

# Automatic water Irrigation System Approach for Smart Homes

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**ABSTRACT** In agriculture, irrigation plays an important role. Normally, we have many issues in irrigating the plants. Over irrigation of plants leads to decay of plants and low irrigation of plants leads to retardation of crop growth, late flowering. To overcome from this issues the proposed system define a method called Automatic Irrigation system for Smart Homes (AI-SH). The proposed model build an automatic irrigation system approach using Arduino in which moisture sensor senses the moisture content present in the soil. According to the moisture content level water will be pumped to the soil by the DC motor. The sensor continuously monitors the soil moisture content, when it reaches the required water tank level will be used for planting water and its water level will be continuously monitored from an Ultrasonic sensor using distance value. If the range goes beyond the certain level, then the system will send message notification to the user mobile. By this proposed AI -SH approach the user can know the pouring method of water for home plants. If the user he/she are far away from their home can also monitor the plant water easily and quickly.

**Keywords:** soil moisture sensor, ultra sonic sensor, motor driver circuit

## I. INTRODUCTION

In general today's agriculture may define with the many smart approach techniques for yielding crops, monitoring moisture content and checking with weather conditions, humidity and moisture. There are many approaches will be used to make the irrigation method for monitoring plants. There are in general many issues are there to monitor the home plants. They are plants affect with the insects, nutrient deficiencies, weather conditions and water level pumping based on the soil conditions.

Insects may affect the plants with the environmental conditions. If the plants may affect with the unconditional weather or improper water level or in a bad condition. Nutrient deficiency is the vitamin deficiency that may affect the plants. The deficiency may presented in the plants by change of colour. The plant colour may get changed or shrined with this deficiency.

Many issues are rectified with the different approaches from that the proposed AI-SH method prefers the water level monitoring issues. The main issue focus on this approach is to monitor the home plant level, when the home person is not physically present at home. He/she

can operate the water level monitoring using the proposed AI-SH system.

## II. RELATED WORK

Henok Kassaa,b, Stefaan Dondeyne et al ( 2017 ), makes the tropical forest and agroforestry lands. The author makes the comparison for the soil ratio with the topsoil and subsoil physico-chemical characteristics, soil organic and nitrogen stocks in soil. The study discuss about the crop land, agroforestry land with the land use and the usage of the historical data. Also it discuss about the soil organic and nitrogen stocks of the tropical and agroforestry lands. The proposed paper produces the comparative study of the two lands.

Alamelu M et al (2017) et al proposed the method for the Most people usage (MPU) Internet of Things structure for the health care and social networking systems. The author proposes the new approach using Internet of Things approach that the collective issues from the health issues are collected and fed to the healthcare system. From this the identified issues are transmitted to the Health Social Cloud Center (HSCC). The internal system will make the analysis of the risk analysis and expert member discussion with the petrified databases. Finally the finalized solution has been sent to the requested client and the customer can make the final solutions.

## III. AUTOMATIC IRRIGATION SYSTEM FOR SMART HOME (AI-SH)

The proposed Automatic irrigation system AI-SH system Fig.1 displays the working scenario of the water level monitoring. The system uses soil moisture sensor, ultra sonic sensor, motor driver circuit. The working process will be starts from the soil sensor that senses the moisture content present in the soil and switches on and off the water motor according to the moisture content level.

When the soil is too dry, water will be pumped to the soil by the DC motor. The sensor continuously monitors the soil moisture content and when it reaches the required level, motor will be turned off. A water tank will be used for planting water and its

water level will be continuously monitored from an Ultrasonic sensor using distance value. We have two fields in ultrasonic sensor which will send trigger signal and echo signal to measure the water level of tanks by the distance covered by it. If the distance value is too low, it indicates that water level is nearer to the top of the tank. If the distance value is too high, it knows that water level goes below the range. Then a message notification will sent to the

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user using SIM800 through GSM module.

The program execution is inserted into the arduino program which then starts executing. This way the water level and moisture level can be monitored. And also this will lead in alerting the Water Supply to the tank from the bore well.

