SMART WATERING DEVICE

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ABSTRACT

Plants watering system is a simple and easy to use plant watering system. As we can see, nowadays people do not get engaged to the plants due to the lack of time, and they find it difficult to handle and water their plant time to time. Thus, this will result bad impact for our nature in future. This system is ideal for monitoring the water level of an urban garden or our pet plant. It will detect the moisture of the soil, the temperature of surrounding and alert the owner about the condition of their plants. With the help of this system, it will help the owner for watering the plants.

Therefore, the proposed this system to help and encourage people to take care of their plant easily. With the help of moisture sensor it will give water automatically to plant. This system will inspire, engage and support people to take their personal responsibility of taking care the environment and making it fun and sustainable. It is a great innovation as the plant and the owner. This project will be implementing using ATMEGA328P-PU by using C programming language.

ACKNOWLEDGEMENT

We would like to take this opportunity to thank our final project lecturer, En. Hamadi Bin Ahmad that helped us to success our final project. Thanks for sharing the information how to write a good proposal. We also would like to thank to our Civil Engineering Head Department, En. Mohamad Fadzil Bin Hj Basir Ahmad that let us leave to go to AIMST, Kedah to learn further knowledge about arduino for our final project. Thank you also for having shared tips on how to deal with other people in formal way.

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In addition, Thank also to our supervisor, Puan Siti Aminah binti Mohd Radzi that guide us to this project. Thank you because keep supporting us and give us advice like our parent. Besides that, Thank for sharing experience to us for us to use in future.

Lastly, we would like to thank to our parent and friend that give us moral supporting. Thank also for give us advice and support money for us to do our final project. Without they we cannot complete our final project.

AUTHOR'S DECLARATION

I declare that the work in this report was carried out in accordance with the regulations of Seberang Perai Polytecnic. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. In the event that my report be found to violate the conditions mentioned above, I voluntarily waive the right of conferment of my diploma and agree be subjected to the disciplinary rules and regulations of Seberang Perai Polytecnic.

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CONTENT

LIST OF FIGURE

LIST OF TABLE

CHAPTER 1

INTRODUTION

This project to design a one device to watering plant in eco water usage. Other than that, it also easy to use and portable because the body design for this device small, light-weight and save space. The project title was named "Smart Watering Device" and the title was selected because in this device contain the combination of hardware and software that controlled by Arduino. The advantage using Arduino in this project is the light-weight microcontroller and easy to understand the syntax or command. The syntax of Arduino is C++ language that easy to construct, edit, update, run, and remove. The main purpose of this project is to save our water usage in daily life.

1.1 BACKGROUND

Massive water crisis threatens Malaysia

PETALING JAYA: First, the prolonged dry spell, and now a potentially massive water crisis ahead as the country faces the full impact of El Nino.

The National Water Services Commission (SPAN) has raised the alarm bells, warning that not enough was being done to conserve water. Rivers are drying up and dam levels are dropping acutely by the day. SPAN chief executive Datuk Mohd Ridhuan Ismail said urgent measures were needed to remind the public to stop wasting and start conserving water. The prolonged hot and dry spell is impacting different parts of the country in different ways. The worst hit will be 85,000 domestic and industrial consumers in parts of Johor when rationing starts on Monday.Output from four water treatment plants in the Kota Tinggi and Mersing districts have reached critical levels.

During the exercise, water supply will run normally for one day in the affected areas while there will be no water supply for the next two days.

In Pahang, Pengurusan Air Pahang Bhd (PAIP) said there was a need to start looking for alternative sources of water, including from wells. This comes after the water level at rivers in Pahang dropped drastically, making it difficult for treatment plants in three districts to get raw water. More than 7,000 account holders in Lipis, Pekan and Temerloh are facing supply disruptions. In Malacca, Chief Minister Datuk Seri Idris Haron said the state will have to consider water rationing if the dry spell continues. For now, there is enough water in all three major dams.Up north, near the Perak-Thai border, an entire lake has all but "disappeared". The man-made Tasik Takong, in the Takong Recreational Park,

used to be popular spot for anglers, picnickers and tourists. In Rantau Panjang, Sungai Golok which divides Kelantan and Thailand is now easier to cross without the need for any travel documents. Dry weather has turned the river into a stream and some parts of the river can be walked across.

