
CROP MONITORING AND CONTROLLING SYSTEM

Authors: 1) Prof. Mrs. Manjushri. Joshi

3) Mousam Thakur

2) Mehak Shaikh

4) Gayatri Relekar

Abstract:

The goal of the concept is to domesticate and nurture exceptional climatic situations primarily based totally flora (for e.g.: strawberry, saffron) with inside the exceptional area. So one can reap this, we've got put together a crop tracking and controlling device on the way to assist us to develop such flora in exceptional areas and screen, thus their boom. The creation of greenhouse technology has become maximum critical and most extensively used component in everyday lifestyles because of the reality greenhouse surroundings protects plant life from unwanted environmental situations and offers properly favored situations for developing below controlled ecosystem. The most important reason of this paper is to suggest effective technique for crop tracking in agricultural, which shows the direction to rural farming network to update conventional crop cultivation strategies. The offered machine efficiently video display units and controls the inexperienced residence parameters of critical importance

Keywords: Crop tracking, Sensors, Farming, Crop controlling, soil moisture, rainfall.

Introduction: Generally, most of the farmers are going through extra problems at the same time as cultivating of their farming fields. And it's also determined that, the farmers are nevertheless relying on antique strategies of agriculture, this is principal

to lesser crop productivity. So, they are able to arise with the aid of the usage of the cutting-edge technology for the productivity of vegetation, which can be maximized at minimum charge with the more productivity. This will even lessen of taking up of more loans for the cultivation which they've got taking dangers on themselves that allows you to incur their livings or to get better yields in their vegetation in the usage of the contemporary-day day technology. So, with the aid of using manner of the usage of those current day generation farmers to get extra cultivate in a powerful way additionally whilst the use of confined belongings and extra yield's this is The inexperienced homes are precisely used for improvement in productivity, first-rate, amount and profitability of vegetable, flower and fruit flora.

The proposed greenhouse tool offers impact on styles of crop species with the aid of using and huge flowers, vegetable flora and fruit flora. The offered machine efficiently video display units and controls the inexperienced residence parameters of critical importance like temperature, rain, and soil moisture. The device were tested in green house surroundings and observations are recorded for crop evaluation reason. The crop evaluation allows farmers for month-to-month destiny prediction to recognize the expenditure for developing crop. This makes effective answer for farmers to broaden pretty green and disorder loose crop species for enterprise production.

Proposed Methodology

Literature Survey:

An survey became been carried out with inside the farm and with inside the nursery , we located that for doing small such things as turning at the water pump and to maintain an eye at the moisture of the soil and to keep the temperature with inside the nursery became a hard mission and someone became had to do all this matters.

We concept to make this paintings easy and automate this matters that may lessen the human interference and simplify the paintings. We accrued the facts from diverse reasserts like studies papers , books , from seniors and google. Furthermore, we made a right observe concerning with inside the every and each equipment's used with inside the task. Not only that, but we went through diverse IEEE papers which consisted of farming strategies , ho w to put into effect farming strategies in accordance to trendy time . Furthermore, we did a study on different sorts of soil wished for exceptional vegetation additionally the soil, water moisture required with the aid of using them and a way to broaden such device that may take readings of those parameters.

Motivation:

For layout and improvement we to start with we were given the incentive from the concept which became clicked to us , we desired to remedy this easy hassle and to make the matters simpler. Our reputable Mentor, Prof. Manjushri Joshi , supported us plenty on this task and guided us from the start to the stop of the task. We additionally had an aid from the coaching workforce for our easy doubts. And closing however now no longer the listing our dad and mom supported us plenty on this task now no longer handiest from the monetary heritage however additionally from the emotional too .

Need:

Auto Crop Monitoring device is a want for today's agriculture practice , we located that because of loss of manage at the parameters' which can be supported for the crop boom , there has been now no longer right boom of the crop and because of this the crop might also additionally even be afflicted by the illnesses, or even they will now no longer have the right end result as according to the requirement. Due to all this troubles the monetary output of the farmers became additionally now no longer true and all this gave upward push to the critical hassle to the farmers , to assist them and conquer this hassle we evolved an automated crop tracking device that allows you to screen the soil moisture , temperature and rainfall with inside the surroundings and relying on in this the actuators will activate and off.

Working

Arduino UNO:

Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-supply microcontroller board that may be incorporated into a lot of digital initiatives. This board may be interfaced with different Arduino forums, Arduino shields, Raspberry Pi forums and might manage relays, LEDs, servos, and cars as an output. Arduino UNO capabilities AVR microcontroller Atmega328, 6 analogue enter pins, and 14 virtual I/O pins out of which 6 are used as PWM output.



