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Smart Home Garden Using Iot Based System

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ABSTRACT: Home-garden' is very functional approach to environment conservation practice that provides solution to microclimatic challenges that directly impact on food, nutrition, agriculture productivity, poverty, hunger and malnutrition; we have chosen 'home garden' as small scale biodiversity and its conservation through women participation as the organizing theme for this manual. However, principles and techniques in this manual can also be applied in developing an interpretive program that focuses on other types of issues, such as health & sanitation, environment pollution or agricultural productivity

Living in high rise building has its own pros and cons, but when it comes to gardening, many have to compromise due to space issue. These smart IoT gardening now enable everyone to take pleasure of gardening. Using the concept of IOT we make sensors to communicate with each other which are powerful in automation. The important aspect of this prototype is that it saves cost and ensures safety. When people try to make plantings and set up their own garden, they were cautious in maintenance at only in their beginning stages. As days go on due to lack of maintenance the plants get destroyed. It will help people to automatically monitor the parameters and ensures maintenance of the garden. It plays a vital role and serves as a good companion for plants. IOT provides solutions for various problems and it allows things to be sensed or controlled remotely in network infrastructure.

KEYWORDS: IoT, Home garden Sensors, indoor plants,

I. INTRODUCTION

Automation rules the world nowadays. It is a technique of using computers or mobile phones in monitoring and controlling the simple parameters of day to day life. The standard of our life will be nourished by the practice of using automation for simple things. Using the concept of IOT we make sensors to communicate with each other which are powerful in automation.

The implementation of Smart Garden system using the Internet of Things has been verified to satisfactorily work by connecting different parameters of the soil to the cloud and was successfully controlled remotely through a mobile application. The system designed not only monitors the sensor data, like moisture, humidity, temperature and ultrasonic but also actuates other parameters according to the requirement, for example, if the water level in tank is reduced to a minimum value then the motor switch is turned on automatically to the water level of the tank reaches the maximum value. The initial cost and the installation of this system are cheap and hence it can be implemented anywhere. With the development of sensor technology, the system can be elevated to the next level which helps the users to utilize their investment in an economic manner. If soil nutrient sensors can be installed, then the system can be modified to supply fertilizers to the garden precisely. This system saves manpower and efficiently utilizes the water resources available ultimately leading to more profit. The feedback provided by the system will improve the implementation of the gardening process.

Our paper is aiming at fundamental concept of IoT in Home Garden , role of IoT in the cultivation and different types of plants use in home plantation .

II. VARIOUS PLANTS FOR HOME GARDEN

India is known for its rich flora and fauna. In India, plants are not only important but worshipped for the wonderful properties present in them. They are a shelter to dwell and also a cure for many problems.

That there are some simple and humble plants that can be planted indoors which also have amazing medicinal properties and health benefits

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1. Holy Basil (Tulsi)

The holy basil plant is a native plant in the Indian subcontinent and has an important place in every Indian household. It has a plethora of medicinal properties which are beneficial for the physical, mental, hormonal and even emotional health and wellbeing. Maybe this is the reason why in a number of regions, Tulsi is also regarded and respected as a mother. Tulsi can be consumed in any form- popularly it is used in a herbal tea. This traditional medical plant can be easily planted indoors and maintained with little efforts.

2. Coriander (Dhania)

You won't see any Indian curries, or salads being served without a dash of these lovely green leaves. Coriander is not only a garnishing herb; but also, a plant with a number of medicinal properties.

It is a cooling herb which can be helpful in treating skin inflammation, high cholesterol levels, diarrhea, mouth ulcers, anemia, indigestion, menstrual disorders, smallpox, conjunctivitis, skin disorders, blood sugar disorders, and also eyes related disorders. Planting this herb in your kitchen garden is a great idea.

3. Mint (Pudina)

Mint is an important ingredient in a number of Indian cuisines; especially in summers. It has useful properties which can help in curing digestion problems, dizziness, nausea, headaches, nasal congestion, dental health, dandruff and head lice, nipple pain due to breastfeeding, blood circulation problems, muscle pain and skin or eye problems. It also helps in weight loss and improves immunity. Plant this herb in your tiny garden for all these benefits!

