# AUTOMATIC IRRIGATION SYSTEM

**A Project submitted in partial fulfillment of the requirements for the Award of Degree of**
**Bachelor of Science in Electrical and Electronic Engineering**


**By**

**SAMMI AKTAR**

**ID: 151-33-2520**

**MALIHA TABASSUM URMI**

**ID: 151-33-2304**

**Supervised by**

**SAIKAT BASAK**

**Senior Lecturer**

**Department of EEE**




**DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING**

**FACULTY OF ENGINEERING**

**DAFFODIL INTERNATIONAL UNIVERSITY**

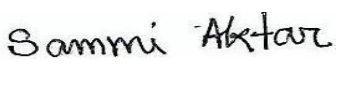


**December 2018**

# CERTIFICATION

This is to certify that this project and thesis entitled "AUTOMATIC IRRIGATION SYSTEM" is done by the following students under my direct supervision and this work has been carried out by them in the laboratories of the Department of Electrical and Electronic Engineering under the Faculty of Engineering of Daffodil International University in partial fulfillment of the requirements for the degree of Bachelor of Science in Electrical and Electronic Engineering. The presentation of the work was held on 10 December 2018

**Signature of the candidates**



**Name: Sammi Aktar**
ID: 151-33-2520

**Name: Maliha Tabassum Urmi**
ID: 151-33-2304

**Signature of the Supervisor**

**Saikat Basak**
Senior Lecturer
Department of EEE

**Dedicated to**

# Our Parents

# &

# Teachers

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| LED | Light Emitting Diodes |

# ACKNOWLEDGEMENT

First of all, we give thanks to Allah or God. Then we would like to take this opportunity to express our appreciation and gratitude to our project and thesis supervisor **Saikat Basak, Senior Lecturer, Department of EEE** for being dedicated in supporting, motivating and guiding us through this project. This project can't be done without his useful advice and helps. Also thank you very much for giving us opportunity to choose this project.

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# ABSTRACT

Bangladesh is the agriculture based country. Most of the people in our country completely depended on the agricultural harvesting. Agriculture is a source of livelihood of majority Bangladeshi and has great impact on the economy of the country. In dry areas or in case of inadequate rainfall, irrigation becomes difficult. So, it needs to be automated for proper yield and handled remotely for farmer safety. If the farmer is far from the agricultural land he will not be noticed of current conditions. So, efficient water management plays an important role in the irrigated agricultural ingathering systems. .

# CHAPTER 1
# INTRODUCTION

## 1.1 Introduction

By applying the idea of Arduino based automatic irrigation system a gardener or farmer can save water up to 60% and power. This idea builds on two irrigation methods those are: conventional irrigation methods like overhead sprinklers, flood type feeding systems i.e. wet the lower leaves and stem of the plants.

## 1.2 Problem Statement

Irrigation of plants is a good time- consuming activity, to be done in amount of time; so it needs a big amount of human resources. With such systems, the control is good limited, and many wealth are still wasted. Water is one of these wealth that are apply excessively. Numerous irrigation is one method apply to water the plant. This method represents voluminous dissipation since the amount of water given is in increase of the plant's needs. The excess water is evacuated by the holes of the pots in greenhouses, or it percolate through the soil in the fields.

## 1.3 Objective

- It's design on a low cost device for control the water pump automatically.
- It's save farmers effort, water and time.
- The power to conserve the simple resources as well as giving excellent boost to the production of the harvests is one of the main aims of incorporating such technology into the agronomic land of the country.

## 1.4 scopes

A critical regard is the placing costs, since expense usually determine the probability and viability of a project. The placing must be simple enough for a domestic Apply. The water saving was also significant aspect, since there is a demand to minimize water loss and to minimize the efficiency

of water used. Finally, the potential for implementing the system at a larger scale should be investigation.

## 1.5 Methodology

- Collection of information's from books and internet.
- Required components have been purchased from market.

### 1.5.1 Sources of Information

The necessary information was set up from a variety of sources. Information about the varied didactic and types of soil moisture roasting jack was earned from the Ontario Ministry of agronomic, Food and Rural Affair website and various roasting jack craftsman and vendors.

### 1.5.2 Required Input Data

Depending on the types of plants to be irrigated, the necessary soil moisture for Enhancement and protection varies.

## 1.6 Project Outline

This project organized as follows

Chapter-1 Introduction of the project

Chapter-2 Reviews the literature

Chapter-3 Theoretical model

Chapter-4 Hardware development part.

Chapter-5 Result and discussion

Chapter-6 Conclusion

## 1.7 Summary

In this chapter, we discussed about our project Automatic irrigation System, where we briefly discuss about project. At the last part of this chapter we discuss about our object, Future scope of the work, methodology and project outline.

# CHAPTER 2

# LITERATURE REVIEWS

## 2.1 Introduction

In this chapter we will contain information about automatic irrigation. Here we will also discuss Arduino and choosing reason. Also, contains moister sensor and its history.

## 2.2 Automatic Irrigation system

Irrigation system apples valves to turn irrigation ON and OFF. These valves may be effortlessly automated by using controllers and solenoids. Automating farm or nursery irrigation allows farmers to apply the right amount of water at the right time, regardless of the availability of la bor to turn valves on and off. In addition, farmers using automation equipment are able to red uce runoff from over watering saturated soils, avoid irrigating at the wrong time of day, which will improve crop performance by ensuring adequate water and nutrients when needed. Auto matic Drip Irrigation is a valuable tool for accurate soil moisture control in highly specialized greenhouse vegetable production and it is a simple, precise method for irrigation. It also helps in time saving, removal of human error in adjusting available soil moisture levels and to max imize their net profits. Irrigation is the artificial application of water to the soil usually for ass isting in growing crops. In crop production it is mainly used in dry areas and in periods of rai nfall shortfalls, but also to protect plants against frost.

Types of Irrigation Surface irrigation

- Localized irrigation
- Drip Irrigation
- Sprinkler irrigation

Conventional irrigation methods like overhead sprinklers, flood type feeding systems usually wet the lower leaves and stem of the plants. The entire soil surface is saturated and often stay s wet long after irrigation is completed. Such condition promotes infections by leaf mold fung i. On the contrary the drip or trickle irrigation is a type of modern irrigation technique that slo

wly applies small amounts of water to part of plant root zone. Water is supplied frequently, of ten daily to maintain favorable soil moisture condition and prevent moisture stress in the plant with proper use of water resources. Drip irrigation saves water because only the plant's root zone receives moisture. Little water is lost to deep percolation if the proper amount is applied. Drip irrigation is popular because it can increase yields and decrease both water requirements and labor. Drip irrigation requires about half of the water needed by sprinkler or surface irrig ation. Lower operating pressures and flow rates result in reduced energy costs. A higher degre e of water control is attainable. Plants can be supplied with more precise amounts of water. Di sease and insect damage is reduced because plant foliage stays dry. Operating cost is usually r educed. federations may continue during the irrigation process because rows between plants re main dry.

