EXCELSSIOR EDUCATION SOCIETY'S

K.C. COLLEGE OF ENGINEERING & MANAGEMENT STUDIES & RESEARCH, THANE

A PROJECT REPORT ON

"Automatic Irrigation System with Notifications"

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CERTIFICATE

This is to certify that the project entitled "Automatic Irrigation System" with Notifications" is a bonafide work of "Kaustubh Gawde(18), Harshal Boga(08),Ankit Dubey(16)" submitted to the Department of Information Technology, KCCEMSR, Thane in partial fulfillment of the requirement for the "T.E.I.T (Sem-V)" in "Sensor Network Lab(Mini-Project Lab)" for Mini-Project.

Name and sign	Name and sign	Name and sign
Head of Department	External Examiner	Guide

DECLARATION

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Name of student and Roll No. Signature

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Date: 30-11-2020

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INDEX

CONTENTS

LIST OF FIGURES

CHAPTER-1

INTRODUCTION

1.1 INTRODUCTION

The consumption of water increases day by day that may leads to the problem of water scarcity. The aim of the article is to develop an smart irrigation system which measures the moisture of the soil and turns on or off the water supply system.

In India, outdoor water use alone averages more than 9 billion gallons of water each day, mainly for landscape irrigation. As much as 50% of this water is wasted due to overwatering caused by inefficiencies in traditional irrigation methods and systems. Smart irrigation technology is the answer.

Smart irrigation systems tailor watering schedules and run times automatically to meet specific landscape needs. These controllers significantly improve outdoor water use efficiencies.

Unlike traditional irrigation controllers that operate on a preset programmed schedule and timers, smart irrigation controllers monitor weather, soil conditions, evaporation and plant water use to automatically adjust the watering schedule to actual conditions of the site.

For example, as outdoor temperatures increase or rainfall decreases, smart irrigation controllers consider on site-specific variables, such as soil type, sprinklers' application rate, etc. to adjust the watering run times or schedules. There are several options for smart irrigation controllers.

1.2 Scope and Feasibility Study

1.2.1 Scope

The main goal of this project is how to control soil moisture of specific area using Arduino to measure soil moisture and turn on or off the water pump accordingly

1.2.2 Feasibility Study

The feasibility study is a major factor which contributes to the analysis and development of the system. The decision of the system analyst whether to design a particular system or not depends on its feasibility study. Feasibility study is undertaken whenever a possibility of probability of improving the existing system or designing new system. Feasibility study helps to meet user requirements.

1.2.2.1 Financial Feasibility :

The goal of this product is to provide a Automatic Irrigation system under the budget of $20.

1.2.2.2 Technical Feasibility :

The operations and content of the project is really efficient and easy to implement, a technical developer or a designer can built it on good scale and with proper implementation knowledge.

1.2.2.3Operational Feasibility :

The basic operation of what Internet of Thing (Mini-Project Lab) is and how will it help in home automation through this feasibility report.

1.3 Problem Statement

The consumption of water increases day by day that may leads to the problem of water scarcity. The aim of the article is to develop an smart irrigation system which measures the moisture of the soil and turns on or off the water supply system.

CHAPTER 2

SYSTEM SPECIFICATIONS

2.1 SYSTEM REQUIREMENTS

2.1.1 Hardware Requirement

Arduino

Connecting wires

LED

Moisture Sensors

Water Pump

LCD Display

2.1.2 Software Requirements

Tinkercad

2.2 SYSTEM FEATURES

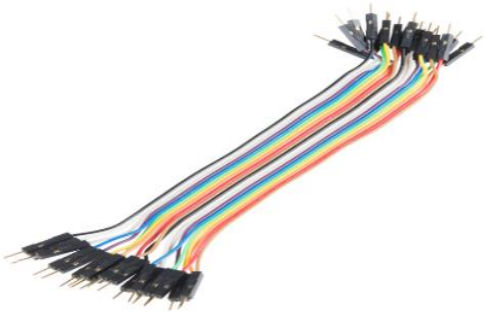
2.2.1 HARDWARE REQUIREMENT

Arduino

The **Arduino Uno** is a microcontroller board based on the ATmega328. It has 20 digital input/output pins (of which 6 can be used as PWM outputs and 6 can be used as analog inputs), a 16 MHz resonator, a USB connection, a power jack, an in-circuit system programming (ICSP) header, and a reset button.

