"Tech Greenhouse"

A Project Report Submitted to
Gujarat Technological University in Fulfillment of the Requirements for the
Degree of Bachelor of Engineering
In
Information Technology

B. E. IV, Semester –VIII

By

GTU Team ID: 20347

Abhinand Pandya	**Enrollment No. 150010116032**
Pratit Patel	**Enrollment No. 150010116039**
Prit Patel	**Enrollment No. 150010116040**

Faculty Guide:

Prof. Jayandrath Mangrolia
[Assistant Professor (IT)]

Academic Year 2018-19

Department of Information Technology
A. D. Patel Institute of Technology

New Vallabh Vidyanagar, Anand

Acknowledgment

We appreciate the **GTU** for giving us a platform which can transform our idea into a design or any product which can help people in their day to day life.

We thank to our guide, **Prof. Jayandrath Mangrolia** (Assistant Professor – IT) for their valuable guidance & the efforts that they have put in each of us. We would not have been able to complete our project without their cooperation, encouragement and immense help.

We are also thankful to other faculty members for their friendly advice and devoted instructions. A report is all-encompassing as this is never the work of one or two people laboring in quiet solitude. It is the product of many hands, and countless hours from many people. Our thanks go to all those who helped us.

Pandya Abhinand (150010116032)

Patel Pratit (150010116039)

Patel Prit (150010116040)

COLLEGE CERTIFICATE

Date:

This is to certify that the project entitled "**Tech Greenhouse**" has been carried out by **Pandya Abhinand (150010116032), Patel Pratit (150010116039), Patel Prit (150010116040)** under my guidance in fulfillment for the degree of Bachelor of Engineering in Information Technology (8th Semester) of Gujarat Technological University, Ahmedabad during the academic year 2018-19.

Internal Guide

Prof. Jayandrath Mangrolia
Assistant Professor (IT)

Head of Department

Dr. N.C.Chauhan
Head (IT)

Undertaking of Originality of Work

We hereby certify that we are the sole authors of this UDP project report and that neither any part of this UDP project report nor the whole of the UDP project report has been submitted for a degree by other student(s) to any other University or Institution.

We certify that, to the best of our knowledge, the current UDP project report does not infringe upon anyone's copyright nor violate any proprietary rights and that any ideas, techniques, quotations or any other material from the work of other people included in our UDP project report, published or otherwise, are full acknowledged in accordance with the standard referencing practices. Furthermore, to extent that we have included copyrighted material that surpasses the boundary of fair dealing within the meaning of the Indian Copyright(Amendment) Act 2012, we certify that we have obtained a written permission from the copyright owner(s) to include such material(s) in the current UDP project report and have included copies of such copyright clearances to our appendix.

We declare that this is a true copy of our report, including any final revisions, as approved by our supervisors.

Date:

Place:

Team

Enrollment No.	Name	Signature
150010116032	Pandya Abhinand	
150010116039	Patel Pratit	
150010116040	Patel Prit	

ABSTRACT

In this work, we have proposed a framework that can gather the data identified with greenhouse environment and yield status and control the system automatically in view of the gathered data. By throatily observing periodic conditions, this study has the reason for securing connection between sensors flags and reference estimations. Control programming will give information finding of ongoing show. Through long time running and functional utilizing, the framework has been demonstrated that it has numerous points of interest. To monitor the environment inside greenhouse different parameters have been considered such as light, temperature, humidity, soil moisture etc. using different sensors like DHT11 temperature and humidity Sensor, LDR, soil moisture sensor etc. which will be interfaced with microcontroller. It is a closed loop system that will execute control action to adjust temperature, humidity, light intensity and soil moisture if any unwanted errors (high/low) occur.

LISTS OF FIGURES

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CHAPTER: 1

INTRODUCTION

1.1 Project Summary

This is a multifaceted set up which is very much prepared to respond to the vast majority of the climatic changes happening inside the greenhouse. It chips away at an input framework which helps it to react to the outside blows proficiently. In spite of the fact, this set-up overcomes the issues created because of human errors it is not totally mechanized and wasteful. The proposed framework is an implanted framework which will nearly screen and control the small scale climatic parameters of a greenhouse on a usual premise. For the development of products or particular plant species which could enhance their creation over the entire yield development season and to kill the challenges included in the framework by falling human negotiation to the best feasible degree. The framework contains sensors, Arduino which is helping us the use of micro controller easily and actuators.

1.2 Aim and objective

We live in our current reality where everything can be controlled and worked naturally, however there are still a couple of vital segments in our nation where computerization has not been received or not been put to an incontestable utilization, maybe in dainty of a few reasons one such reason is expense. One such field is that of agricultural. Agricultural has been one of the essential occupations of man subsequent to right on time developments and even today manual interventions in cultivating are certain. Greenhouse frame an imperative piece of the agribusiness and agriculture areas in our nation as they can be utilized to develop plants under controlled climatic conditions for ideal produce. An automated system inside a greenhouse visualizes checking and controlling of the climatic parameters which specifically or in an indirect way administer the plant development and consequently their produce. Automation is methodology control of automated hardware and courses of action, subsequently supplanting human proprietors.

1.3 Problem specification

The proposed framework is an implanted framework which will nearly screen and control the small scale climatic parameters of a greenhouse on a usual premise. For the development of products or particular plant species which could enhance their creation over the entire yield development season and to kill the challenges included in the framework by falling human negotiation to the best feasible degree. The framework contains sensors, Arduino which is helping us the use of micro controller easily.

1.4 Literature Review

IOT Based Greenhouse Monitoring System: Technical Review:

Varsha Modani , Ravindra Patil , Pooja Puri , Niraj Kapse
Department of Electronics Engineering DKTE'S Textile & Engineering Institute
Maharashtra, India

Agriculture plays vital role in the development of agricultural country. Agriculture has been one of the primary occupations of man since early civilizations and even today manual interventions in farming are inevitable. In our country, as they can be used to grow plants under controlled climatic parameters which directly or indirectly govern the plant growth and hence they produce.. Greenhouse agriculture needs to control the environmental factors to obtain the optimum growth conditions for the crop. Currently, artificial management is the major way to detect and control the environment factors, wastes lots of manpower and relatively large of monitoring error, affecting the growth of crops. To achieve the intelligent monitoring of greenhouse environment parameters like temperature, humidity, soil moisture and light intensity and keeping the user continuously informed of the conditions inside the greenhouse using IoT technology.

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CHAPTER: 2

DESIGN ENGINEERING CANVAS

3.1 AEIOU Summary:

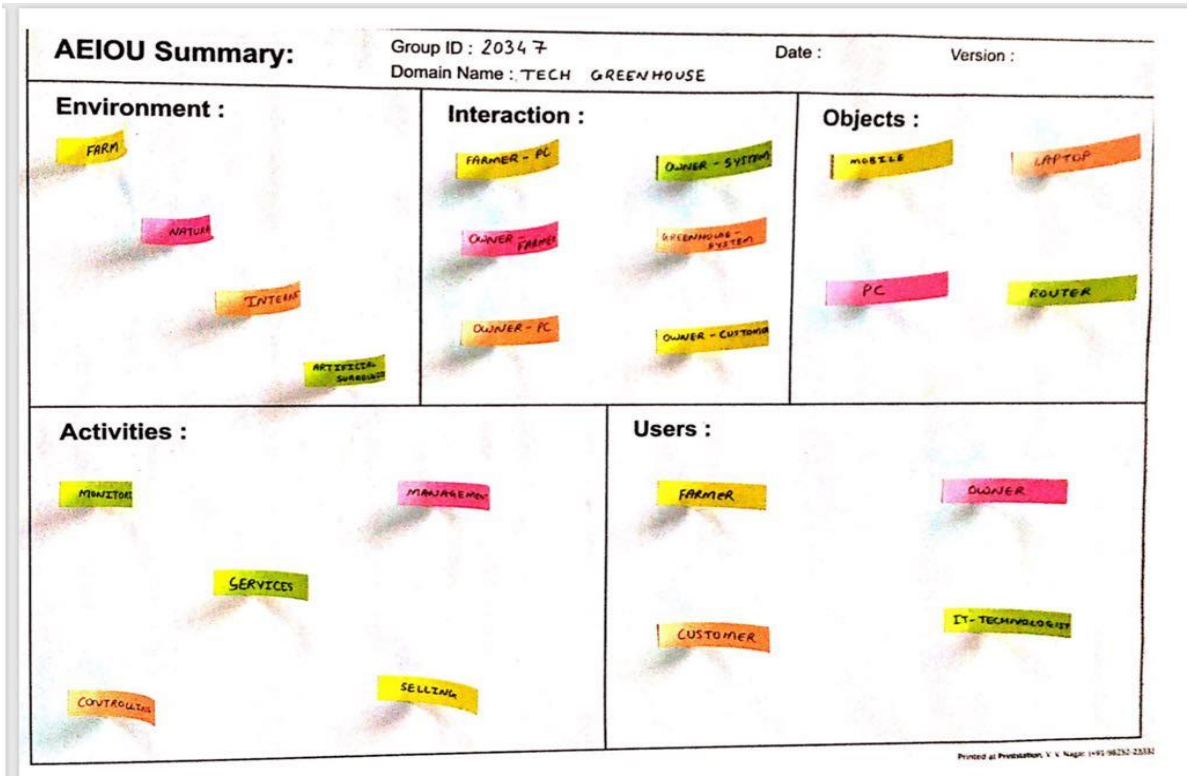


Figure 3.1 AEIOU Summary

The above canvas is an AEIOU Summary about the Activities, Environment, Interactions, Objects and Users. Based on the observations done we were able to draft this summary which includes the situations and the major/minor factors that are responsible for the inactions.