## 2.3 Arduino Nano

Arduino is open source physical processing which is based on a microcontroller board and an incorporated development environment for the board to be programmed. Arduino gains a few inputs, for example, switches or sensors and control a few multiple outputs, for example, light s, engine and others. Arduino program can run on Windows, and Linux operating systems (O S) opposite to most microcontrollers' frameworks which run only on Windows. Arduino progr amming is easy to learn and apply to beginners and amateurs. Arduino is an instrument used t o build a better version of a computer which can control, interact and sense more than a norm al desktop computer. It's an open-source physical processing stage focused around a straight forward microcontroller board, and an environment for composing programs for the board. Ar duino can be utilized to create interactive items, taking inputs from a diverse collection of swi tches or sensors, and controlling an assortment of lights, engines, and other physical outputs. Arduino activities can be remaining solitary, or they can be associated with programs running on your machine. The board can be amassed by hand or bought preassembled; the open-source IDE can be downloaded free of charge. Focused around the Processing media program ming environment, the Arduino programming language is an execution of Wiring, a comparati ve physical computing platform. [1]

### 2.3.1 Why using Arduino

Arduino has been used in thousands of different projects and applications. It runs on Mac, Wi ndows, and Linux. Teachers and students use it to build low cost scientific instruments, to pro ve chemistry and physics principles, or to get started with programming and robotics. Designe rs and architects build interactive prototypes, musicians and artists use it for installations and t o experiment with new musical instruments. Arduino is a key tool to learn new things. There are many other microcontrollers and microcontroller platforms available for physical computin g. All of these tools take the messy details of microcontroller programming and wrap it up in an easy-to use package. Arduino also simplifies the process of working with microcontrollers, but it offers some advantage for teachers, students, and interested amateurs over other system.

- Inexpensive-Arduino boards are relatively inexpensive compared to other microcontroller platforms. The least expensive version of the Arduino module can be assembled by hand, and even the pre-assembled Arduino modules cost less than 417 Taka.
- Cross-platform - The Arduino Software (IDE) runs on Windows, Macintosh OSX, and Linux operating systems. Most microcontroller systems are limited to Windows.
- Simple, clear programming environment - The Arduino Software (IDE) is easy-to-use for beginners, yet flexible enough for advanced users to take advantage of as well. For teacher s, it's conveniently based on the Processing programming environment, so students learnin g to program in that environment will be familiar with how the Arduino IDE works.Here we use Arduino IDE 1.8.1.
- Open source and extensible software - The Arduino software is published as open source tools, available for extension by experienced programmers. The language can be expanded through C++ libraries, and people wanting to understand the technical details can make the leap from Arduino to the AVR C programming language on which it's based. Similarly, y ou can add AVR-C code directly into your Arduino programs if you want to.
- Open source and extensible hardware - The plans of the Arduino boards are published under a Creative Commons license, so experienced circuit designers can make their own v ersion of the module, extending it and improving it. Even relatively inexperienced users ca n build the breadboard version of the module in order to understand how it works and sav e money.[1]


Fig 2.1: Arduino IDE download

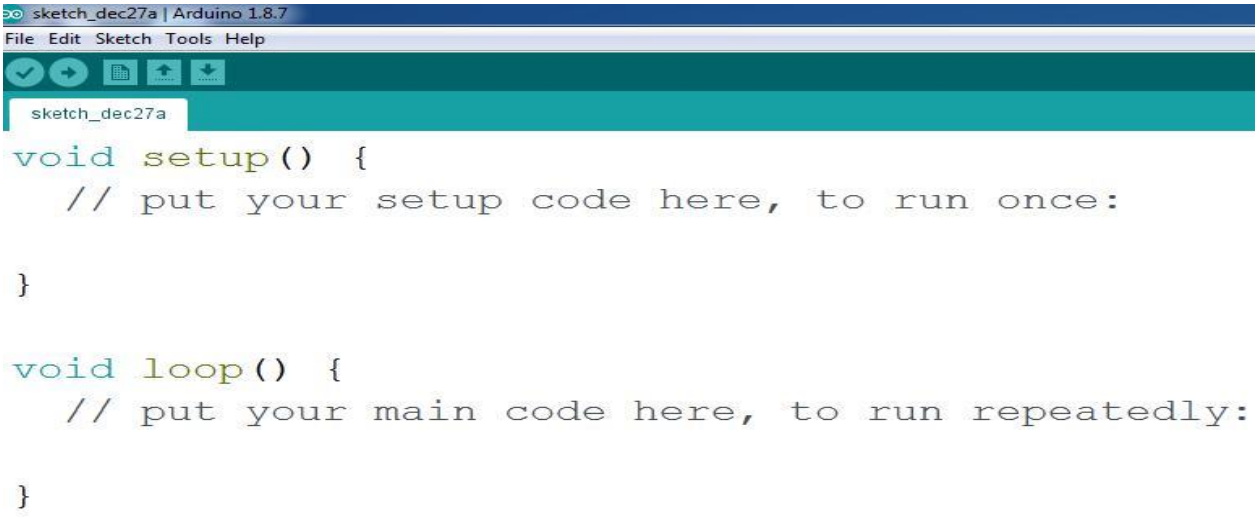


Fig 2.2: Arduino IDE work area

## 2.4 Soil Moisture Sensor

Two types of soil moisture sensors are available in the market—contact and non-contact sensors. A contact soil sensor is used in this project because it has to check soi l moisture to measure the electrical conductivity. The moisture sensor provides an anal ogue output, which can easily be interfaced with Arduino. In this project, two sensors can be connected to analogue pins A0, of the Arduino board. Each sensor has two pin available for interfacing with the Arduino board. Here, digital output pin (Do) is not us ed. The water pump and servo motor are controlled by Arduino connected to digital pi ns 3 and 9, respectively. That is, the servo motor signal control pin is connected to pin 9 of the Arduino board.

### 2.4.1 History of soil moisture sensor

Technologies commonly used to indirectly measure volumetric water content (soil moisture) in clude)

- Frequency Domain Reflectometry (FDR): The dielectric constant of a certain volume elem ent around the sensor is obtained by measuring the operating frequency of an oscillating ci rcuit.
- Time Domain Transmission (TDT) and Time Domain Reflectometry (TDR): The dielectric constant of a certain volume element around the sensor is obtained by measuring the spee d of propagation along a buried transmission line.
- Neutron moisture gauges: The moderator properties of water for neutrons are utilized to es timate soil moisture content between a source and detector probe.
- Soil resistivity: Measuring how strongly the soil resists the flow of electricity between two electrodes can be used to determine the soil moisture content.
- Galvanic cell: The amount of water present can be determined based on the voltage the so il produces because water acts as an electrolyte and produces electricity. The technology b ehind this concept is the galvanic cell.

## 2.5 History of Relay

American scientist Joseph Henry is often claimed to have invented a relay in 1835 in order to improve his version of the electrical telegraph developed earlier in 1831.

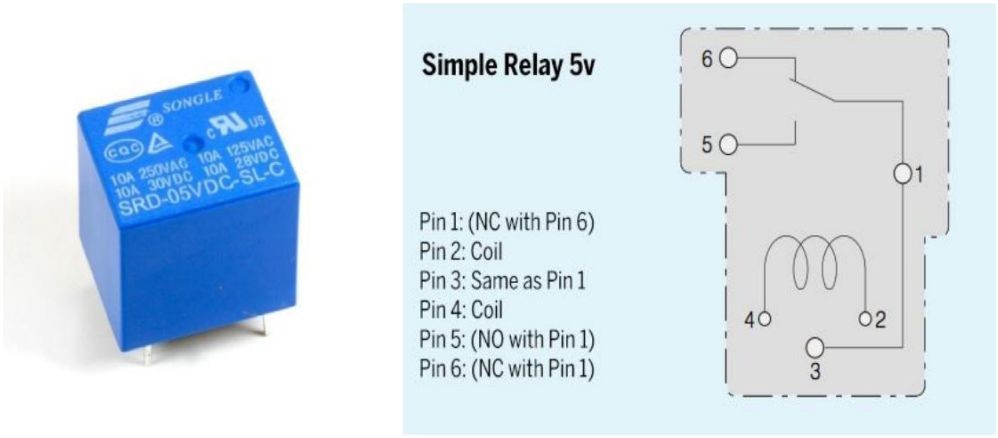


Fig 2.3: Relay pin configuration

It is claimed that English inventor Edward Davy *"certainly invented the electric relay"* in his electric telegraph 1835.