In Kangar, cows were seen grazing in the Timah Tasoh Dam which saw water levels dipping below the critical level.A village road submerged when the dam was built over two decades ago is now usable again. In Sabah, villagers on Banggi Island have resorted to digging into dry riverbeds while others are relying on wells and springs which are also drying up. Penang's state-owned water corporation - PBA Holdings Bhd - urged the Federal Government to instruct all water authorities to stop irrigation of paddy fields, especially in the northern region, until the rains return. PBA Holdings chief executive officer Datuk Jaseni Maidinsa said the extraordinary move was needed to counter the effects of what he described as a "super drought". Jaseni said the water of the Muda River in Kedah was too precious to be used in the thousands of hectares of paddy fields in Kedah and Penang.

The Star. (2016, April 16). Massive water crisis threatens Malaysia. Retrieved from Asia One: http://news.asiaone.com/news/malaysia/massive-water-crisis-threatens-malaysia

(The Star, 2016)

1.2 Problem Statement

Water waste happen during watering plant.	Plant does not watered at the proper time with right amount of water.	Automatic watering system using big area to place it.
• Much water have been use while watering plant without limit. • No measurement usage of water during watering plant by human in normal method.	• Human cannot know accurately when the soil completely dry and moist. • Busy user have no time to watering the plant according right time.	• Normal automatic watering system device using large of space to set up. • Using many pipe and water. • Need many of attachment piping.

TABLE 1.2 PROBLEM STATMENT

1.3 Objectives.

- To build watering device in automatic mode, lightweight, portable and easy to handle.
- The objective of this project was to design a small-scale automated

irrigation system for indoors that would use water in a more efficient way, in order to prevent water loss.

1.4 Issue

Why this project need to build?

- To help our nation to decrease the percentage of water crisis.
- To save our water usage in daily life.
- This device can help to watering the plant by itself in 24/7.
- This device can help to watering the plant using accurate amount of water for plant and in eco mode water usage.
- This device can manage around 2-3 port with the same size of port.
- This device can expand the power by changing the water pump. The bigger the water pump the more power for this device to watering the plant.

1.5 Scope of work.

Scope:

For busy user that like to build small garden but does not have much time to watering the plant and do not know how much the plant need amount of water.

Limitaton:

- Only can support in small area 1m x 1m x 1m.
- Can pump the water 800L in 1 hour.
- Can Pump for 3 port of plant with same size of port in the same time.

Significant:

This project focus on busy user that love to build mini garden including eco usage of water during watering the plant because usually busy user such as traveller, businessman, and busy worker does not have much time to watering the plant on regular basis. This device application is to help busy worker to watering the plant regularly. Although the device will watering the plant in eco water usage mode, lightweight, portable, and easy to handle.

Chapter 2

Literature Reviews

2.1 CHAPTER INDTRODUCTION

Literature review can be defined as a background study about the erudition and information needed to develop a project. To develop a consummate and functional project it is obligatory to inditing literature review to go through afore starting project analysis and design. This chapter will fixate on the theory of each part and software utilized in my project. The sources from theory are taken from book, journal, article and website that are pertinent. Besides, methods and implements used to handle project are described and discussed.

