Faculty of Electrical and Electronic Engineering Technology

DEVELOPMENT OF IOT BASED SMART KELULUT HONEY PUMP

NURUL NADIAH BINTI NASRUDDIN

Bachelor of Electronics Engineering Technology (Industrial Electronics) with Honours

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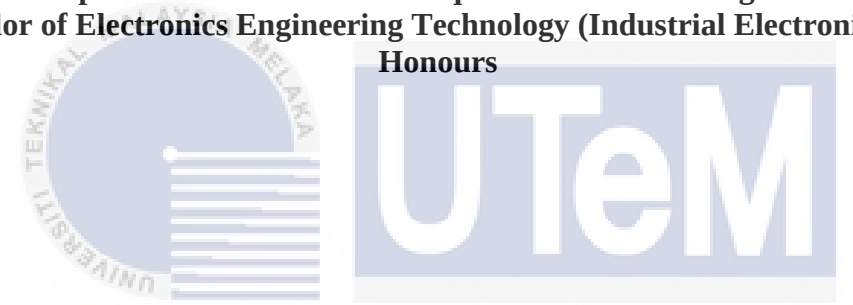
DEVELOPMENT OF IOT BASED SMART KELULUT HONEY PUMP

NURUL NADIAH BINTI NASRUDDIN

A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Electronics Engineering Technology (Industrial Electronics) with Honours



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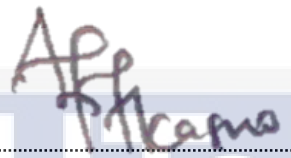
Signature : 

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DEDICATION

To my beloved parents
Nasruddin Bin Haji Abdul Rahman and Norani Binti Samsuri who always there for me and support me to finish my final year project report.
To my siblings that always give me an idea in order to complete this report.

To my great supervisor,
Ir. Ts. Mohammad 'Afif Bin Kasno who encourage and guide me to complete this report.

ABSTRACT

Development of IOT Smart Kelulut Honey Pump is a machine that functioning as a smart pump or honey extractor by using an electric compressor and using air pressure which has been set using a developed program. In its planning and implementation, the facing challenges are making a container for the machine and ensuring the level of air pressure. Next, connecting the compressor to the glass container also programming the electronic parts. The purpose of this project is to innovate the existing honey suction to have element of IR 4.0 by using a compressor and smart IOT automation system using Blynk. The movement system of this machine is by using a compressor connected to electrical energy. In addition, by added the programs such as relays, buzzers and ultrasonic sensor, the result of the machine has more function and easy to use. When the user is not nearby it is not a problem to turn off the switch because with the relay this machine will stop with the program that has been set[8]. In addition, this machine can also solve the problem of overflowing honey from the container, because this machine has been programmed using ultrasonic sensor to detect and prevent the honey from overflowing[9]. In addition, if the user cannot find out whether this machine is working or not, this machine will automatically emit a sound if it is no longer working and the sound will come out through the buzzer that has been installed[10]. Therefore, this Kelulut honey suction machine is easier to use compared to other suction machines and pumps**.** Then, ESP8266 will send the notification thru Blynk to alert the beekeepers that the honey have reach the maximum level.