A simple device, which is now called a relay, was included in the original 1840 telegraph pate nt of Samuel Morse. The mechanism described acted as a digital amplifier, repeating the teleg raph signal, and thus allowing signals to be propagated as far as desired. This overcame the pr oblem of limited range of earlier telegraphy schemes.

The word *relay* appears in the context of electromagnetic operations from 1860. [2]

## 2.6 Summary

Background history of anything is impressed us to work with more attentively and help us to know the dedication of a person to invent anything. Thus, in this chapter, we discuss about the background history of soil moister sensor, Arduino Nano, relay.

# Chapter 3

# THEPRETICAL MODEL

## 3.1 Introduction

In this project, Atmega328 microcontroller will be used to program an application The Moister sensor will detect the moister level send analog data signal to microcontroller. The microcontroller will use the data to process, analyze and calculate the specific information about the moister, and then it will be display on a 16x2 screen (LCD – 16x2).

## 3.2 Block diagram of AUTOMATIC IRRIGATION SYSTEM

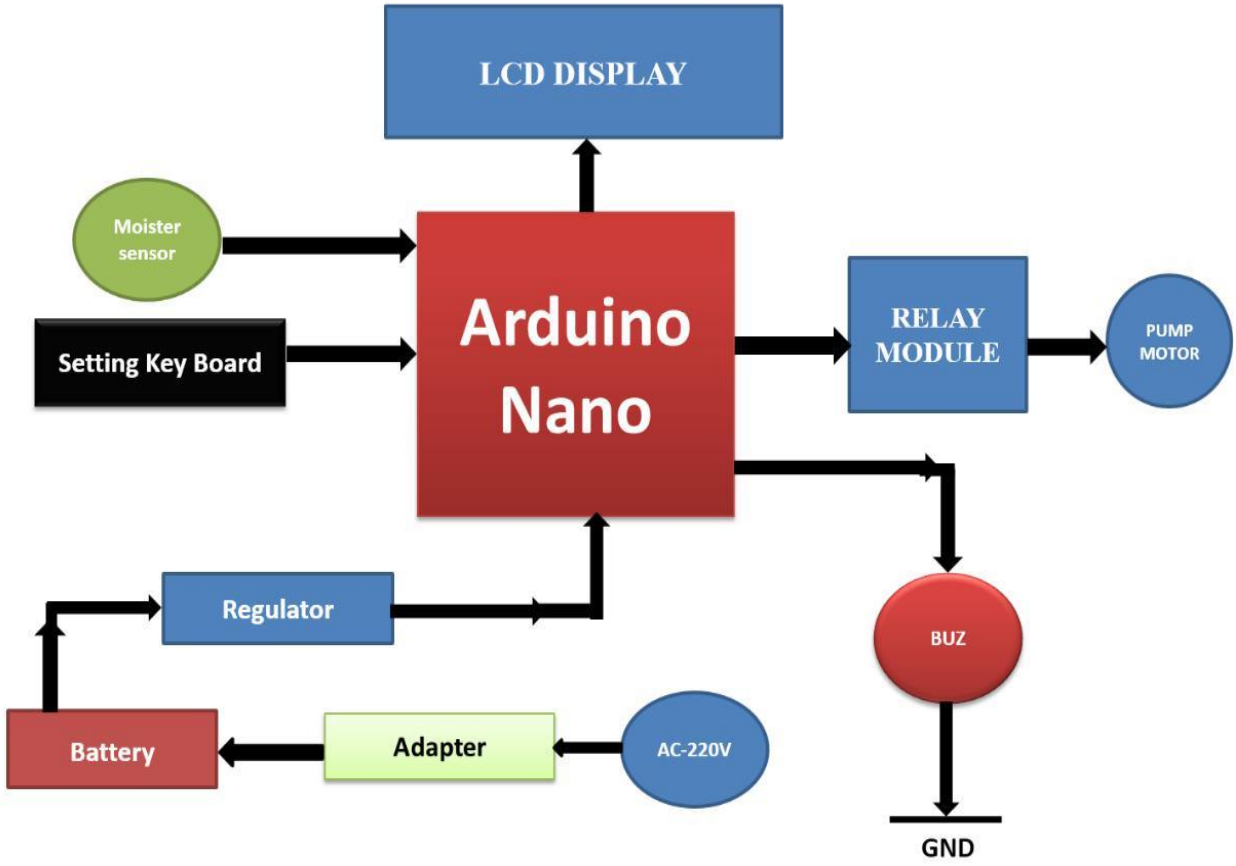


Fig 3.1: Block diagram

Moisture sensor detects the moister from the plant soil. It sends analog signal to Arduino. Arduino detect the signal, process and calculate the data. Arduino send data on LCD. It shows us the data and we can also able to see the data. Every unit is connected to power supply which is a prerequisite for operation.

