POLITEKNIK SEBERANG PERAI

AUTOMATIC HOME-BASED WATERING SYSTEM

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PENGISYTIHARAN

Di sini kami mengisytiharkan bahawa laporan ini adalah berdasarkan hasil kerja kami sendiri dengan bantuan maklumat daripada sumber-sumber yang diberitahu di dalam pengakuan. Kami juga mengisytiharkan hasil projek kami ini tidak pernah dihasilkan oleh mana-mana pelajar lain serta dari institusi pengajian yang lain

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Tarikh : 17 Mac 2017

Disahkan Oleh Penyelia Projek :

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(Encik Faizal Bin Mohamad Twon Tawi)

Tarikh:

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ABSTRACT

Abstract: Watering is the most important cultural practice and most labor intensive task in daily greenhouse operation. Watering systems ease the burden of getting water to plants when they need it. Knowing when and how much to water is two important aspects of watering process. To make the gardener works easily, the automatic plant watering system is created. There have a various type using automatic watering system that are by using sprinkler system, tube, nozzles and other. This project uses watering sprinkler system because it can water the plants located in the pots. This project uses Arduino board, which consists of ATmega328 Microcontroller. It is programmed in such a way that it will sense the moisture level of the plants and supply the water if required. This type of system is often used for general plant care, as part of caring for small garden. Normally, the plants need to be watered twice daily, morning and evening. So, the microcontroller has to be coded to water the plants in the greenhouse about two times per day. People enjoy plants, their benefits and the feeling related to nurturing them. However for most people it becomes challenging to keep them healthy and alive. To accommodate this challenge we have developed a prototype, which makes a plant more self-sufficient, watering itself from a large water tank and providing itself with artificial sunlight. The pro-To type reports status of its current conditions and also reminds the user to refill the water tank. The system automation is designed to be assistive to the user. We hope that through this prototype people will enjoy having plants without the challenges related to absent or forgetfulness.

APPRECIATION

Praise be to Allah, The Lord Of the World peace and blessing be communicated to the beloved prophet Muhammad's S.A.W family and His companions. In order to complete a proposal, told this to thank Allah S.W.T. As the author of this project, I and my friends thank the infinite especially to our supervisor Encik Faizal Bin Mohamad Twon Tawi and do not forget also to all lecturers, friends, family and involved either directly or indirectly in aid and encouragement to us in a book report project and complete the project "Automatic Home-based Watering system". All the error and deficiencies are weakness of us. Thus, al-adjust Assamualaikum.

CHAPTER 1

INTRODUCTION

1.1 : INTRODUCTION

Water is the most important element in our life. Without it, we cannot survive. Watering system can be defined as a system to deliver water to the plants in a greenhouse. These types vary from simple ones to most sophisticated systems and you have to choose the best suited one for your plants. In short, such system takes care of the water requirements of plants and totally eliminates watering.

Healthy plants can transpire a lot of water, resulting in an increase in the humidity of the greenhouse air. A high relative humidity (above 80-85%) should be avoided because it can increase the incidence of disease and reduce plant transpiration. Sufficient venting or successive heating and venting can prevent condensation on plants surfaces and the greenhouse structure. During periods with warm and humid outdoor conditions, humidity control inside the greenhouse can be a challenge. Greenhouses located in dry, dessert environments benefit greatly from evaporative cooling systems because large amounts of water can be evaporated into the incoming air, resulting in significant temperature drops.

Hence, home-based watering system is created. It is one of the electrical designed that have multipurpose function. It is used not only for housewife but everyone. Home-based watering system is used to water the plant automatically in a straight line by following the line that has been installed. It gives a slightly effect in planting plants around house compounds or outdoor. This is because not all types of plantation that is able to grow systematically. With this help of the robot it can helps housewives and society to do their own duties. Through the home-based watering system, world temperature could also be maintained in a balanced temperature from getting higher or lower thus can prevent from greenhouse effect.

1.2 : PURPOSE

- Functional :

Thought this may be taken for granted, a working prototype is necessary to   satisfy with people.

- Safe :

The completed system should pose no risk to either the user. Risks include electric shock, damaged the device or damage to other electronic devices in the environment.

1.3 : PROBLEM STATEMENT :

Nowadays, automatic home-based watering system is commonly applied in housing area. However, there are also a small proportion of housewives who prefer to self-water their plant as they believe that there is high cost involved in the utilization of the water system. Despite the cost involved, problem will arise when the housewives forget, did not have time to water the plants or even accidentally watering too much which will cause the plants do not get enough water. Hence, the project is focus on self-timer, controllable and durable system to create a Public Water System.