Connecting wires:

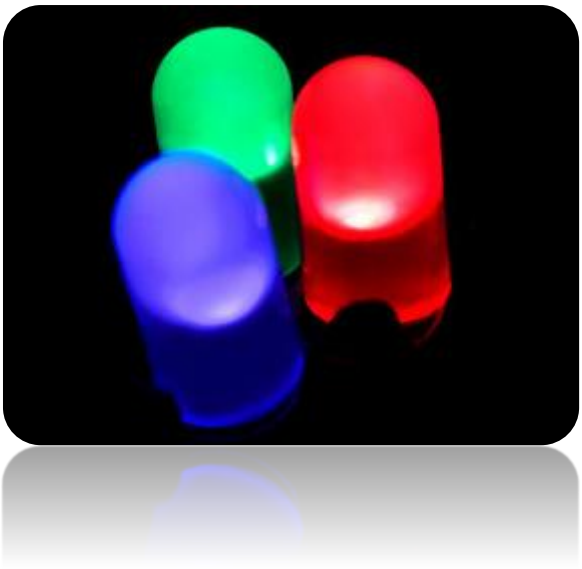
1. Connecting wires allows an electrical current to travel from one point on a circuit to another because electricity needs a medium through which it can move
2. Most of the connecting wires are made up of copper or aluminum. Copper is cheap and good conducting material.



LED:

A **light-emitting diode** (**LED**) is a semiconductor light source that emits light when current flows through it.

The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor.



WATER PUMPS:

Water pumps are machines for moving water, they play a fundamental part in agriculture as they move water from its source to the fields and crops. Water pumps can be used with many forms of irrigation, such as drip, sprinklers or with a hos**e.**

LCD Display

RGB LCD Shield for Arduino Microcontroller Boards that only uses 2 I2C pins. The best part is you don't really lose those two pins either, since you can stick i2c-based sensors, RTCs, etc and have them share the I2C bus. This is a super slick way to add a display without all the wiring hassle. The shield is designed for 'classic' Arduinos such as the Uno, Duemilanove, Diecimilla, etc. It uses the I2C pins at Analog 4 and Analog 5.

MOISTURE SENSOR :

Soil moisture sensors measure the volumetric water content in soil. ... Another class of sensors measure another property of moisture in soils called water potential; these sensors are usually referred to as soil water potential sensors and include tensiometers and gypsum blocks.

Fig 6: Moisture sensor

2.2.2 Software Requirements

Tinkercad:

Tinkercad is a free, online 3D modeling program that runs in a web browser, known for its simplicity and ease of use.Since it became available in 2011 it has become a popular platform for creating models for 3D printing as well as an entry-level introduction to constructive solid geometry in schools