3.2 Product Development Canvas:

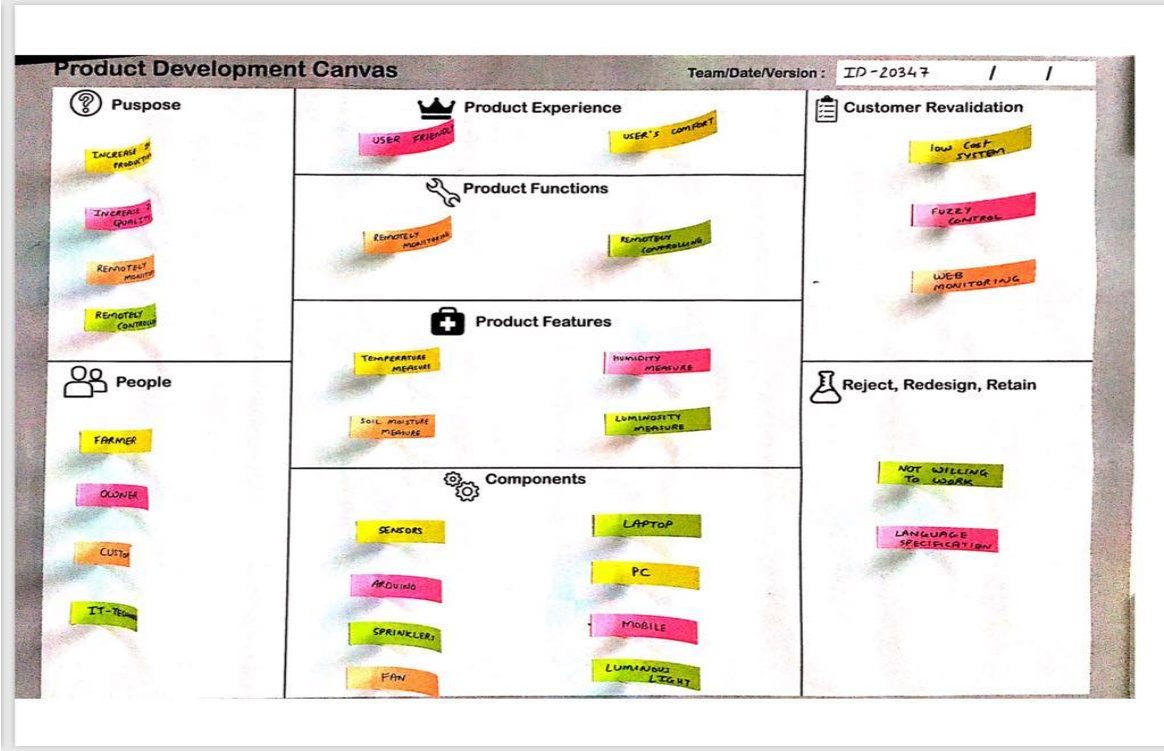


Figure 3.2 Product Development Canvas

Based on the observation in the previous AEIOU summary a particular Ideation can be derived which results into the Ideation Canvas above. This canvas shows the initial idea about the formation of the product and shows that how a particular product should be designed. The factors that will be affecting the development of the product are also included in this canvas.

3.3 Empathy Mapping:

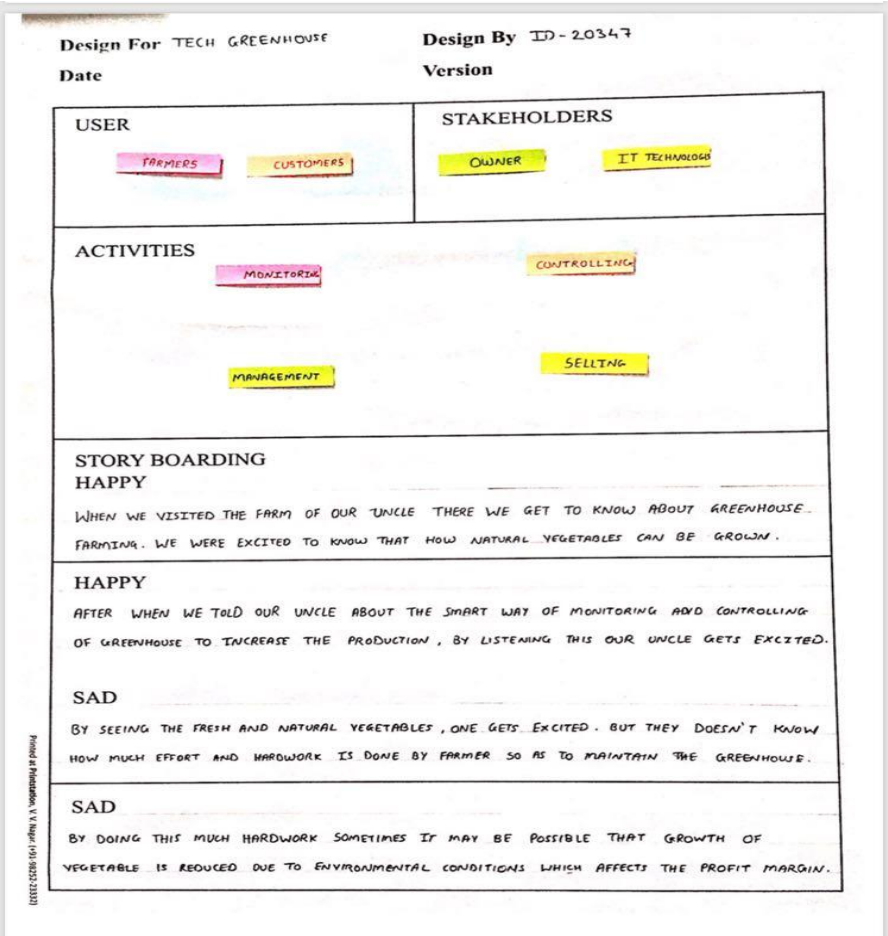


Figure 3.3 Empathy Mapping Canvas

The above canvas shows the empathy part included behind the creation of the project. The canvas includes some short stories that depict the actual case scenarios of the use and need of the product. The scenarios are best show cased using two happy and two sad stories.

3.4 Ideation Canvas:

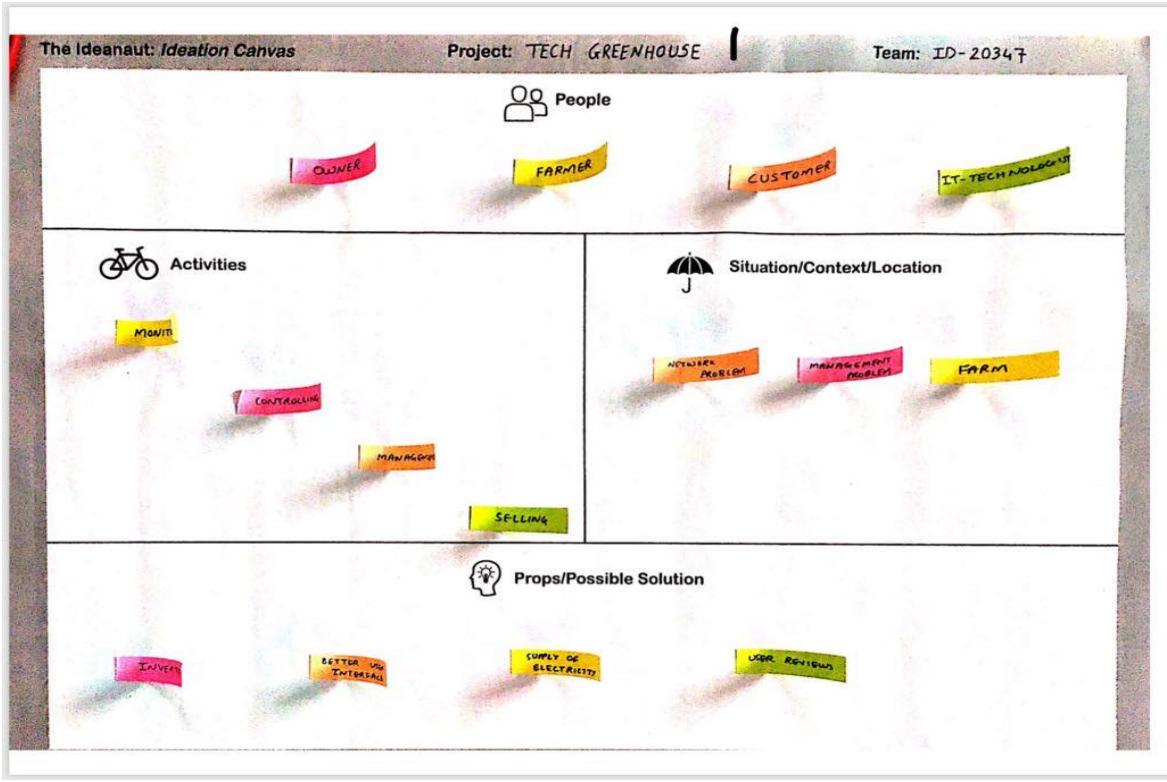


Figure 3.4 Ideation Canvas

After understanding the ideal stage of the product and going through the empathy part of the product it is time to design the final product definition, users, features, functions and components. This canvas will let us know exactly the amount of efforts and the clear idea that is to be put into this project. After that, the Customer revalidation part shows us how true we were in idealizing and creating a solution for the user. After that according to the Validations it is up to us that we reject, redesign and retain the function and features according to the feedback from the customer.

