A **Project Report**
on

"Disease Prediction of Crops Using IoT"

Submitted in partial fulfilment of the requirements for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

INFORMATION TECHNOLOGY

By

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CERTIFICATE

This is to certify that the project work titled **"Disease Prediction of Crops using IoT"** is submitted by **Mr. Nilesh V. Pingale (1654005), Ms. Vaishnavi V. Tevare (1654012)**, **Ms. Ananya V. Malwade (1654013), Shubham S. Yadav (1404044)** for the partial fulfilment of the requirement for the degree of **Bachelor of Technology** in **Information Technology at Rajarambapu Institute of Technology** (An autonomous Institute), Affiliated to **Shivaji University, Kolhapur**.

This preliminary report is the record of the student's work carried out for the course: Project Work (Code: IT456) under my supervision and guidance.

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Date:

DECLARATION

I declare that this report reflects my thoughts about the subject in my own words. I have sufficiently cited and referenced the original sources, referred or considered in this work. I have not misrepresented or fabricated or falsified any idea/data/fact/source in this my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute.

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दिनांक:

कु. शुभम शंकर यादव हा राजारामबापू इन्स्टिटयूट ऑफ टेकनॉलॉजि ह्या महाविद्यालातील विद्यार्थी असून त्याचे प्रकल्प गटाने सर्वांसाठी शेतातील वातावरणामुळे होणारे नुकसान कमी व्हावे म्हणून एक यंत्र तयार केले आहे, त्यांची कल्पना मला आवडली असून , तो प्रकल्प भविष्यात मला खूप फायदेशीर ठरणार आहे आणि प्रकल्प संदर्भित सर्व देखभाल स्वतः शुभम यादव भविष्यामध्ये करणार आहे याची मला हमी देतोय , म्हणून मी या प्रकल्पासाठी ३५०० रुपये देण्यास तयार आहे .

क्रमांक	संपूर्ण नाव	PNR
१	निलेश पिंगळे	१६५४००५
२	वैष्णवी तेवरे	१६५४०१२
३	शुभम यादव	१४०४०४४
४	अनन्या माळवदे	१६५४०१३

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शुभम यादव ९७५७२४४९७१

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Prof. Yogini Bhosale	Prof. Ashwini Patil	Dr. Jayashree Awati	Prof. Supriya Sawant	Dr. D. G. Thombare	Dr. Mrs. S. S. Kulkarni
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ABSTRACT

India is an agricultural country which fully depends on agriculture, agricultural production and crops for its economic survival. With help of technological involvement and its usability still have to be grown and cultivated for agriculture sector in India.

IoT is an emerging technology all over the world and it is used in agriculture for monitoring different parameters. Also this project general agriculture monitoring, pest disease monitoring, and different techniques to send alerts about diseases. We analyze and classify diseases in technological, non-technological and integrated solutions. Then we compare the disease prevention mechanism based on their effectiveness, cost and other performance parameters. Finally, we analyse the feasibility of disease prevention mechanism based on the use of IoT for farmers in developing countries.

In few many countries agriculture has been adopted. Agriculture industry in India still needs to be renovate with the involvement of many technological factors for improve better production, distribution and cost control, improve economical condition.

Few researchers in agriculture domain have proposed overall design based on IoT to monitor supply chain management of agricultural products and its production. The Internet of Things (IoT) has the capability to automatically transform the world. we all use application and live in the application of technology IoT in agriculture could have the strong impact on agricultural productivity.

The global population is set to touch up-to 9.6 billion by 2050. So, to feed this much high population, the farming industry must embrace IoT. Against more challenges such as extreme weather conditions, rising a climate change, environmental impact resulting from intensive farming practices and the demand for more food has to be met. Smart farming is based on IoT technologies will enable growers and farmers to reduce waste and enhance productivity ranging from the quantity of fertilizer utilized to the number of journeys farm vehicles have made.

Contents

List of Figures

List of Tables

Chapter 1

Introduction

Agriculture is the major source of every country. The agriculture production will play an important role in the development of the country. Due to GDP will get improve by the agriculture production. Agriculture contribution in India is about total GDP of 15 percent and total exports of 10 percent. Backbone of Indian economy is depending on the overall agriculture production. When compare with the growth of other sectors, the overall share of Agriculture on GDP of the country has been decreased. The overall economic scenario of India will depending upon the agriculture system.

Now a days agriculture becomes important due to the increasing population in the world. According to the report by United Nations of Food and Agriculture Organization the population will get doubles in 2050.Countries like India and China they have to increase their agriculture production, because the birth rates of this country are demonstrably increasing fast. The increased production of the agriculture will support huge economic boost to the nation. In agriculture crops is the major food crop consumed by majority of the people in the world, particularly in India 70 percent of the people taking the crops as their major food. Our focus is going to based on the crops production agriculture system. Across the Globe, India ranks the second largest producer of crops after china.

The farmers face lot of problems in the crops due to the diseases. Major problems in the agriculture include water problem, climatic change, pests and diseases in the plants . Due to pests and diseases along the crop losses up to 37 percent every year. The proposal is going to deal with the diseases alone. The diseases caused by crops are fungi, bacteria, viruses, nematode and it occurs where ever crops is grown. Some of them national and international importance, others occur in local areas. This proposal deals with only diseases of national importance which may cause considerable crop losses. The crop disease detection can be done with the IoT based user friendly system. The Internet of Things (IoT) is going to change the agriculture industry and connects the farmers to contend with the challenges they face. Now the IoT System will address these issues and increasing the quantity of the crop production.

what is smart farming?

Smart farming means it is capital-intensive and high-tech system of growing food cleanly and sustainable for the masses. It is the modern application of ICT (Information and Communication Technologies) into agriculture.

In IoT-based smart farming, a system is built for monitoring the crop yield with the help of sensors (light, humidity, temperature, soil moisture, etc.) and automating the irrigation system. The farmers can monitor the yield conditions from anywhere. IoT-based farming is highly smart and efficient when compared with the conventional approach.

The applications of IoT-based smart farming not only target conventional, large farming operations, but also be new levers to uplift other growing or common trends in agricultural as organic farming, family farming and enhance highly transparent farming.

1.1 Scope of Work

- This model totally depends on analyzing the environmental conditions using the electronic components.
- Many sensitive components we used so handling of that project is sensitive task.
- Any change in programming that actually replicate in system feature so programming view we need to deploy perfect accuracy program.
- We cant able do dynamic modification so, any new diseases cannot identify by project we need to modify in programming modules.
- Project is humidity and temperature sensitive module so as much as possible stay long from this causes.

1.2 Closure

In this chapter how, our system help such candidates to get hired by such a company or an organization that really worth their ability and their skill sets. Where our techniques will work in such a way that it will try to rank the candidates. This will make sure that the relevant candidate is been hired for that particular vacancy. You can say the best possible candidate.

Chapter 2

Problem Life Cycle

2.1 Problem Identification

sectionProblem Identification The purpose of project identification is to develop a preliminary proposal for the most appropriate set of interventions and course of action, within specific time and budget frames, to address a specific development goal in a particular region. Investment ideas can arise from many sources and contexts. They can originate from a countrys sector plan, as follow-up of an existing project or from priorities identified in a multi-stakeholder sector or local authority.

social analysis understanding the socio-economic context, and examining the dynamics of rural livelihoods, social diversity and gender in the context of agriculture and rural development.

Agriculture is the main occupation of the majority of population in India. The farmers of our country rely heavily on agriculture for earning their livelihood. The development of agriculture depends on various aspects such as type of soil, relief, vegetation, climatic conditions, attitudes of different social groups of farmers to agriculture, use of irrigation, HYV seeds, fertilizer, pesticides and insecticides, use of mechanical tools and implements, as well as proper scientific rotation of crops by which production be enhanced. The impact of these aspects of agriculture varies in different regions. There are distinct variations in the climate and weather. To have real understanding of the nature of agricultural development, scientific investigation and evaluation of different aspects of development become highly necessary. The level of agricultural development is not the same throughout the project.

2.2 Problem Selection

Climate change is any significant long-term change in the expected patterns of average weather of a region (or the whole Earth) over a significant period of time. It is about abnormal variations to the climate, and the effects of these variations on other parts of the earth. These changes may take tens, hundreds or perhaps millions of years. But increased anthropogenic activities such as

industrialization, urbanization, deforestation, agriculture, change in land use pattern etc. lead to emission of greenhouse gases due to which the rate of climate change is much faster.