## 3.3 Circuit diagram of AUTOMATIC IRRIGATION SYSTEM

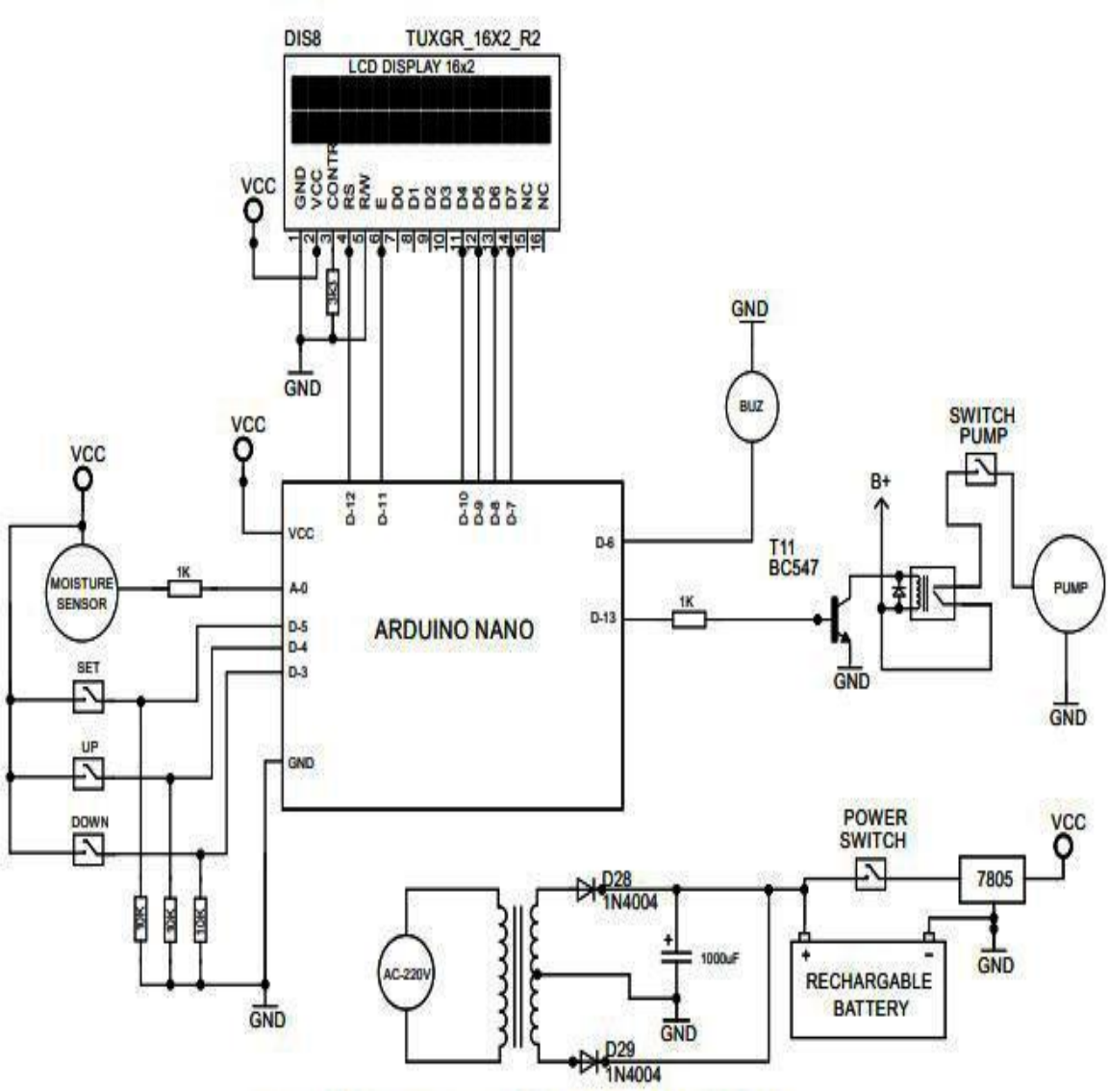


Fig 3.2: Circuit diagram of automatic irrigation system

Connection of moister monitor using moister sensor, Arduino and Bluetooth module is very simple. Liquid crystal display (LCD) is applied for display the moister which is transmitted though the moisture sensor. Data pins of LCD namely RS, E, D4, sD5, D6, D7 are connected to Arduino digital pin number 7, 6, 5, 4, 3, and 2.0ne buzzer is connected in digital pin 6 and GND.

Moister sensor data is connected to analog A0. That entire component is powered by dc 5volt. Here we used three moister value controlling push switch. These are connected Arduino digital pin number 5, 4 and 3.

## 3.4 Working procedure

Arduino Nano is applied to control the entire process, LCD used to display moister level and water pump status .We place our moister sensor into the soil, it detects moisture from soil and sends analog information in Arduino. Now Arduino receive the analog signal and process and check the condition and decide pump ON or off, at the same time calculate the signal then it sends the calculated data to LCD. We also used buzzer for a warning system when our system is ready to work and end of the work.

## 3.5 Summary

First, we showed our flow chart which contains steps of our Project. Then we showed our block diagram and circuit diagram with some explanation. At lastly, we briefly discussed about working procedure of our project.

# Chapter 4
# HARDWARE DEVELOPMENT

## 4.1 Introduction

In this chapter, we will talk about the hardware material that have used in our project. So the portion will explain the path needed to undertake in order to gain the goal of the project.

## 4.2 Components Name and Quantity

Table No 4.1: Components Name and Quantity

| SL | Component Name | Quantity |
|---|---|---|
| 1 | Arduino Nano | 1Pcs |
| 2 | Moister sensor | 1 Pcs |
| 3 | 16X2 LCD | 1 Pcs |
| 4 | Buzzer | 1 Pcs |
| 5 | 5 Volt Dc water Pump | 1 Pcs |
| 6 | Strip Board (mini) | 2 Pcs |
| 7 | ON/OFF Switch Pump | 1 Pcs |
| 8 | 1 channel Relay module | 1 Pcs |
| 9 | Battery Charger (4v*3) | 1 Pcs |
| 10 | Connecting Wire | As Require |
| 11 | Transformer 220/09 | 1 Pcs |
| 12 | TIP 7805 | 1Pcs |
| 13 | Water Tank | 1 Pcs |
| 15 | NO/OFF Switch Battery | 1 pcs |
| 16 | Regulator | 1Pcs |
| 17 | Plastic pipe | 1fit |
| 18 | Setting key Board | 1pcs |
| 19 | Push Switch | 3pcs |

## 4.3 Arduino Nano

It is a microcontroller board based on the ATmega328.Here it has 14 digital input/output pins, 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It has everything needed to restore the microcontroller; only connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get opened .

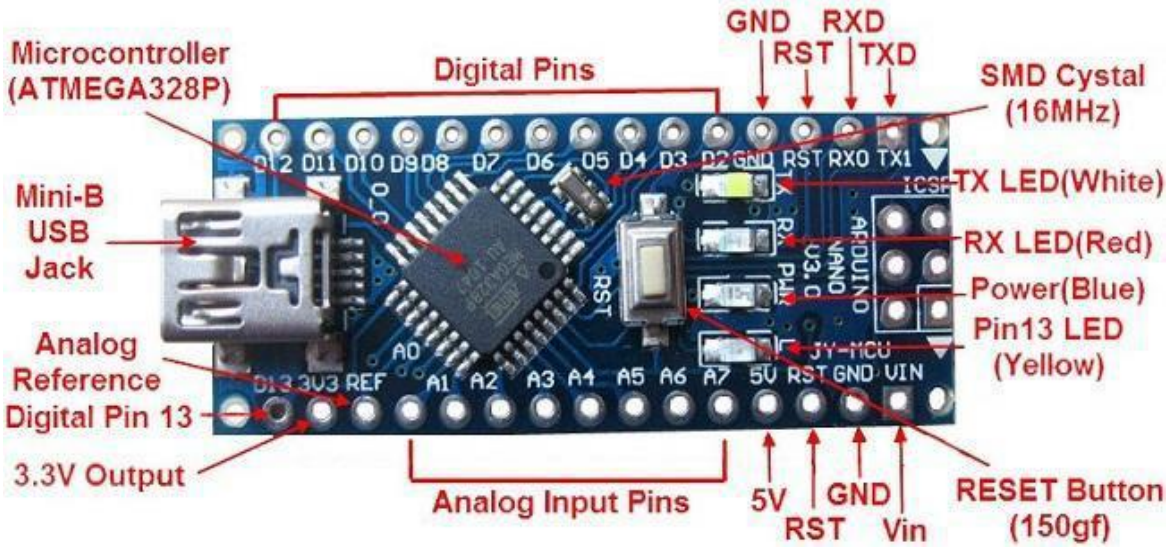


Figure 4.1: Top View of Arduino Nano

### 4.3.1 Technical Specification of Arduino

Table No 4.2: Technical specification

| | |
|---|---|
| Microcontroller | ATmega328 |
| Architecture | AVR |
| Operating Voltage | 5 V |
| Flash Memory | 32 KB of which 2 KB used by boot loader |
| SRAM | 2 KB |
| Clock Speed | 16 MHz |
| Analog I/O Pins | 8 |
| EEPROM | 1 KB |
| DC Current per I/O Pins | 40 mA (I/O Pins) |
| Input Voltage | 7-12 V |
| Digital I/O Pins | 22 |
| PWM Output | 6 |
| Power Consumption | 19 mA |
| PCB Size | 18 x 45 mm |
| Weight | 7 g |

### 4.3.2 Pin Description of Arduino Nano

Here it has 14 digital pins on the Nano can be used as an input or output, using pin Mode, digital Write and digital Read functions. It's reissue at 5 volts. Here each pin can receive a maximum of 40 mA and has an interior pull-up resistor (disjointed by default) of 20-50 kohms. Some pins have specialized performances :

- Serial: 0 (RX) and 1 (TX). It's used to receive (RX) and transmit (TX) TTL serial data
  . So these pins are connected to the similarly pins of the FTDI USB-to-
  TTL Serial chip.
- External Interrupts: 2 and 3. This pins can be configured to trigger an interrupt on a lo w value, a rising or falling edge, or a change in value. See the attach Interrupt function for details.
- PWM: 3, 5, 6, 9, 10, and 11. Provide 8-
  bit PWM output with the analog Write function.
- SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communicatio n, which, although provided by the underlying hardware, is not currently included in th e Arduino language.
- LED: 13. There is a built-
  in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, whe n the pin is LOW, it's off.
- I2C: 4 (SDA) and 5 (SCL). Support I2C (TWI) communication using the Wire library (documentation on the Wiring website).