2.2 PREVIOUS RESEARCH

2.2.1 Moisture Sensor

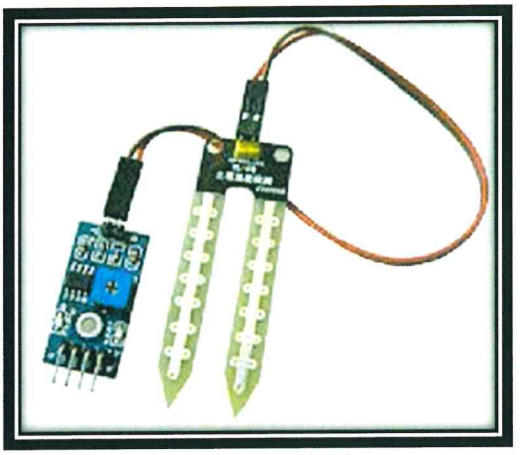

Figure 2.2.1: MOISTURE SENSOR

Soil moisture measurements are essential to understand land surface–atmosphere interactions. In this paper we evaluate the performance of the low-cost 10HS capacitance sensor (Decagon Devices, United States) using laboratory and field measurements. Measurements with 10HS sensors of volumetric water content (VWC, Vol.%), integrated absolute soil moisture (millimeters) over the measured soil column, and the loss of soil moisture (millimeters) for rainless days are compared with corresponding measurements from gravimetric samples and time domain reflectometry (TDR) sensors. The field measurements were performed at two sites with different soil texture in Switzerland, and they cover more than a year of parallel measurements in several depths down to 120 cm. For low VWC, both sensor types present good agreement for laboratory and field measurements. Nevertheless, the measurement accuracy of the 10HS sensor reading (millivolts) considerably decreases with increasing VWC: the 10HS sensors tend to

become insensitive to variations of VWC above 40 Vol.%. The field measurements reveal a soil type dependency of the 10HS sensor performance, and thus limited applicability of laboratory calibrations. However, with site-specific exponential calibration functions derived from parallel 10HS and TDR measurements, the error of the 10HS compared to the TDR measurements can be decreased for soil moisture contents up to 30 Vol.%, and the day-to-day variability of soil moisture is captured. We conclude that the 10HS sensor is appropriate for setting up dense soil moisture networks when focusing on medium to low VWC and using an established site-specific calibration function. This measurement range is appropriate for several applications in climate research, but the identified performance limitations should be considered in investigations focusing on humid conditions and absolute soil moisture.

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2.2.2 Arduino

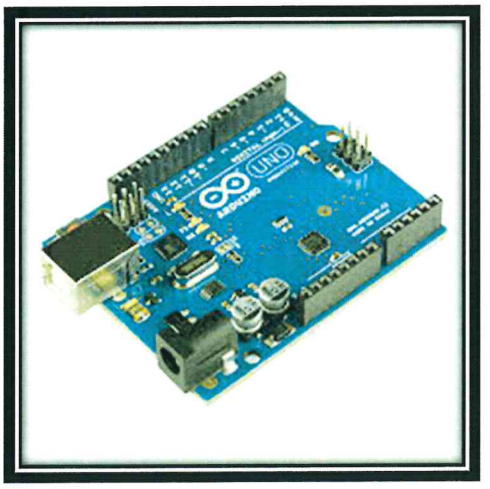

Figure 2.2.2: ARDUINO UNO

In this paper, we analyze the working principle of an arduino. These days many people try to use the arduino because it makes things easier due to the simplified version of C++ and the already made Arduino microcontroller(atmega328 microcontroller [1]) that you can programme, erase and reprogramme at any given time. In this paper we will discuss the hardware components used in the arduino board, the software used to programme it (Arduino board) with the guide on how to write and construct your own projects, and a couple of examples of an arduino project, This will give you the overall view of an arduino uno, that after reading this paper you will get the basic concept and use of an arduino uno.