CHAPTER 3

SYSTEM DESIGN

3.1 SYSTEM ARCHITECTURE

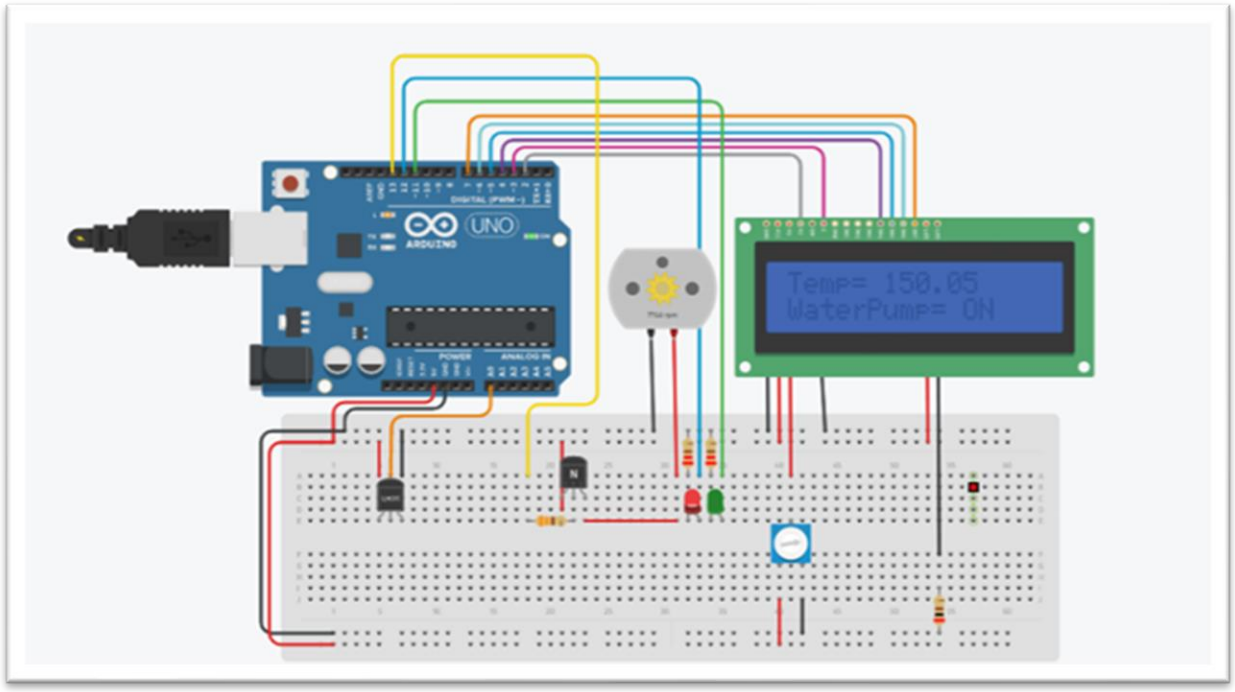


Fig 7: Circuit Diagram

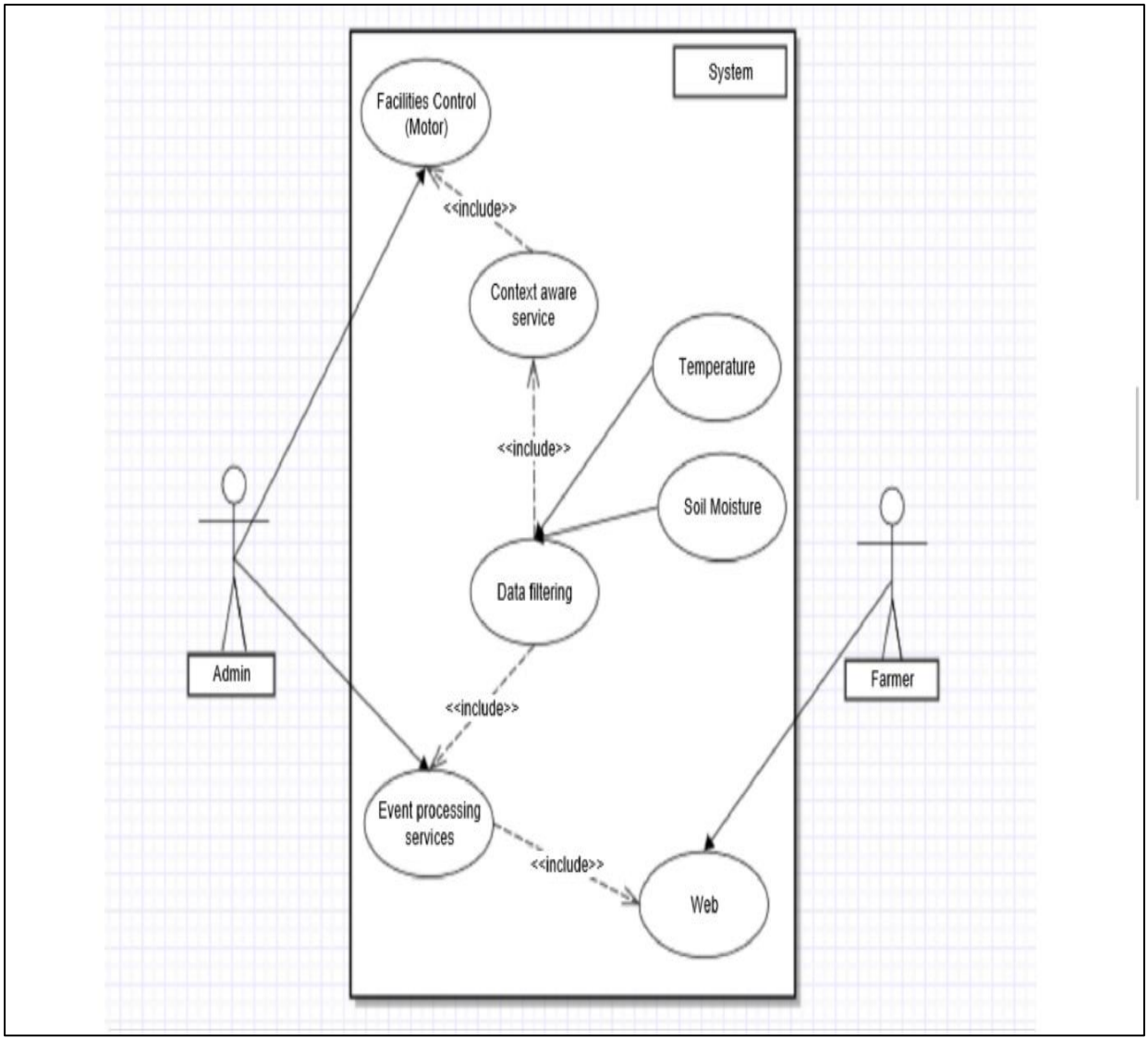
Circuit Diagram :