From ancient times Indias agriculture has been dependent on monsoons. Any change in monsoon trends drastically affects agriculture. Even the increasing temperature is affecting Indian agriculture. In the Indo-Gangetic Plain, these pre-monsoon changes will primarily affect the wheat crop

Increase in CO2 to 550 ppm increases yields of rice, wheat, legumes and oilseeds by 10 to 20 percent. A 1o C increase in temperature may reduce yields of wheat, soybeans, mustards, groundnuts, and potatoes by 3 to 7 percent. There would be higher losses at higher temperatures. Productivity of most crops decreases only marginally by 2020 but by 10 to 40 percent by 2100 due to increases in temperature, rainfall variability, and decreases in irrigation water.

The major impacts of climate change will be on rain fed or un-irrigated crops, which is cultivated on nearly 60 percent of cropland. A temperature rises by 0.5o C in winter temperature is projected to reduce rain fed wheat yield by 0.45 tonnes per hectare. Possibly there might be some improvement in yields of chickpeas, ragi, maize, sorghum and millet and coconut on the west coast and less loss in potatoes, mustard and vegetables. Increased droughts and floods are likely to increase production variability.

Food security is both directly and indirectly linked with climate change. Any alteration in the climatic parameters such as temperature and humidity which govern crop growth will have a direct impact on the quantity of food produced. Indirect linkage pertains to catastrophic events such as floods and droughts which are projected to multiply as a consequence of climate change leading to huge crop loss and leaving large patches of arable land unfit for cultivation which hence threatens food security. The net impact of food security will depend on the exposure to global environmental change and the capacity to cope with and recover from global environmental changes. On a global level, increasingly unpredictable weather patterns will lead to a fall in agricultural production and higher food prices, leading to food insecurity.

2.3 Problem Definition

- Monitor Current Weather.
- Monitoring the current atmospheric condition
- Setup our module with program.
- Whats app message send to the Farmer mobile number
- Sensor active 24*7 for monitoring weather and atmospheric condition.
- If weather Condition is not suitable for crops, then our system will sense abnormal conditions itself and farmer will get notify about it and this will lead to prevent future loss.
- Notification is done via Whats App Message service.

2.3.1 Objectives

- To identify and prevent disease depending on environmental condition.
- To prevent Economical loss by knowing uncertainty in atmosphere.
- To notify farmer by sending WhatsApp alert if any unfavourable condition occurs.
- Maximize the farmer production.

Chapter 3

LITERATURE REVIEW

3.1 LITERATURE REVIEW

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Internet of Things : The Internet of Things (IoT) involves continuously connected Internet devices that can be used to simplify activities in many aspects of life [2]. The main purpose of IoT is to increase various types of functions in any system consist of the Internet and we can make it more useful than the existing system. With help of IoT many users can share various information which is provided by the humans that are contained in the cloud databases and it also contains information provided by the several things in physical world [3]. With help of IoT and recent technologies, we can create a smart ecosystem of computing. IoT has several components and described with including embedded intelligence for different objects those can notice at an early stage and changes in atmospherically physical state.

IoT is a combination of computers, sensors, and several objects that are interacting with each other. It may process data automatically without any interfering of humans. IoT is one of the best new technology used in the various system, which is combined with several various information technologies. Internet of Things is connecting with each individual device in the network. In IoT, there are special systems which control software services which act as the brain of this system which helps us to process data. The Internet of Things software system is analyzed by using the collected data which is connected by various devices to make important decisions [4].

Now a day, IoT is used in each field. A general example of IoT is a smart home, in which users don't need to turn off lights/fans/equipment manually. There are various sensors are integrated with hardware components and it automatically detects any motion with this system. With this system, we can save human efforts and power consumption. In a smart home system, many such functionalities are made available. With help of interconnected devices, it measures the various environmental factors from the sensor nodes. Physical activities are performed by actuators, which converts digital data from the sensor to any physical activity such as switching

off on power supply, our module turns on in presence of unfavorable condition and with these components, we can easily manage any action and it becomes much easier [5].

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Disease Prediction and Notification alert: This Machine Leaning (Linear Regression) consists of an algorithm, which is used to detect abnormal atmosphere condition from farmer area where it is much needed and this is used to detect any dangerous behavior. Regression Algorithm used to detect danger and display an alert message.

Whenever the temperature, humidity and soil moisture level goes high then regression algorithm detect the change and send message on farmer mobile The algorithm process for decision-making is used to decide if the temperature, humidity and soil moisture is low or normal, medium or high. If the temperature is low then the early detector not display a message since this is normal; if the temperature is medium or high, the early detector displays a message and information is sent to the farmer, so that the loss gets reduce and avoid.

An atmosphere condition detection prototype implemented by applying the IoT and machine learning algorithms. The IoT used to send data from Temperature, humidity and soil moisture sensors to the cloud, fetch and analysis will have performed by algorithms if unwanted behavior is detected then WhatsApp API library send message to the farmer. Depending upon the selected crops condition of the prototype module will change. By considering the farmer view many of the crops having favorable temperature condition between 19c 25c. Detection of the disease done by checking the 2 days abnormal condition. In some case soil moisture level getting low then soil moisture sensor detect the moisture level and notify to the farmer, moisture level highest moisture (0) Lowest Moisture (1023).

3.2 Motivation

The current hiring process is more complex and time-consuming. And HR team requires more manpower to scrutinize the resumes of the candidates. So that motivated to build a solution that is more flexible and automated. HR teams need to go through all the resumes of the applied candidates. In the growing world of information technology,this manual and time-consuming process can get automated.

Chapter 4

System Analysis

In the development of any system, there are various initial steps and that how we can analyze the functionalities and design of system and objective of our project is to design Intelligent IoT based disease prediction system for specific selected (for eg:- watermelon, chilly, gram, groundnuts, etc)crops and alerting system by sending a simple WhatsApp message. Early detection of danger occurred in the farm and generate an automatic alert system in terms of messaging and it will help to protect the farm(crop) from major economic losses.

4.1 Requirement Specifications

Requirements specification is the total description and behavior of the proposed system to be developed. All required requirements which are essential for the development of the proposed system and this require analysis are categorized in different ways. In this section, it covers all the functional requirements and Financial requirement of the prototype.

4.2 Functional Requirement

In the functional requirements, we have to explain what we been done by the prototype by identifying each separate and the necessary task that we must have been accomplished. They include:

- The proposed system should detect temperature, humidity, and soil moisture detection data of farm or yield environment from several sensors.
- This proposed system should display a text alert on a monitor during a sudden rise or deduction in temperature.
- The prototype should send a Whats App message to specific user or farmer if any suspicious activity occurs in the farm.

- The proposed system should send a Whats App message to a specific person if any unfavorable condition for a specific crop is detected.

In this work, the recent new technology is used which helps us to minimize catastrophic accidents which are caused due to huge loss in agriculture sector due to crop diseases. With the use of outstanding IoT sensor technology, our system is become more efficient and much useful from several aspects and it is cost effective.

Financial requirement:

Sr.No.	Name/Hardware Details	Cost per unit (in Rs.)	Units Required	Total Amount (in Rs.)
1	Raspberry Pi 3 B	4000	1	4000
2	Humidity sensor	225	1	225
3	Temperature Sensor	225	1	225
4	Soil Moisture sensor	260	1	260
5	Jumper Wires(Bundle)	200	1	200
6	Cloud Service	1200	1	1200
			Total	6110

