Faculty of Electrical and Electronic Engineering Technology

DEVELOPMENT OF IOT BASED SMART FARMING IN SMART AGRICULTURE MONITORING SYSTEM

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Bachelor of Computer Engineering Technology (Computer Systems) with Honours

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DEVELOPMENT OF IOT BASED SMART FARMING IN SMART AGRICULTURE MONITORING SYSTEM

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A project report submitted
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I declare that this project report entitled "Development Of IoT Based Smart Farming In Smart Agriculture Monitoring System " is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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APPROVAL

I hereby declare that I have checked this project report and in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Computer Engineering Technology (Computer Systems) with Honours.

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DEDICATION

To my beloved mother, Kamalatchi, and father, S.Magenthiran.

This project is earnestly dedicated to my beloved parents, who have been my source of inspiration and gave me strength when I thought of giving up, who continually provide their moral, spiritual, emotional, and financial support and taught me to work hard for the things that I aspire to achieve. I am truly grateful for having them in my life.

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Last but not least, I devoted this project to the Almighty God, thank you for the guidance, vitality, power of mind, safety, skills and also for giving me a healthy life. All of these, I offer to you.

ABSTRACT

Agriculture is done in every country from ages. Agriculture is both a science and a plant culture-related art form. Agriculture was a pivotal step in the evolution of sedentary human civilization. For millennia agriculture was done by hand. As the globe shifts to new technologies and deployments, agriculture is crucial. In intelligent agriculture, the Internet of Things (IoT) plays an essential role. IoT sensors are designed, on the basis of farmer input, to provide information about the nature of agricultural areas. An IOT and smart agriculture system that makes use of automation was proposed. A wireless sensor networks are used to collect data from different sensors deployed on a variety of nodes and transmit it through the wireless protocol. The Arduino-powered smart agriculture system includes a temperature sensor, a soil moisture sensor, an LDR sensor, a water pump, and a WiFi module. When the IOT-based agriculture monitoring system is turned on, it measures the humidity, light level, and moisture level. It sends an alert to the phone's application which is called Blynk. The moisture of soil is detected by sensors, and if it falls, the water pump is activated. When the temperature rises above a certain threshold, the fan kicks on. Everything is displayed on the LCD display module. This is also seen in IOT, which displays information such as humidity, moisture and light with graph shown life of these 3 with a report generated. Depending on the crop type, the temperature may be set to a certain level. If the water is to be closed by IOT forcefully, the water pump can be stopped with a button. As a result, agriculture can be made smarter by utilising IoT and other technologies. Smart agriculture increases crop yield while reducing water waste and fertiliser imbalances.

ABSTRAK

Pertanian dilakukan di setiap negara dari peringkat umur. Pertanian adalah bentuk seni yang berkaitan dengan sains dan budaya tumbuhan. Pertanian merupakan langkah penting dalam evolusi peradaban manusia yang tidak aktif. Selama ribuan tahun pertanian dilakukan dengan tangan. Ketika dunia beralih ke teknologi dan penggunaan baru, pertanian sangat penting. Dalam pertanian pintar, Internet of Things (IoT) memainkan peranan penting. Sensor IoT dirancang, berdasarkan input petani, untuk memberikan maklumat mengenai sifat kawasan pertanian. Sistem pertanian IOT dan pintar yang menggunakan automasi. Rangkaian sensor tanpa wayar digunakan untuk mengumpulkan data dari sensor yang berlainan yang digunakan pada pelbagai nod dan menghantarnya melalui protokol tanpa wayar telah dicadangkan. Sistem pertanian pintar bertenaga Arduino merangkumi sensor suhu, sensor kelembapan tanah, sensor LDR, pam air, dan modul WiFi. Apabila sistem pemantauan pertanian berasaskan IOT dihidupkan, ia mengukur tahap kelembapan, cahaya, dan kelembapan tanah. Ini mengirimkan peringatan ke aplikasi telefon yang disebut Blynk. Kelembapan tanah dikesan oleh sensor, dan jika jatuh, pam air diaktifkan. Apabila suhu meningkat di atas ambang tertentu, kipas akan menyala. Semuanya dipaparkan pada modul paparan LCD. Ini juga dilihat di IOT, yang memaparkan maklumat seperti kelembapan, kelembapan dan cahaya dengan grafik yang ditunjukkan kehidupan ketiga ini dengan laporan yang dihasilkan. Bergantung pada jenis tanaman, suhu dapat ditetapkan ke tahap tertentu. Sekiranya air ditutup oleh IOT dengan kuat, pam air dapat dihentikan dengan butang. Hasilnya, pertanian dapat dibuat lebih pintar dengan menggunakan IoT dan teknologi lain. Pertanian pintar meningkatkan hasil tanaman sambil mengurangkan ketidakseimbangan sisa air dan baja.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Background