ABSTRAK

Development of IOT based Smart Kelulut Honey, Pembangunan Pam Madu Kelulut Pintar IOT adalah mesin yang berfungsi sebagai pam pintar atau pengekstrak madu dengan menggunakan pemampat elektrik dan menggunakan tekanan udara yang telah ditetapkan menggunakan program yang dibangunkan. Dalam perancangan dan pelaksanaannya, cabaran yang dihadapi ialah membuat bekas untuk mesin dan memastikan tahap tekanan udara. Seterusnya, menyambungkan pemampat ke bekas kaca juga memprogramkan bahagian elektronik. Tujuan projek ini adalah untuk menginovasikan sedutan madu sedia ada untuk mempunyai elemen IR 4.0 dengan menggunakan pemampat dan sistem automasi IOT pintar menggunakan Blynk. Sistem pergerakan mesin ini adalah dengan menggunakan pemampat yang disambungkan kepada tenaga elektrik. Di samping itu, dengan menambah program seperti relay, buzzer dan sensor ultrasonik, hasil mesin mempunyai lebih banyak fungsi dan mudah digunakan. Apabila pengguna tidak berada berdekatan tidak menjadi masalah untuk mematikan suis kerana dengan geganti mesin ini akan berhenti dengan atur cara yang telah ditetapkan[8]. Selain itu, mesin ini juga dapat menyelesaikan masalah limpahan madu dari bekas, kerana mesin ini telah diprogramkan menggunakan sensor ultrasonik untuk mengesan dan menghalang madu daripada melimpah[9]. Selain itu, sekiranya pengguna tidak dapat mengetahui sama ada mesin ini berfungsi atau tidak, mesin ini akan mengeluarkan bunyi secara automatik sekiranya ia tidak berfungsi lagi dan bunyi akan keluar melalui buzzer yang telah dipasang[10]. Oleh itu, mesin sedut madu Kelulut ini lebih mudah digunakan berbanding mesin sedut dan pam lain. Kemudian, ESP8266 akan menghantar pemberitahuan melalui Blynk untuk memaklumkan penternak lebah bahawa madu telah mencapai tahap maksimum.

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LIST OF ABBREVIATIONS

V	-	Voltage
LCD	-	Liquid Crystal Display
LED		Light Emitting Diode
IOT	-	Internet of Thing
GSM	-	Global System for Mobile
UART	-	Universal Asynchronous Receiver-Transmitter
USART	-	Universal Synchronous and Asynchronous Receiver-Transmitter

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CHAPTER 1

INTRODUCTION

1.1 Background

Nowadays, many technologies are advanced and growing rapidly in various sectors. The sophistication of technology available today, is designed to facilitate users, save users time and save users energy while saving maintenance costs. Thus, various new inventions have been designed, and also various equipment have been innovated that have been marketed in various sectors. The current technology for Kelulut honey harvest is becoming more sophisticated daily [1], but it still has its shortcomings and resistance in producing Kelulut honey inhalation. Obstacle in the process of honey inhalation is, it takes a long time in the process of honey inhalation Kelulut this is because it can inhale one hive at a time. Other than that, the maintenance cost is also so high[3].

The project is planned to innovate a honey extractor to a motorized and electronic honey extractor pump, and is a pump specially designed to facilitate users to harvest honey easily without using a lot of energy and time. Its works by using a compressor. It has a thin nozzle and a long pipe that serves as a channel for honey extractor. Therefore, Smart Kelulut Honey Pump also has a container to fill with honey. This project is the improvement from manual work done by the Kelulut honey harvester whereby it is automatic and user friendly.

This Smart Kelulut Honey Pump can be stopped manually in the event of any damage or any accident. However, to avoid any accidents for example the honey is overload from the container. These pumps operate with several types of pre -built programs.

In creating Development of IOT based Smart Kelulut Honey Pump from beginning to end, there are many studies that need to focus on and need to pay attention to. Among them, how the methods need to be done to ensure that this machine successfully meets the objective requirements.

Therefore, the steps that need to be taken are to always learn, understand and make a clear study of the needs of the machine to be produced. Finally, a systematic method is also very important to use because it will be able to give satisfaction to the user and suitable for use.

1.2 Problem Statement

At this time we can see more people venturing into the field of Kelulut breeding. The problem that starts to arise is during the process of inhaling honey. Various ways are done by breeders to facilitate the process of honey inhalation. Among the tools that beekeepers like to use to suck honey is a syringe. However, syringes have many disadvantages, among which the syringe takes too long to harvest the honey. In addition, it also consumes a lot of user energy and the user is less comfortable, because the syringe is a manual tool. At the same time, syringe is not suitable for Kelulut farming on a scale of more than 50 colonies. In addition, the pumps available today are not durable, which results in the honey suction pressure is only small.

Therefore, large-scale Kelulut farming often involves full-time labor and hired labor during major operations such as processing logs and making toppings as well as the honey harvesting process. The livestock area could be part of a livestock farm that was built particularly for that purpose. For the use of such scale breeders, pumps with high suction power should be used to save harvest time. In addition, it must also be rugged and able to suck up many colonies per harvest session.