3.5 Business Model Canvas:

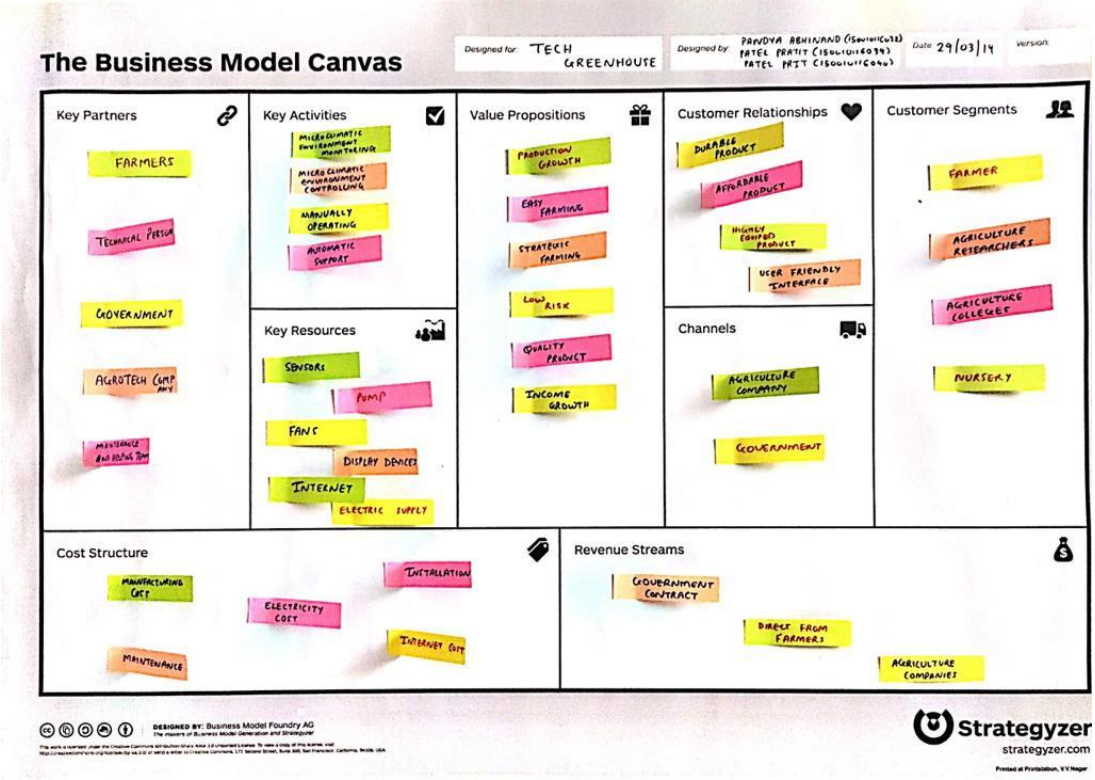


Figure 3.5 Business Model Canvas

Business Model Canvas is a strategic management and lean startup template for developing new or documenting existing business models. It is a visual chart with elements describing a firm's or product's value proposition, infrastructure, customers, and finances. The above canvas depicts the business strategy's compelled like costing, revenue, etc.

CHAPTER: 3

ANALYSIS & DESIGN METHODOLOGY

3.1 System Architecture

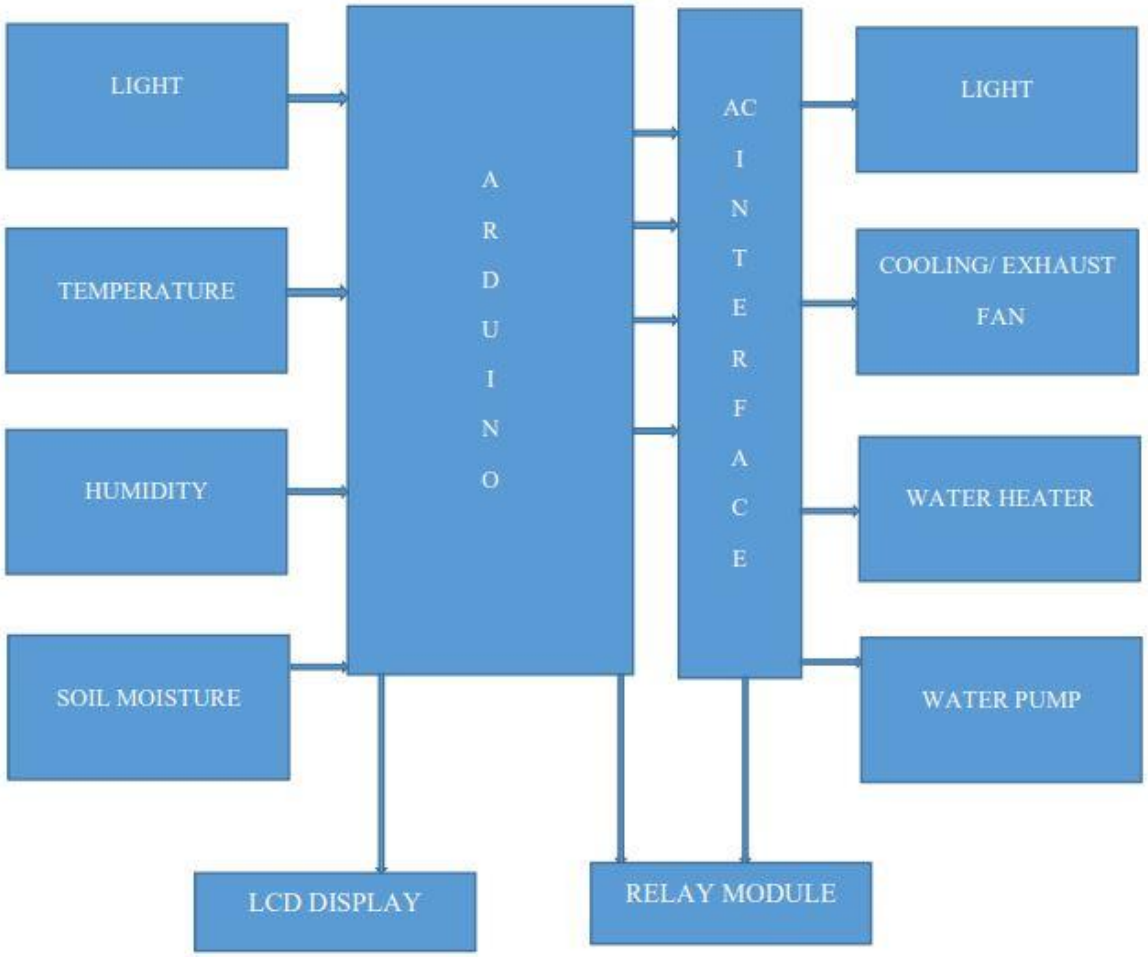


Figure 3.1 System architecture

3.2Use Case Diagram

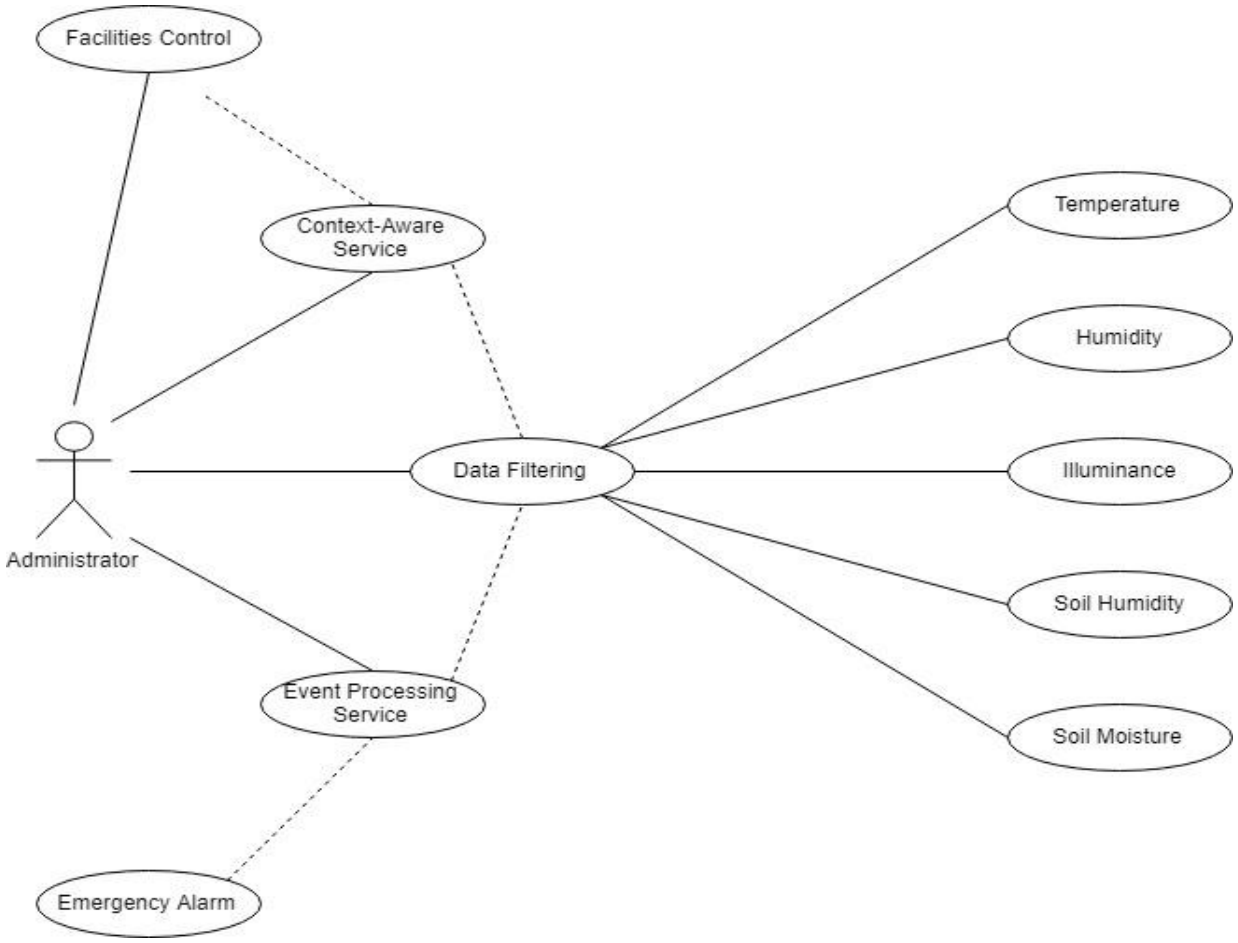
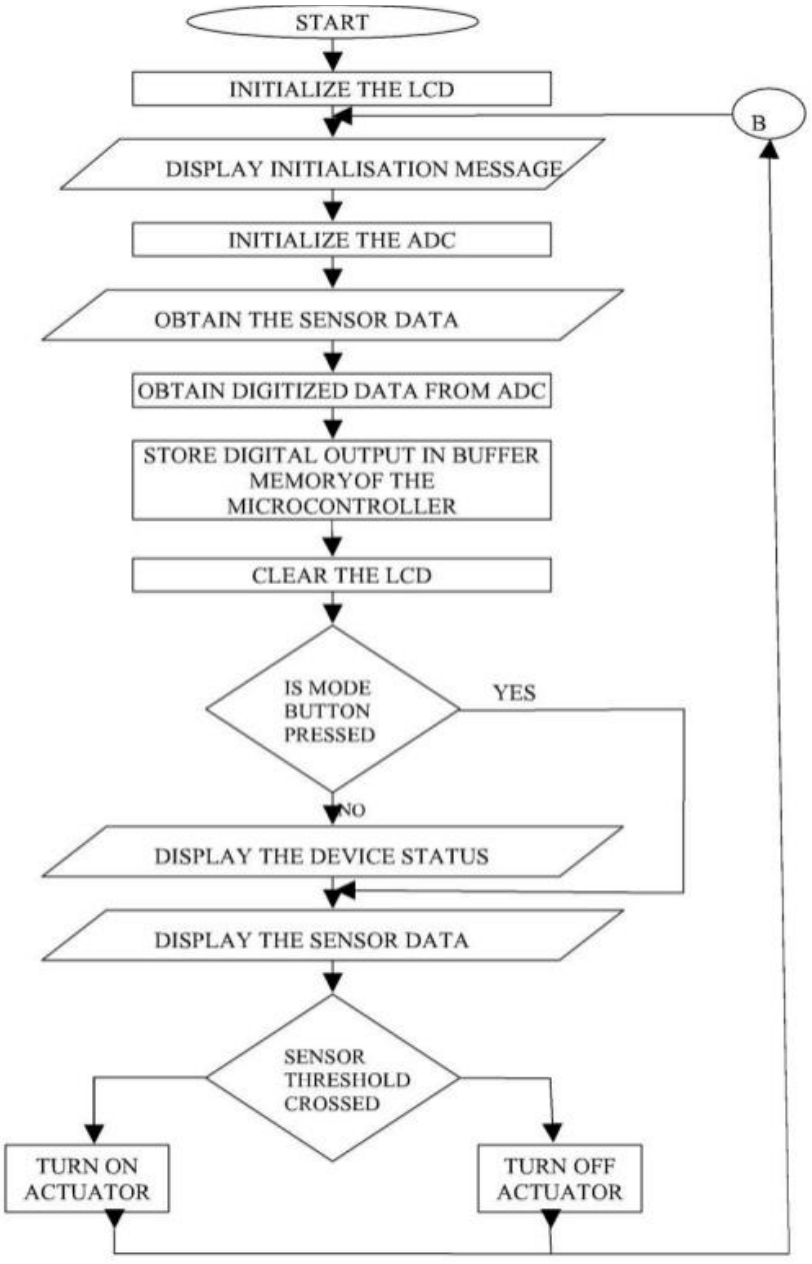