- In this circuit, the Soil sensor is connected to the A0 pin of NodeMCU.
- LDR sensor is connected to the D1 pin, and the Relay module is connected to the D0 pin of NodeMCU
- Display will display whether Water Pump is on or off.
- This project uses a solenoid valve to supply the water to the plants.
- You can change the moisture value at which the solenoid valve should turn on according to your plant's requirement.
- Here we are using Arduino which is a very popular for IoT based Projects

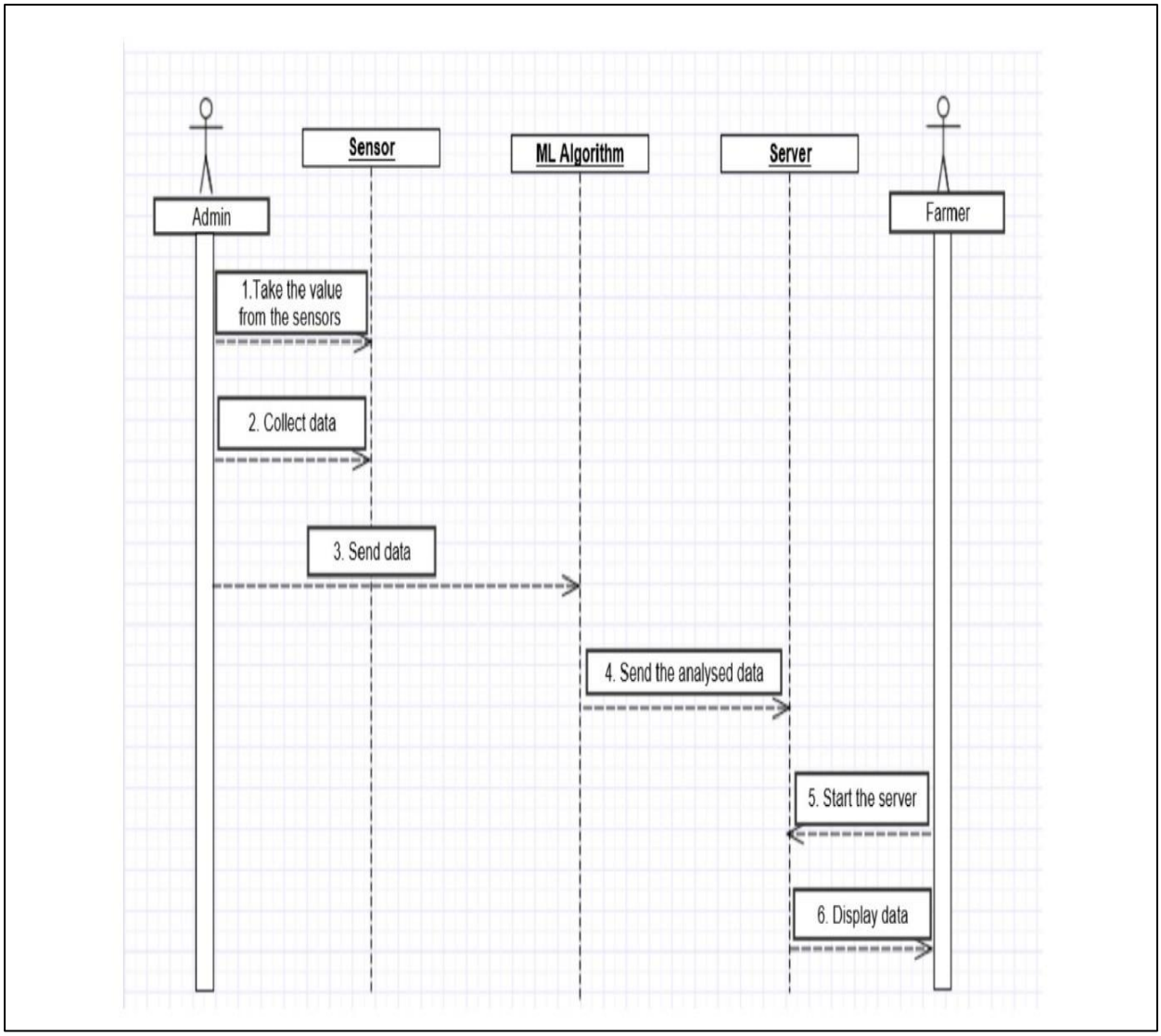
3.2 MODULES IN THE SYSTEM

- In this project, we are building an **IoT based smart irrigation System** using Arduino UNO, Moisture sensor, and LCD display.
- It will automatically sprinkle the water to plants when the moisture value goes below a particular value.
- It will also send the moisture data to LCD display to keep track of the land condition. LCD
- Here we are using Arduino which is a very popular for IoT based Projects.