1.3 Project Objective

In order to ensure the system, work properly, the objective of the project must be stated clearly. The objective of this project is:

1. To design the IOT based Smart Kelulut Honey Pump based on Blynk
2. To develop the IOT based Smart Kelulut Honey Pump which able to automate the process and remotely monitor.
3. To analyze the performance of Smart Kelulut Honey Pump in comparison with manual system.

1.4 Scope of Project

The scope of this project are as follows:

a) This project will develop a prototype to Development of IOT based Smart Kelulut Honey Pump which limit to ESP8266 and Blynk application.

b) This project is an innovation of honey extractor device aimed at making it easier for consumers to save time and manpower, while being able to grow the economy.

c) This project is to focus the uses of IOT by using Blynk application inside the smartphone.

1.5 Summary

In this chapter, research information on Development of IOT based Smart Kelulut Honey Pumpis based on relevant sources such as setting the motor to be used as a suction device. The conclusion from this study is a pump that uses a combination of mechanical and electronic or

called mechatronics and uses a program to build it. It also created this machine to complete the objectives of this project.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

KELULUT HONEY is one of the few Kelulut livestock products apart from other products such as propolis, pollen, and so on. Kelulut bees have origins in Malaysian and have existed here for thousands of years but had only commercialized in 2015. Therefore there are many ways to collect Kelulut honey from small pouches in super boxes or other locations for honey storage. A Kelulut honeycomb are different from the ordinary honeycomb. Consumption of Kelulut honey requires a high level of skill if using less suitable equipment[1]. In the meantime, there have been several innovations to inhale Kelulut honey done by several entrepreneurs and individuals. The original objective of the entrepreneur is to find new tools aimed at producing beneficial innovations that can increase the productivity of honey production, clean and safe to eat.

2.2 Background

In order to develop this project, a few researches on the past paper specifically on this type of criteria have been made. The related topic searched is Honey Sucker Pump, liquid level with IOT and more. The past researcher does have a few good thesis papers on this subject however no physical evidence product yet to be shown.

2.3 Manual Honey Pump

Syringe is the first tools that beekeepers used in honey production for honeycomb. This tool is both simple to locate and inexpensive to purchase. This instrument also makes inhaling

honeycomb easier for beekeepers and it does neither harm nor destroy the honeycomb because the honey may be replenished without having to rebuild the nest it would have taken a lot more time. The advantages of using syringe is the beekeepers prefer to used it because it claim that they can suck the many honey from honeycomb in a day and more safety to honeycomb. The syringe also can save the beekeepers to produces more honey. Last but not list, syringe also can reduce energy consumption for beekeepers[4].

Figure 2. 1 Manual Honey Pump

2.4 Annahli Honey Inhaler

There have been several innovations to honey Kelulut suction done by several local entrepreneurs and individuals. One of the innovations made is to use the Alat Penyedut Madu 'ANNAHLI' (PPA) created by a young entrepreneur from the State of Terengganu. The Kelulut entrepreneur is Mohd Nur Hafiz from Terengganu. During problems among entrepreneurs doing manual training to suck honey directly from the comb when there is no electricity source, the concept for the design of this PPA originated. This PPA tool comes in a specially designed box made of lightweight and durable material that makes it easy to carry. This PPA tool was found to be able to be used for a large number of colonies up to 30 nests once honey collection. These techniques and tools are designed to make the process of inhaling honey easier and faster, resulting in lower manpower costs and increased productivity. Discuss this practical PPA tool

where according to its creator there are three main components of PPA that are adapted to its function. The components are the Car Battery, Suction Pump and also the Honey Collector Bottle[12].

Figure 2. 2 Annahli Honey Inhaler.

2.5 Honey Vacuum

This project is a creation, and it makes use of materials that are simple to work with. It is usable and simple to manufacture communities especially beekeepers, because it can satisfy the expectations of clients. In the past, there were some tools that were frequently utilized. Honey is sucked like a syringe by the beekeeper. As a result, the project was designed to make the process of breathing Kelulut honey more efficient. One goal in this project is store between them to use battery energy to make Honey Vacuum instead use manually. Ability to vacuum and analyze Honey Vacuum communities, particularly beekeepers, in addition to making ecologically friendly honey. In this project, Honey Vacuum used the motherboard as their microcontroller and power bank as their power supply[11].