Figure 3.2 Use case diagram

3.3 System Flow Diagram

Figure 3.3 System Flow Diagram



3.4 Sequence Diagram

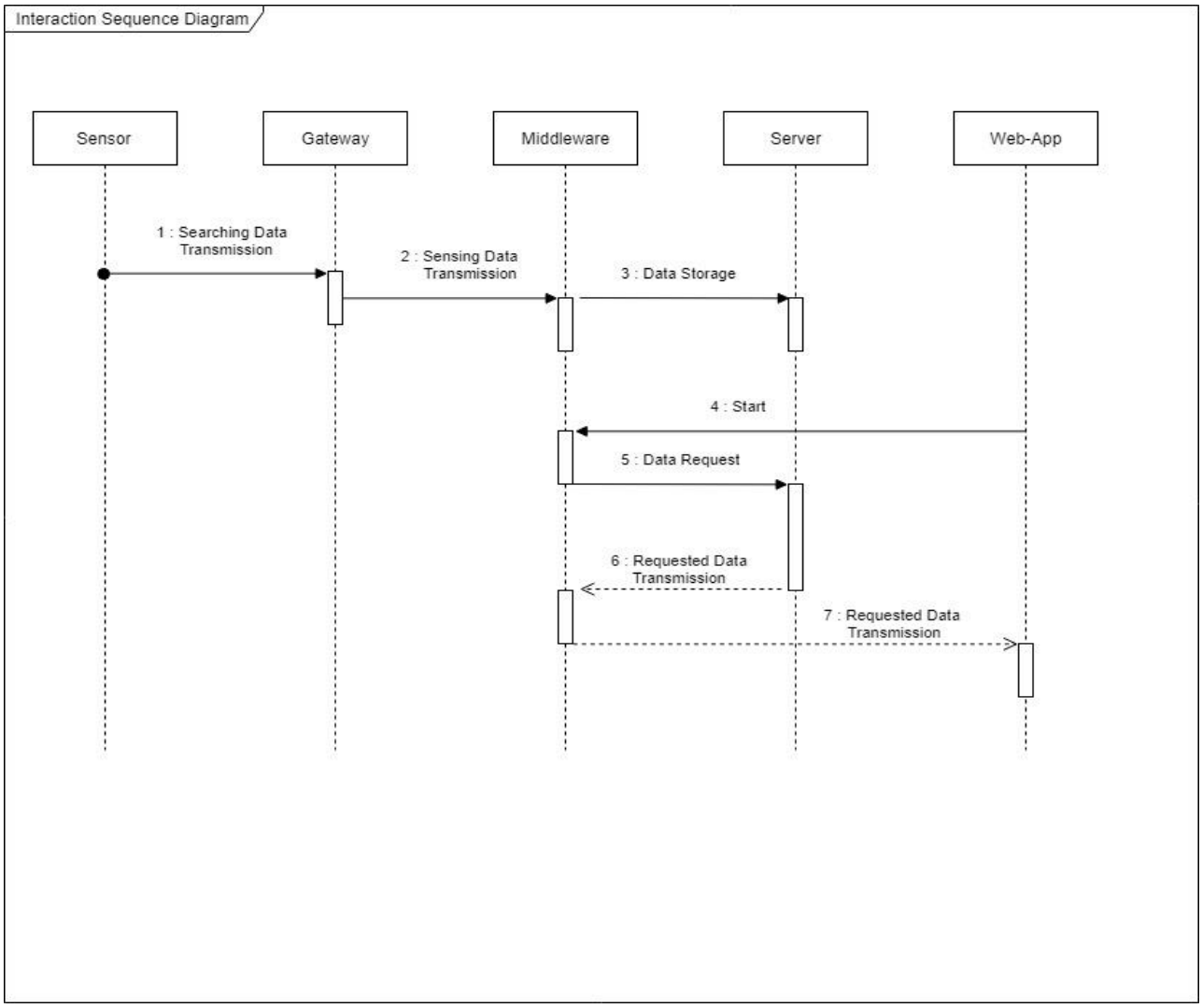


Figure 3.4 Sequence Diagram

CHAPTER: 4

IMPLEMENTATION

4.1 User Interface

The User Interface of Tech Greenhouse has many features like:

- Full responsiveness and browser **compatibility**.
- **Connectivity** independence.
- App-like interface.
- Push **notifications**.
- **Manual/Self**-updates.
- Safety.
- Discoverability and easy installation.
- Offline work mode.