There are a couple of other pins on the board:

- AREF. It's means reference voltage for the analog inputs and used with analog Reference.
- Reset. Bring this line LOW to reset the microcontroller.

## 4.4 Soil Moisturizer Sensor

It’s measure the volumetric water quantity in soil. From the straight gravimetric measurement of free soil moisture asserts removing, drying, and weighting of a sample, soil moisture sensors measure the volumetric water content circuitously by using some other feature of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content.

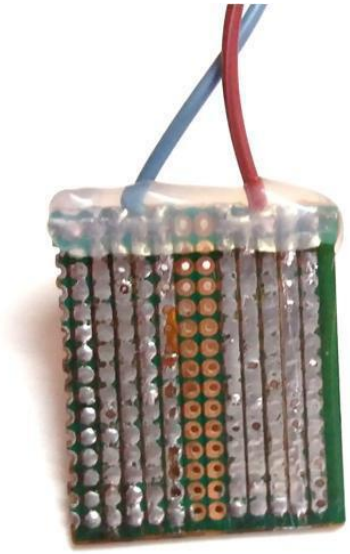

Fig 4.2: Soil moisture sensor front view

### 4.4.1 Hardware Features of Soil moisture sensor

Table 4.3: Hardware features

| **Sensitivity** | **Adjustable sensitivity** |
|---|---|
| Module mode | Dual Output mode, a simple digital output, analog output more accurate. |
| Operating voltage | 5v |
| With edge connector | |
| A0 small board analog output interface | |

## 4.5 Relay Module

This is a LOW Level 12V 1-channel relay interface board, and channel needs a 15-20mA propeller current. Various appliances and equipment with huge current it can be used to control. It is equipped with high-current relay that work under AC250V 10A or DC30V 10A. It has a standard interface that can be controlled presently by microcontroller.

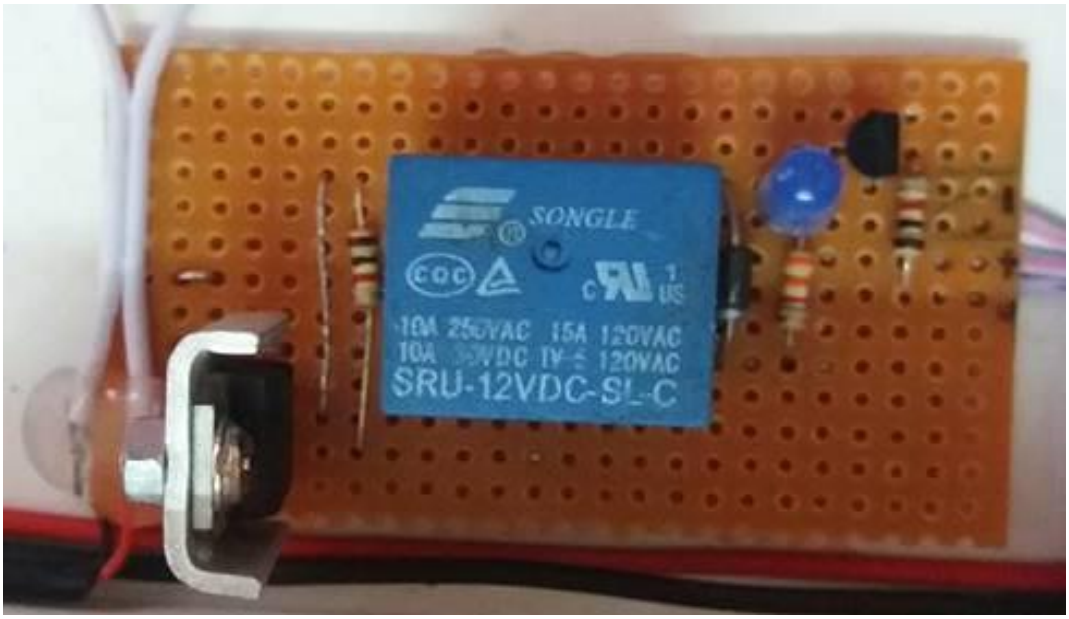


Fig 4.3: Relay module top view

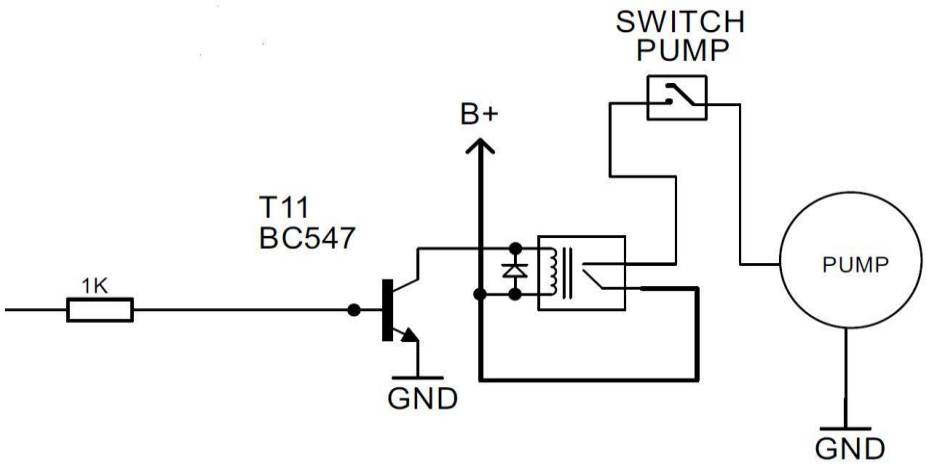


Fig 4.4: Relay module circuit diagram

## 4.6 LCD Display

LCD (Liquid Crystal Display) screen is an electronic display module. A 16x2 LCD display is very basic module. It is very usually used in several devices and circuits. Over seven segment and other multi segment LCDs are preferred these modules. Each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD.


Fig 4.5:16*2 LCD display

Pin description as follows

- Pin 7 to pin 14 all 8 pins are data pins.
- Pin 4-This is RS i.e., Register select pin.
- Pin 5-This is R/W i.e., Read/Write pin.
- Pin 6-This is E i.e., Enable pin which sends data to data pins when a high to low pulse is given.
- Pin 2-This is VCC i.e., It is supply voltage.
- Pin 1-This is GND i.e., It is ground pin.
- Pin 3- This is contrast adjustment i.e., It is through a variable resistor.

## 4.7 Vero Board

It is a brand of strip board, a pre-formed circuit board element of copper strips on an insulating bonded paper board which was a produced and promoted in the early 1960s by the Electronics Department of Vero Precision Engineering Ltd (VPE).

