

SMART CITY GARDEN ENVIRONMENT USING IOT TECHNIQUES

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Abstract: This paper focus on a smart city gardening system which is cost effective now a days we are living in 21st century where automation is playing important role in human life. Automation allows us to control appliances automatic control. It not only provides comfort but also reduce energy, efficiency and time saving. Today industries are use automation and control machine which is high in cost and not suitable for using in a farm field. So here we also design a smart irrigation technology in low cost which is usable by India. The objectives of this paper were to control the water motor, automatically and select the direction of the flow of water in pipe with the help of soil moisture sensor and solar, LDR, Temperature sensor, micro controller, relay, using the project. Finally send the information (operation of the motor and every process) of the garden field to the mobile message and application of the user.

Keywords: Soil moisture Sensor, Solar tracking, LDR, Temperature Sensor, Arduino, Smart Garden.

1. INTRODUCTION

Since these days, in the time of cutting edge gadgets and innovation, the life of person ought to be less difficult and more helpful; there is a requirement for some computerized frameworks that are equipped for supplanting or lessening human exertion in their day by day exercises and employments. Here we present one such framework, named as programmed plant watering framework,

Which is really a model of controlling water system offices that utilizations sensor innovation to detect soil dampness with a microcontroller keeping in mind the end goal to make a shrewd changing gadget to help a huge number of individuals. Would we be able to naturally water our home and garden plants without annoying our neighbours when we choose to take some time off or elsewhere for a long stretch Since sporadic watering prompts the mineral misfortune in the dirt and may wind up with spoiling the plants, would we be able to then in some way or another know whether the dirt truly should be watered and assuming this is the case, when precisely do we need to water the plants. Is it conceivable in any capacity from remote area to deal with our plants to be watered? These are a few inquiries that can be heard frequently and reply on every one of them is empowering and positive, in light of the fact that best in class innovation gives us extensive variety of potential outcomes these days. All things considered, there is an extremely straightforward and prudent answer for every one of these inquiries and perplexities. As extraordinary crossing point between organic building and hardware, the arrangement requires just a tad information of gadgets and additionally that learning identified with herbal science and plant physiology.

A. Smart Cities

Brilliant Cities fluctuates from city to city and nation to nation as indicated by level of advancement to change, assets, innovation, condition, way of life, culture, financial level of people groups and so forth. In India, a Smart City would have an alternate idea. It's not possible for anyone to characterize how a shrewd city can be?

Shrewd Cities principally centre their needs and the offices to enhance client's life. Savvy City has been produced for expanding computerized and data advancements, to enhance urban arranging and people in general private connections and approaches for client comfort life. In India, 31% of individuals live's in city. These rates are quickly expanding with populace projection. Keen urban communities predominantly cantered around requirements of clients to enhance the personal satisfaction for occupants' kin in their future. Shrewd urban areas might be the frameworks with streams of vitality, materials, administrations, individuals, condition, activity, security and financing and so on. Urban arranging must build up the innovation with monetary and social digestion of groups, for example, vitality proficient and green spaces, ID, and mix, and transportation, versatility in city arranging, administration and advancement in more quick witted way. Subsequently, it is requirements to build up the urban individuals' life astutely with imaginative innovations as opposed to existing structures.

B. Smart City Mission of India

In India, mission of Smart city is to improve the economic growth with high quality of urban life by creation of infrastructure with assured service level and efficient governance. Several programs are shaped to urban development on India's growth, challenges and opportunities. Smart City aims to promote growth of economics, strength of governance and give a comfort life of users to improve urban residents. To set the Smart city in India, good ideas are welcomed in many shapes and sizes, designs that includes technology, institutional or managerial reforms, citizen involvement.

C. Smart City Vision of India

The vision of the Ministry of Urban Development (MoUD) says "creation of economically vibrant, inclusive, efficient and sustainable urban habitats".