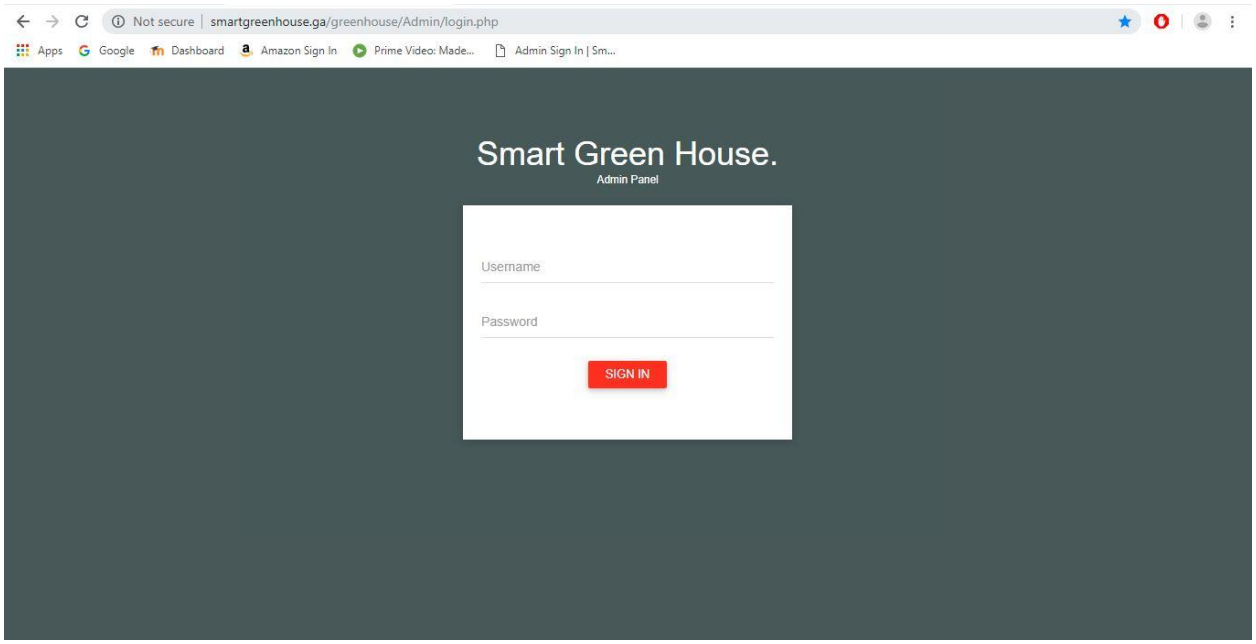


Figure 4.1 Login

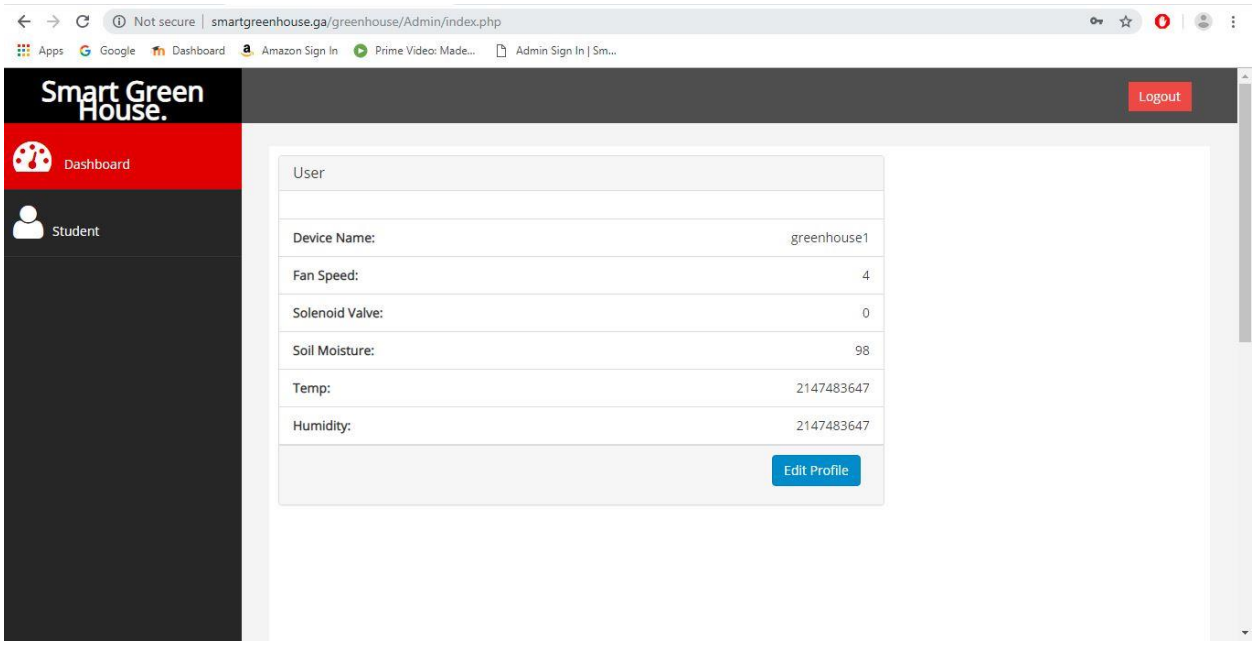


Figure 4.2 Dashboard

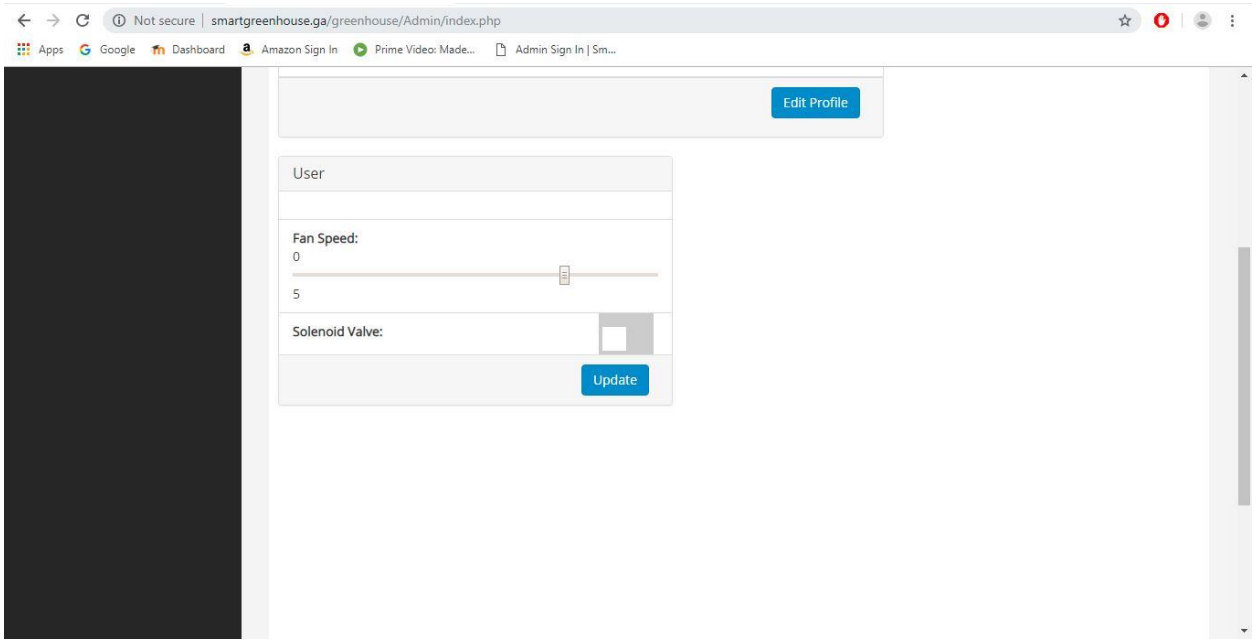


Figure 4.3 Update

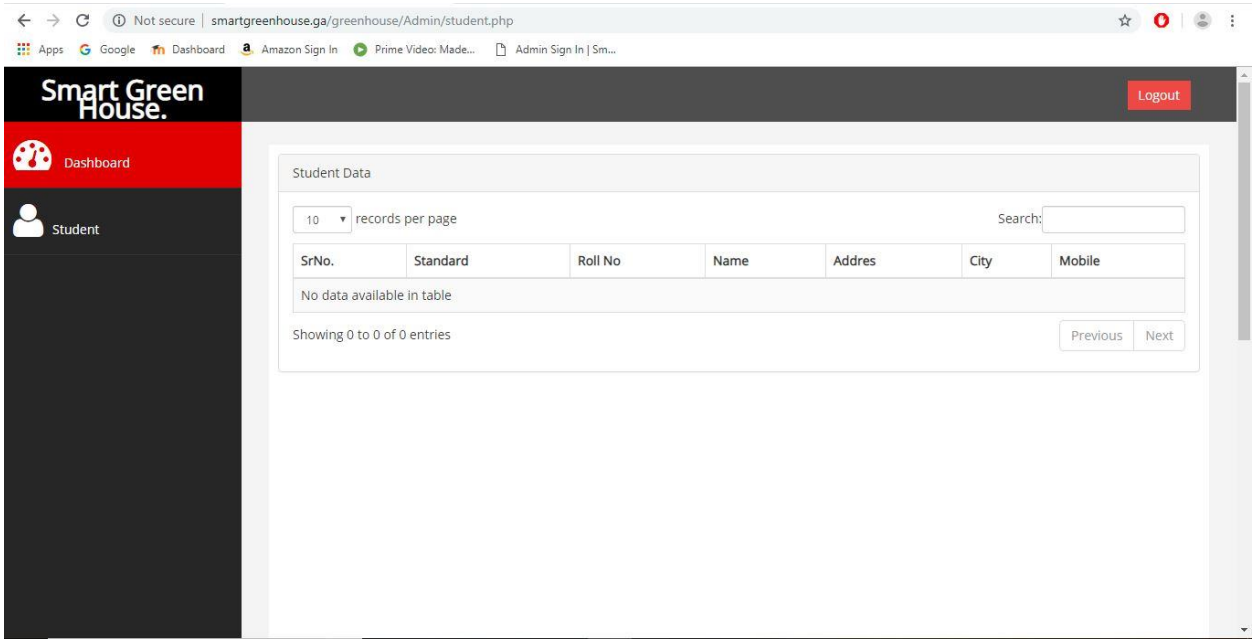


Figure 4.4 Database

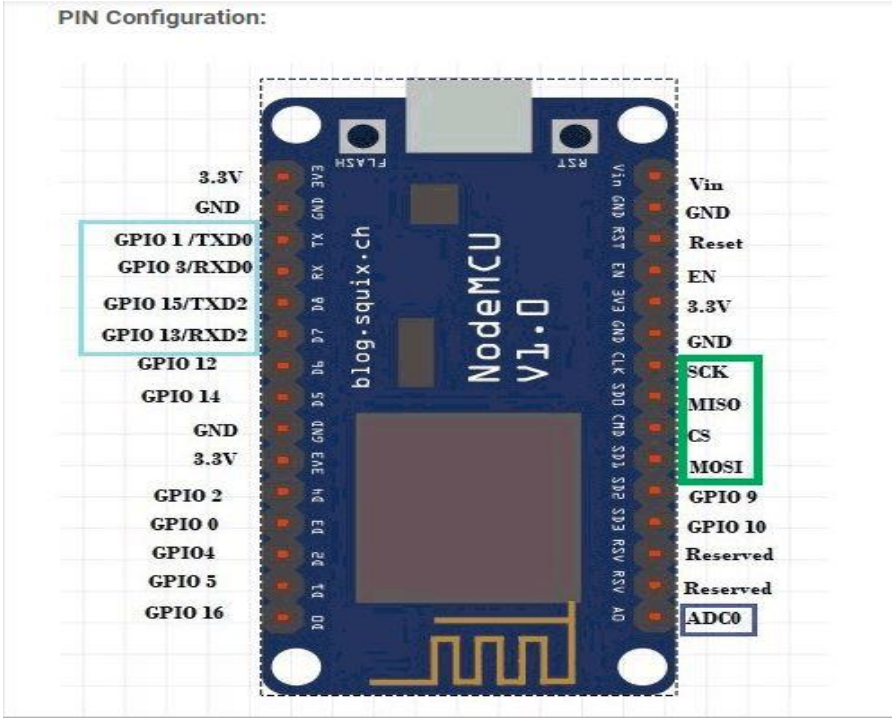
4.2 Hardware

The Hardware components used in Tech Greenhouse:

- **NodeMCU**
  - NodeMCU is a Firmware on ESP8266. It is ESP-12 and it is basically a System on Chip (SoC).It has Lua based firmware which is used to develop IoT based applications.
  - It is easy to work on this inexpensive SoC and make our device smart. It has analog and digital pins, which we can use to interface our sensors and can get the data over internet.

