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MEC 300

**DEVELOPMENT OF ROBOTIC ARM SYSTEM
REPLICA TO ASSIST SEEDING IN AGRICULTURE**

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ABSTRACT

This study focuses on the application of robotic technology in agriculture to address the challenges of sustainability, productivity, and the increasing demands of food production in a rapidly changing world. The manual method of seeding in agriculture is time-consuming and lacks accuracy. To overcome these limitations, the study develops an accurate robotic arm system replica using an Arduino mechanical robotic arm. The primary objective is to design a system replica capable reduce the time of completing the seeding process. The system replica's performance is then evaluated based on time and accuracy. It is anticipated that this system replica will outperform human capabilities in terms of speed and accuracy. Integrating robotic technology into agriculture enhances the potential for a more sustainable and productive farming industry, enabling it to meet the evolving global food production needs.

CHAPTER ONE INTRODUCTION

1.1 BACKGROUND OF STUDY

Agriculture dates back nearly 10,000 years. Former nomadic hunter-gatherers in the "Fertile Crescent" in the Middle East started to plan the sowing and harvesting of certain plants instead of gathering them for food in the wild [1]. Agriculture plays a vital role in sustaining human civilization. It is the primary source of food production, providing nourishment and sustenance to populations worldwide. Additionally, agriculture is closely linked to rural economies, employment, and food security. Over time, agricultural practices have evolved, incorporating various methods and techniques to improve productivity and efficiency. These include land preparation, seed sowing and breeding, irrigation, fertilization, pest control, crop rotation, and post-harvest management.

The development of robotic arm systems has revolutionized various industries, including agriculture. Robotic technology offers immense potential to enhance the efficiency, productivity, and sustainability of agricultural practices. In particular, the application of robotic arms for seeding operations has the potential to save significant attention due to the time-consuming and labor-intensive nature of traditional manual methods. To address these challenges, this study focuses on the development of a robotic arm system replica specifically designed to assist seeding in agriculture. The goal of this study is to develop an accurate and efficient robotic arm system that can precisely and consistently place seeds at desired locations with minimal errors. The robotic arm system replica serves as a technological advancement in agriculture, aiming to overcome the limitations of manual seeding methods, such as time consumption and low accuracy.

1.2 PROBLEM STATEMENT

The manual seeding method involves placing each seed by hand, which is a time-consuming process that takes a significant amount of time to complete [2]. The manual method of planting is labor-intensive and a tedious [3].

1.3 OBJECTIVE

1. To build a robotic arm that can reduce the time required to complete the seeding process.
2. To measure the reduced time between the manual seeding method and the mechanical robotic arm.

1.4 SCOPE OF WORK

1. Mechanical robotic arm by Arduino Braccio.
2. Robotic arm system to assist seeding in agriculture is a replica.
3. Material such as seeds.

1.5 SUMMARY CHAPTER 1

The expected result that was obtained was a reduction in the time required to complete the seeding. This was achieved by using a robotic arm system replica to assist in seeding, making it faster than the manual method.