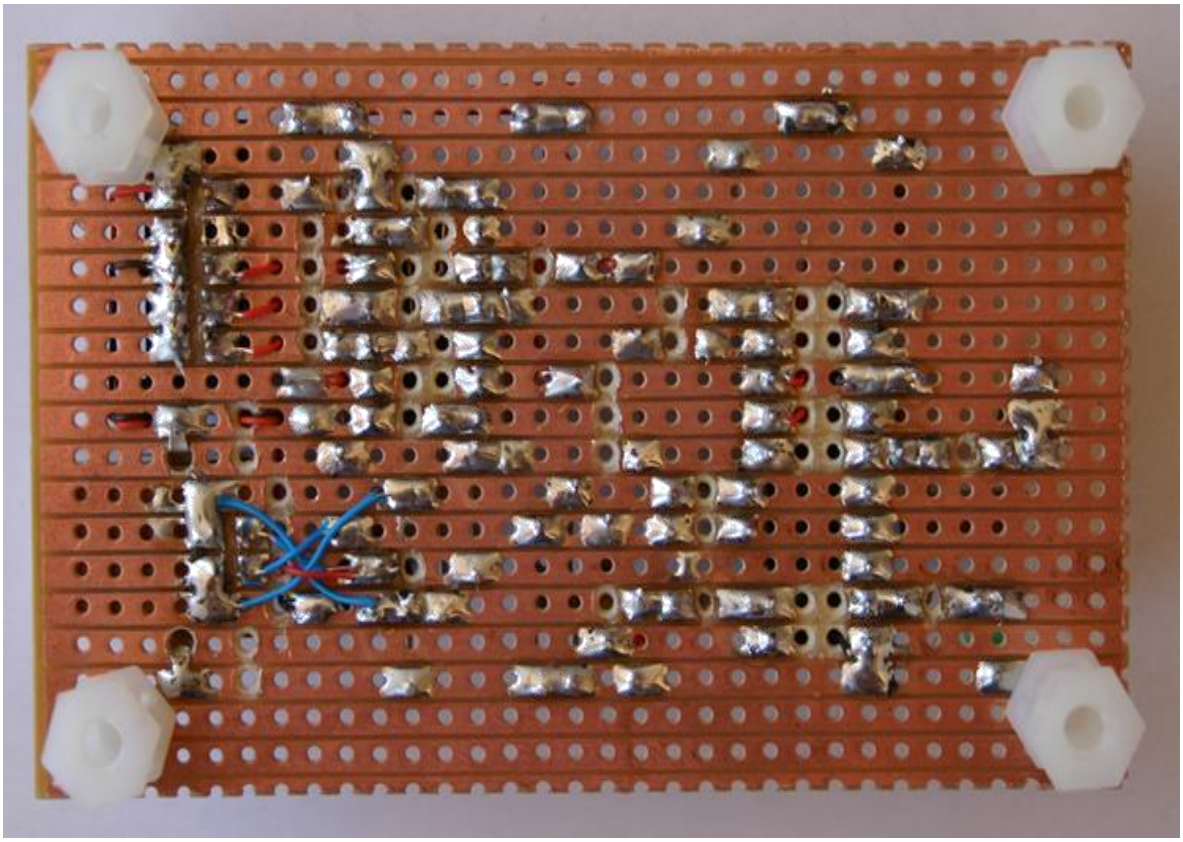

Fig 4.6: Vero board

## .4.8 Piezo Buzzer

It is an electronic device. Generally it used to creat sound. Simple construction, Light weight, and low price so that,s why it usable in several applications like car reversing indicator, computers, call bells etc. Piezo buzzer is emerged on the converse principle of piezo electricity discovered

in 1880 by Jacques and Pierre Curie. it is the phenomena of generating electricity when mech anical pressure is used to certain materials and the vice versa is also true. So that's why this materials are called piezo electric materials.

Figure 4.7: Piezo buzzer

## 4.9 Water Pump

A DC motor is designed to run on DC electric power. DC Motors are the brushed and brushless types. These are use internal and externally. Brushless DC motors are mostly used where precise speed control is required**.**


Figure 4.8: Water pump

# 4.10 ON/OFF Switch

## 4.10.1 Battery Switch

Specifications

- Voltage: 12V
- Switch Color: Black
- Switch Type: Rocker
- Model Number: KCD1-101

Figure 4.9: Battery on/off switch

## 4.10.2 Motor Switch

Specifications

- Voltage: 250V
- Switch Color: Black
- Switch Type: Rocker
- Model Number:KAN-28

Figure 4.10: Motor on/off switch

## 4.11 Bridge Rectifier

The rectifier converts ac voltage into dc voltage. Here we use 4 diodes which are connected in bridge.

## 4.12 Voltage Regulator

Voltage regulator is a system planned to automatically maintain a constant voltage level. Voltage regulator can infliction a simple feed-forward design or may include negative feedback. It may apply an electromechanical equipment's or electronic materials**.**

**Application areas for 7805 IC**

7805 IC is applied in a spacious range of circuits. The main ones being:

- Output voltage is fixed
- Output Regulator is adjustable
- Current Regulator
- DC Voltage Regulator is stable

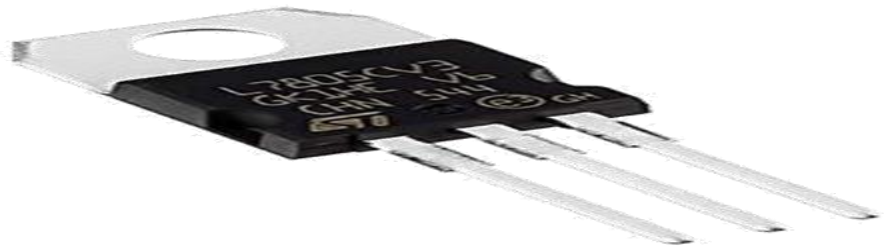

Figure 4.11: Voltage regulator

## 4.13 Summary

In this chapter, we have discussed Arduino Nano and its pin description, moister sensor and Technology, application of moister sensor, Relay module, its hardware feature, LCD display its pin description, Varo board, Dc Power supply and Piezo buzzer, water pump, switch,, bridge rectifier and voltage regulator.

# CHAPTER 5

# RESULT AND DISCUSSIONS

## 5.1 Introduction

Result presents the success as well as the satisfaction. It inspires us to work and keep it up. In this chapter, we show our experiment result and briefly discuss about that. Here also show the cost analysis of our project in this chapter

## 5.2 Hardware Result

- With our project we became successful to demonstrate with regarding the objectives of the project.
- The moisture content of the three different types of field were measured successfully.
- Motor automatically turn on or off with the different level of moisture content in the soil.
- Gardener or Farmer successfully got the status of his fields whether dry or wet by LCD.