Chapter 5

Design

5.1 Architecture

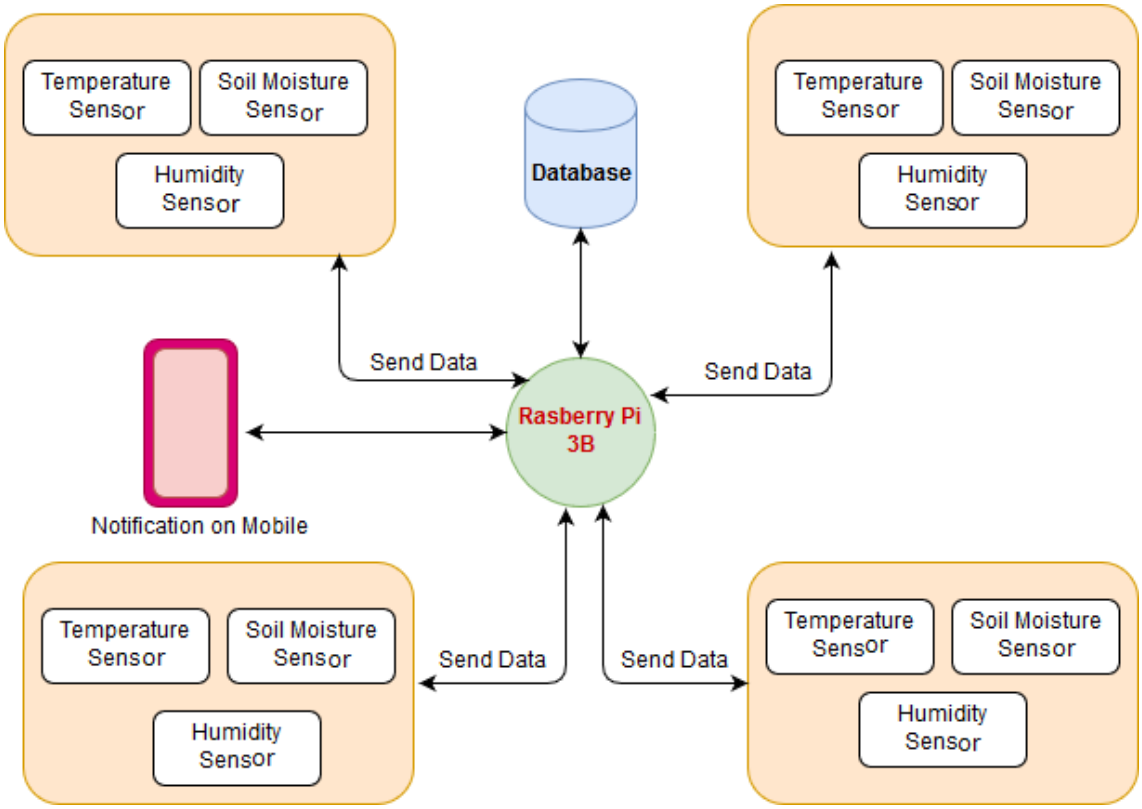

Figure 5.1: System Architecture

Fig. 5.1 System Architecture shows To control or we can say predict crop diseases, there should be proper mechanisms to detect and identify the immediate and as soon as any danger for our crops is found without any presence of camera or intelligent system action this danger should get inform to owner of particular farm and as soon as WhatsApp message get that person there should be fast reaction and some basic precaution should be taken to prevent economic loss from crop disease as quickly as possible.

Fig. 5.1 describe the raspberry pi 3 micro controller converts all of the various analog values from each sensor used in this system and converts each of them into the digital values. The several IoT platforms are implemented in this prototype which is systematically fully managed, to ease and derive various value from IoT devices is sent to display device and it was used to record data from the various devices. The disease prediction system is connected to the display device by using the lightweight wires and secured by the MQTT protocol. Actually, this IoT various devices can create a lot of different data. In fact, to detect signals by sensor technology on smart devices already in the use of accounts by 30 percent varies by the worlds data. Such as some of IoT technology like Blue-mix generates a NoSQL database which is further used for purpose of storage for various devices and that data sent by the proposed system developed in this project.

Once our connection of hardware configured with the Raspberry Pi, our code for decision is written in Noob/Raspbian that is in python language however we can customize the code to get any desired format of sensor data in software design. In the implementation of temperature, humidity and soil moisture DHT11 and PIR sensor are done using standard library codes. This program is used in python in raspberry pi and then uploaded on board then again it uploaded into raspberry pi and we can achieve output on the monitor screen. From various sensor, further data is collected and the result will be displayed on a desktop device.

5.2 Flowchart

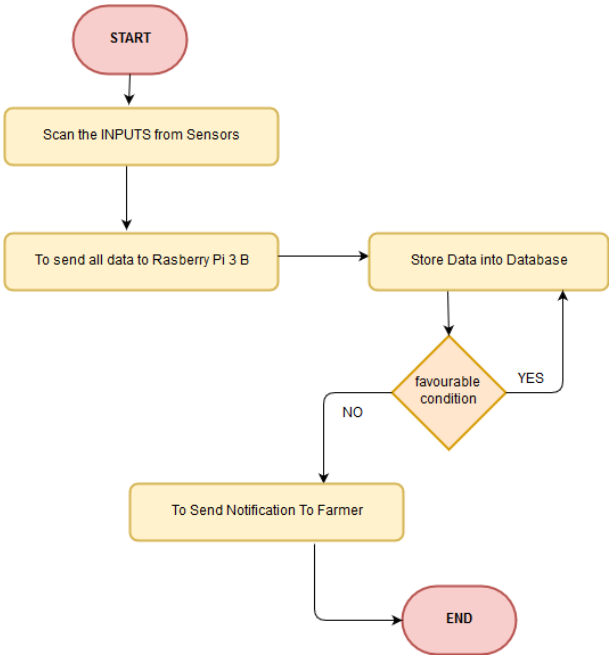

Figure 5.2: Flowchart Diagram

5.3 DFD

5.3.1 DFD level 0

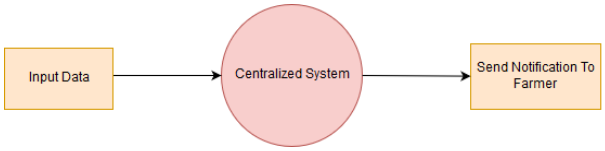

Figure 5.3: Data flow diagram level 0

Fig. 5.3 DFD level 0 for the system. The data flow diagram level 0 for our system only contains a process node that processes the function of the whole system in relationship to other entities. The detailed Data flow is explained with the help of DFD level 1

5.3.2 DFD level 1

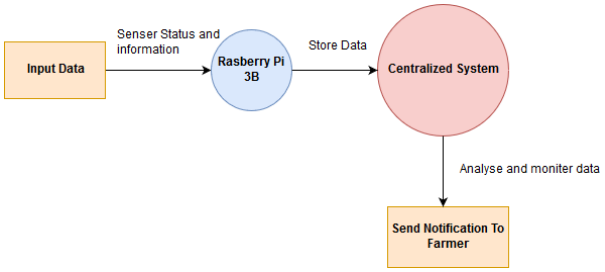

Figure 5.4: Data flow diagram level 1

Fig. 5.4 shows a level 1 data flow diagram. It is more detailed than a level 0 DFD. It explains the more details of the system than the level 0.

5.4 Use case

Fig. 5.5 Fig. 3.3 describe the use case diagram of the proposed system which is consist of only one human actor that is a farmer. The sensor node of the system sends data through text communication is the makeup of the given system.

The main purpose of use case diagram in this discretion was used for the model of the functionality of the detection of crops disease prototype using various actors and use cases for the proposed system. For use case diagram special use cases are defined in the presence of a different set of actions and services and some of the other functions that the proposed system needs to perform.