The vision of smart cities is to develop the urban people life with safe, secure and efficient. Because the structure of smart cities with power, water, transportation and the other basic needs is designed, constructed and maintained with integrated materials, sensors, electronics and integrated networks through computerized system

2. GARDEN ENVIRONMENT USING IOT

A.Arduino

The figure 1 shows Arduino is a situated of advancement sheets that accompany pretested equipment and programming libraries. That is to say, easy to arduino board and begin adding to your task immediately. The sheets are constructed around the avr microcontroller as the base. Programming libraries to run on the board are composed and made accessible free of charge.

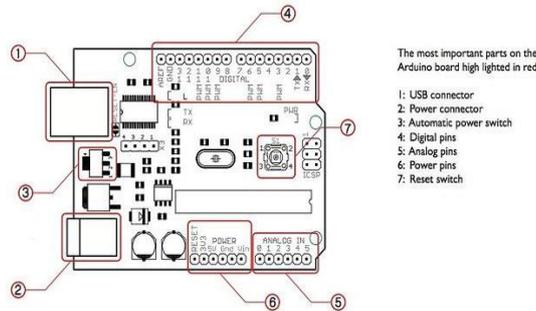


Figure 1. diagram of arduino

B.Relay Module

A cluster of actuators can be utilized as a part of the framework. for example, transfers, contactors, and change over switches and so forth. they are utilized to turn on ac devices. for example, engines, coolers, pumps, haze machines, sprayers. with the end goal of exhibit transfers have been utilized to drive ac globules to reproduce actuators and ac gadgets. a complete working framework can be acknowledged by essentially replacing these simulation devices by the actual devices.

Simple Relay Circuit.

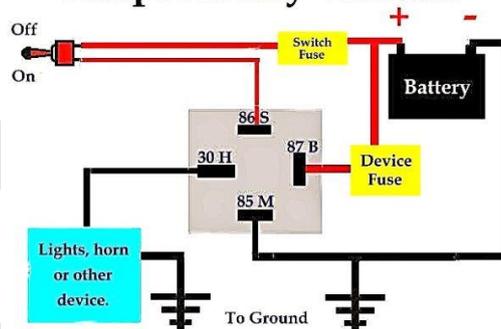


Figure 2.simple relay circuit

C.Ldr

The circuit shown above shows a simple way of constructing a circuit that turns on when it goes dark. In this circuit the LDR and the other Resistor form a simple 'Potential Divider' circuit, where the centre point of the Potential Divider is fed to the Base of the NPN Transistor. When the light level decreases, the resistance of the LDR increases. As this resistance increases in relation to the other Resistor, which has a fixed resistance, it causes the voltage dropped across the LDR to also increase. When this voltage is large enough (0.7V for a typical NPN Transistor), it will cause the Transistor to turn on. The value of the fixed resistor will depend on the LDR used, the transistor used and the supply voltage.