2.2.3 Relay

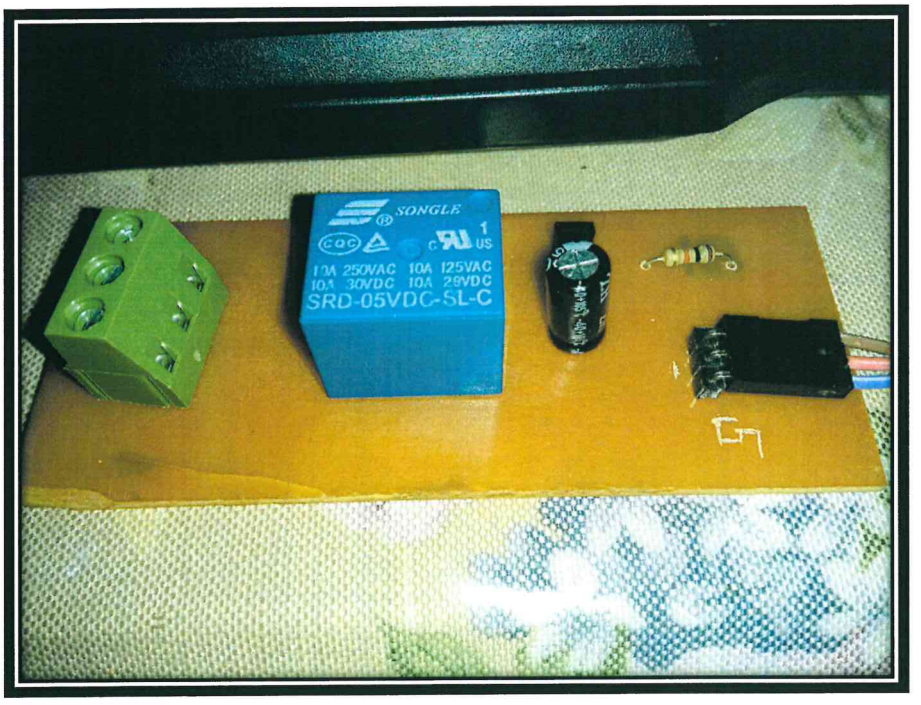

Figure 2.2.3 :RELAY

A relay is an electromagnetic switch operated by a relatively small electric current that can turn on or off a much larger electric current. The heart of a relay is an electromagnet (a coil of wire that becomes a temporary magnet when electricity flows through it). You can think of a relay as a kind of electric lever: switch it on with a tiny current and it switches on ("leverages") another appliance using a much bigger current. Why is that useful? As the name suggests, many sensors are incredibly sensitivepieces of electronic equipment and produce only small electric currents. But often we need them to drive bigger pieces of apparatus that use bigger currents. Relays bridge the gap, making it possible for small currents to activate larger ones. That means relays can work either as switches (turning things on and off) or as amplifiers (converting small currents into larger ones).

2.2.4 LED

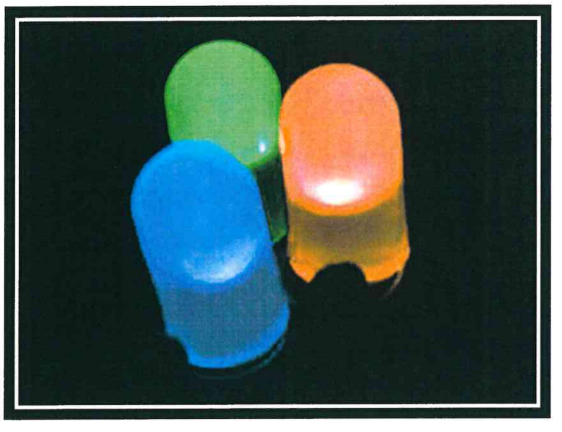

Figure 2.2.4: LED

An overview of the rapid progress in the developments of the inorganic light emitting diode (LED) technology is presented. Innovative structures and designs of the

device have led to dramatic improvements of the performance in LED technology, groundbreaking performance records are being reported constantly. This article summaries the recent progress of the high brightness LEDs, and describes the LED structures from the basic pn homojunction, to heterojunction, and eventually the use of nano-scale low-dimensional structures in the device fabrication. Some of the novel structures and designs of the most recent developed high brightness LEDs, as well as the conventional and innovative ways of producing white LEDs are briefly discussed.

2.2.5 Buzzer

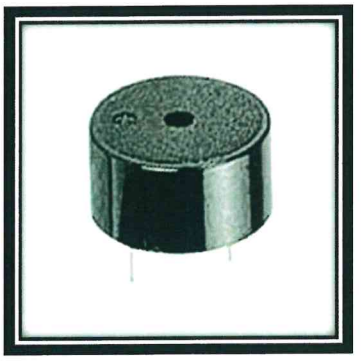

Figure 2.2.5: Buzzer

A buzzer is a mechanical, electromechanical, magnetic, electromagnetic, electro-acoustic or piezoelectric audio signalling device. A piezo electric buzzer can be driven by an oscillating electronic circuit or other audio signal source. A click, beep or ring can indicate that a button has been pressed.

2.3 LITERATURE SUMMARY

Base on literature review, Smart Watering Device is a good device because it has a simple program and easy to use for user. Besides, this Smart Watering Device using relay

and its can operate with small current to operate larger electric current. As we know relay can react as two function such as switching the circuit on and off and react as amplifiers converting from small current to larger.