Pin Description:

- **GPIO Pins:** NodeMCU has 16 GPIO pins as shown in above diagram which can be used to control other peripheral devices like sensors, LEDs, switches etc. These pins can also be used as PWM pins.
- **ADC (Analog to Digital Converter) Pin:** It has one ADC channel and can be accessed through pin A0.
- **SPI Pins:** There are 4 pins (SCK, MISO, MOSI etc) available for SPI communication as shown in green rectangle in diagram.
- **I2C Pins:** It has I2C functionality support but due to internal use of these pins, you have to find which pin is I2C.
- **UART Pins:** It has two UART interfaces. Since, RXD0 and TXD0 is used to upload codes to board, we cannot use them while programming this module. We can use RXD1 and TXD1 anytime.



- **DHT11 Tempearture and Humidity sensor**

  - This DHT11 Temperature and Humidity Sensor features a calibrated digital signal output with the temperature and humidity sensor capability. It is integrated with a high-performance 8-bit microcontroller. Its technology ensures the high reliability and excellent long-term stability. This sensor includes a resistive element and a sensor for wet NTC temperature measuring devices. It has excellent quality, fast response, anti-interference ability and high performance.

  - Each DHT11 sensors features extremely accurate calibration of humidity calibration chamber. The calibration coefficients stored in the OTP program memory, internal sensors detect signals in the process, we should call these calibration coefficients. The single-wire serial interface system is integrated to become quick and easy. Small size, low power, signal transmission distance up to 20 meters, enabling a variety of applications and even the most demanding ones. The product is 4-pin single row pin package. Convenient connection, special packages can be provided according to users need.

- **Relay Module**
  - The relay module is a separate hardware device used for remote device switching. With it you can remotely control devices over a network or the Internet. Devices can be remotely powered on or off with commands coming from ClockWatch Enterprise delivered over a local or wide area network. You can control computers, peripherals or other powered devices from across the office or across the world.
  - The Relay module can be used to sense external On/Off conditions and to control a variety of external devices. The PC interface connection is made through the serial port.
  - The Relay module houses two SPDT relays and one wide voltage range, optically isolated input. These are brought out to screw-type terminal blocks for easy field wiring. Individual LED's on the front panel monitor the input and two relay lines. The module is powered with an AC adapter.

- **Soil Moisture sensor**

  - The soil moisture sensor consists of two probes which are used to measure the volumetric content of water. The two probes allow the current to pass through the soil and then it gets the resistance value to measure the moisture value.
  - When there is more water, the soil will conduct more electricity which means that there will be less resistance. Therefore, the moisture level will be higher. Dry soil conducts electricity poorly, so when there will be less water, then the soil will conduct less electricity which means that there will be more resistance. Therefore, the moisture level will be lower.
  - This sensor can be connected in two modes; Analog mode and digital mode. First, we will connect it in Analog mode and then we will use it in Digital mode.

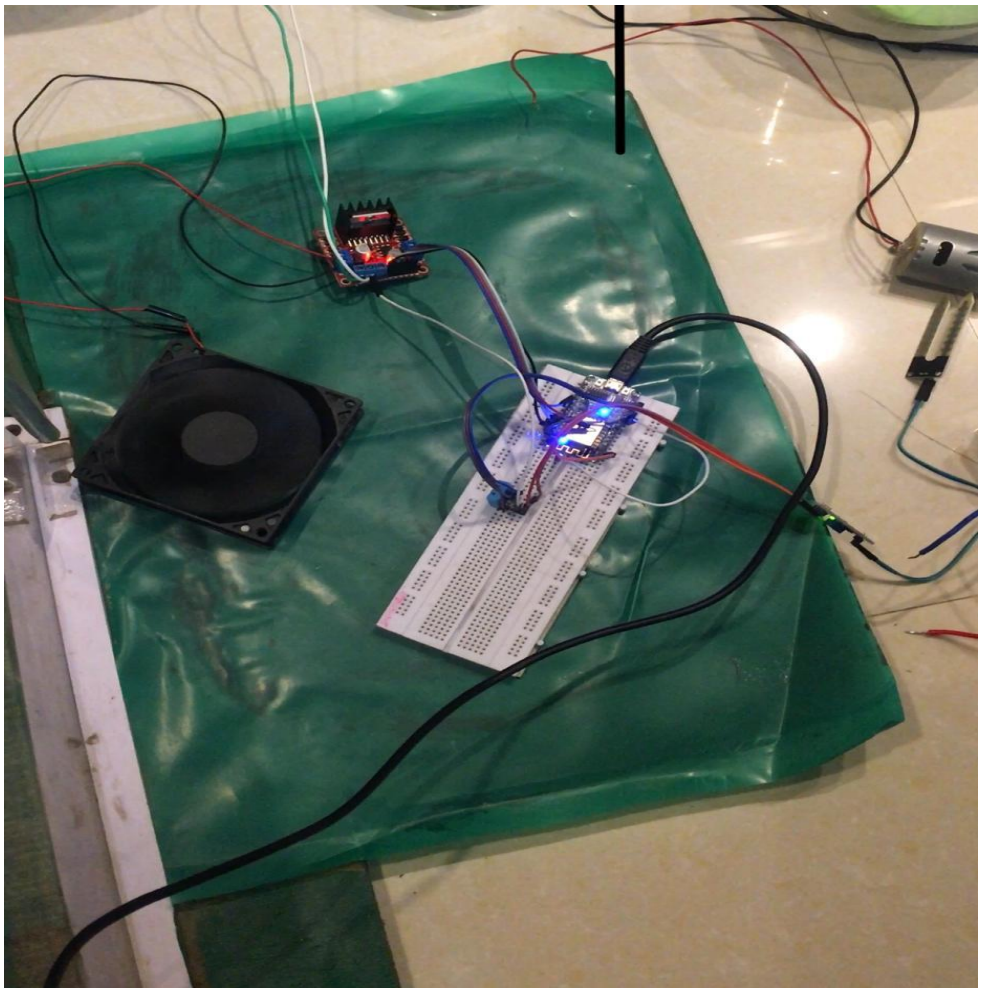
- **Motor Driver**
  - Motor drives are circuits used to run a motor. In other words, they are commonly used for motor interfacing. These drive circuits can be easily interfaced with the motor and their selection depends upon the type of motor being used and their ratings (current, voltage).

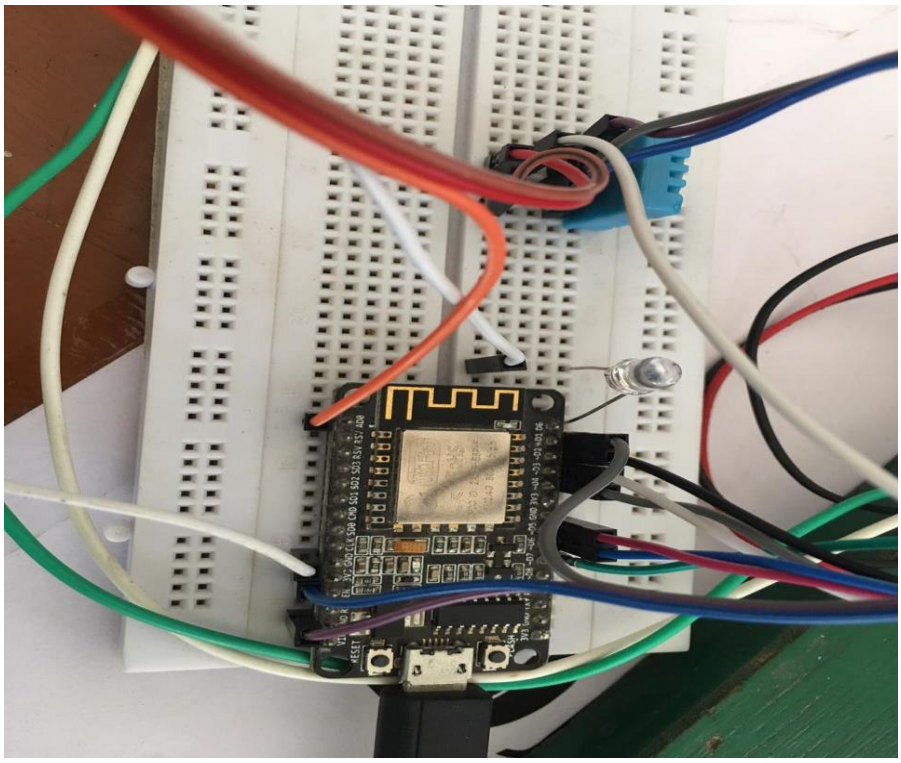
- **Submercible Pump**

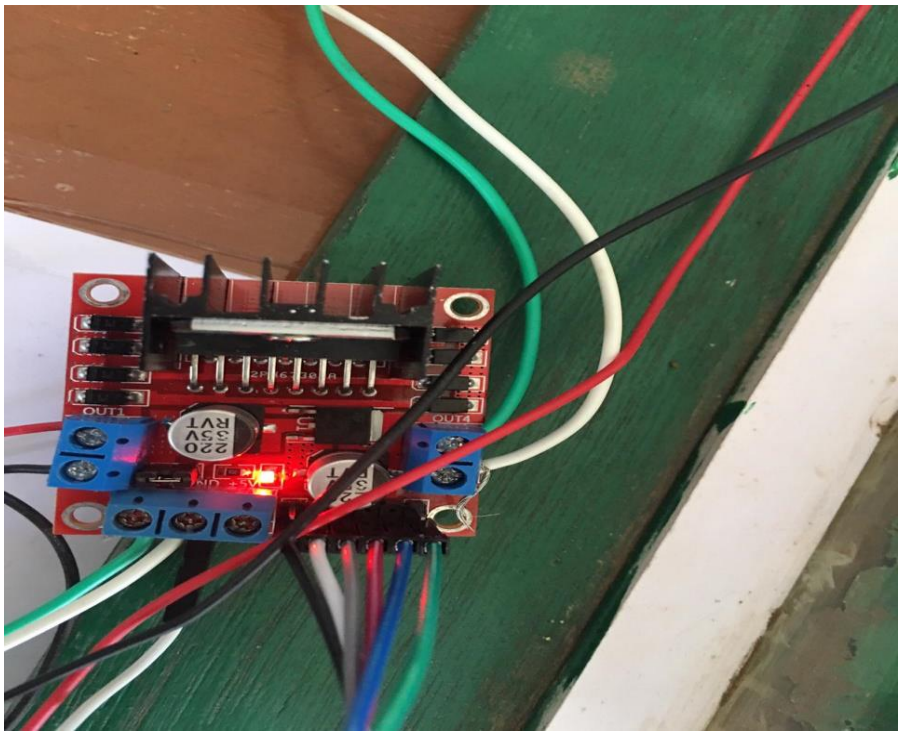
  - A submersible pump, also called an electric submersible pump, is a pump that can be fully submerged in water. The motor is hermetically sealed and close-coupled to the body of the pump.