The world population is increasing at a daunting pace. With such a large population, it is a big challenge to provide basic necessities of life. Healthy nutrition is the fundamental necessity of all people. Due to the growing population, however, conventional agricultural methods are not enough to supply bulk food. Fortunately, we are able to improve production and productivity much too much by using the new agricultural technologies as well as smart electronics technology to ensure our food safety. Fortunately we will improve efficiency and productivity by applying the most up-to-date agriculture technology as well as smart electronic technology to our food protection levels, thus providing an IOT smart agriculture monitoring project based on Arduino.

Smart farming was a term derived from software engineering and computer sciences that have arrived in an overall world of almost ubiquitous computing, with the addition of computer technology and transmission of farm data. These computer elements are integrated into objects and linked to the internet. Due to the use of sensors in agriculture, the use of smart farmer tools is possible. A sensor is an electrotechnical system which measures physical volumes from the environment and turns these measurements into a tool readable signal. Sensor readings include temperature, humidity, light, pressures, noise levels, presence or lack of certain object types, mechanical stresses, speed, directions and size of objects.

Internet of Things (IoT) means the interconnection of a network of physical devices which, without any human intervention, are interlinked to computer devices, digital and mechanical machines, persons or livestock. All has a unique identification. This is an advanced analysis and the mechanised systems that employ the detection, organisation, huge data and man-made awareness creativity to have a complete administration system. IoT essentially involves expanding the influence of the Internet beyond computers and smartphones.

Agriculture's destiny needs to be combined with an appreciation and excessive cessation of technology that can increase productivity and also attract farmers' interest in this sector. Thus, these intelligent agriculture techniques will help farmers to reduce waste and increase capacity. It is essentially a high-tech method for sustainable cultivation of crops for masses and capital intensive. This technology can enable farmers to track conditions from around the world using sensors and also allows irrigation in fields using an automated device. In the field of agriculture it is the application of information and communication technology.

1.2 Problem Statement

The system for utilising technology in farming and agriculture necessitates extensive knowledge of agricultural procedures as well as research. Before developing a system to ensure the best cultivation method, numerous factors must be considered, carefully investigated and made agriculture more competitive and sustainable. To increase the accuracy of agricultural systems that many farmers can use and deploy in a range of scenarios,such as:

i. Must build a framework that can handle any possible circumstance in an agricultural context.

ii. If agriculture's automation role be useful, when and how it can be used in the cultivation process?

iii. Explain the net cost and profit of the cultivation process reduced and how is this process automated.

iv. When developing smart agriculture approaches, some components are required.

v. What is the most expensive part of this mechanism, and how can it be reduced? How can this be reduced and to what extent?

vi. Geographical factors such as temperature, soil mineral content, moisture content, location, and season to influence the rate of cultivation.

vii. What conditions must be considered when cultivating.

This project solves the problem described on the basis of the problem statement mentioned. Yes, from the first point of view, because sunlight, air, water and soil are the core needs of agriculture, where this project covers all aspects that are required for the production of a healthy crop. I would then claim that the role of agriculture in automation is useful, in particular during the cultivation process, because farmers can automatically irrigate the right quantity of water in the right time and prevent irrigation on the wrong day by reducing runoffs from overwatering saturated soils that will enhance crop efficiency. It is precise method for irrigation and a valuable tool for accurate soil moisture control in highly specialized greenhouse vegetable production.

The best part of this project is that it is possible to reduce the net cost and benefit of using the cultivation method by automating it, since pumping seems to be water only if necessary. It is possible to save from waste water. The development of smart farming

techniques requires components such as LDR sensors, soil moisture sensors and temperature sensors.

As previously explained, the most costly mechanism is the irrigation system of the plant, as it does not have to be over and if farmers do not currently meet the needs for crops, this automation process takes place where the message will be sent to their telephones as an alert massage.

Briefly, all of the geographical factors that are necessary to influence the rate of cultivation such as temperature, mineral content of soil and moisture content are able to monitor smart farming through this automation.To be clear, some questions cannot be answered by specialists because horticulture science is a multidisciplinary discipline, and all of the above factors must be considered when making a decision. Furthermore, agricultural research is directly related to local communities. The climate and soil properties of one location vary from those of another. Climate change and plant and soil transformation are also unpredictable. It happens over time, resulting in effective and long-term cultivation.