Furthermore, this Smart Watering Device using portable brain and it was Arduino Uno. This Microcontroller is easy to use, easy to control or changing command. Although Arduino Uno is an open source and cheap. Other than that, water level sensor also has been used in this project. The accuracy of this low-cost sensor is field tested and found to be ±0.5% of the full range, for a 10 m level of water in a tank, and is working reliably for the period of 18 months. The sensor range can be easily extended to lower and higher tank heights. The sensor is crowned by its easy installation and calibration.

Lastly, we use moisture sensor to detect the percentage of humidity inside the soil. By using this sensor we able know when the plant need water. So it can help the soil keep in good humidity and it also in low cost sensor.

Chapter 3

Methodology

3.1 INTRODUCTION CHAPTER

Methodology is a system of broad principles or rules from which specific methods or procedures may be derived to interpret or solve different problems within the scope of a particular discipline.

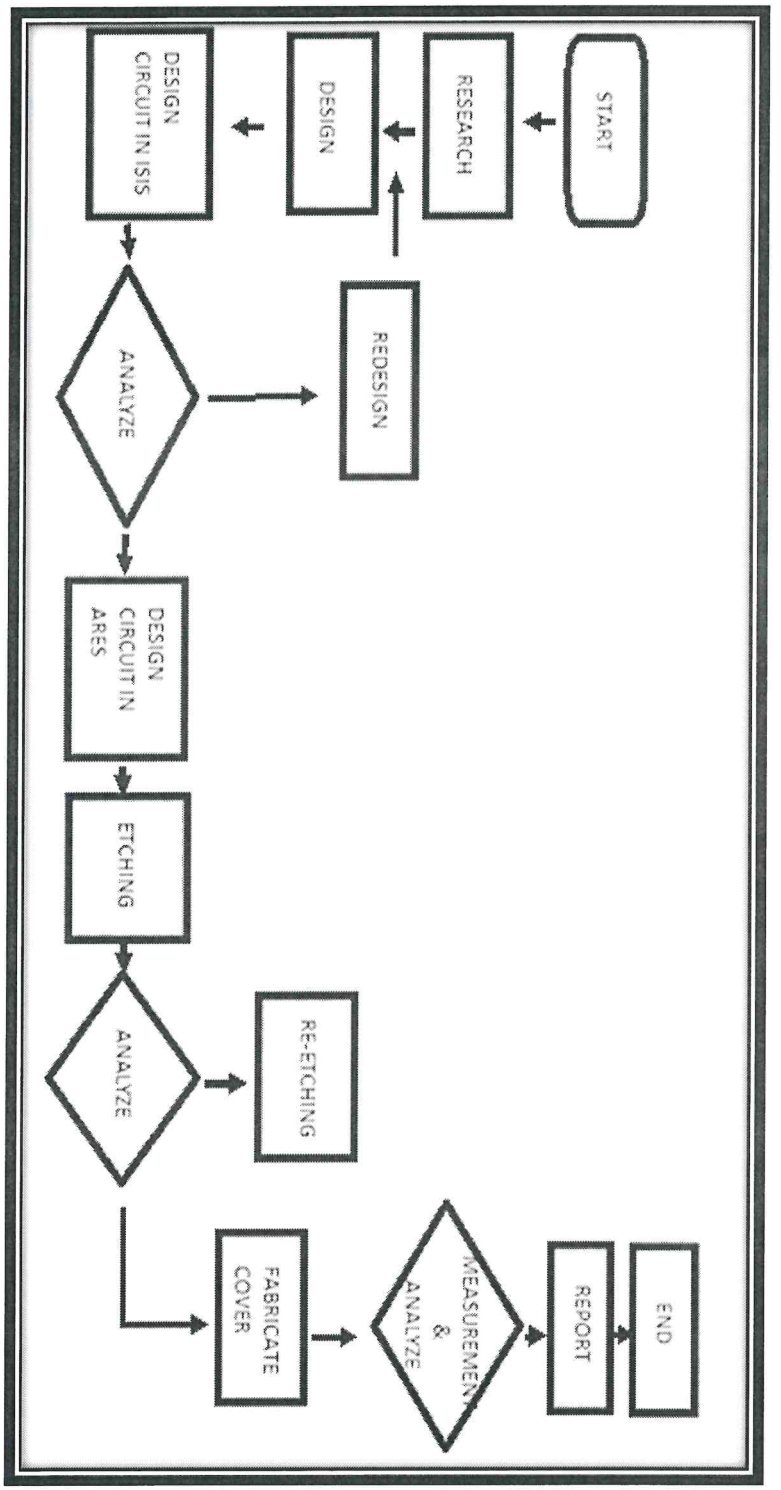

Table 3.1(a): FLOW CHART

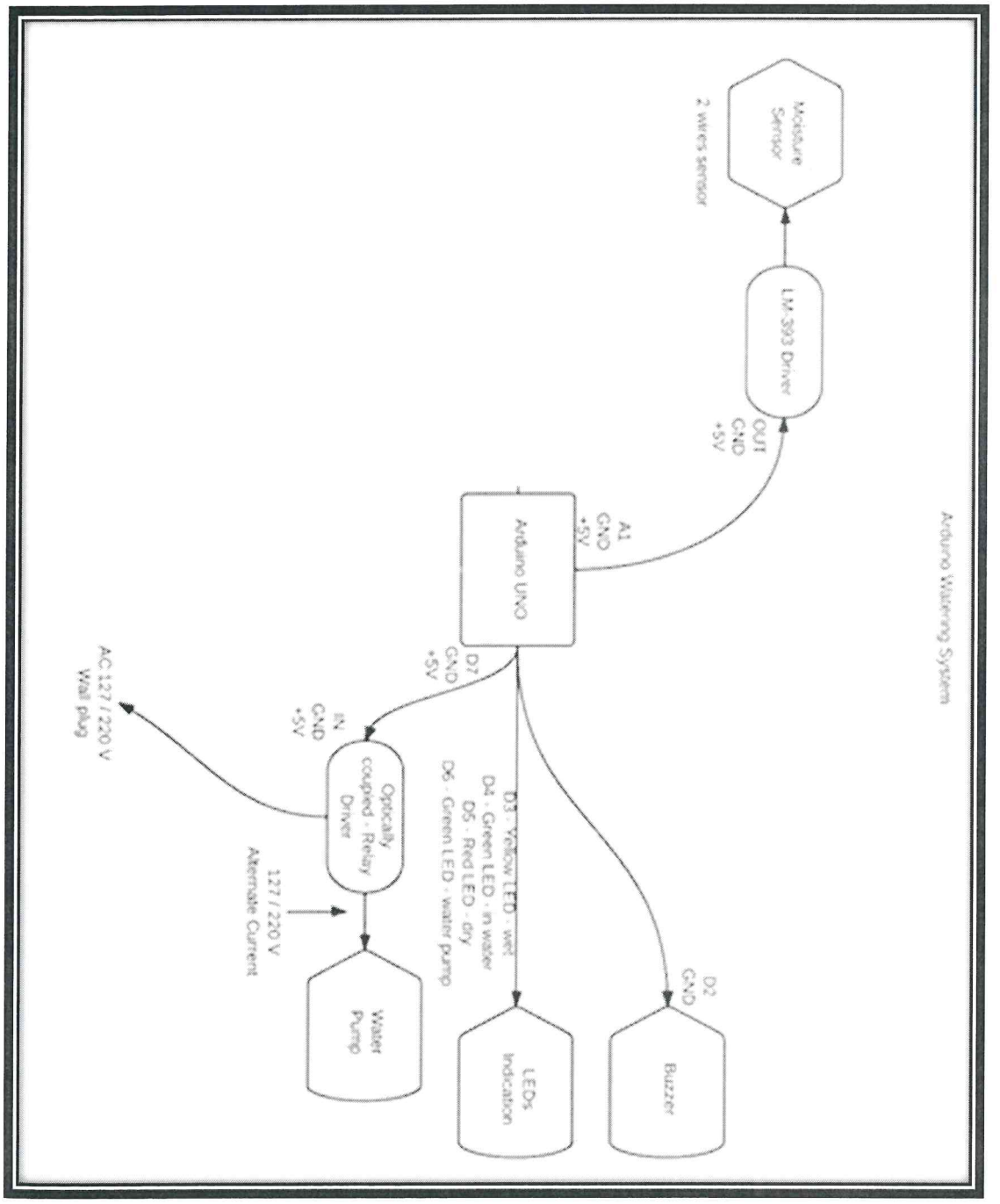

Figure 3.1(a): DIAGRAM

3.2 GENERAL CONSTRUCTION

Figure 3.2(a): Ganeral Construction

Smart watering device has been built to encorage human to save our resource. It help human to set limit of water usage while take care of plant. Besides, this method will be one of trending method in future because almost all thing nowdays have been change from analog to digital and manually to automatic. This phenomena happen when all human involve with work and no time to take care our earth resources. So this type of device encorage