1.4 : OBJECTIVES OF THIS WORK :

- To maintain the moisture of the plant

- To water the plant systematically whenever family was not at home.

- To save up the time to water the plant.

1.5 PROJECT SCOPE :

- This robot only used soil moisture sensor grove to detect the moisture of the soil .
- This robot used transistor to control the amount of water by preventing the extra flowing of the water though the water pump.
- This robot waters the plants for every single pot.

1.6 : THE IMPORTANCE AND IMPACT OF THE PROJECT.

- Reduce energy to carry the piping system for every single watering moment.
- Prevent the plant to get damaged because of the dryness.
- Cover shortage of land reserved water due to lack of rain and unplanned use of water as a result large amounts of water goes waste.
- Improving the lifestyle and able to easy the family to go with vacation throughout the day.

CHAPTER 2

LITERATURE REVIEW

2.1: INTRODUCTION

This session discuss on the overall project theory and concept. Thus, the heart of this project is microcontroller where it can influences the entire of the project. The system using arduino to automate the watering of small potted plants or crops. This system majority does the control of soil moisture to ensure that the plant will grow eventually. Hence, the purpose of the literature review is to explain the perspective and method that is used in previous research or project and to classify how much this project related with those research and theory. Moreover, this session will show the theory and concept used to solve problem. Theoretical is very important as a guidelines in doing any kind of research.

2.2: CIRCUIT OF HOME-BASED WATERING SYSTEM

The figure 2.2.1 circuit diagram is a home - based watering system which shows that a simple automatic plant watering system for watering your gardens, plants, etc. Frequently, we cannot set the time for watering the plants due to which the soil of the plants becomes dry. So, for a proper care, we used a moisture sensor grove to detect the moisture level in the soil.

This circuit contains a probe, which will sense the moisture of the soil at the specific value of dryness. You can connect the water pump with the motor to switch the circuit on automatically to water the plant. Thus, water pump 12V is used. This circuit uses one transistor which names as transistor 2n222 that work as a switches which is connected to water pump. Furthermore, two motors are used to function the wheels.
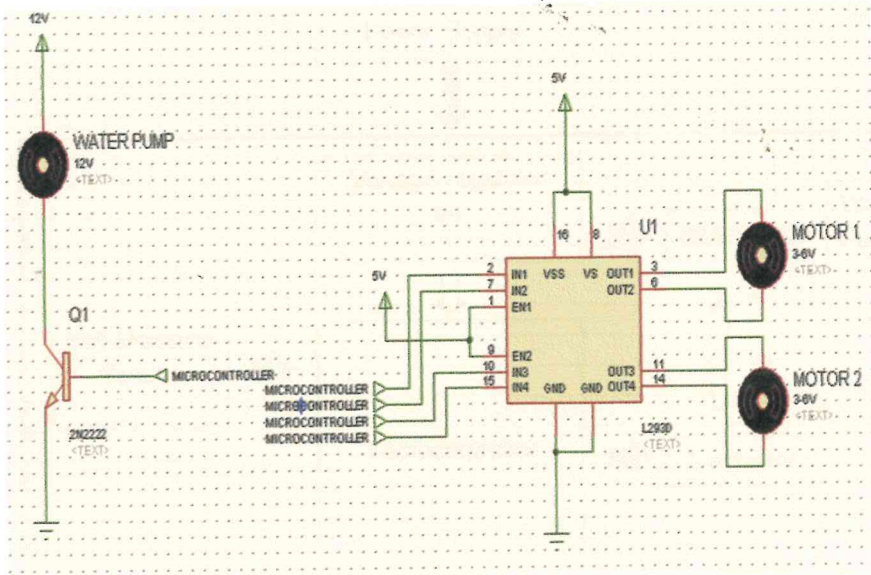

FIGURE 2.2.1 HOME-BASED WATERING SYSTEM CIRCUIT

2.3: BLOCK DIAGRAM OF HOME-BASED WATERING SYSTEM

The power supply includes a step-down transformer that steps down the voltage to 12V AC. This AC voltage is converted into a DC using a bridge rectifier, and then regulates 5V using a voltage regulator. This voltage is used for the operation of the microcontroller.