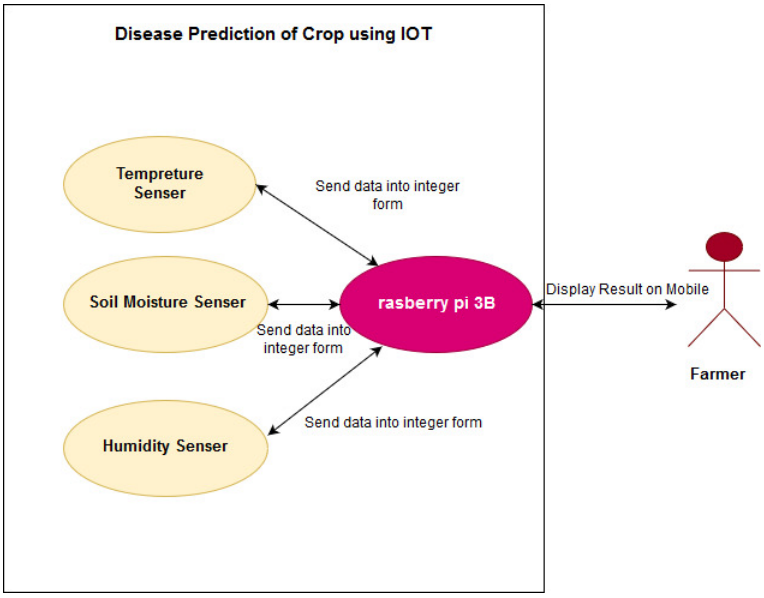

Figure 5.5: Use case Diagram

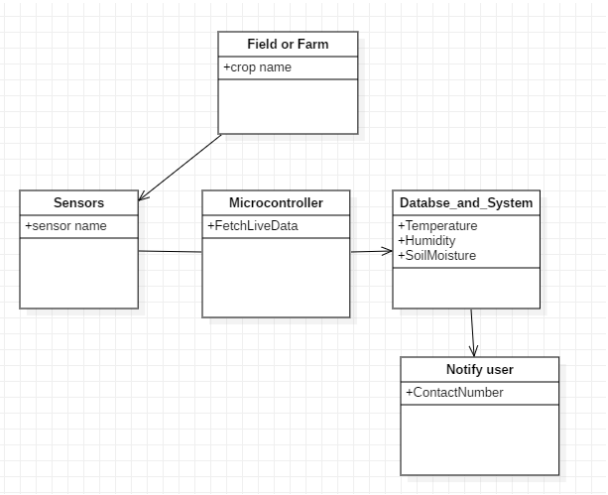

Figure 5.6: Object Diagram

5.5 Object Diagram

5.6 Component Diagram

5.7 Deployment Diagram

5.8 Class Diagram

Fig. 5.9 describes the design of a system by showing the system's classes, operations (or methods), and the relationships among the entities. It is useful for analysis of connections within the different system classes.

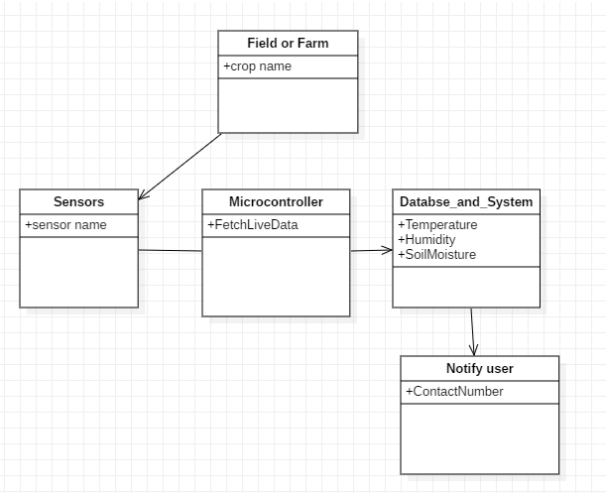

Figure 5.7: Component Diagram

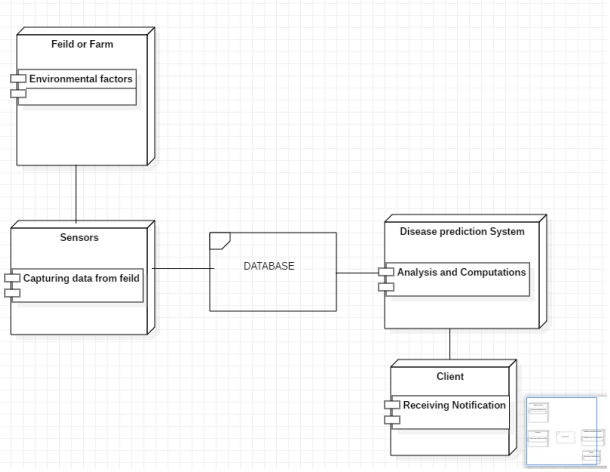

Figure 5.8: Deployment Diagram

5.9 Activity Diagram

Fig. 5.8 describes the activity diagram of system. It is another important diagram in UML to describe the dynamic behaviour of the system. basically describes a flowchart to represent the flow from one activity to another activity. The activity is as a process of the system. The flow is mentioned in the fig. which can be also used for detail analysis.