4. Carom (Ajwain)

Ajwain is a native Indian herb, and its leaves are mostly used in Pakoras and Parathas. Carom is amazingly helpful in curing digestion and stomach related problems. If you plant this tree in your home garden, then you will be surely able to benefit from its amazing properties.

5. Aloe Vera (Ghritkumari)

Aloe Vera is commonly found in Indian cosmetics and lotions. It has anti-inflammatory properties which can help in curing skin diseases and problems. Moreover, it has an interesting shape and grows easily; which makes it easier for you to plant it indoors.

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6. Mustard (Sarson)

Mustard has a number of healing properties; and health benefits like aiding digestion, treating dizziness, nausea, headaches, nasal congestion, improving dental health, avoiding dandruff, relieving nipple pain, improving blood circulation, relieving muscle pain, healing skin problems, promoting eye health, and promoting weight loss.

Moreover, the mustard greens are the rich source of minerals and Vitamins A, C, and K. Planting this in your backyard will surely be helpful in a lot many ways!

7. Curry Leaves/Kadi Patta

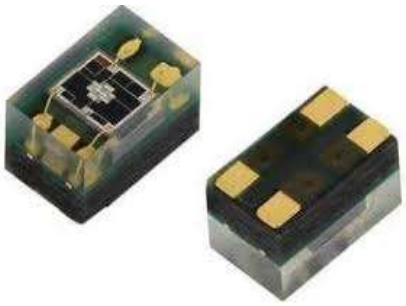
Curry leaves are a popular seasoning in Indian cuisine. It has a myriad of health benefits and nutrients which are beneficial for your heart, hair, skin and overall health. This plant can easily be planted and grows with minimal maintenance.

III. VARIOUS TYPES OF SENSORS

Sensors: Sensors are important component which capture analog signals. As per requirements & domains, various sensors like light sensors, gas sensors, temperature sensors etc are used. Regarding to requirements of sensors various parameters which are actually based on these sensors should be kept in mind. These parameters are like accuracy towards inputted data, reliable input and purpose etc.

Location Sensors

These sensors determine latitude, longitude and altitude of any position within required area. They take help of GPS satellites for this purpose.



Optical Sensors

These sensors use light in order to measure properties of the soil. They are installed on satellites, drones or robots to determine clay, organic matter and moisture contents of the soil.

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Electro-Chemical Sensors

These sensors help in gathering chemical data of the soils by detecting specific ions in the soil. They provide information's in the form of pH and soil nutrient levels.

Mechanical Sensors

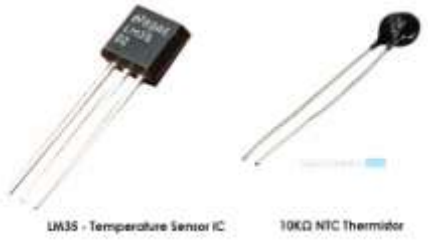
These sensors are used to measure soil compaction or mechanical resistance.

Air Flow Sensors

These sensors are used to measure air permeability. They are used in fixed position or in mobile mode.

Temperature Sensor

One of the most common and most popular sensor is the Temperature Sensor. A Temperature Sensor, as the name suggests, senses the temperature i.e. it measures the changes in the temperature.

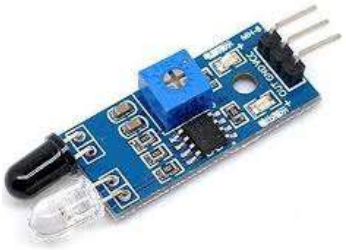


Infrared Sensor (IR Sensor)

IR Sensors or Infrared Sensor are light based sensor that are used in various applications like Proximity and Object Detection. IR Sensors are used as proximity sensors in almost all mobile phones.

There are two types of Infrared or IR Sensors:

Transmissive Type and Reflective Type. In Transmissive Type IR Sensor, the IR Transmitter (usually an IR LED) and the IR Detector (usually a Photo Diode) are positioned facing each other so that when an object passes between them, the sensor detects the object.



