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A proposal On

**“IOT Based irrigation & plant monitoring system”**

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**Table of Content**

1. Introduction 1
   1. Introduction of our project 1
   2. Problem Statement 1
   3. Objective 1
   4. [Aim 2](#_TOC_250003)
2. [Methodology 2](#_TOC_250002)
   1. [System Design 2](#_TOC_250001)
   2. Block Diagram 2
   3. Flow chart 3
3. Hardware and Software components 4
4. [Cost Structure 5](#_TOC_250000)
5. Economic Benefit 6
6. Conclusion 6
7. Reference 6

ABSTRACT

Automation of farm activities can transform agricultural domain from being manual and static to intelligent and dynamic leading to higher production with lesser human supervision. We have proposed an automated irrigation system which monitors and maintains the desired soil moisture content via automatic watering. Microcontroller ATMEGA328P on arduino uno platform is used to implement the control unit. The setup uses soil moisture sensors which measure the exact moisture level in soil. This value enables the system to use appropriate quantity of water which avoids over/under irrigation. IOT is used to keep the farmers updated about the status of sprinklers. Information from the sensors is regularly updated on a webpage using wifi modle through which a farmer can check whether the water sprinklers are ON/OFF at any given time. Also, the sensor readings are transmitted to a Thing speak channel to generate graphs for analysis.

**INTRODUCTION**:

Agriculture is the unquestionably the largest livelihood provider in India. With rising population, there is a need for increased agricultural production. In order to support greater production in farms, the requirement of the amount of fresh water used in irrigation also rises. Currently, agriculture accounts 83% of the total water consumption in India . Unplanned use of water inadvertently results in wastage of water. This suggests that there is an urgent need to develop systems that prevent water wastage without imposing pressure on farmers. Over the past 15 years, farmers started using computers and software systems to organize their financial data and keep track of their transactions with third parties and also monitor their crops more effectively . In the Internet era, where information plays a key role in people's lives, agriculture is rapidly becoming a very data intensive industry where farmers need to collect and evaluate a huge amount of information from a diverse number of devices (eg., sensors, faming machinery etc.) in order to become more efficient in production and communicating appropriate information . With the advent of open source Arduino boards along with cheap moisture sensors, it is viable to create devices that can monitor the soil moisture content and accordingly irrigating the fields or the landscape as an when needed. The proposed system makes use of microcontroller ATMEGA328P on arduino uno platform and IOT which enable farmers to remotely monitor the status of sprinklers installed on the farm by knowing the sensor values thereby, making the farmers' work much easier as they can concentrate on other farm activities.

**LITERATURE REVIEW**

In A Remote Measurement and Control System for Greenhouse Based on wifi module remote monitoring the proposed system introduced a wifi based remote measurement and control system for greenhouse based on PC-based database system connected with base station. Base station is developed by using a microcontroller, GSM module, sensors and actuators. In practical operation, the central station receives and sends

messages through GSM module. Criterion value of parameters to be measured in every base station is set by central station, and then in base stations parameters including the air temperature, the air humidity. Indu et al. (2013) [5] mainly focuses on reviews in the field of remote monitoring and control, the technology used and their

potential advantages. The paper proposes an innovative GSM/Bluetooth based remote controlled embedded system for irrigation. The system sets the irrigation time depending on the temperature and humidity reading from sensors and type of crop and can automatically irrigate the field when unattended. Information is exchanged between far end and designed system via SMS on GSM network. A Bluetooth module is also interfaced with the main microcontroller chip which eliminates the SMS charges when the user is within the

limited range of few meters to the designated system. The system informs users about many conditions like status of electricity, dry running motor, increased temperature, water content in soil and smoke via SMS on GSM network or by Bluetooth. In , R.Suresh et al. (2014) mentioned about using automatic microcontroller based rain gun irrigation system in which the irrigation will take place only when there will be intense

requirement of water that save a large quantity of water. These systems bring a change to management of field resource where they developed a software stack called Android is used for devices that include an operating system, middleware and key applications. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language. Mobile phones have almost become an integral part of us serving multiple needs of humans. This application makes use of the GPRS feature of mobile phone as a solution for irrigation control system. These system covered lower range of agriculture land and not economically affordable. In IOT SMS alarm system based on SIM900A [7], an IOTalarm system based on SIM900A module of SIMCOM Company was designed for greenhouse. The system can gather environmental parameters such as air temperature and air humidity. Meanwhile, with the use of AT command, this system can also realize SMS automatic sending and receiving, environmental parameters overrun alarm and insufficient balance alarm. Through the system setting, the alarm message can be sent to the user-specified mobile phone automatically no matter what the users' location is. This system as a typical application of IOT in the agriculture has got some satisfactory results in the actual operation.

**PROBLEM:**

As, Nepal is a agricultural country the country faces a major economic impact positively through agriculture. The agricultural system allows the unemployed and illiterate to earn a good income and preserve the environment degradation. The dryness of land can cause the plants to die and similarly, cause the huge loss in agricultural production. Similarly, automating the agricultural system can cause a huge economic benefit in the country.

