ISSN (Online) : 2455 - 3662
SJIF Impact Factor :5.148

EPRA International Journal of

Multidisciplinary Research

Monthly Peer Reviewed & Indexed International Online Journal

Volume: 5 Issue: 3 March 2019

Published By :EPRA Publishing

Volume: 5 | Issue: 3 | March 2019 || SJIF Impact Factor: 5.148 ISSN (Online): 2455-3662

EPRA International Journal of
Multidisciplinary Research (IJMR) *Peer Reviewed Journal*

GREENHOUSE AUTOBOT

Mr.B.Vignesh Kumar
Assistant Professor,
Dr.Mahalingam college of Engineering and Technology,
Pollachi-642003.

S.Rishish
Dr.Mahalingam college of Engineering and Technology,
Pollachi-642003.

T.Dhravid
Dr.Mahalingam college of Engineering and Technology,
Pollachi-642003.

M.Rahul
Dr.Mahalingam college of Engineering and Technology,
Pollachi-642003.

ABSTRACT

Home Gardening is emerging at faster rates. Many of them are trying to have their own garden and want to reap their own vegetables. But time is not allowing them to do. Moreover, they lack the farming methods. This is the age of internet and automation. So in order to make their desires come true our team developed the bot called Greenhouse Autobot. Greenhouse Autobot is the basic prototype of a bot which can be controlled by a system or an app. This bot consists of an automatic seed dispenser which plant the seeds, after planting the seeds, the irrigation is done by the water dispenser planted in the soil which is interfaced with the controller. The pesticide sprayer will be activated at necessary times. The seed implantation, irrigation at proper times, pesticide spraying all are controlled by the controller. The advantage is that you can sit in the home and can control your gardening.This Greenhouse Autobot will make you to farm your own plants. All you have to do is give him some electricity.

1. INTRODUCTION

Scientific methods are adopted in almost every fields. But in the field of Gardening, still traditional methods were generally used. We are trying to focus on adopting modern methods and new techniques to employ automation in the field of Gardening. Our Prototype will able to monitor the temperature, supplies the adequate amount of water whenever it is needed, use pesticides whenever it is needed and reminds you the day you need to harvest. Irrigation, pesticide spraying and other activities are automated.

2. HARDWARE DESIGN

2.1 DESIGN OF RECTANGULAR BOX:

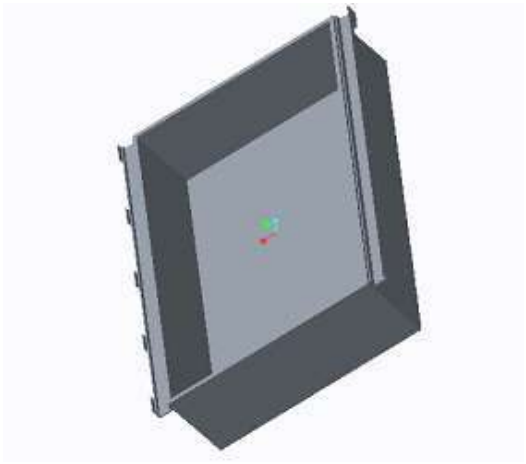

FIG: 2.1 CAD TOOL DESIGN

	Dimensions in mm
Length	1000
Breadth	1000
Height	350
Track Length	900
Track Width	10
Track Height	30