3.3 Use case diagram



3.4 Activity Sequence Diagram



CHAPTER 4

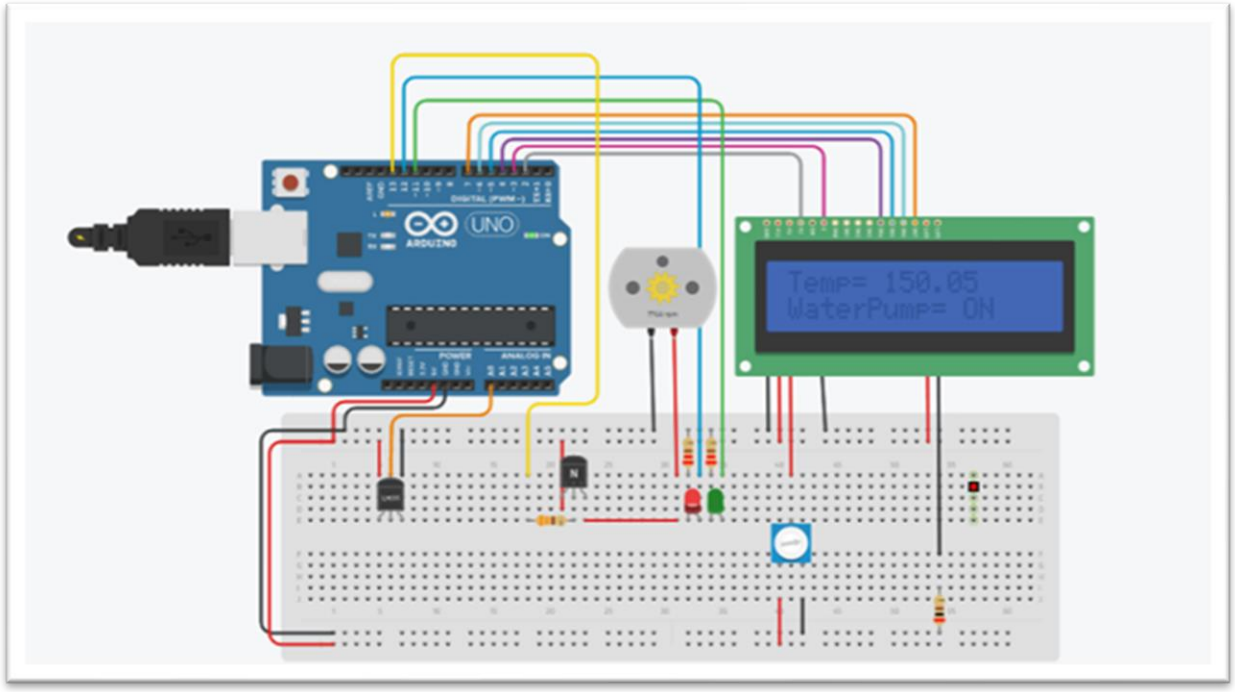
IMPLEMENTATION

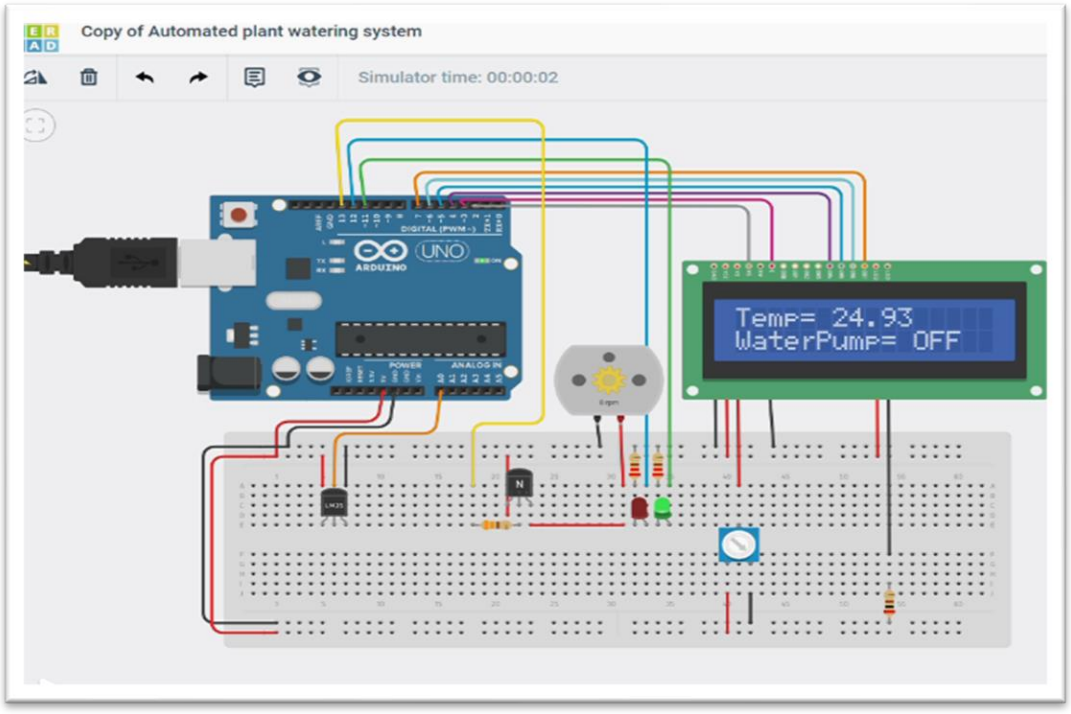
4.1 Code Snippets

```
#include <LiquidCrystal.h>


const int LM35 = A0;
const int motor = 13;
const int LedRed = 12;
const int LedGreen = 11;


LiquidCrystal lcd(2, 3, 4, 5, 6, 7);
void setup() {
  Serial.begin(9600);
  lcd.begin(16, 2);
  lcd.print("Automated Plant");
  lcd.setCursor(0,1);
  lcd.print("Watering System!");
  pinMode(motor, OUTPUT);
  pinMode(LedRed, OUTPUT);
  pinMode(LedGreen, OUTPUT);
  delay(2000);
  lcd.clear();
  lcd.print("Temp= ");
  lcd.setCursor(0,1);
  lcd.print("WaterPump= ");
}


void loop() {
```

```
 int value = analogRead(LM35);

 float Temperature = value * 500.0 / 1023.0;

  lcd.setCursor(6,0);
  lcd.print(Temperature);

  lcd.setCursor(11,1);

  if (Temperature > 50){
    digitalWrite(motor, HIGH);
    digitalWrite(LedRed, HIGH);
    digitalWrite(LedGreen, LOW);
    lcd.print("ON ");
  }
  else {
    digitalWrite(motor, LOW);
    digitalWrite(LedRed, LOW);
    digitalWrite(LedGreen, HIGH);
    lcd.print("OFF");
  }

   delay(1000);
}
```

4.2 Screenshots





CHAPTER 5

CONCLUSION

5.1 CONCLUSION

The smart irrigation system implemented is feasible and cost effective for optimizing water resources for agricultural production.

This irrigation system allows cultivation in places with water scarcity thereby improving sustainability.

The smart irrigation system developed proves that the use of water can be diminished for a given amount of fresh biomass production.

Real time system for irrigation is based on Node MCU. The system is incredibly versatile and economical.

5.2 Future Scope:

This automated Smart Irrigation System using IoT is found to be cost-effective for enhancing the techniques to preserve water resources and to optimize them for agriculture production. This system helps the farmer by working automatically and smartly. With placing multiple sensors in the soil, water can be only provided to the required piece of land. This system requires less maintenance so it is easily affordable by all farmers. This system helps to reduce water consumption. With using this system the crop production increases to a great extent. As per future perspective, this system can be the more intelligent system which predicts user actions, nutrient level of the plants, time to harvest, etc. With using Machine Learning algorithms more advancements
can be done in the future which will help farmer a lot and water consumption can also be reduced in agriculture.

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