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MEC300

DEVELOPMENT OF ROBOTIC ARM SYSTEM REPLICA FOR MOVING HAZARDOUS MATERIAL

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ABSTRACT

Handling hazardous materials, especially biological hazards, demands great precision and expertise. Untrained human operators lack the necessary skills to manage these materials safely, while even competent operators face inherent risks. To address these challenges, this study aims to develop a robotic arm system replica capable of moving hazardous materials effectively. Utilize an Arduino-based mechanical robotic arm, the study focuses on designing a system that can carry the material by emphasizing the limit factor of the object's weight and also the range of motion of the robotic arm. The system's precision will be observed through experiments to assess its effectiveness in handling hazardous materials. Last but not least, this robotic arm system replica is expected to compete human capabilities in terms of abilities of moving hazardous materials.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Hazardous materials are substances that could harm human health or the environment. Hazardous means dangerous, so these materials must be handled the right way. Hazardous materials must be handled the way so that it will not harm anyone. Besides, the challenge that people need to face in handling hazardous material is term of its safety. This is because when people have to handle hazardous substance, they are expose to the toxic substance. The use of robots as one of resources to do work is receiving increasing attention in the present time. This follows from the rapid development of the industry which can be seen to be actively developing from time to time. By this, this thesis will explain the functions that can carried out by this replica of mechanical robotic arm using its dynamical traits to handle hazardous items. Besides, the coding system will also be done as the main key of this dynamic controller to obtain the data. In the end, this robotic arm replica will show how it's capability in moving any hazardous material in any environment.

Robotic arms are articulated machines that are fast, and reliable to use. It can be programmed to perform in a variety of tasks in any environment. It can be also used to carry any item that is not suitable for humans to make contact directly. This robotic arm replica is controlled by a software called Arduino. It is suitable in carrying any dangerous material with the movement of three rotational axis.

1.2 Problem Statement

The current problem is to find the efficient method for handling hazardous material in various environment. Based on United States Environmental Protection Agency (EPA), some hazardous substances produce toxic effects in humans or the environment after a single, episodic release which is really dangerous. [1] Besides, there were some case happened involved hazardous material issue, which have caused a serious incident to the workers.[2] Therefore, a robotic arm may be capable to handle and prevent such accidents from happening again.

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