1.3 Project Objective

The primary goal of this project is to complete a mission using technology in this era. This product's goals are as follows:

a) To make farming being useful to everyone out there other than farmers who are interested in farming as their passion as this project can be carry out even in home garden.

b) To make it as an additional income during the pandemic outbreak. Besides, it also reducing water waste and boosting crop productivity in an ideal way.

c) To promote a balanced lifestyle by promoting the consumption of organic and fresh foods. At the same time, it helps to create a greener planet which is healthier for us and also the future generation.

1.4 Scope of Project

Scope project are important element in this project. It can make sure the project can be finished on the time. Because to make a good project there must have a scope. The work scope in this project is :

a) Garden lane

- The water is styled as water pump. The pipe will be attach to the lane accodingly. The lane have a length of 152.4 cm and 60.96 width. The host is approaximetely of 5 feet which will be given small holes in between the pipe to pump out the water

b) Network connection

- When selecting an Internet service provider, Internet speed is one of the main factors. It not only decides how easily you can perform tasks online, but also how many tasks can be performed at a time by your network.

c) Blynk

- Blynk is an iOS and Android-based platform for controlling Arduino, Raspberry Pi, and other Internet-connected devices. It's a virtual dashboard where you can drag and drop widgets to create a project's graphic interface.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter clarified the study literature review to get as much background and data on this research. All facts and information pertaining to this section is taken from and specifically quoted from the article and web assets relevant to the subject matter. The notion of the visually disabled aid invention is not all that old. In these lines, a few projects identified with this system have been discovered. journals relating to the project. This chapter contains some valuable theoretical concepts and ideas for this project. These related works have also been examined in a wise way to increase the project's efficiency and reliability. That is why this chapter helps to ensure that the project has a proper plan.

2.2 Smart Farming System using IoT for Efficient Crop Growth

The paper described the advanced IoT-based solution used by a group of researchers to track conditions on the ground and air for effective crop growth (Abhiram MSD1, Jyothsnavi Kuppili2 and N.Alivelu Manga3 2020). This paper is from the Chaitanya Bharathi Technology Institute in Hyderabad, India, which explains the device which has been developed and which is able to control temperature, humidity, soil moisture through NodeMCU and several of its sensors. In addition, a notice of the environment of the field in the form of an SMS will be sent to the farmers' phone via Wi-Fi [1].

Agriculture is India's main occupation and is the backbone of Indian economic systems providing large-scale employment opportunities for rural people in underdeveloped and developing countries, but this will be a challenge for those working on farming as climate

changes impact agriculture by increasing water demand and reducing crop productivity.[17][21][23] Some techniques, including irrigation, rainfed agriculture and soil irrigation, were also introduced to grow healthier plants, but these were never effective in using water. While many of them use the conventional approach to waste water enormously [2].

The awareness of soil's properties decides on a smart approach to the water source. Smart farming helps to gain insight into soil and temperature conditions. The development of intelligent agriculture with IoT-based systems not only increases yield but also prevents water waste [3]. This research therefore explained the use of fewer sensors that offer soil moisture, humidity, and temperature, as well as a rain sensor, to determine whether the plant is suitable for growing, in order to avoid these problems. All sensors are linked with the internet and a smartphone, along with NodeMCU.

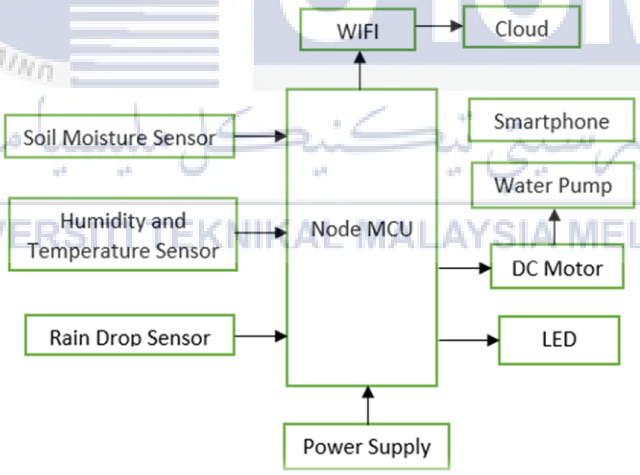

Figure 2.2.1 Block diagram of the Smart Farming System

The device proposed uses a NodeMCU microcontrol unit that is supported by a wireless Internet connection (ESP8266) module, as shown in Figure 2.2.1. As user interface, smartphone with blynk is used. The sensor is used for soil humidity, temperature and