The below figure 2.3.1 is a diagram which show that the block diagram of home-based watering system. The block diagram includes a few of components. Firstly, the main components is namely as soil moisture sensor. It is a sensor grove which is used to detect the moisture sensor level in the soil. Thus, the arduino works as an internal switching. 5V of the motors is used to function the water pump and move the wheels which can also turns to 360 degree. The water pump is used to pump out the water which when the transistor 2n222 is turning on by controlling the flowing of the water.

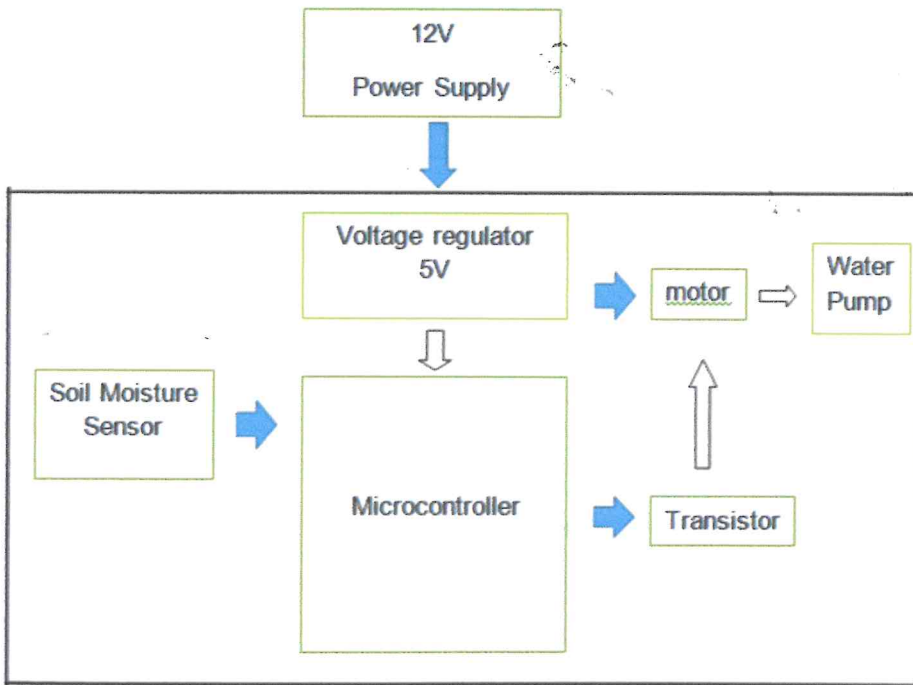**Block diagram of home-based watering system**

FIGURE 2.3.1 HOME-BASED WATERING SYSTEM BLOCK DIAGRAM

2.4 CONNECTION OF THE COMPONENTS OF THE CIRCUIT

Figure 2.4.1 show that a complete connection of a components in a home-based watering system.
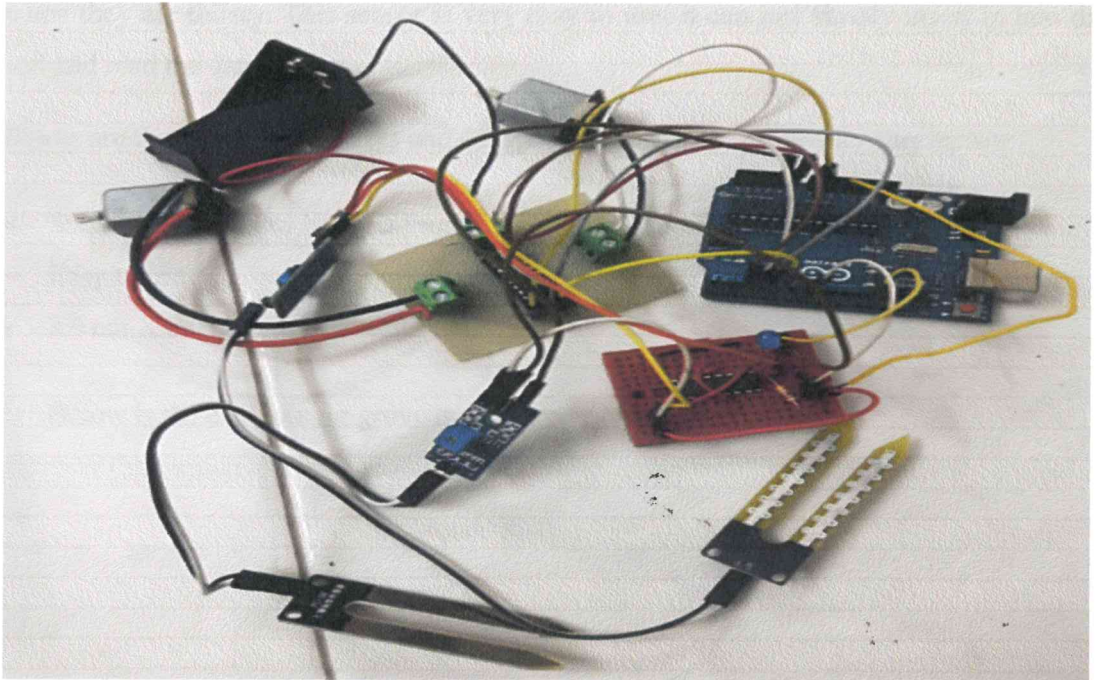