Fig 2.1 HARDWARE DIMENSIONS

3. HARDWARE COMPONENTS

3.1 SOIL MOISTURE SENSOR-YL69:

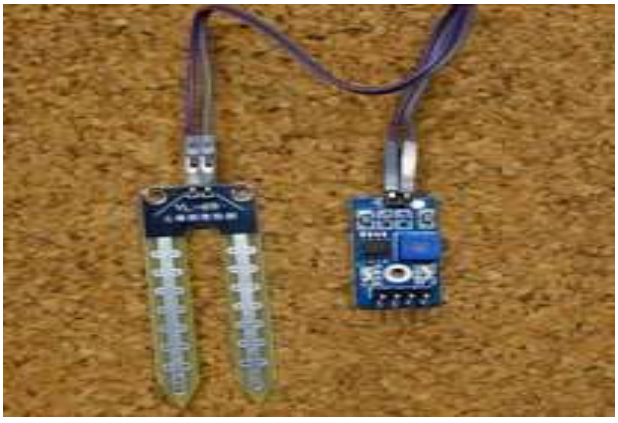

Fig:3.1 SOIL MOISTURE SENSOR

The soil moisture sensor or the hygrometer is usually used to detect the humidity of the soil. So, it is perfect to build an automatic watering system or to monitor the soil moisture of your plants. The sensor is set up by two pieces: the electronic board (at the right), and the probe with two pads, that detects the water content (at the left).The sensor has a built-in potentiometer for sensitivity adjustment of the digital output (D0), a power LED and a digital output LED. When the soil is under wet condition, the output voltage decreases. When the soil is under dry condition, the output voltage increases. Then the motor is ON. When the soil is under wet condition, the output voltage decreases.The output can be a digital signal (D0) LOW or HIGH, depending on the water content. If the soil humidity exceeds a certain predefined threshold value, the modules outputs LOW, otherwise it outputs HIGH. The threshold value for the digital signal can be adjusted using the potentiometer.

3.2 LCD MODULE:

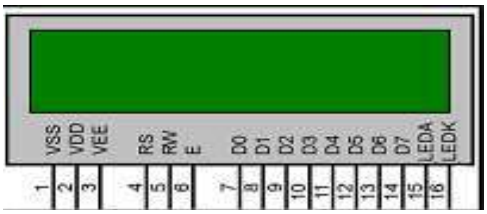

Fig:3.2 LCD Display

LCD (Liquid crystal display) is used to display the characters. We are using the LCD which is 16 X 2, that will display the 16 characters in two rows. It has command for control the controller which is in LCD.The LCD unit receives character codes (8 bits per character) from a microcontroller, latches the codes to its display data RAM (80-byteDD RAM for storing 80 characters), transforms each character code into a 5 ‘7 dot-matrix character pattern, and displays the characters on its LCD screen. The unit also provides a character generator RAM (64 bytes) through which the user may define up to eight additional 5 ‘7 dot-matrix character patterns, as required by the application.To display a character, positional data is sent via the data bus from the microcontroller to the LCD unit, where it is written into the instruction register. A character code is then sent and written into the data register. LCD Module displays the current schedule of the working process whether the motor is ON or OFF and the content of the soil with the desired value

3.3 BIPOLAR STEPPER MOTOR:

In a bipolar stepper we don’t have a common lead like in a uni-polar stepper motor.A bipolar stepper motor has easy wiring arrangement but its operation is little complex. In order to drive a bipolar stepper, we need a driver IC with an internal H bridge circuit. This is because, in order to reverse the polarity of stator poles, the current needs to be reversed. This can only be done through a H bridge. The micro-controller pin can only

provide up to 15mA at maximum. The stepper needs current which is around ten times this value.Stepper motor.This Stepper motor is connected to the Arduino module with the TB6560 driver circuit.This driver provides the necessary current to the Stepper motor.It drives the wheel mounted on a aluminium bars which contains a Pesticide Sprayer.

3.4 TB6560 STEPPER MOTOR DRIVER:

3.4.1 INTRODUCTION:

The TB6560-3 Axis Stepper Motor Driver is a excellent microstepping driver that use TOSHIBA TB6560 Chip,based on pure-sine current control technology.Owing to the above technology and the self-adjustment technology (self-adjust current control parameters) according to different motors, the driven motors can run with smaller noise, lower heating, smoother movement and have better performances at higher speed than most of the drives in the markets. It is suitable for driving 2-phase and 4-phase hybrid stepping motors.

3.4.2 FEATURES:

1. Low cost and good high-speed torque
2. Supply voltage up to +32 VDC
3. Output current up to 3.0A
4. Over-voltage and short-circuit protection

FIG 3.4.2 TB6560 DRIVER

3.5 RTC DS1307:

The DS1307 serial real-time clock (RTC) is a lowpower, full binary-coded decimal (BCD) clock/calendar plus 56 bytes of NV SRAM. Address and data are transferred serially through an I2C, bidirectional bus. The clock/calendar provides seconds, minutes, hours, day, date, month, and year information. Pesticide sprayer is sprayed at the regular intervals of time. So RTC can be addressed with the frequent time intervals. The end of the month date is automatically adjusted for months with fewer than 31 days, including corrections for leap year. The clock operates in either the 24-hour or 12-hour format with AM/PM indicator. The DS1307 has a built-in power-sense circuit that detects power failures and automatically switches to the backup supply. Timekeeping operation continues while the part operates from the backup supply.

