In the partial fulfillment of the requirement for degree of

Bachelor of Engineering

In

Instrumentation and Control Engineering

Under the guidance of

Dr. P. S. Vikhe

DEPARTMENT OF INSTRUMENTATION AND CONTROL ENGINEERING

PRAVARA RURAL ENGINEERING COLLEGE, LONI

Tal-Rahata, Dist: Ahmednagar, 413736

Academic Year: 2022-23

PRAVARA RURAL ENGINEERING COLLEGE, LONI

DEPARTMENT OF INSTRUMENTATION AND CONTROL ENGINEERING

CERTIFICATE

This is to certify that,

Mr. Shinde Kiran Suresh

Mr. Wale Akash Bharat

Miss. Pawar Shital Balasaheb

have satisfactorily carried out the B.E. Project work entitled **"Pick & Place Robotic Arm Using Arduino".** This work is being submitted for the award of degree of Bachelor of Instrumentation & Control Engineering. It is submitted in the partial fulfilment of the prescribed syllabus of Savitribai Phule Pune University, Pune for the academic year 2022 – 2023.

Dr. P. S. Vikhe	**Mr. N. N. Lokhande**	**Prof. (Dr.) C. B. Kadu**
Project Guide	Project Coordinator	H. O. D

Pravara Rural Engineering College, Loni Pin-413736 Dist.A'Nagar. (M.S.) INDIA Tal.Rahata

Principal
Pravara Rural Engineering College, Loni

QUALITY POLICY

Institute Vision

Enrich the youth with skills and values to enable them to contribute in the development of society: nationally and globally.

Institute Mission

To provide quality technical education through effective teaching-learning and research to foster youth with skills and values to make them capable of delivering significant contribution in local to global development.

Department Vision

Develop skilful graduate engineers in the field of Instrumentation and Control Engineering for the benefit of society and industry globally.

Department Mission

To offer a well-composed course of instructions, learning environment, hands on experience and problem solving skills for developing professionals to provide safe and efficient solutions in the field of Instrumentation, Control, Automation and allied sectors.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

PO1 Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4 Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5 Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6 The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7 Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11 Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12 Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

Graduates would demonstrate ability to,

PEO1: Actively participate in designing, calibration and testing, operating and maintaining systems in the field of Instrumentation & Control engineering and allied industry.

PEO2: Solve problems in the field of commercial, residential and industrial automation by applying knowledge of Instrumentation & Control Engineering.

PEO3: Work as an individual and as a team member/leader in multidisciplinary projects effectively and ethically.

PEO4: Provide innovative, feasible, economical and socially relevant solutions to engineering problems, based on analysis, design and development using software and hardware platforms.

PROGRAM SPECIFIC OUTCOMES (PSOS)

PSO1: Analyze dynamics of process control systems, select sensors/transducers and controllers to ensure the performance, safety and quality of the processes through measuring, monitoring and designing of automated systems.

PSO2: Develop mathematical model, validation of model, design and tuning of the controller for process control systems and its realization using DCS, PLC, SCADA and MATLAB.

COURSE OUTCOME (COS)

After completion of this course students are able to,

Course Outcomes Code	Statements	Bloom's Taxonomy	
		Level	Descriptor
C472.1	Identify the problem that deals with society, industry or research needs based on investigated literature survey to explore recent technical trends.	3	Apply
C472.2	Analyse identified problem and suggest appropriate solution to solve the problem.	4	Analyse
C472.3	Design an appropriate solution to ensure performance, safety and quality.	5	Evaluate
C472.4	Implementation of solution using modern tools and development of prototype systems.	6	Create
C472.5	Work as an individual and contribute as a team member with effective management skills to achieve a desired objective.	3	Apply
C472.6	Present their work in written and oral form with ethical values.	3	Apply

DECLARATION

This report has been prepared on the basis of our own work. Wherever other published and unpublished source materials have been used, these have been acknowledged.

Student Name: **Signature of students:**

1. Mr. Shinde Kiran Suresh

2. Mr.Wale Akash Bharat

3. Miss.Pawar Shital Balasaheb

Date of Submission: 02/06/2023

Place: Loni

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Mr. Shinde Kiran Suresh.

Mr. Wale Akash Bharat.

Miss. Pawar Shital Balasaheb.

ABSTRACT

In this project deals with operations like pick and place robotic arm for picking and placing bottle on conveyor belt It is an automated bottle 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 we are developed manually or using processors likewise Arduino, microcontroller. But microprocessors have several limitations so this limitationcan be overcome by Arduino. Here Arduino 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.

Keywords: Robotic arm, Gripper, Arduino, Relay Module.

CONTENTS

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 Introduction

Robotics is a involves the conception, design, manufacture and operation of robots. The objective of the robotics field is to create intelligent machines that can assist humans in a variety of ways.The branch of technology that deals with the design, construction, operation, and application ofrobots[8]. Robots have long been the focus of science fiction and literature, but it wasn't until recent decades that they became a viable part of our workforce. Science fiction lovers will recall Isaac Asimov and his Three Laws of Robotics. While made from fiction, these rules more or less define our robots today.

1.2 History of manufacturing robotics arm

The development of Numerically Controlled (NC) machines, and the rising popularity of the computer both helped bring out about the first industrial robots. The earliest known industrial robot that fits into the ISO definition of the term was created by Griffith "Bill" P. Taylor and appeared in Meccano Magazine the following year.It was a crane-like design that used Meccano parts and was powered by a single electric motor. It had five axes of movement, including a grab and grab rotation. The robot was automated through the use of paper tape with punches in it to energize solenoids. This would create movement in the control levers. This first robot could stack wooden blocks in patterns programmed by the paper tape. George Devol placed the first industrial robot patent. His robot was able to transfer objects from one point to another within a distance of 12 feet or less. He founded a company called Animation to build the robot and coined the term "Universal Automation"[7].

Unimation manufactured UNIMATE, was the first robot to be implemented by a major manufacturer. General Motors began using it in their New Jersey plant that same year. Victor Scheinman invented the Stanford arm at Stanford University. This was an all-electric 6-axis articulated robot. This new technology opened up the possibility for manufacturers to use robots in assembly and welding tasks. He later sold his designs to Unimation, which then developed them alongside General Motors [5].