## 5.3 Project Physical View

**Step 1**: Project physical view.

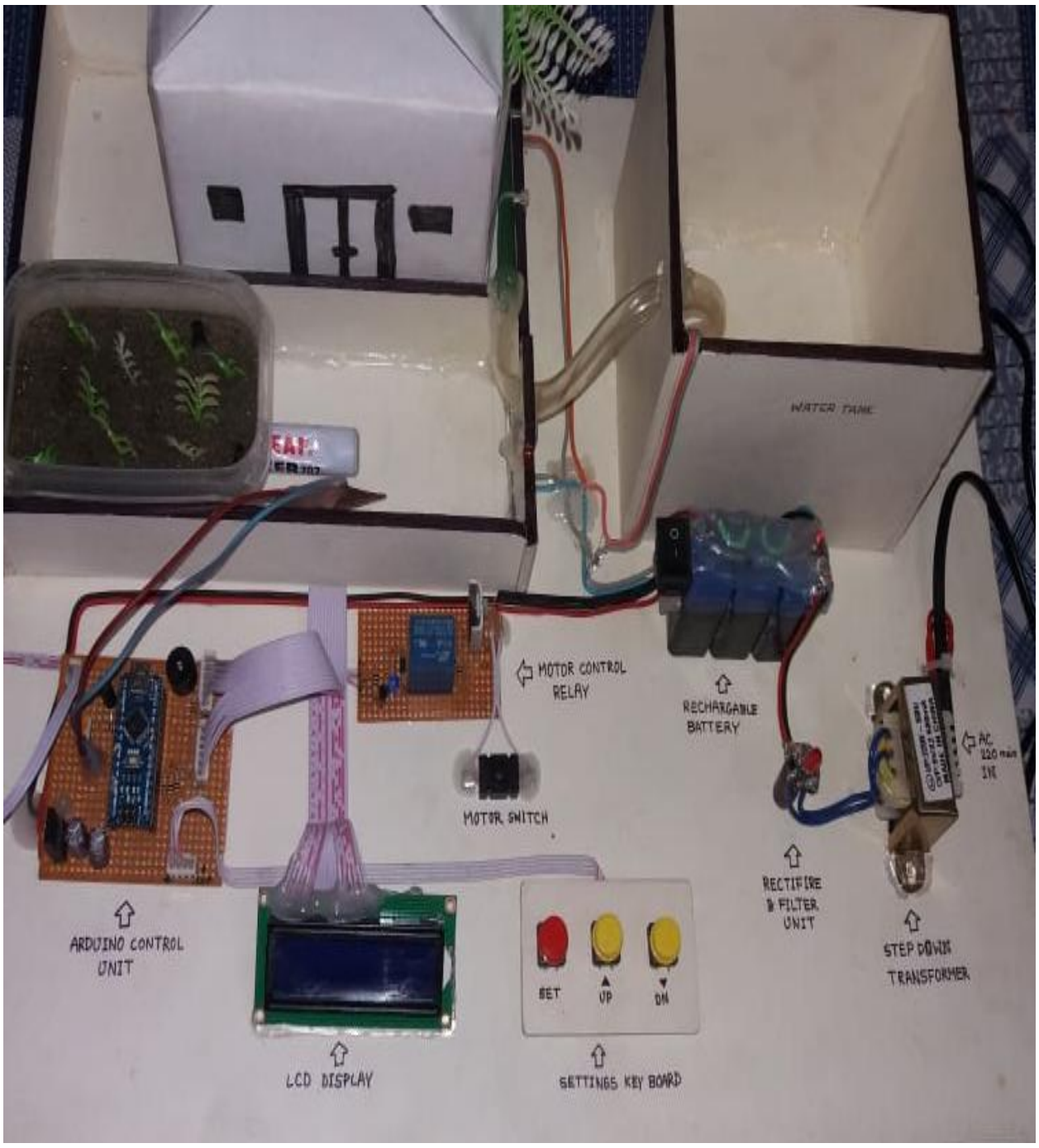


Figure 5.1: Project physical view

**Step 2**: When irrigation system is starting


Figure 5.2: Irrigation system

**Step 3:** When motor is on mode

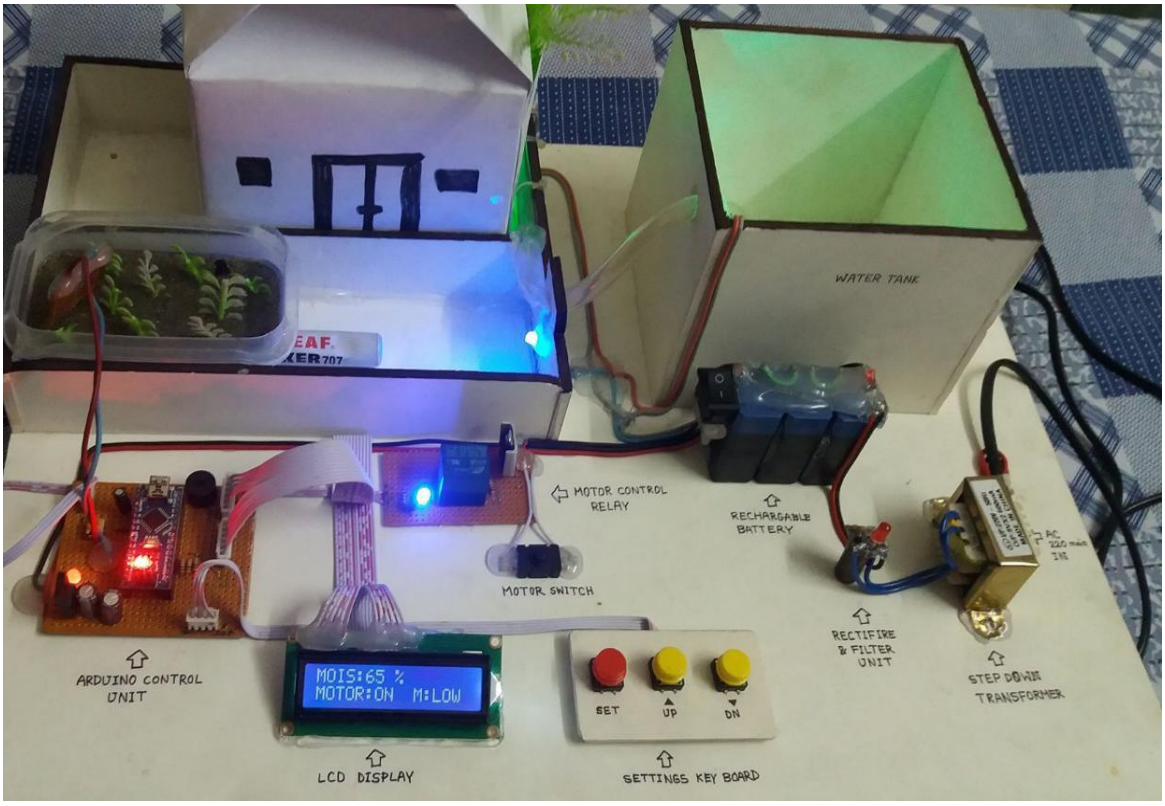


Figure 5.3: Motor is on

**Step 4:** When motor is off mode


Figure 5.4: Motor is off

## 5.4 Result of the Project


Figure 5.5: Showing the moisture level and motor status on LCD

## 5.5 Total Project Cost, Quantity and Price

Table 5.1: Equipment Cost

| SL | Equipment Name | Quantity | Price(TK) |
|---|---|---|---|
| 1 | Arduino Nano | 1 | 417 |
| 2 | 1 channel Relay module | 1 | 190 |
| 3 | LCD 16*2 | 1 | 150 |
| 4 | Transformer 220/09 | 1 | 150 |
| 6 | PVC White Board | As necessity | 50 |
| 8 | Varo Board | 1 | 30 |
| 9 | Glue | 7 | 110 |
| 10 | Water Pump | 1 | 240 |
| 11 | Connecting Wire | As necessity | 210 |
| 12 | NO/OFF Switch Battery | 1 | 25 |
| 13 | Buzzer | 1 | 60 |
| 14 | TIP 122 | 1 | 65 |
| 15 | NO/OFF Switch Motor | 1 | 10 |
| 16 | Soil Moisture sensor | 2 | 70 |
| | | | Total Project Cost = 1777Tk |

**Note 1:** For testing pupas we need to collect more equipment

| SL | Equipment Name | Quantity | Price(TK) |
|---|---|---|---|
| 1 | Glue Gun | 1 | 180 |
| 2 | Cable Tie | 3 | 10 |
| 3 | Transistor(BC547) | 1 | 10 |
| 4 | Capacitor(1uf/50V) | 1 | 5 |
| 5 | Capacitor(100uf/16V) | 2 | 4 |
| 6 | Voltage Regulator | 1 | 26 |
| 7 | Resistor 10k | 3 | 5 |
| 8 | Power cable | 1 | 30 |
| 9 | Battery(4V*3) | 3 | 250 |
| 10 | LED | 7 | 14 |
| 11 | Push Switch | 3 | 15 |
| 12 | Power Filter Circuit | 1 | 63 |
| 13 | Super glue(Favicon) | 2 | 60 |
| 14 | Plastic pipe | 1fit | 20 |
| 15 | Other | | 500 |
| | Soldering Iron | 40w | 160 |
| | soldering paste, Rang | | 65 |
| | | | Total cost = 1352 Taka only |

**Note 2:** So Total project cost =2657 Taka only.

## 5.6 Advantages of this project

1. Anyone can use this
2. Gardener and farmer can use this.
3. Cost efficient.
4. Saving time, power and water.
5. Low power consumption.
6. Easy to setup.
7. Sating moisture value.