FIG 3.5:LCD MONITOR

4. SOFTWARE COMPONENTS

4.1 ARDUINO UNO MODULE:

Moisture Sensor are the input units. Moisture Sensor test the moisture of soil, when the soil is having the water shortage, the module output is at the high level, else the output is at low level. Soil sensor gives the signal to the Arduino module. The sensor has the key for the motor to pump the water.The Sensor's data will be taken to the microcontroller based board. The controller will check whether the signal matches with the desired signal. Then microcontroller send the result to the interfaced units like LCD, RTCDS1307, drive circuit.RTC (Real Time Clock) counts seconds, minutes, hours, date of the month, day of the week, and year. It reads the register of this chip. When a data line is high, it starts the condition and when a data line is low it stops the condition.TB6560 is a typical motor driver or motor driver IC which allows the Stepper motor to drive. It can be used to control or drive the motor. Here Water dispenser, Pesticide sprayer, Stepper motor and the DC pump motor are the output units.

5. METHODOLOGY

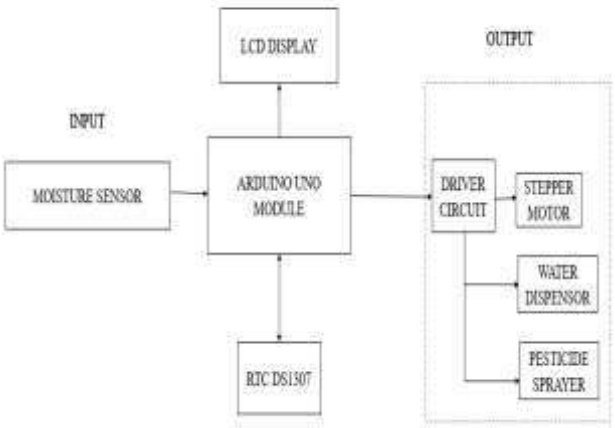

FIG 5 BLOCK DIAGRAM

Greenhouse Autobot is completely different from FARMBOT. The aluminium slots used for making tracks in FARMBOT are replaced by aluminium bars and gantry plates are excluded from the arrangement.Arduino microcontrollers are used to control and operate the Soil sensor, Temperature sensorand motors for irrigation purposes.Greenhouse Autobot is cheaper.This Method is proposed based on the survey of the local environment.

6. CONCLUSION

The Project "GREENHOUSE AUTOBOT" has been completed and objective has been achieved. This project when implemented will prove to be an effective and efficient system. With the help of this, it is possible to grow plants in your house or in apartment effectively for your family needs. This project when implemented will able to grow plants for your daily needs. The most important factor is that it is cost efficient than the original FARMBOT. At present we have uploaded the knowledge of 5 plants. This could be upgraded and will be uploaded with the knowledge of more number of daily need plants.

FIG 6 HARDWARE IMPLEMENTATION

7. REFERENCES

1. *https://farm.bot/*
2. *https://blog.robotiq.com/*
3. *https://opensource.ecology.com/*
4. *http://www.circuitstoday.com/arduino-soil-moisture-sensor*
5. *https://www.electronicshub.org/interfacing-soil-moisture-sensor-with-arduino/*
6. *https://www.electronicshub.org/arduino-real-time-clock tutorial/*
7. *http://www.circuitstoday.com/arduino-real-time-clock*
8. *https://www.instructables.com/id/Controlling-Bipolar-Stepper-Motors-with-Arduino-wi/*
9. *https://www.circuitmagic.com/arduino/3amp-stepper-motor-driver-tb6560-with-arduino/*
10. *Karan Kansara, Vishal Zaveri, Shreyans Shah, Sandip Delwadkar, Kaushal Jani , "Sensor based Automated Irrigation System with IOT" , International Journal of Computer Science and Information Technologies, Vol. 6 (6)*
11. *R.Suresh, S.Gopinath, K.Govinda raju, T.Devika, N.Suthanthira Vanitha, "GSM based Automated Irrigation Control using Rain gun Irrigation System", International Journal of Advanced Research in Computer and Communication Engineering Vol. 3, Issue 2, February 2014.*
12. *S. Darshna, T.Sangavi , Sheena Mohan, A.Soundharya, Sukanya Desikan , "Smart Irrigation System", IOSR Journal of Electronics and Communication Engineering Volume 10, Issue 3, Ver. II (May - Jun.2015).*
13. *Vinay Kumar, Binod Kumar Vimal, Rakesh Kumar, Rakesh Kumar, Mukesh Kumar , "Determination of soil pH by using digital image processing technique " , Journal of Applied and Natural Science 6 (1): 14-18 (2014).*
14. *Pavithra D.S, M. S .Srinath, "GSM based Automatic Irrigation Control System for Efficient Use of Resources and Crop Planning by Using an Android Mobile", IOSR Journal of Mechanical and Civil Engineering (IOSRJMCE) Vol 11, Issue I, Jul-Aug 2014, pp 49-55.*