This board includes a USB interface i.e. USB cable is used to attach the board with the laptop and Arduino IDE (Integrated Development Environment) software program is used to application the board. The unit comes with 32 KB flash reminiscence, this is used to keep the variety of commands, whilst the SRAM is 2 KB and EEPROM is 1 KB. The working voltage of the unit is 5V which initiatives the microcontroller at the board and its related circuitry operates at 5V whilst the enter voltage levels among 6V to 20V and the advocated enter voltage levels from 7V to 12V Arduino UNO Components.

The Arduino UNO board includes the subsequent additives and specifications:

ATmega328:

This is the mind of the board wherein this system is saved Ground Pin: there are numerous floor pins included at the board.

PWM: the board includes 6 PWM pins. PWM stands for Pulse Width Modulation, the usage of this manner we will manage the speed. Of the servo motor, DC motor, and brightness of the LED.

Digital I/O Pins: there are 14 virtual (0-13) I/O pins to be had at the board that may be linked with outside digital additives.

Analogue Pins: there are 6 analogue pins incorporated at the board. These pins can study the analogue sensor and might convert it right into a virtual sign.

AREF: It is an Analog Reference Pin used to set an outside reference voltage.

Reset Button: This button will reset the code loaded into the board. This button is beneficial while the board hangs up, urgent this button will take the whole board into a preliminary state.

USB Interface: This interface is used to attach the board with the laptop and to add the Arduino sketches (Arduino Program is known as a Sketch) DC Power Jack: This is used to energy up the board with a energy deliver.

Power LED: This is an energy LED that lighting fixtures up while the board is hooked up with the energy supply.

Micro SD Card: The UNO board helps a micro SD card that permits the board to keep extra facts.

3.3V: This pin is used to deliver 3.3V energy for your initiatives.

5V: This pin is used to deliver 5V energy for your initiatives.

VIN: It is to enter voltage carried out to the UNO board.

Voltage Regulator: The voltage regulator controls the voltage that is going into the board.

SPI: The SPI stands for Serial Peripheral Interface. Four Pins 10(SS), 11(MOSI), 12 (MISO), 13(SCK) are used for this communication.

TX/RX: Pins TX and RX are used for serial communication. The TX is a transmit pin used to transmit the serial records, whilst RX is an acquire pin used to acquire serial records. Arduino UNO Pinout There are quite a number of Arduino forums

to be had with inside the marketplace, however the Arduino UNO is the maximum not unusual place board used with inside the digital industry.

The following determine suggests the Arduino UNO Pinout for higher understanding:

Temperature sensor (DS18B20) :

The sensor comes commonly in shape factors. One that is available in The-ninety two package deals seems precisely like an everyday transistor. Other one in a water-resistant probe fashion, which may be extra beneficial while you want a degree of something some distance away, underwater or below the floor.



DS18B20 temperature sensor in all fairness particular and wishes no outside additives to paintings. It can be degree temperatures from -55 °C to +125 °C with ± 0.5 °C Accuracy. The decision of the temperature sensor is user-configurable to 9, 10, 11, or 12 bits. However, the default decision at energy-up is 12-bit (i.e. 0.0625 °C precision). The sensor may be powered with a 3V to 5.5V energy deliver and consumes handiest 1mA at some point of energetic temperature conversions.

Capacitive Soil Moisture Sensor :



This Capacitive Soil Moisture Sensor V1.2 measures soil moisture degrees with the aid of using capacitive sensing in preference to resistive sensing like different sensors at the marketplace. It is manufactured from corrosion resistant fabric, which offers it a top-notch carrier life. Insert it into the soil round your flora. This module consists of an onboard voltage regulator which offers it a working voltage variety of 3.3 ~ 5.5V. It is best for low-voltage MCU, each 3.3V and 5V. For compatibility with a Raspberry Pi, it'll want an ADC converter.

Raindrop Sensor :

The operating of the rain sensor is quite straightforward. The sensing pad with a collection of uncovered copper strains, collectively, acts as a variable resistor (similar to a potentiometer) whose resistance varies consistent with the quantity of water on its floor. This resistance is inversely proportional to the quantity of water: The extra water at the floor method higher conductivity and could bring about a decrease in resistance. The much less water at the floor method terrible conductivity and could bring about a better resistance. The sensor produces an output voltage consistent with the resistance, which, with the aid of using measuring, we will decide whether it's raining or now no longer.

The Sensing Pad:

The sensor includes a sensing pad with collection of uncovered copper strains, this is located out with inside the open, in all likelihood over the roof or wherein it is able to be suffering from rainfall.

The Module of The sensor additionally includes a digital module that connects the sensing pad to the Arduino. The module produces an output voltage consistent with the resistance of the sensing pad and is made to be had at an Analog Output (AO) pin. The equal sign is fed to a LM393 High Precision Comparator to digitize it and is made to be had at a Digital Output (DO) pin.