## 5.7 Discussion

The main objective of this project is to design for control the water pump automatically. Auto matic irrigation system senses the moisture content of the soil and automatically switches the pump when the power is on.

## 5.8 Summary

In this chapter, we briefly discuss and show the result of our experiment. Here, we show several outputs and try to make it easier. And we also Advantages and added the cost analysis. So, we hope that this project will be helpful for gardener and farmer their garden and plant watering.

# CHAPTER 6

# CONCLUSINS

## 6.1 Conclusions

The basic applications for this project are for gardeners and farmers who do not have sufficient time to water their harvests. Those farmers who are wasteful of water during sprinkling. This project can be expanded to greenhouses where manual supervision is far and few in between. The principle can be expanded to create fully automated gardens and farmlands. The principle of rain water harvesting, it could lead to huge water savings if applied in the right manner.

## 6.2 Limitations of the Work

In the load shading period the machine will be turn off and measuring process will also turn off automatically. By adding the battery backup, we can remove this problem. Accept it, we are getting some noise from our sensor. By adding a better sensor, we can remove this problem. This moister uptake method relies upon several assumptions and it has been shown that the results can deviate up to 10% from the true value.

## 6.3 Future Scope

This project can be further developed in future by adding GSM module to make a text message or phone call for alarm. Without it, we can enhance the feature of this project by using solar technology for power supply We can also measure water level of my reserve water tank can be monitored using this technology.

# Reference Link


[1] https://www.arduino.cc/en/Guide/Introduction

[2] https://en.wikipedia.org/wiki/Relay#History

[3] https://en.wikipedia.org/wiki/Soil_moisture_sensor

[4] http://www.geeetech.com/wiki/index.php/1-Channel_Relay_module

[5] https://electronicsforu.com/resources/learn-electronics/7805-ic-voltage-regulator

# Appendix

## Program Description:

```
#include<LiquidCrystal.h>
LiquidCrystal lcd(12,11,10,9,8,7);

#define MOIS_PIN A0
#define SET_PIN 5
#define UP_PIN 4
#define DN_PIN 3

#define RL 13
#define BUZ 6

int CNT,UP,DN,SET=0,MOIS=0,MOISon=30,MOISof=80,BUZF,SETCNT,RLF;

void setup()
{
 Serial.begin(9600);
 lcd.begin(16,2);
 lcd.clear();
 lcd.setCursor(0,0);
 lcd.print(" AUTOMATIC ");
 lcd.setCursor(0,1);
 lcd.print(" IRRIGATION SYS ");

 pinMode(MOIS_PIN,INPUT);
 pinMode(SET_PIN,INPUT);
```

```
 digitalWrite(BUZ,LOW);delay(70);digitalWrite(BUZ,HIGH);delay(70);
 digitalWrite(BUZ,LOW);delay(70);digitalWrite(BUZ,HIGH);delay(70);
 digitalWrite(BUZ,LOW);delay(70);digitalWrite(BUZ,HIGH);delay(70);

 digitalWrite(BUZ,LOW);
 digitalWrite(RL,LOW);
}

void loop()
{
  LOAD_CONTROL();

  SET = digitalRead(SET_PIN);
  if( SET == HIGH )
  SETTINGS();

  CNT++;delay(2);
  if(CNT > 200)
  {
    MOIS = analogRead(MOIS_PIN);
    MOIS = ( MOIS / 2.55 );
    LCD_DISPLAY();
  }

}
//////////////////////////////////////////////////////
void LCD_DISPLAY()
{
  lcd.setCursor(0,0);
  lcd.print("MOIS:");
  lcd.print(MOIS);

  lcd.print(" %   ");
```

```
  if(RLF==0)
  {
    lcd.setCursor(0,1);
    lcd.print("MOTOR:ON M:LOW ");
  }
  if(RLF==1)
  {
    lcd.setCursor(0,1);
    lcd.print("MOTOR:OFF M:FULL ");
  }

}
//////////////////////////////////////////////////////
void LOAD_CONTROL()
{
  if(MOIS > MOISof)
  {
   if(BUZF==1)
   {
     digitalWrite(BUZ,HIGH);delay(200);digitalWrite(BUZ,LOW);delay(200);
     digitalWrite(BUZ,HIGH);delay(200);digitalWrite(BUZ,LOW);delay(200);
     digitalWrite(BUZ,HIGH);delay(200);digitalWrite(BUZ,LOW);delay(200);
     BUZF=0;
   }
   digitalWrite(RL,LOW);RLF=1;
  }
  if(MOIS < MOISon)
  {
    if(BUZF==0)
    {
     digitalWrite(BUZ,HIGH);delay(200);digitalWrite(BUZ,LOW);delay(200);
```

```
    digitalWrite(BUZ,HIGH);delay(200);digitalWrite(BUZ,LOW);delay(200);
    digitalWrite(BUZ,HIGH);delay(200);digitalWrite(BUZ,LOW);delay(200);
    BUZF=1;
   }
  digitalWrite(RL,HIGH);RLF=0;
 }

}
//////////////////////////////////////////////////////
void SETTINGS()
{
 SETCNT=0;digitalWrite(RL,LOW);
 digitalWrite(BUZ,HIGH);delay(200);digitalWrite(BUZ,LOW);delay(70);
 digitalWrite(BUZ,HIGH);delay(70);digitalWrite(BUZ,LOW);delay(70);

 lcd.setCursor(0,0);
 lcd.print(" SETTINGS       ");
 lcd.setCursor(0,1);
 lcd.print(" PLEASE WAIT...     ");
 delay(1500);

 while(SETCNT < 2 )
 {
   SET = digitalRead(SET_PIN);
   UP = digitalRead(UP_PIN);
   DN = digitalRead(DN_PIN);
   if(MOISon > 99)
   MOISon=99;
   if(MOISof > 99)
   MOISof=99;

   if(MOISon < 1)
```

```
MOISon=1;
if(MOISof < 1)
MOISof=1;

if(SETCNT==0)
{
 lcd.setCursor(0,0);
 lcd.print(" SET M-ON MOIS: ");

 lcd.setCursor(0,1);
 lcd.print(" SET VAL: ");
 lcd.print(MOISon);
 lcd.print(" %   ");

 if(UP==HIGH)
 {
  MOISon++;delay(100);
 }
 if(DN==HIGH)
 {
  MOISon--;delay(100);
 }
}
if(SETCNT==1)
{
 lcd.setCursor(0,0);
 lcd.print(" SET M-OFF MOIS:   ");
 lcd.setCursor(0,1);
 lcd.print(" SET VAL: ");
 lcd.print(MOISof);
 lcd.print(" %   ");
 if(UP==HIGH)
```

```
      {
        MOISof++;delay(100);
      }
      if(DN==HIGH)
      {
        MOISof--;delay(100);
      }
    }

    if( SET == HIGH )
    {
      lcd.setCursor(0,1);
      lcd.print(" PLEASE WAIT...     ");
      SETCNT++;delay(500);
    }

  }
  lcd.setCursor(0,0);
  lcd.print(" SETTINGS       ");
  lcd.setCursor(0,1);
  lcd.print(" COMPLETE...    ");
  delay(1500);
}
```