

HY-FAH: An Indoor Hydroponic System with a Fully Automated Harvester

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I. Introduction

Nutritious food is a necessity for a healthy diet to improve an individual's overall health and well-being. Food insecurity and malnutrition go hand in hand as issues that the Philippines has been dealing with for years [1]. Food security is constantly affected by population growth and urbanization. An increasing fraction of the population is now experiencing hunger and malnourishment as agricultural fields are transformed to accommodate the changes brought by urbanization. The Philippines has the most food-insecure people in Southeast Asia, recording a total of 59 million Filipinos suffering from a moderate to severe lack of consistent access to food between 2017 and 2019 [2].

Through thorough investigation and research, this study aims to construct an Indoor Hydroponics System with a Fully Automated Harvester, which will allow a sustainable and energy-efficient environment and hands-free farming of high-quality herbs and leafy vegetables.

II. Background of the Problem

Crops are traditionally and frequently harvested by hand. Manual harvesting is particularly common for crops that have wide time periods for optimal maturation or for crops that are offered for direct consumption, despite the fact that it is labor-intensive. Farmers turned out mostly complaining about their inability to find labor. The shortage in terms of labor had started to become a major issue for farmers,

especially in states like California [3]. As for the chefs, what they were mostly looking for was quality, of course, but also predictability and consistent quality. Thus, automation is sought out by most in order to lessen manual labor.

This present invention revolutionizes the traditional farming process through the integration of a fully automated harvesting system into the hydroponic system. A fully automated hydroponic harvester has the potential to streamline the harvesting process, reduce labor costs, and increase efficiency. This method doubles plant growth in half the time. This type of harvesting system could use sensors and cameras to gather data from the system and detect whether the plants are ready for harvest and employ a robotic arm to cut and transport them to a processing area.

III. Objectives

The general objective of the study is to design an Indoor Hydroponics System with a Fully Automated Harvester, which allows a sustainable and energy-efficient environment and hands-free farming of high-quality leafy vegetables.

This research journal aims to design and develop a regulation system suitable for indoor use with a rechargeable battery as a backup power supply that will serve as the controlled environment for the hydroponics system.

Also this research also aims to design and develop a system that can automate a single robotic arm that will be used throughout the whole system for harvesting using Arduino UNO.

IV. REFERENCES

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