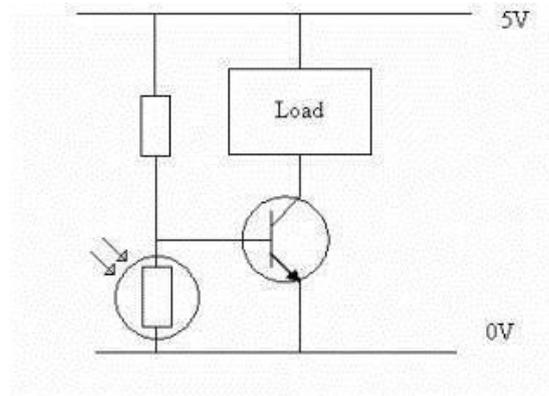


Figure .3 LDR circuit

D.Dht-11 Temperature and Humidity Sensor

Dht11 temperature & humidity sensor highlights a temperature & stickiness sensor complex with a calibrated digital signal input. By utilizing the selective computerized sign securing system and temperature & dampness sensing innovation, it ensures high reliability and excellent long-term stability. This sensor incorporates a resistive-sort moistness estimation segment and a ntc temperature estimation part, and associate with a high- execution 8-bit microcontroller, offering fabulous quality, quick reaction, hostile to obstruction capacity and expense adequacy. Each dht11 component will be entirely balanced in the lab that will be to a great degree exact on dampness adjustment. The adjustment coefficients are put away as projects in the otp memory, which are utilized by the sensor's inner sign distinguishing methodology. The single-wire serial interface makes framework reconciliation brisk and simple. Its little size, low power utilization and up-to-20 meter signal transmission settling on it the best decision for different applications, including those most requesting ones. The part is 3-pin single line pin bundle. It is advantageous to associate and unique bundles can be given in response to popular demand

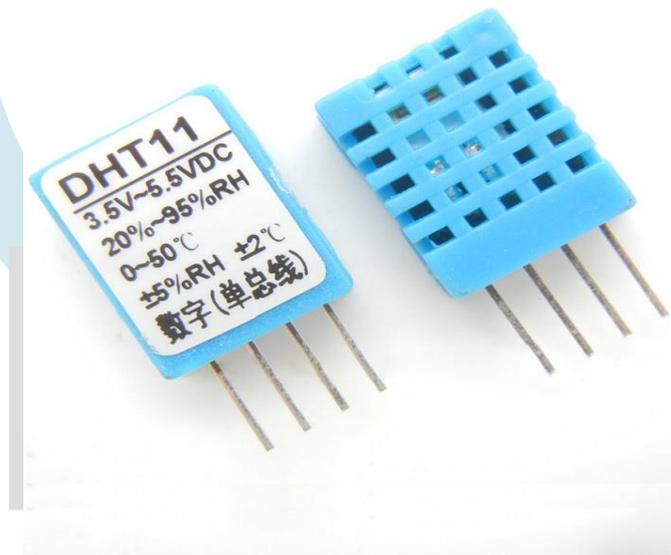


Figure 4 . DHT11 Temperature and Humidity Sensor

E. Soil Moisture Sensor

The Soil Moisture Sensor is used to measure the volumetric water content of soil. This makes it ideal for performing experiments in courses such as soil science, agricultural science, environmental science, horticulture, botany, and biology. The Soil Moisture Sensor uses capacitance to measure the water content of soil (by measuring the dielectric permittivity of the soil, which is a function of the water content). Simply insert this rugged sensor into the soil to be tested, and the volumetric water content of the soil is reported in percent

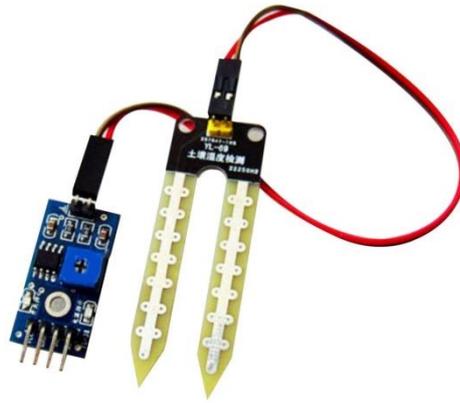
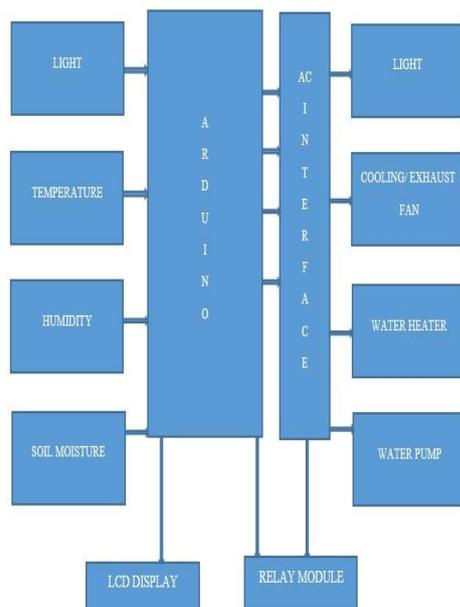