5.10 Fishbone Diagram

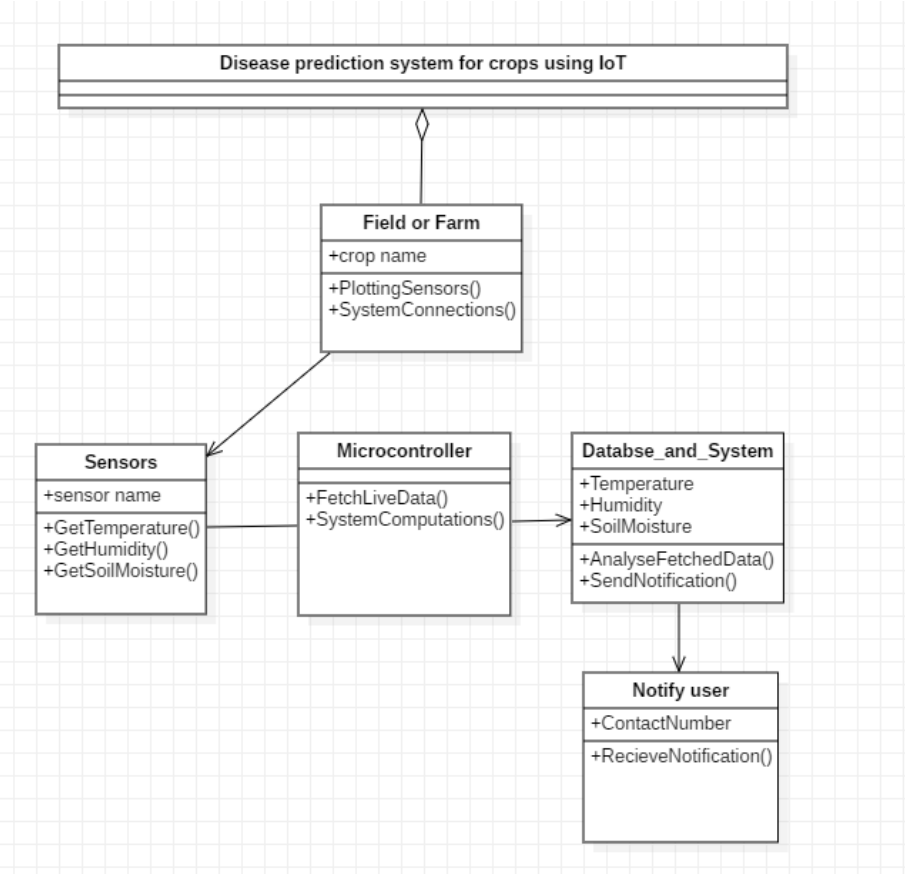

Figure 5.9: Class Diagram

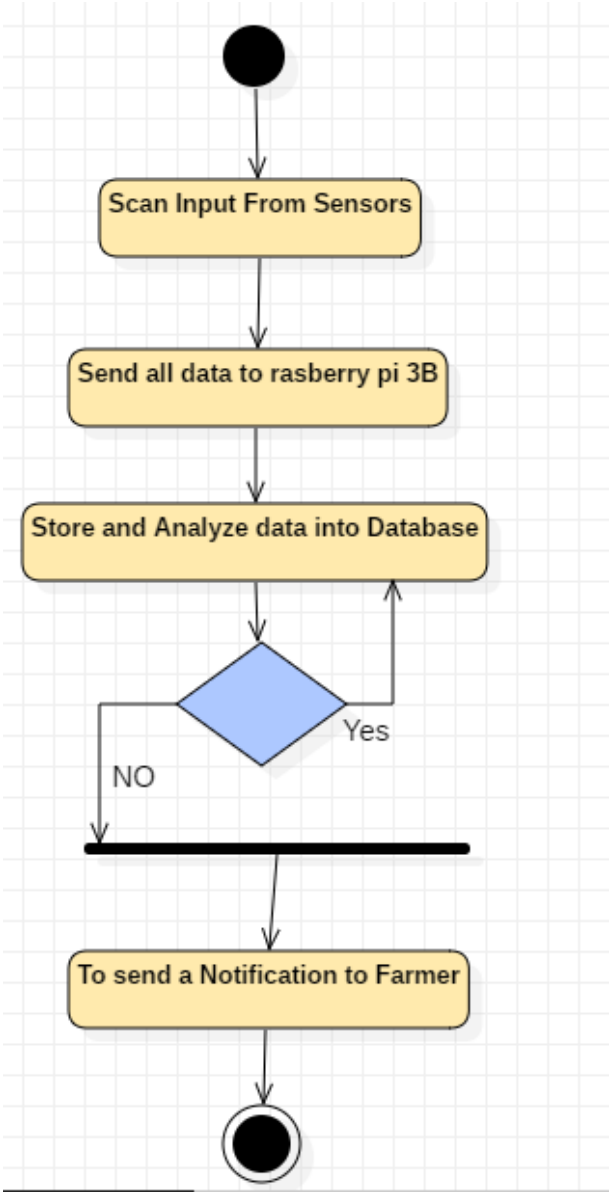

Figure 5.10: Activity Diagram

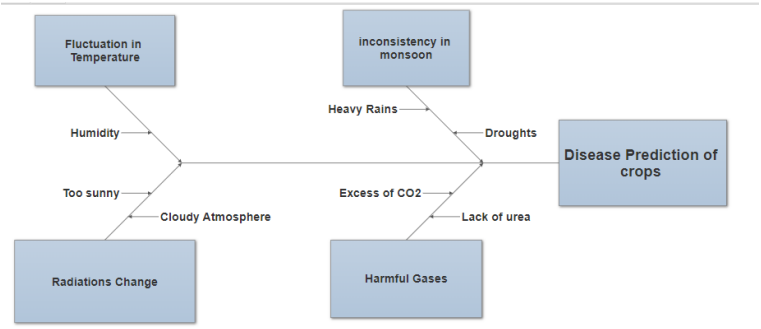

Figure 5.11: Fishbone Diagram

Chapter 6

DESIGN AND TESTING OF HARDWARE SYSTEM

6.1 Hardware Components and Design

In these system total hardware design are divides into various parts. First design is to proper connection of raspberry pi and different sensors at single point. Another design is to send alert message to specific users. In these system raspberry pi and sensors plays important role.

6.1.1 Humidity and Temperature Sensor

This DHT11 Temperature and Humidity Sensor features a calibrated digital signal output with the temperature and humidity sensor complex. Its technology ensures the high reliability and excellent long-term stability.

Specification:

- Supply Voltage: +5 V
- Temperature range :0-50 C error of 2 C
- Humidity :20-90
- Interface: Digital

6.1.2 Soil Moisture Sensor

This sensor can be used to test the moisture of soil, when the soil is having water shortage, the module output is at high level, else the output is at low level. By using this sensor one can automatically water the flower plant, or any other plants requiring automatic watering technique.

Specification:

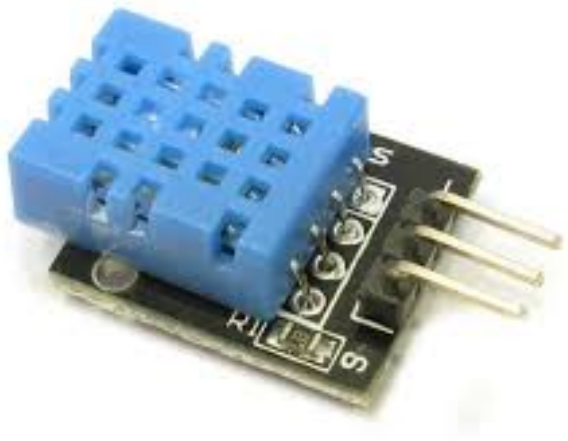

Figure 6.1: Humidity and Temperature Sensor

- Operating voltage: 3.3V 5V
- VCC: 3.3V-5V
- GND: GND
- DO: digital output interface(0 and 1)
- AO: analog output interface

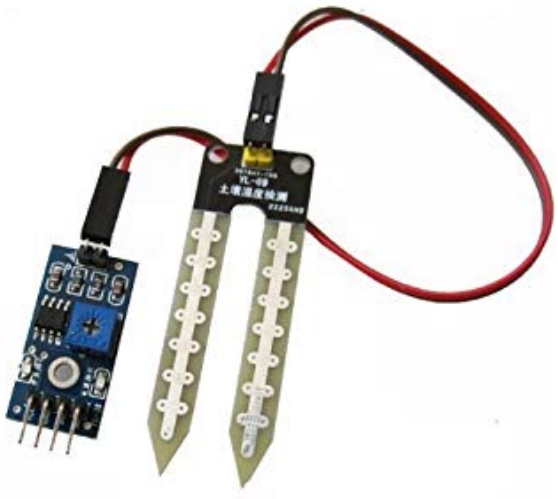

Figure 6.2: Soil Moisture Sensor

6.1.3 Raspberry Pi 3

The Raspberry Pi 3 Model B is the earliest model of the third-generation Raspberry Pi. It replaced the Raspberry Pi 2 Model B in February 2016. See also the Raspberry Pi 3 Model B+, the latest product in the Raspberry Pi 3 range.

Specification:

- Quad Core 1.2GHz Broadcom BCM2837 64bit CPU
- 1GB RAM
- BCM43438 wireless LAN and Bluetooth Low Energy (BLE) on board
- 100 Base Ethernet
- 40-pin extended GPIO
- 4 USB 2 ports
- 4 Pole stereo output and composite video port
- Full size HDMI
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- Micro SD port for loading your operating system and storing data
- Upgraded switched Micro USB power source up to 2.5A

Figure 6.3: Raspberry Pi 3

6.1.4 Jumper wires

A jump wire (also known as jumper wire, or jumper) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

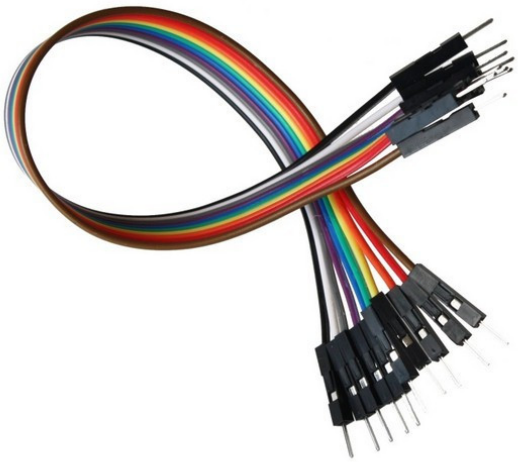

Figure 6.4: Jumper wires

6.1.5 Rotary Potentiometer

A potentiometer is a three-terminal resistor with a sliding or rotating contact that forms an adjustable voltage divider.[1] If only two terminals are used, one end and the wiper, it acts as a variable resistor or rheostat.The measuring instrument called a potentiometer is essentially a voltage divider used for measuring electric potential (voltage); the component is an implementation of the same principle, hence its name.

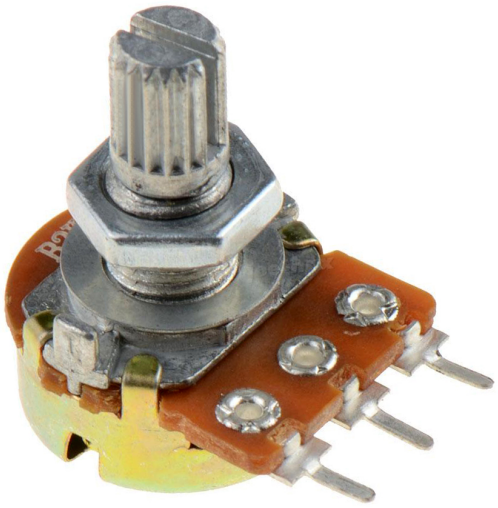

Figure 6.5: Rotary Potentiometer

6.1.6 MCP 3008

The MCP3008 10-bit Analog-to-Digital Converter (ADC) combines high performance and low power consumption in a small package, making it ideal for embedded control applications. The MCP3008 features a successive approximation register (SAR) architecture and an industry-standard SPI serial interface, allowing 10-bit ADC capability to be added to any PIC microcontroller.