FIGURE 2.4.1: HOME-BASED WATERING SYSTEM KIT

Thus, this automatic plant-irrigation system depends on the input of the soil moisture sensors. Whenever there is a need of excess water in the soil , by using soil moisture sensor , we will be able to detect the moisture level of the soil .

2.5: SELECTION OF SOIL MOISTURE SENSOR

After searching various type of soil moisture sensor, the grove moisture sensor is the most suitable to be used in the home-based watering system.

This Moisture Sensor can be used for detecting the moisture of soil or judge if there is water around the sensor, let the plant in the garden be able to reach out for human's help when they are thirsty. This sensor is very easy to use; it can just simply insert in into the soil and read the data.

Below are the according features and the specification of the grove moisture sensor.

- Soil moisture sensor based on soil resistivity measurement
- Easy to use
- 2.0 cm X 6.0 cm grove module
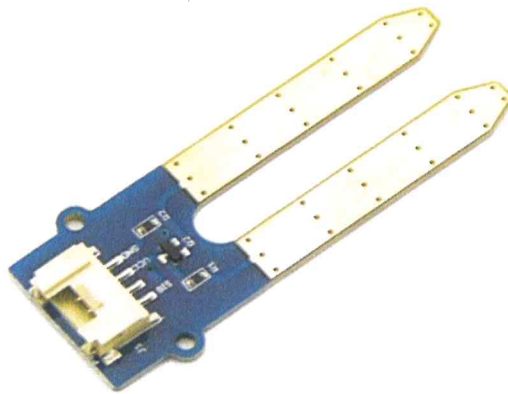
Below is the example for grove moisture sensor.

FIGURE 2.5.1 DIAGRAM OF GROVE MOISTURE SENSOR

2.5.2 SPECIFICATION

Item	Condition	Min	Typical	Max	Unit
Voltage	–	3.3	–	5	V
Current	–	0	–	35	mA
Output Value	Sensor in dry soil	0	–	300	
	Sensor in humid soil	300<700>		700	
	Sensor in water			950	

Furthermore, there is a using of using the grove moisture sensor since it can be used with arduino. When the soil moisture deficits, the sensor output value will decrease. So it can be detected that and know that whether a plant needs water or not by observing the result that the sensor output.

Precaution of grove moisture sensor:

This sensor isn't hardened against contamination or exposure of the control circuitry to water and may be prone to electrolytic corrosion across the probes, so it isn't well suited to being left in place or used outdoors.

- Do not left in place the sensor.
- Stop to power the sensor when is not used.

2.5.3 CONNECTION OF THE ARDUINO

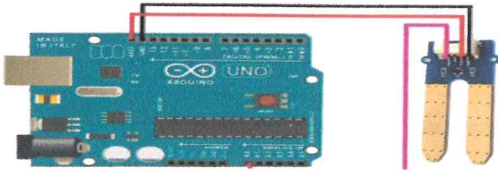Hence, here is a simple way to connect to the arduino

FIGURE 2.5.4 DIAGRAM OF CONNECTION OF ARDUINO

```
int sensorPin = A0;

int ledPin = 8;

int sensorValue = 0;


void setup() {

  Serial.begin(9600);

  // put your setup code here, to run once:

pinMode(ledPin, OUTPUT);

}


void loop() {

 sensorValue = analogRead(A0);

digitalWrite(ledPin, HIGH);


delay(9600);

Serial.println(sensorValue);

delay(100);// put your main code here, to run repeatedly:
```