**OBJECTIVES:**

* To detect the moisture content of the soil.
* The system informs about the level of moisture it needs regularly.
* To grow the plant automatically without any kinds of disturbance by dryness and lack of monitoring guy.
* To design a system that monitors the plant and create an automated agricultural system.

**AIM:**

We are focused on developing an IOT based remotely monitoring and then watering syttem for plants.

The plant moisture can be monitored and then remotely watered so we can grow plant without any fear of it dying sooner due to dry soil.

**METHODOLOGY:**

Most of the farmers use large portions of farming land and it becomes very difficult to reach and track each corner of large lands. Sometime there is a possibility of uneven water sprinkles. This result in the bad quality crops which further leads to financial losses. In this scenario the Smart Irrigation System using Latest [IoT technology](http://circuitdigest.com/internet-of-things-iot-projects) is helpful and leads to ease of farming.

The **Smart irrigation System** has wide scope to automate the complete irrigation system. Here we are building a **IoT based Irrigation System** using wifi Module and DHT11 Sensor. It will not only automatically irrigate the water based on the moisture level in the soil but also send the Data to ThingSpeak Server to keep track of the land condition. The System will consist a water pump which will be used to sprinkle water on the land depending upon the land environmental condition such as Moisture, Temperature and Humidity.

Before starting, it is important to note that the different crops require different Soil Moisture, Temperature and Humidity Condition. So in this tutorial we are using such a crop which will require a soil moisture of about 50-55%. So when the soil loses its moisture to less than 50% then Motor pump will turn on automatically to sprinkle the water and it will continue to sprinkle the water until the moisture goes upto 55% and after that the pump will be turned off. The sensor data will be sent to ThingSpeak Server in defined interval of time so that it can be monitored from anywhere in the world.

**HARDWARE REQUIREMENT:**

1) soil sensor

2) arduino uno

3) jumper wires

4) relay module

5) wifi module

**SOFTWARE REQUIREMENT:**

Arduino programming

C/C++ programming

**BLOCK DIAGRAM**

The proposed system consists of a arduino uno board with an wifi module connected to soil sensor that senses the soils moisture and the level of moisture it needs for the plant to grow efficiently. So, in order to grow the plant we need to know the moisture level and then water it. Then wifi module allows he data of moistre level to be sent over internet plus we can remotely water the plant.

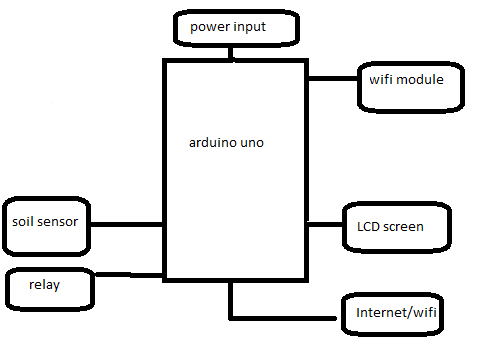


Fig: block diagram for IOT bsed irrigation system

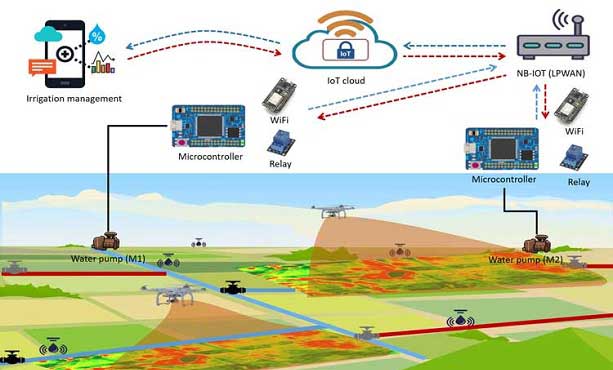


Fig: IOT system for smart irrigation

**FLOWCHART:**

start

Moisture sensor checks

Relay works

If the soil is dry

Water through the pump send message

Send data of mosisture

Display the monitored data in site

End

**COST STRUCTURE:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.N** | **Hardware** | **Quantity** | **Rate** | **Amount** |
| 1. | Arduino uno | 1 | Rs 1100 | Rs 1100 |
| 2. | Wifi module | 1 | Rs 500 | Rs 500 |
| 3. | Soil sensor | 1 | Rs 350 | Rs 1050 |
| 4. | Soldering wire/flux | 1 | Rs 200 | Rs 200 |
| 5. | Screw | Few | Rs 500 | Rs 500 |
| 6. | Glue Gun | 1 | Rs 500 | Rs 500 |
| 7. | Lcd screen | 1 | Rs | Rs 300 |

|  |  |
| --- | --- |
| Total | Rs 16800 |

**ECONOMIC BENEFIT:**

The IOT system on irrigation with help of monitoring process can greatly help in technological enhancement and finally replace traditional methods of agriculture with newer technologies based systems. More production can be made and more income can be generated as nepal is an economical country it can greatly benefit the economic development of country. The automated system can reduce time, cost and effort.

**CONCLUSION:**

Thus, the agriculture is one of primary source of economy for nepal so, the agriculture sector if mixed with technology then it can cause a huge benefit for country. The use of technology in agriculture like drone based pesticides spreading plus tractor farming and many more. The IOT system can be much useful for such purpose because it can be helpful in monitoring and then watering the plant remotely.

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