

MAL3018 Computing Project

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Application of IOT technology in monitoring soil
conditions for gardening and assisting optimal
plant growth

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Github repository: [FYP_Development](#)

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Introduction

Background

In recent years, price inflation of food has increased exponentially year by year and as a result much of the world's population are struggling to keep up with this rampant price increase. For example, the combination of decreasing commodity prices, geopolitical uncertainty, and the Covid-19 pandemic caused the Malaysian ringgit to depreciate against the US dollar, thus weakening the Malaysian ringgit's exchange rate and causing a rise in the inflation rate (Yusof et al., 2021) which also affects the price of food.

This price hike on food necessitates families and individuals to save money where possible. Therefore, gardening becomes an attractive option to save money by growing vegetables at home which are a healthier option and tends to generate a higher yield than if purchased at a vendor. Plus, the act of gardening could improve mental health while providing food, thus maintaining our body and mind's health (Sofa & Sofa, 2020). However, maintaining an efficient and healthy garden can be challenging as its labour intensive and time consuming.

Traditionally, maintaining crop health requires manual intervention by way of constant soil sampling or visual inspection which doesn't provide enough data on the soil's conditions (Pechlivani et al., 2023). This approach is inefficient, introduces human error, and is generally time consuming. As such, the use of smart solutions leveraging the Internet of Things (IOT) becomes increasingly common to assist in this challenging endeavour (Chakraborty et al., 2022) by collecting real time data on environmental conditions for monitoring, automating tasks like irrigation, and more which helps to improve plant growth, minimize wastage, and saves time and effort via automation.

This purpose of this project is to provide a user-friendly solution that will make gardening easier by providing accurate real-time data on garden conditions and automate certain essential gardening tasks. This project consists of a IOT smart garden system that monitors garden conditions and automates certain tasks, a RESTful API that serves as an interface to access real-time garden data and to initiate automation tasks if needed, and an application to view real-time garden data and define automation conditions.