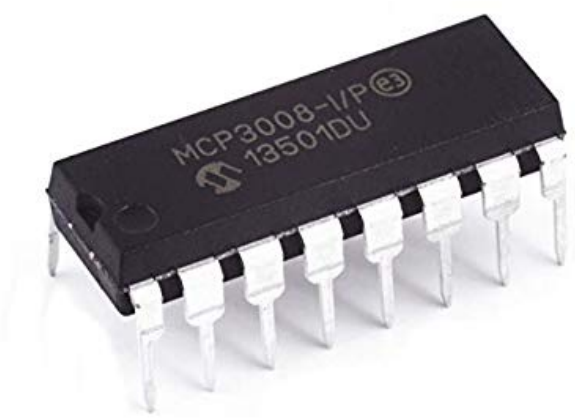

Figure 6.6: MCP 3008

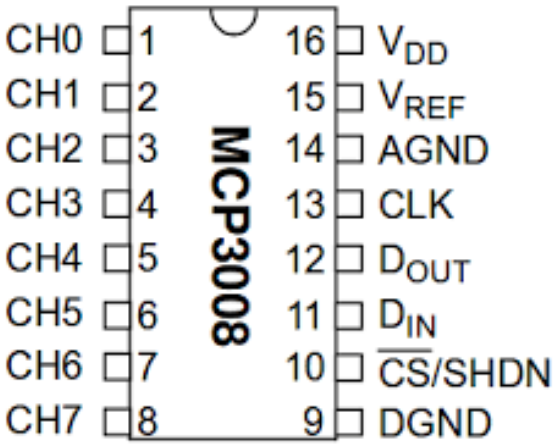

Figure 6.7: MCP 3008 Pin Diagram

6.2 Testing

6.2.1 Unit Testing

In this type of testing individual sensors are connected to microcontroller and test system from the input sensor node and detect output in the danger.

Soil Moisture Sensor

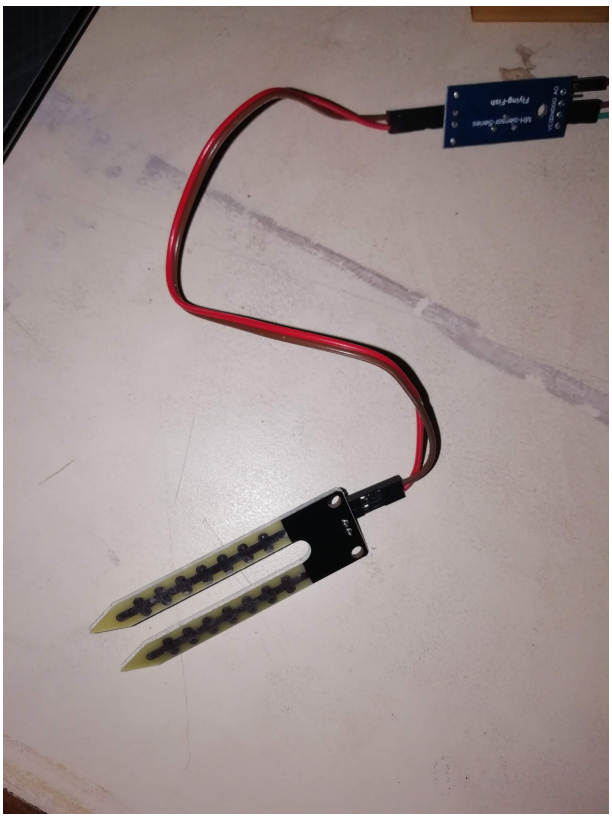

Figure 6.8: Soil Moisture Sensor

Humidity and Temperature Sensor

Rotary Potentiometer

6.2.2 Integration Testing

6.2.3 Closure

Each sensor unit was tested individually. Several tests were conducted for intended to ensure the exact accuracy of each one of the various sensors in this main prototype. We have used soil-moisture sensor, humidity sensor and temperature sensor. For example: for testing soil-moisture we have used moisture sensor in many different ways, so that we could catch and store the accurate values. (As we have fetching live data continuously from field or farm) The final proposed system is tested to detect these accurate result based on our prediction system and to implying alert message to a specific user or a service-consumer