  - A submersible pump pushes water to the surface by converting rotary energy into kinetic energy into pressure energy. This is done by the water being pulled into the pump: first in the intake, where the rotation of the impeller pushes the water through the diffuser. From there, it goes to the surface.

- Fan







4.3 Usefulness w.r.t. Existing System

The proposed framework is an implanted framework which will nearly screen and control the small scale climatic parameters of a greenhouse on a usual premise. For the development of products or particular plant species which could enhance their creation over the entire yield development season and to kill the challenges included in the framework by falling human negotiation to the best feasible degree. The framework contains sensors, Arduino which is helping us the use of micro controller easily. The main purpose of this system will be that, it will be operated day and night that is 24X7. This feature will increase the growth and farmer will earn more than the expectations.

CHAPTER: 5

PRIOR ART & SUMMARY

5.1 Prior Art

Research Paper 1 :
Greenhouse intelligent monitoring system based on internet of things

The greenhouse intelligent monitoring system based on internet of things comprises a device level data monitoring and control unit, a regional level monitoring management center and intelligent mobile phone client, wherein the regional level monitoring management center is a monitoring software terminal of a regional center and is installed in a greenhouse, monitoring is set to manage one or a plurality of greenhouses, and the device level data monitoring and control unit includes a plurality of fixed-point data acquisition equipment (DAE), mobile DAE, wireless telecom equipment and a device level monitoring and management center. According to the greenhouse intelligent monitoring system based on internet of things, the problems are solved, large-scale and intelligent supervision for a greenhouse is enabled to be very convenient and reliable, and the greenhouse intelligent monitoring system based on internet of things is beneficial to popularization of greenhouse technology.

Research Paper 2 :
Internet of Things Based Farm Greenhouse Monitor and Alarm Management System

A farm greenhouse monitor and alarm management system based on the Internet of things with real-time monitoring environmental parameters, which is aimed at monitoring and managing the growth of crops in the farm greenhouse, includes mobile inspection devices, data acquisition units, data receiving devices, REID devices and data storage servers. The system can automatically collect such greenhouse environmental parameters as air temperature, air humidity, illumination, soil temperature and soil moisture etc. and also automatically judge the critical value of every parameter and alarm otherwise. It utilizes ZigBee chip integrated wireless sensors and data collecting modules. This system provides inspection devices, which lowers the requirements for practitioners and reduces the cost of automatic management of the farm greenhouse.

Research Paper 3 :

Intelligent agricultural greenhouse monitoring and controlling system based on wireless passive

The invention discloses an intelligent agricultural greenhouse monitoring and controlling system based on a wireless passive technology. The system comprises a control terminal, a master control machine room and a plurality of greenhouses, a remote control network is formed by the control terminal and the master control machine room through the internet, an inter-greenhouse ad-hoc network is formed by the master machine room and the greenhouses through a net-shaped ZigBee ad-hoc network, a single-greenhouse central control module, an execution module and a wireless passive ZigBee sensing module are arranged in each greenhouse, and a single-greenhouse sensing control network is formed by the single-greenhouse central control module, the execution module and the wireless passive ZigBee sensing module in the single greenhouse through a star-shaped ZigBee ad-hoc network.

Research Paper 4 :

Intelligent greenhouse demonstration measurement and control system based on Internet of things

IOT refers to various information sensing apparatus, various devices and techniques such as sensors, global positioning systems, infrared sensors, laser scanner, gas sensors, etc., any real-time acquisition need to monitor, access, interactive object or process, needs to collect information, a huge network formed in conjunction with the Internet. The aim is to achieve the objects thereof, things and people, all the items connected to the network, to facilitate the identification, management and control.

Research Paper 5 :
Greenhouse intelligent control system based on internet of things

The invention discloses a greenhouse intelligent control system based on an internet of things, which comprises a local server, a running web server, a greenhouse intelligent control module and an intermediate layer and also comprises a remote browser, detection equipment, execution equipment, a transmission module and a control module, wherein the remote browser can visit the local server through a network; the detection equipment is used for detecting environment parameters in a greenhouse; the execution equipment is used for executing a control instrument of the local server; the transmission module is used for receiving and transmitting the data of the execution equipment and the detection equipment.

5.2 Summary

It is our great pleasure that we have successfully completed our project which we dreamed of previously. In addition, we want to build a wireless remote control system with more parameters such as temperature and humidity, soil moisture etc. To be confirmed, we have tasted our greenhouse project in different places whether it works without any error or not and we delighted to get positive feedback regarding our project implemented in Botanical Garden. In addition, Botanical Garden authority showed their huge interest to assist us in every aspect for our further research, which is a massive opportunity for us to move forward.

References

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[4] S. Speetjens, H. Janssen, G. Van Straten, T. H. Gieling, and J. Stigter, "Methodic design of a measurement and control system for climate control in horticulture," Computers and Electronics in Agriculture, vol. 64, pp. 162-172, 2008.

Appendix

Business Model Canvas Report

A D Patel Institute of Technology
(Affiliated to Gujarat Technological University)

Report

On

BUSINESS MODEL CANVAS

Prepared

By:

GTU Team ID: 20347		
College Team Id:		
Sr No	**Enrollment Number**	**Name**
	150010116032	Pandya Abhinand
	150010116039	Patel Pratit
	150010116040	Patel Prit
Guided By: Prof. Jayandrath Mangrolia		

Business Model Canvas

1. **Customer Segments:**

- *Mass Market*
- *Niche Market*
- *Segmented*
- *Diversified*
- *Multi-sided Platform*

2. **Value Propositions:**

- *characteristics*
- *Newness*
- *Performance*
- *Customization*
- *"Getting the Job Done"*
- *Design*
- *Brand/Status*
- *Price*
- *Cost Reduction*
- *Risk Reduction*
- *Accessibility*
- *Convenience/Usability*

3. **Channels:**

This business block comprises of a list of important Channels, linked to Personas or Segments if they differ substantially. Make notes on what steps are relevant for each- promotion, sales, service, etc.

4. **Customer Relationship:**

- *Personal assistance*
- *Dedicated Personal Assistance*
- *Self-Service*
- *Automated Services*
- *Communities*
- *Co-creation*

5. Revenue Streams:

- *Asset sale*
- *Usage fee*
- *Subscription Fees*
- *Lending/Renting/Leasing*
- *Licensing*
- *Brokerage fees*
- *Advertising*
- *fixed pricing*
- *List Price*
- *Product feature dependent*
- *Customer segment*
- *dependent*
- *Volume dependent*
- *dynamic pricing*
- *Negotiation (bargaining)*
- *Yield Management*
- *Real-time-Market*

6. Key Activities:

- *Production*
- *Problem Solving*
- *Platform/Network*

7. Key Resources:

- *Physical*
- *Intellectual (brand patents, copyrights, data)*
- *Human*
- *Financial*

8. Key Partnerships:

Motivations for partnerships

- *Optimization and economy*
- *Reduction of risk and uncertainty*
- *Acquisition of particular resources and activities*

9. Cost Structure:

- *Fixed Costs (salaries, rents, utilities)*
- *Variable costs*
- *Economies of scale*
- *Economies of scope*

Periodic Progress Report (PPR)

Print Back

College : A. D. PATEL INSTITUTE OF TECHNOLOGY, KARAMSAD
StudentName : Patel Prit Hiteshbhai
EnrollmentNo : 150010116040 Department : Information Technology
MobileNo : 9586474226 Discipline : BE
Email : pritpatel25@gmail.com Semester : Semester 8

PPR Details

Periodic Progess Report : First PPR

Project : Tech Greenhouse

Status : Reviewed

1. What Progress you have made in the Project ?

Currently we have created temperature and humidity module which measures the two main parameters of Greenhouse and shows it on the devices.

2. What challenge you have faced ?

As we worked on hardware components being a IT student, it was been hard for us to implement.

3. What support you need ?

We were supported by our EC friend.

4. Which literature you have referred ?

Youtube online tutorials regarding hardware implementation.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

Print Back

College : A. D. PATEL INSTITUTE OF TECHNOLOGY, KARAMSAD
StudentName : Patel Prit Hiteshbhai
EnrollmentNo : 150010116040 Department : Information Technology
MobileNo : 9586474226 Discipline : BE
Email : pritpatel25@gmail.com Semester : Semester 8

PPR Details

Periodic Progess Report : Second PPR

Project : Tech Greenhouse

Status : Reviewed

1. What Progress you have made in the Project ?

We maintain the temperature and humidity by giving a threshold value which will alert us for the further process. We have also done the same for other components which we are going to use for our project like soil moisture, luminosity, etc.

2. What challenge you have faced ?

It was time consuming as we encountered this for the first time.

3. What support you need ?

We reffered to Arduino programming tutorials for implementation.

4. Which literature you have referred ?

Youtube online tutorials.