AI-SH process execution algorithm is defined below

- **Soil Monitor Ranges:**

The soil monitor ranges will measure the soil condition of the plant. Based upon the soil condition the water will be poured to the plants with the different water ratios. Such as if the soil is too dry then 10% of the water will be pumped to the plants. If not the soil is checked with the soil volume, soil weight and the type of plant is greater than 50% percentage then water will be poured to the plants with the good condition.

The good condition it resembles that the soil volume to be measured or checked with the diameter ring of the pot and soil container weight .If the weight has exceeded the water level ratio then the pouring can be stopped. In final the type of plant to be monitored and with the type of plant the water poured to the pot.

### Soil monitor Ranges

- Check with the soil condition
- Soil is too dry -> will pump 10 % of water based upon the plant category
- eg.. Ruber plant , yucca, jade plant  
If not measure
- Accept with soil volume+ soil weight + types of plants is greater than 50% of good condition then pour water
- Soil volume -> measure with the diameter ring
- Soil weight -> soil container weight
- Type of plant -> yucca, jade plant

### Delivery notification to the home user

- Notify the messages to the registered customer
- Registered customer restricted with the limit of 3.
- Registered customer can be authorized with the Administrator system
- If the registration has accepted with the Administrator System then the indication messages sent to the customer.

- **Water tank level Indication**

The water tank level will indicate the water level before and after pumping water to the home plants. Such as the water level can be indicated as the set level. When the set level is less than 10 % then no water to be poured to the plants, if it is greater than 25% then the water is to be poured with respect to the soil volume and the soil weight. After the water level monitoring the water indication can be sent to the customer as an message indication.

### Water tank level indication

- Water monitoring condition defined with the set level
- Set level checked with the water measuring level
- Set level -> water measuring level.
- If the set level < 10% -> no water to be pumbed
- Set level >= 25% -> water will be pumped with the soil range (soil vol+ soil weight)
- Send notification to the messages

has been permitted to use the system. The registered customer can be authorized with the personal identity information and accepted by the administrator system. The system which collects all the essential information about the register customer and sent the



**Figure.1 Automatic Irrigation system for smart Home (AI-SI)**

### IV. WORKING SCENARIO OF AI-SH

AI-SH executes with this main component, it is a single board micro controller, where it connects with two sensors namely ultrasonic sensor and moisture sensor. The moisture

sensor continuously monitors the moisture content in the soil and it will send values to the arduino. Moisture sensor is placed inside the soil, it sense the moisture upto the depth of 25m and that is placed nearer to root zone of plants. Depending upon the moisture content of the soil the DC Motor is turned on and off.

DC motor pumps the water from the tank and this would lead to supplying water to the plants. If it water is sufficient to the plant, then the DC motor will stop pumping water. Ultrasonic sensor is used to monitor the water level of the tank. A water tank will be placed for supplying water to the plants .The water level is continuously monitored from an Ultrasonic sensor .When the water level goes below the particular range, then the indication shows up. By using SIM800, water level will be notified to the user by using GSM module. Then the water get filled in to the water tank.

**V.PERFORMANCE STUDY**

The proposed AI-SH system was compared with the existing system methods. Where the water level pumping approach was compared with the automatic plant water irrigation system. The water level can be analysed as a comparative study. Next the user accessibility ratio can be analysed with the existing system RF module. Table.1 can present AI-SH analysis study.

**Table. 1 AI system analysis with existing system**

S.No	Proposed	Existing
1.	AI-SH – Water level monitoring	Automatic plant water irrigating system
2.	AI-SH – Messaging ( user )	Automatic irrigation system based on RF Module

**VI.CONCLUSION AND FEATURE WORK**

Irrigation and crop maintaining is one of the major factor of agriculture. In general agriculture plays vital role in all kind of sources. From that home gardening takes the major part of maintain the plants and crops. To make the quick maintenance the proposed AI-SH system develop an approach for maintaining the water level of home plants. The major advantage of this system is to maintain and monitor the water level and the user can operate the system from the remote area, monitor and operate water pouring from the water tank. In future the proposed system will execute and enhanced with the Android applications for more number of users.

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