Color Sensor

A colour sensor is a type of "photoelectric sensor" which emits light from a transmitter, and then detects the light reflected back from the detection object with a receiver.

A colour sensor can detect the received light intensity for red, blue and green respectively, making it possible to determine the colour of the target object.

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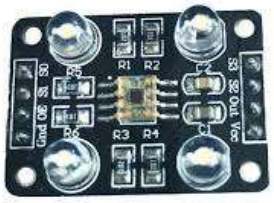

Soil Moisture Sensors

Tensiometric and volumetric are the two primary sensor types that measure soil moisture. As the name implies, tensiometric sensors or probes measure soil moisture tension, or the potential soil moisture. Tensiometers are sensitive to soil properties by measuring how tightly a particular soil type retains water. Volumetric sensors measure the actual volume of water in the soil. Soil moisture sensors can work in tandem with your irrigation system by signaling the need for water and turning on the system, or they can prevent sprinklers from coming on if there's enough moisture in the soil.

IV. DIFFERENT TYPES OF GARDENS

There are gardens for any kind of taste, desire, and space. Among the many choices, here are some types of familiar vegetable gardens :

Flat gardens.

This type is the most traditional; it involves growing vegetables on a level surface, often in rows or beds. Currently used for large surface areas, it can easily be adapted to any vegetable or machinery.

Gardens on ridges

It involves creating ridges (sometimes permanent) where vegetables are planted. In this way, the height of the earth is raised, vegetables are higher up and easier to harvest; the earth heats up faster.

Garden boxes:

if you don't have a vegetable garden, this type is ideal for starting out. Build (or buy) a box with wood boards, fill it with earth, compost and/or potting mix, and all you have to do is sow and plant. A vegetable garden can thus be part of a pleasure garden and becomes a decorative element! Vary the crops and varieties for greater aesthetics.

Terrace and Balcony" gardens:

no land is necessary; city dwellers also have a right to their vegetable garden! Select pots and containers that match your exterior, as well as adapted varieties and enjoy watching your vegetables grow in the city! A little corner of greenery that is relaxing, provides something to eat, breaks up the view... lots of good reasons to grow vegetables on your terrace or balcony!

Vertical smart garden

You can grow plants along your walls with the help of hydroponic technique with will allow the plants to grow without soil. Only water solution is required for the proper growth of your plants. This water solution will contain every necessary nutrient required for plant growth. The plant roots must be dipped in the nutrient solution. The vertical garden units are generally wall mounted which use IoT enabled micro-controllers which analyse the moisture, nutrients, and other necessary factors and send a notification to the owner about it. For the smooth operation of the system, you need a strong internet connection. You can also buy the smart gardening unit with built-in lighting, which will help you in maintaining optimum temperature and light for your plant growth.

VI. CONCLUSION

IoT-enabled indoor home garden management solutions monitor and automate processes around small-scale home greenhouses. Similar to applications in agriculture and smart farming, smart gardening solutions monitor soil and environmental conditions, automate irrigation, and check in on the health of plants to improve yield. Home garden management solutions allow garden owners to remotely monitor and manage environmental conditions in their greenhouse, including temperature and humidity. From anywhere, gardeners can ensure that their greenhouse is operating at ideal conditions and, if not, make adjustments. One of the biggest benefits of home gardening solutions is the wealth of data. Home gardeners don't typically have access to historical records in their greenhouses, and if they want to collect them, it often means manually checking and recording the readings on devices located in the garden. Home gardening solutions

automatically gather historical data to monitor environmental trends and allow gardeners to monitor, adjust, and track environmental factors affecting the health and quality of their gardens. With the use of these solutions, home gardeners can hone in on the perfect combination of temperature, humidity, and irrigation. Besides data, IoT-enabled home garden management can, much like its large-scale counterparts, automate irrigation to decrease water waste and, ultimately, save their users' money and protect their garden from neglect when they travel.

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