Comments

Comment by Internal Guide :
None

Comment by External Guide :
None

Comment by HOD :
None

Comment by Principal :
None

Comment by University Admin :
None

Print Back

College : A. D. PATEL INSTITUTE OF TECHNOLOGY, KARAMSAD
StudentName : Patel Prit Hiteshbhai
EnrollmentNo : 150010116040 Department : Information Technology
MobileNo : 9586474226 Discipline : BE
Email : pritpatel25@gmail.com Semester : Semester 8

PPR Details

Periodic Progess Report : Third PPR

Project : Tech Greenhouse

Status : Reviewed

1. What Progress you have made in the Project ?

We develop a Web app which will shows the reading of all the parameters of the greenhouse.

2. What challenge you have faced ?

No challenges faced yet.

3. What support you need ?

Contacted our Guide to give us guidance for what further implementation should be done.

4. Which literature you have referred ?

Recalled some basics of php and mysql from online tutorials.

Comments

Comment by Internal Guide :
None

Comment by External Guide :
None

Comment by HOD :
None

Comment by Principal :
None

Comment by University Admin :
None

Print Back

College : A. D. PATEL INSTITUTE OF TECHNOLOGY, KARAMSAD
StudentName : Patel Prit Hiteshbhai
EnrollmentNo : 150010116040
MobileNo : 9586474226
Email : pritpatel25@gmail.com
Department : Information Technology
Discipline : BE
Semester : Semester 8

PPR Details

Periodic Progess Report : Forth PPR

Project : Tech Greenhouse

Status : Reviewed

1. What Progress you have made in the Project ?

We have implemented our hardware components on PCB from breadboard so that it can run efficiently.

2. What challenge you have faced ?

It was very difficult for us to do soldering the components.

3. What support you need ?

We were guided by EC department faculties for implementation on PCB.

4. Which literature you have referred ?

No literatures refered.

Comments

Comment by Internal Guide :
None

Comment by External Guide :
None

Comment by HOD :
None

Comment by Principal :
None

Comment by University Admin :
None

Patent Drafting Exercise (PDE)

College : A. D. PATEL INSTITUTE OF TECHNOLOGY, KARAMSAD
Department : Information Technology
Discipline : BE
Semester : Semester 8
Project Name : Tech Greenhouse
Team ID : 44493

Form 1 – APPLICATION FOR GRANT OF PATENT

Applicants :

Sr. No	Name	Nationality	Address	Mobile No.	Email Id
1	Pandya Abhinand Mauleshbhai	Indian	Information Technology , A. D. PATEL INSTITUTE OF TECHNOLOGY, KARAMSAD , Gujarat Technologycal University.	9712808781	pandya.abhinand91@gmail.com
2	Patel Pratit	Indian	Information Technology , A. D. PATEL INSTITUTE OF TECHNOLOGY, KARAMSAD , Gujarat Technologycal University.	7572908613	pratit1997@gmail.com
3	Patel Prit Hiteshbhai	Indian	Information Technology , A. D. PATEL INSTITUTE OF TECHNOLOGY, KARAMSAD , Gujarat Technologycal University.	9586474226	pritpatel25@gmail.com

Inventors :

Sr. No	Name	Nationality	Address	Mobile No.	Email Id
1	Pandya Abhinand Mauleshbhai	Indian	Information Technology , A. D. PATEL INSTITUTE OF TECHNOLOGY, KARAMSAD , Gujarat	9712808781	pandya.abhinand91@gmail.com

			Technologycal University.		
2	Patel Pratit	Indian	Information Technology , A. D. PATEL INSTITUTE OF TECHNOLOGY, KARAMSAD , Gujarat Technologycal University.	7572908613	pratit1997@gmail.com
3	Patel Prit Hiteshbhai	Indian	Information Technology , A. D. PATEL INSTITUTE OF TECHNOLOGY, KARAMSAD , Gujarat Technologycal University.	9586474226	pritpatel25@gmail.com

I/We, the applicant(s) hereby declare(s) that:

Following are the attachments with the applications :

Form 2 - PROVISIONAL/COMPLETE SPECIFICATION

1 . Title of the project/invention :

Tech Greenhouse

2. Preamble to the description :

Provisional

3. Description

a) Field of Project / Invention / Application :

In this work, we have proposed a framework that can gather the data identified with greenhouse environment and yield status and control the system automatically in view of the gathered data. By throatily observing periodic conditions, this study has the reason for securing connection between sensors flags and reference estimations. Control programming will give information finding of ongoing show. Through long time running and functional utilizing, the framework has been demonstrated that it has numerous points of interest. To monitor the environment inside greenhouse different parameters have been considered such as light, temperature, humidity, soil moisture etc. using different sensors like DHT11 temperature and humidity Sensor, LDR, soil moisture sensor etc. which will be interfaced with microcontroller. It is a closed loop system that will execute control action to adjust temperature, humidity, light intensity and soil moisture if any unwanted errors (high/low) occur.

b) Prior Art / Background of the Project / Invention :

In this work, we have proposed a framework that can gather the data identified with greenhouse environment and yield status and control the system automatically in view of the gathered data. By throatily observing periodic conditions, this study has the reason for securing connection between sensors flags and reference estimations. Control programming will give information finding of ongoing show. Through long time running and functional utilizing, the framework has been demonstrated that it has numerous points of interest. To

monitor the environment inside greenhouse different parameters have been considered such as light, temperature, humidity, soil moisture etc. using different sensors like DHT11 temperature and humidity Sensor, LDR, soil moisture sensor etc. which will be interfaced with microcontroller. It is a closed loop system that will execute control action to adjust temperature, humidity, light intensity and soil moisture if any unwanted errors (high/low) occur.

c) Summary of the Project / Invention :

It is our great pleasure that we have successfully completed our project which we dreamed of previously. In addition, we want to build a wireless remote control system with more parameters such as temperature and humidity, soil moisture etc. To be confirmed, we have tasted our greenhouse project in different places whether it works without any error or not and we delighted to get positive feedback regarding our project implemented in Botanical Garden. In addition, Botanical Garden authority showed their huge interest to assist us in every aspect for our further research, which is a massive opportunity for us to move forward.

d) Objects of Project / Invention :

NodeMcu, Relay Modulle, Sprinkler, Exhaust Fan, Web App, Internet, Electric Supply,etc.

e) Drawings :

f) Description of Project / Invention : (full detail of project) :

In this work, we have proposed a framework that can gather the data identified with greenhouse environment and yield status and control the system automatically in view of the gathered data. By throatily observing periodic conditions, this study has the reason for securing connection between sensors flags and reference estimations. Control programming will give information finding of ongoing show. Through long time running and functional utilizing, the framework has been demonstrated that it has numerous points of interest. To monitor the environment inside greenhouse different parameters have been considered such as light, temperature, humidity, soil moisture etc. using different sensors like DHT11 temperature and humidity Sensor, LDR, soil moisture sensor etc. which will be interfaced with microcontroller. It is a closed loop system that will execute control action to adjust temperature, humidity, light intensity and soil moisture if any unwanted errors (high/low) occur.

g) Examples :

h) Claims (Not required for Provisional Application) / Unique Features of Project

High Efficiency, 24X7 operatable.

4. Claims

5. Date and signature

6. Abstract of the project / invention :

In this work, we have proposed a framework that can gather the data identified with greenhouse environment and yield status and control the system automatically in view of the gathered data. By throatily observing periodic conditions, this study has the reason for securing connection between sensors flags and reference estimations. Control programming will give information finding of ongoing show. Through long time running and functional utilizing, the framework has been demonstrated that it has numerous points of interest. To monitor the environment inside greenhouse different parameters have been considered such as light, temperature, humidity, soil moisture etc. using different sensors like DHT11 temperature and humidity Sensor, LDR, soil moisture sensor etc. which will be interfaced with microcontroller. It is a closed loop system that will execute control action to adjust temperature, humidity, light intensity and soil moisture if any unwanted errors (high/low) occur.

Form 3 – STATEMENT AND UNDERTAKING UNDER SECTION 8

Name of the applicant(s) : I/We, Pandya Abhinand Mauleshbhai ,Patel Pratit ,Patel Prit Hiteshbhai

Name,Address and Nationality of the joint applicant :

Hereby declare :

(i) that I/We have not made any application for the same/substantially the same victim invention outside India.

(ii) that the rights in the application(s) has/have been assigned to

Name of the Country	Date of Application	Application Number	Status of the Application	Date of Publication	Date of Grant
N/A	N/A	N/A	N/A	N/A	N/A

(iii)That I/We undertake that upto the date of grant of the patent by the Controller, I/We would keep him informed in writing the details regarding corresponding applications for patents filed outside India within three months from the date of filing of such application.

Dated this 18 day of April 2019

To be signed by the applicant or his authorised registered patent agent :

Signature.....

Name of the Natural Person who has signed :

Pandya Abhinand Mauleshbhai ,Patel Pratit ,Patel Prit Hiteshbhai

To,
The Controller of Patents,
The Patent Office,
At Mumbai

Plagiarism Checker X Originality Report

Similarity Found: 14%

Date: Thursday, April 18, 2019
Statistics: 570 words Plagiarized / 4074 Total words
Remarks: Low Plagiarism Detected - Your Document needs Optional Improvement.

/ “Tech Greenhouse” A Project Report Submitted to Gujarat Technological University in Fulfillment of the Requirements for the Degree of Bachelor of Engineering In Information Technology B. E. IV, Semester –VIII By GTU Team ID: 20347 Abhinand Pandya Enrollment No. 150010116032 Pratit Patel Enrollment No. 150010116039 Prit Patel Enrollment No. 150010116040 Faculty Guide: Prof.

Jayandrath Mangrolia [Assistant Professor (IT)] / Academic Year 2018-19 Department of Information Technology A. D. Patel Institute of Technology New Vallabh Vidyanagar, Acknowledgment We appreciate the GTU for giving us a platform which can transform our idea into a design or any product which can help people in their day to day life. We thank to our guide, Prof.

Jayandrath Mangrolia (Assistant Professor – IT) for their valuable guidance & the efforts that they have put in each of us. We would not have been able to complete our project without their cooperation, encouragement and immense help. We are also thankful to other faculty

INTERNET SOURCES:

3% - https://collegedunia.com/college/23751-a-d-patel-institute-of-technology-adit-vallabh-vidyanagar/faculty

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