human to take care our resources while busy with their jobs. The benefit from this type of device is our earth will stay remain in good condition and decrease the percentage of water crisis issue.

3.3 DATA COLLECTION METHOD

3.3.1 SELF STUDY

- Use observation from internet and from jurnal. In this method we select water crisis in Malaysia and how to encounter the water crisis. Try figure out the problem and try make one device that can help to decrease the crisis.

3.4 ELECTRICAL DESIGN

The electrical design in this system include the Arduino Uno, Water Pump, Moisture sensor,Relay, Buzzer, Power Bank and LED.

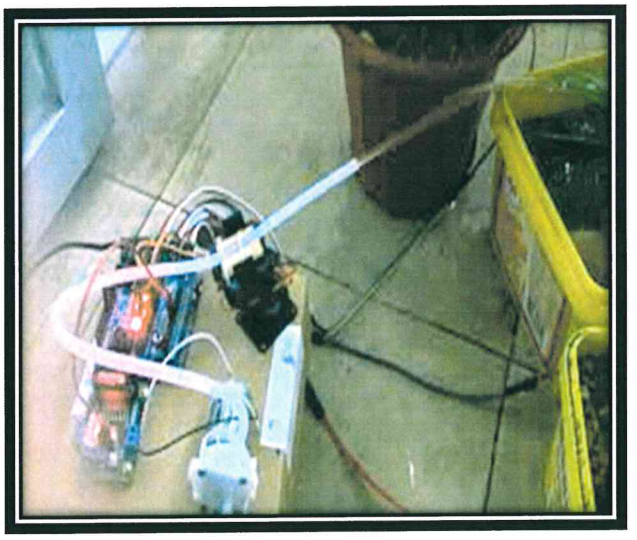

Figure 3.4(a) Electrical Design

Figure 3.4.(b) Electrical Design

3.4.1 Microcontroller Design

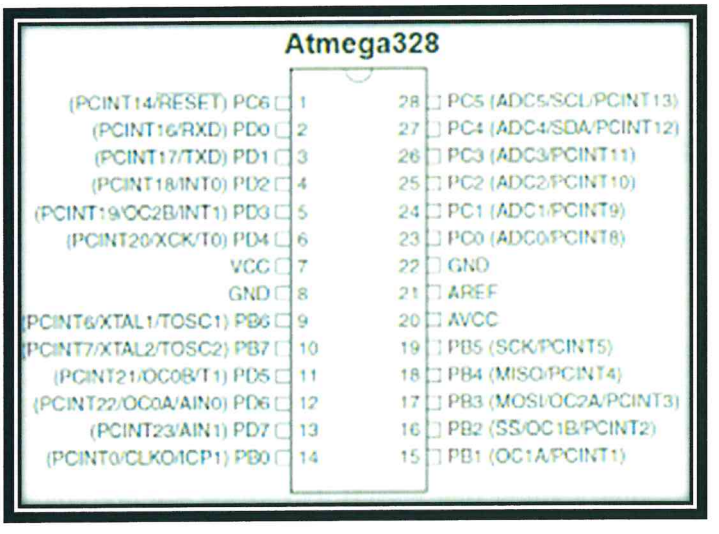

Figure 3.4.1.(a): Microcontroller Atmega 328 Pin Diagram