References:

1. December 2016. View at: [Publisher Site](#) | [Google Scholar](#)
3. W. Foote, *To Feed the World in 2050, We Need to View Small-Scale Farming as a Business*, Skoll World Forum, Oxford, UK, 2015.
4. V. Doknić, *Internet of Things Greenhouse Monitoring and Automation System. Internet of Things: Smart Devices, Processes, Services*, 2014, http://193.40.244.77/idu0330/wpcontent/uploads/2015/09/140605_Internet-of-Things_Vesna-Doknic.pdf.
5. D. K. Großkinsky, J. Svensgaard, S. Christensen, and T. Roitsch, "Plant phenomics and the need for physiological phenotyping across scales to narrow the genotype-to-phenotype knowledge gap," *Journal of Experimental Botany*, vol. 66, no. 18, pp. 5429–5440, 2015. View at: [Publisher Site](#) | [Google Scholar](#)
6. E. Playán and L. Mateos, "Modernization and optimization of irrigation systems to increase water productivity," *Agricultural Water Management*, vol. 80, no. 1-3, pp. 100–116, 2006. View at: [Publisher Site](#) | [Google Scholar](#)
7. L. Levidow, D. Zaccaria, R. Maia, E. Vivas, M. Todorovic, and A. Scardigno, "Improving water-efficient irrigation: prospects and difficulties of innovative practices," *Agricultural Water Management*, vol. 146, pp. 84–94, 2014. View at: [Publisher Site](#) | [Google Scholar](#)
8. R. Qiu, S. Wei, M. Zhang et al., "Sensors for measuring plant phenotyping: a review," *International Journal of*
2. D. Pimentel, B. Berger, D. Filiberto et al., "Water resources: agricultural and environmental issues," *Bioscience*, vol. 54, no. 10, pp. 909–918, 2004. View at: [Publisher Site](#) | [Google Scholar](#)
- Agricultural and Biological Engineering*, vol. 11, no. 2, pp. 1–17, 2018. View at: [Publisher Site](#) | [Google Scholar](#)
9. W. Baudoin, R. Nono-Womdim, N. Lutaladio et al., *Good Agricultural Practices for Greenhouse Vegetable Crops: Principles for Mediterranean Climate Areas (No. 217)*, Food and Agriculture Organization of The United Nations, Rome, 2013.
10. M. Lee and H. Yoe, "Analysis of environmental stress factors using an artificial growth system and plant fitness optimization," *BioMed Research International*, vol. 2015, Article ID 292543, 6 pages, 2015. View at: [Publisher Site](#) | [Google Scholar](#)
11. S. M. Moon, S. Y. Kwon, and J. H. Lim, "Minimization of temperature ranges between the top and bottom of an air flow controlling device through hybrid control in a plant factory," *The Scientific World Journal*, vol. 2014, Article ID 801590, 7 pages, 2014. View at: [Publisher Site](#) | [Google Scholar](#)
12. C. Stanghellini, "Horticultural production in greenhouses: efficient use of water," *Acta Horticulturae*, vol. 1034, pp. 25–32, 2014. View at: [Publisher Site](#) | [Google Scholar](#)
13. D. Savvas, G. Gianquinto, Y. Tuzel, and N. Gruda, "Soilless culture," in *Good Agricultural Practices for Greenhouse Vegetable Crops: Principles for Mediterranean Climate Areas (No. 217)*, W. Baudoin, R. Nono-Womdim, N. Lutaladio et al., Eds., pp. 303–354, Food and
14. Agriculture Organization of The United Nations, Rome, 2013. View at: [Google Scholar](#)
15. I. A. Lakhiar, X. Liu, G. Wang, and J. Gao, "Experimental study of ultrasonic atomizer effects on

values of EC and pH of nutrient solution,” *International Journal of Agricultural and Biological Engineering*, vol. 11, no. 5, pp. 59–64, 2018. View at: [Publisher Site](#) | [Google Scholar](#)

16. J. P. Beibel, *Hydroponics -The Science of Growing Crops without Soil*, Department of Agriculture. Tallahassee. Bulletin, 1960.
17. J. L. Reyes, R. Montoya, C. Ledesma, and R. Ramírez, “Development of an aeroponic system for vegetable production,” *Acta Horticulturae*, vol. 947, pp. 153–156, 2012. View at: [Publisher Site](#) | [Google Scholar](#)
18. M. Raviv and L. Lieth, “Significance of soilless culture in agriculture,” in *Soilless Culture: Theory and Practice*, M. Raviv and J. H. Lieth, Eds., pp. 117–156, Elsevier, Amsterdam, 2007. View at: [Google Scholar](#)
19. V. Valenzano, A. Parente, F. Serio, and P. Santamaria, “Effect of growing system and cultivar on yield and water-use efficiency of greenhouse-grown tomato,” *The Journal of Horticultural Science and Biotechnology*, vol. 83, no. 1, pp. 71–75, 2008. View at: [Publisher Site](#) | [Google Scholar](#)