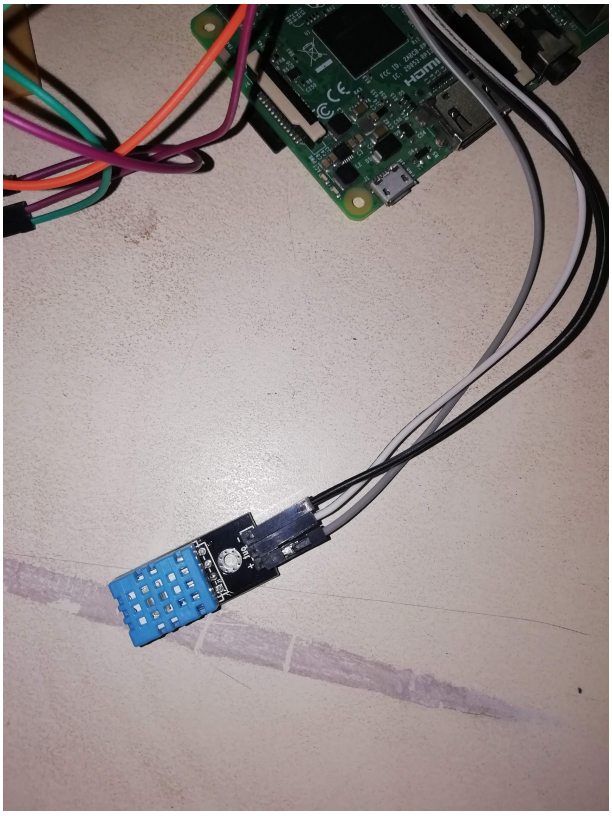

Figure 6.9: Humidity and Temperature Sensor

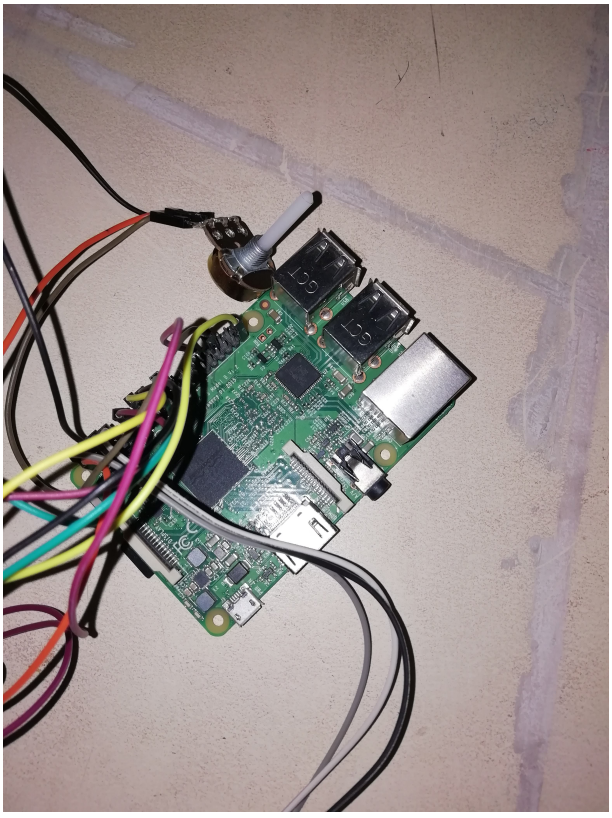

Figure 6.10: Rotary Potentiometer

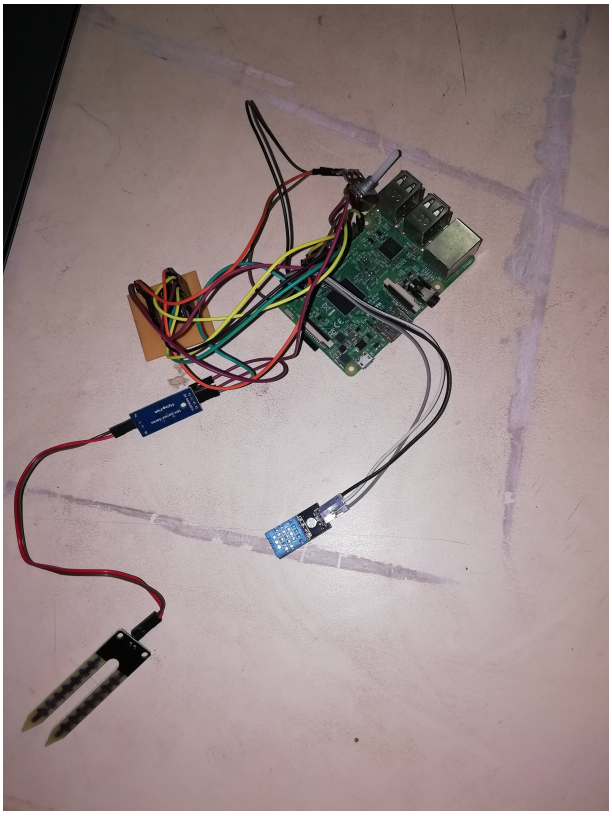

Figure 6.11: combine all Sensor connection with raspberry pi 3

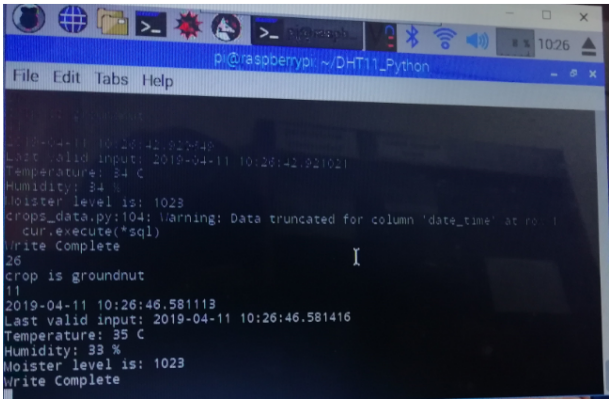

Figure 6.12: Real time values of current atmosphere

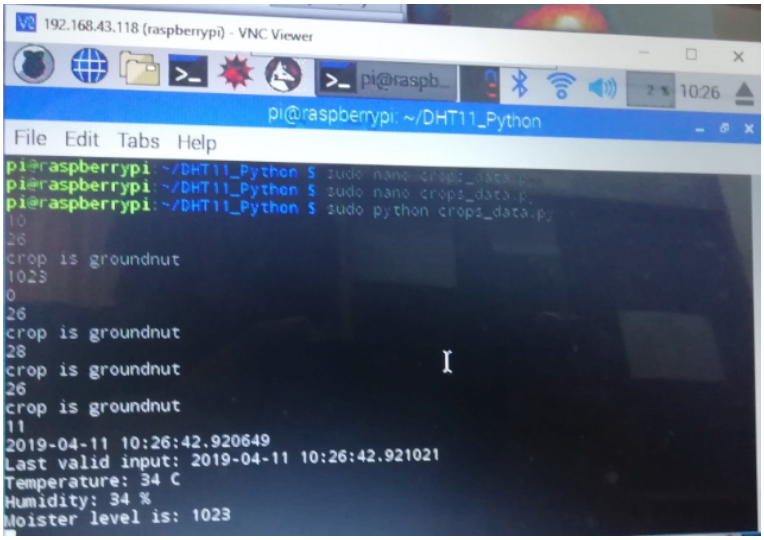

Figure 6.13: Reading Data

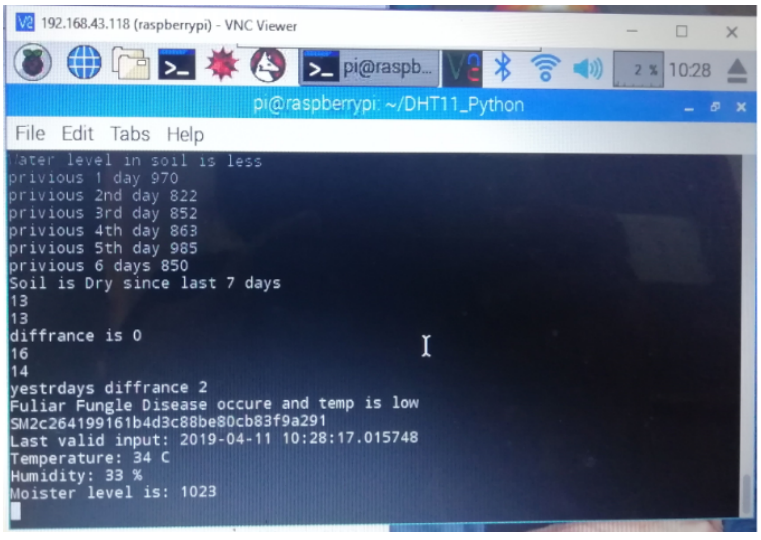

Figure 6.14: Result

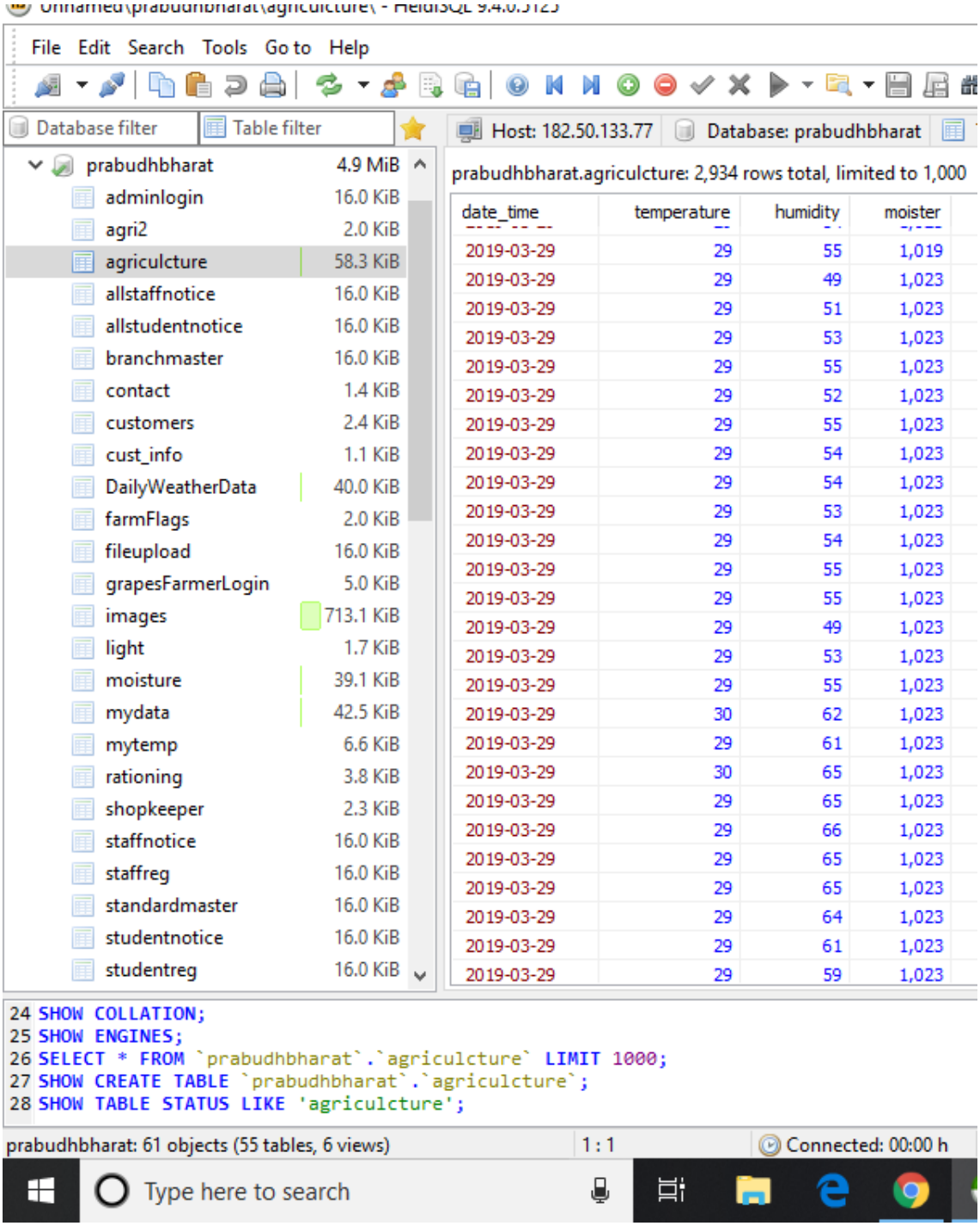

Figure 6.15: Database

Chapter 7

Results and Discussion

This chapter present more details about the project as well as result and behind python programming logic.

In farm we deploy our model in particular area. Humidity, temperature and soil moisture sensor fit their location correctly, its help to module read current atmosphere condition. Once the data reading started module save all the data by 10 min of time interval in database. Data is a form of humidity (percentage), Temperature, and soil moisture (0-1023).

Sr.No.	**Source**	**Sensor Used**	**Detection Result** .
1	Temperature	DHT11	Heat Detected
2	Humidity	DHT11	Air Humidity
3	Soil Moisture	Soil Moisture	Soil Moisture

Table 7.1: Sensor Components

By considering the crops and its threshold range of fight with environmental change, we develop he python logic, where real time data store in cloud database, so we can analyze the past atmosphere situation of that area by comparing with todays atmosphere of the situation.