Figure .5 Soil Moisture Sensor

PROPOSED METHOD

We live in our present reality where everything can be controlled and worked normally, however there are as yet several key sections in our country where computerization has not been gotten or not been put to an incontestable use, perhaps in dainty of a couple of reasons one such reason is cost. One such field is that of horticultural. Agrarian has been one of the basic occupations of man consequent to ideal on time improvements and even today manual mediations in developing are sure. Nursery outlines a basic bit of the agribusiness and horticulture territories in our country as they can be used to create plants under controlled climatic conditions for perfect deliver. A computerized framework inside a nursery imagines checking and controlling of the climatic parameters which particularly or in a backhanded way regulate the plant advancement and subsequently their deliver. Mechanization is philosophy control of robotized equipment and blueprints, in this manner supplanting human proprietors.

ARCHITECTURE OF PROPOSED MODEL



SOLAR TRACKING USING LDR

In this project, LDR's are working as light detectors. Before we go into detail, we will have to understand how the LDR's work. **LDR (Light Dependent Resistor)** also known as photo resistor is the light sensitive device. Its resistance decrease when the light falls on it and that's why it is frequently used in Dark or Light Detector Circuit. Check the various circuits based on LDR here. The two LDR's are placed at the two sides of solar panel and the **Servo Motor** is used to rotate the solar panel. The servo will move the solar panel towards the LDR whose resistance will be low, mean towards the LDR on which light is falling, that way it will keep following the light. And if there is same amount of light falling on both the LDR, then servo will not rotate. The servo will try to move the solar panel in the position where both LDR's will have the same resistance means where same amount of light will fall on both the resistors and if resistance of one of the LDR will change then it rotates towards lower resistance LDR

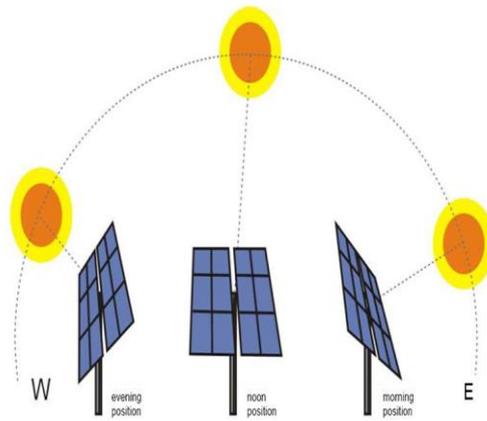


Figure. 6 solar sun tracking

GARDEN AUTO WATER SRINKLER

The circuit diagram of the automatic plant watering system is shown in Fig. 7. The circuit connectivity comprises an Arduino UNO board, a soil moisture sensor, a servo motor, a 12V water pump and an L293D (IC1) motor driver IC to run the water pump. You can power the Arduino board using a 7V to 12V wall wart or plug-in adaptor or solar panel. You need a separate 12V battery or power supply or solar panel for the pump motor.

