

# IoT Based Smart Home Gardening System

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## ABSTRACT

The need of every human being in this world is oxygen. Plants play a vital role in maintaining the carbon dioxide and oxygen content in the air. Number of plants is being destroyed each and every day for urbanization process. The number of plantings made is also reduced. Apart from these things more plants die due to lack of maintenance. The main objective of this IoT based gardening system is to maintain the environmental nature of the plants by continuously monitoring the parameters such as moisture level, temperature and water level. The development of the automation systems for the motor on/off once the level off the water is high. Android application is developed which are easy used to monitor the parameters of the garden and automate the watering process. Arduino is used to connect different sensors which collect the parameters of soil and transmits the information to server through NodeMCU Wi-Fi model.

**Keywords:** IoT, NodeMCU ESP8266, Arduino Microcontroller, Temperature sensor, Smart Garden, Soil and moisture sensor, Motor.

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## I. INTRODUCTION

Today world is Automation in every environment. It is the technique of using the computer, tablet and mobile phones in monitoring and controlling the simple parameters such as (emergency notification) 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. An important aspect of this prototype is that it saves the cost and ensures safety. When people try to make plantings and set up their own garden, they were cautious of maintenance only in their beginning stages. As the days pass away, due to lack of maintenance, the plants get destroyed. This prototype will help people to automatically monitor the parameters and ensure 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.

The desired paper is organized as follows. The problem statement and existing system in Section 2; System

motivation is presented in Section 3; literature survey in Section 4; Proposed model in Section 5; Result discussion in Section 6 and concludes the paper.

## II. PROBLEM STATEMENT

The problem of the system is that plants provides good health to us, quality air with almost all the basic needs for the survival of a people, but many people are unable to provide the plants with its basic needs, like limited water, non-pollution oxygen and as a result, plants are unable to survive. In automation world, our automatic systems are more preferred than the manual system.

In the Existing System many systems are providing a manual way for android applications, Protecting a garden in terms of environmental situation and the database ended with proper recovering options is the best part of the system, The proposed system designs idea in breakdown model to evaluate automatic gardening system of the android applications along with its database in every step.

### III. MOTIVATION

- Our main motivation is to provide all the initial cost and the installation of this system is minimum.
- To us, the IoT concept with sensor technology, the system can be elevated to the next level, which helps the users to utilize their investment in an economic manner.
- This smart gardening system minimizes manpower and efficiently utilizes the water resources available, ultimately leading to more profit.
- The feedback provided by the system based on the sensors data will improve the implementation of the gardening process with proper manner.

### IV. LITERATURE SURVEY

In [1], the system uses Cortex-A8 and ZigBee. The system consists of three parts include the user intelligent control terminal, embedded home gateway and home ZigBee wireless network. It can perform functions such as safety and alarm, the indoor environment testing, household electrical appliances control and intelligent lighting and other functions. Users can access the Internet web to monitor a home furnishing remotely. The users can also use cell phone with Android smart furnishing control client applications to interact remotely with a home furnishing device.

In [2], the system uses the Intel Galileo that employs the integration of cloud networking, wireless communication, to provide the user with remote control of various lights, fans, and appliances within their home and storing the data in the cloud. The system will automatically change on the basis of sensors' data. This system is designed to be low cost and expandable allowing a variety of devices to be controlled. The designed system not only monitors a sensor data, like temperature, gas, light, motion sensors, but also actuates a process according to the requirement, for example switching on the light when it gets dark. It also stores the sensor parameters in the cloud (Gmail) in a timely manner. This will help the user to analyze the condition of various parameters in the home anytime anywhere.

In [3], an Android based home automation system that allows multiple users to control the appliances by the Android application or through the web site are presented. The system has three hardware components: a local device to transfer signals to home appliances, a web server to store customer records and support services to the other components, and a mobile smart device running Android application. The distributed cloud platforms and services of Google are used to support messaging between the components. Such a design of service and data distribution through public and free Google platform makes the system cost-effective.

In [4], the model includes soil moisture, temperature and pressure sensors to monitor the irrigation operations.

Specifically, we take into account the case where a system malfunction occurs, as when the pipes burst or an emitters block. Also, we differentiate two main traffic levels for the information transmitted by the WSN, and we use an adequate priority-based routing protocol to achieve high QoS performance. Simulations conducted over the NS-2 simulator show promising results in terms of delay and Packet Delivery Ratio (PDR), mainly for priority traffic.

In [5], the system has a distributed wireless network of soil-moisture & temperature sensors placed in a root of plants. A gateway unit handles sensor information, triggers actuators, and transmits data to a web application. The algorithm was developed with threshold values of sensors that were programmed into a microcontroller-based gateway to control water quantity.

### V. PROPOSED SYSTEM

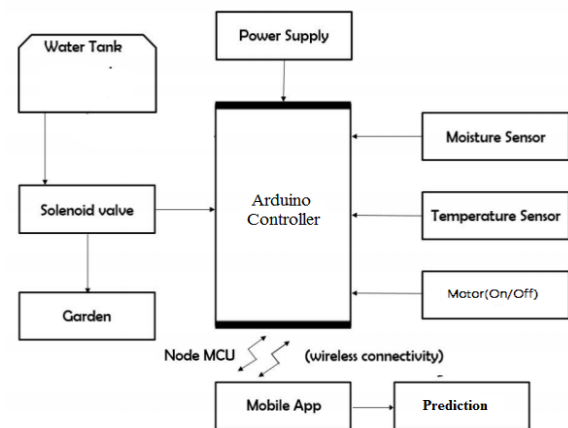


Fig 1. Block diagram

The proposed block diagram consists of different sensors like temperature, soil moisture, and a motor pump. Initially the esp8266 connects to the internet through Wi-Fi. When the connection is established, it will start reading the parameters of sensors which are connected to the controller. The threshold levels which are set in programming for the analysis of current required sensors. The sensor data are sent from android application to the web server and stored in the global cloud. The coming sensor data can be analyzed anywhere at any time from the android application. If the sensor values are greater than the set value, i.e. threshold level then the respective notification will be sent to the user and the required action will be done for the controlling of the parameters.

In the proposed model a temperature, moisture, water level in the house are monitored. The temperature and moisture percentage detection are stored in cloud for analysis. If the soil moisture value is above the moisture level then the motor will be OFF, whereas if the moisture level is low, motor will be ON, through the relay.

#### MODULES:

1. Registration

Any user can register easily in our android application. We will store all needed data of user, so that only authorized user can use the application in this system feature.

## 2. Authentication

Only registered users can use our featured system, so this authentication feature is a very important to step in our application.

## 3. Connect with Hardware

After authentication, by using our mobile app the user can connect with controller to sense the sensors values.

## 4. Prediction

After fetching the all sensors values our system will predict the how many needs to the gardening crop moisture, temperature to protect them.

## VI. CONCLUSION

The development of a smart garden system, using the Internet of Things by connecting different parameters of soil, temperature, on/off motor to the cloud and was successfully controlled remotely through a mobile application. The proposed system develops not only monitors a sensor data, like moisture, humidity and temperature but also actuates other parameters according to the requirement. We totally develop automatically and reduce the manual efforts in this system. So automatically, the system installation of an initial cost and maintenance cost will reduce.

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