Previous:

- Min=Min(temperature)
- Max=Max(temperature)
- Previous difference = Max-Min

Today:

- Min=Min(temperature)
- Max=Max(temperature)

- Today difference = Max-Min

Here, we calculate both previous as well as today data difference by performing subtraction

- Previous difference < 3
- Today difference < 3

Environment since two-day temperature high and low.

- Today Max < 18

Environment last two day temperature is low.

- Today Min > 25

Environment last two day temperature is low.

Soil moisture play very important role in growth of crops. Depending upon crop farmer will give water to the farm, it may be 6 to 9 days gap. So we also calculate all 7 days soil moisture level

- Day1 < 200
- Day2 < 300
- Day3 < 420
- Day4 < 600
- Day5< 800
- Day6< 1023

Notify the farmer Water level in land is very low so farmer immediately on water supply in farm.

Chapter 8

Conclusion and Future scope

8.1 Conclusion

The contribution of this proposed work is to develop an IoT agricultural applications that is different from the existing system. Application of IoT in agricultural are making it possible for farmers to collect meaningful data. Large landowners and small farmers must understand the potential of IoT market for agriculture by installing smart technologies to increase competitiveness and sustainability in their production. The demand for a growing population can be successfully met if the ranchers as well as small farmers implement agricultural IoT solutions in a successful manner.

The depiction of how the disease prediction system and devices have been used to capture data from the sensors, the sensors send data to devices which is connected to microcontroller raspberry pi 3B and this IoT device saves data in a continuous manner and after analyzing this data and calculating result and then send an alert message of respective danger by identification of disease and sending notification message by WhatsApp is done by the proposed system.

8.2 Future Scope

Chapter 9

References

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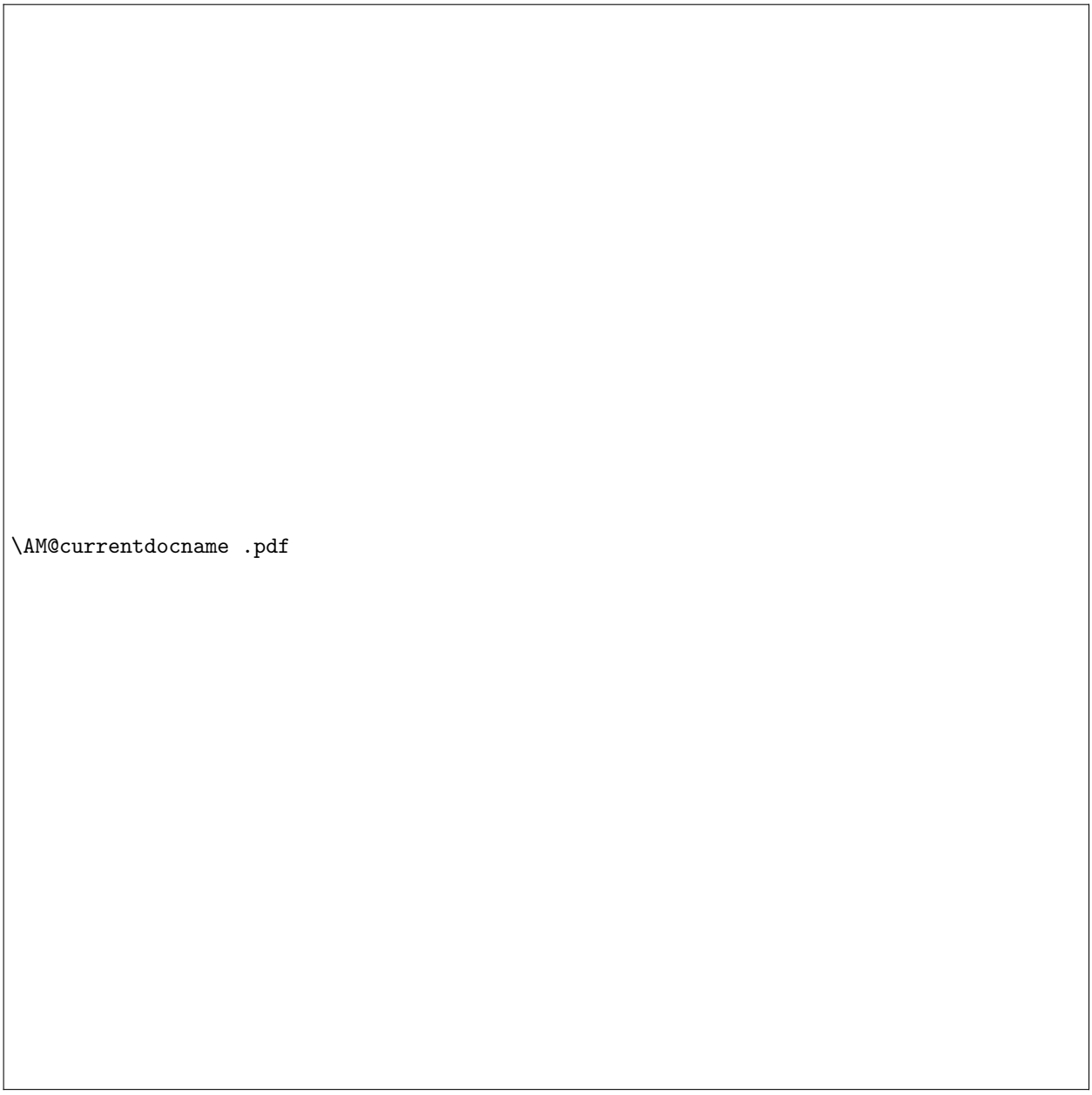
7. G. Anthonys and N. Wickramarachchi. 2009. An image recognition system for crop disease identification of paddy fields in Sri Lanka. 2009 International Conference on Industrial and Information Systems.Sri Lanka. pp. 403-407.

Activity Chart

Activity	Duration in Days	End Date	Month 2018-19						
			7	8	9	10	1	3	4
Team Formation,project proposal/Problem identification, Background work and finalization	15	17/7/2018							
Project Title finalization and Literature Review	10	14/8/2018							
System Requirements specification	6	21/8/2018							
Synopsis Submission and Presentation	8	29/8/2018							
Project Design Phase Evaluation	20	11/9/2018							
Project Phase-I Report Preparation	8	19/9/2018							
Coding 50% completion	15	22/10/2018							
Project Phase –I Evaluation	3	25/10/2018							
Self Study on relevant technology	20	15/1/2019							
100% Coding and Preparation for various competitions	15	30/1/2019							
Report Preparation	8	15/3/2019							
Final Report Preparation and Submission		15/4/2019							
Participation in Quantum 2019	1	18/4/2019							
Final Presentation	1	18/4/2019							

Table of Activity



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PROJECT WORK: CHECK LIST

Team No: P10 **Year:** 2018-19 **Curriculum:** B. Tech, IT

Project Title: Disease Prediction of Crops Using IoT

Sr. No	Activity	✓
1	Certificate page details	
2	Sponsorship letter/paper presentation certificate/competition achievement proofs Office staff name: Mr. G. D. Chavan sign:	
3	Xerox copy of all proofs submitted in the Department office and sign taken.	
4	Format of report as per given guidelines	
5	Readme file in report hard copy	
6	User Manual in Report Hard Copy	
7	Soft Copy in CD: Project Report, readme file, User Manual, Proofs soft copy and diagrams in each separate folders	
8	Softcopy in CD: Project Code and Database files	
9	RESUME of the Report and Mega Project Summary(MPS) submitted to Project Coordinator.	
10	Deployment proof	
11	Activity chart	
12	Plagiarism report	
13	Title of the Project and year written on the CD	
14	Project CD stapled at the end of Project Report(Department's Copy and Guide's Copy)	
15	Project Poster folded and stapled at the end of the Department's copy of the project report. Submitted FLEX to guide (Width:30 inches xheight:20inches) Poster and FLEX are mandatory	
16	Project Deployed on Departments Server & accessible over the WEB.	
17	Project Team member marked their signature on Project Evolution Sheet	
18	Uploaded the softcopy of entire Project Work on Department FTP server Lab Assistant's Name: Mr. G. D. Chavan Sign:	
19	Submitted the project summary details to Project Coordinator Project Coordinator Signature	

Guide Name: Prof.P.T.Sawant **Signature:**