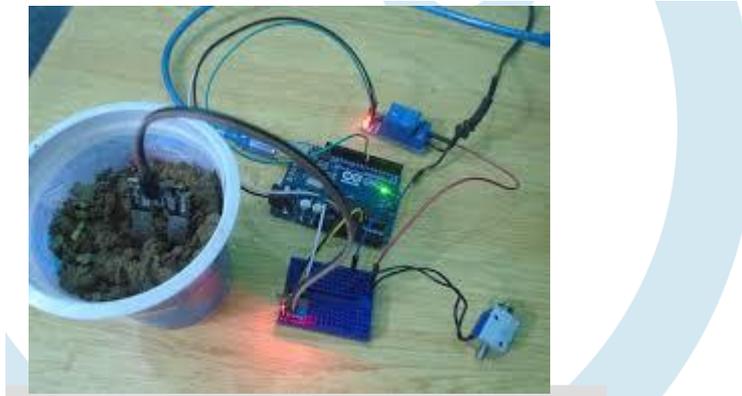


Figure.7 auto water sprinkler with Soil Moisture Sensor

SOIL MOISTURE SENSOR

Two types of soil moisture sensors are available in the market—contact and non-contact sensors. A contact soil sensor (as shown in Fig. 8) is used in this project because it has to check soil moisture to measure the electrical conductivity. The moisture sensor provides an analogue output, which can easily be interfaced with Arduino. In this project, two sensors can be connected to analogue pins, A0 and A1, of the Arduino board. Each sensor has four pins (Vcc, Gnd, Ao and Do) available for interfacing with the Arduino board. Here, digital output pin (Do) is not used. The water pump and servo motor are controlled by Arduino connected to digital pins 3 and 9, respectively. That is, the servo motor signal control pin is connected to pin 9 of the Arduino board.



Figure .8 soil moisture sensors

RESULT:

Figure 9 below represents results of our experiment in the form of the overall representation of our tested automatic plant watering system based on Arduino microcontroller and sensor technology. As it can be concluded from the picture below, the system has been designed and tested successfully in a successful manner. Also, functionality of the system, as well as the overall behaviour of the plant, has been observed in the next 30 days and the results were great as expected and desired. As result of our observation we noticed that plant maintained its homeostasis in desired, regular and health manner without any deficiencies observed. Whenever a need for water was recognized by the sensor, microcontroller sent a signal to the pump to start watering the plant until enough quantity of water was not delivered.

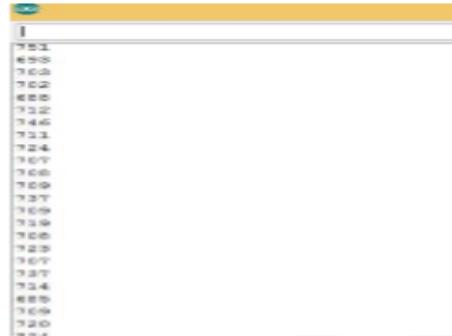


Figure .9 output of auto water supply

The proposed dual axis solar tracker automatically tracks position of sun and maximise the solar power with help of arduino. As compared to single axis, dual-axis system provides high abundant electrical energy output when compared to the fixed mount system. The Dual axis tracker is having more efficiency. The main aim of this work is to develop two axis solar tracker systems that use four sensors (ldr s) to predict the sun position.

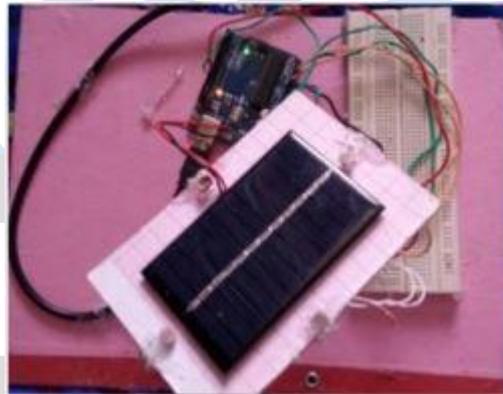


Figure .10 Sun tracking solar panel

CONCLUSION

To be affirmed, we have tasted our nursery venture in better places whether it works with no blunder or not and we enchanted to get positive input in regards to our task executed in botanical garden. What's more, botanical garden expert demonstrated their colossal enthusiasm to help us in each angle for our further research, which is a huge open door for us to advance. The structure has successfully defeated exceptionally a couple of insufficiencies of the current systems by reducing the power use, upkeep and complexity, meanwhile giving a versatile and correct indication of keeping up nature. Besides, the reliably decreasing costs of gear and programming, the more broad affirmation of electronic structures in agribusiness, and a creating cultivating control system industry in a couple of scopes of agricultural creation, will bring about tried and true control systems that will address a couple of parts of significant worth and measure of age. Additionally changes will be made as not so much exorbitant but rather stronger sensors are made for use in plant creation

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