IoT BASED SOLAR POWERED AUTOMATIC GARDEN MAINTANENCE SYSTEM

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ABSTRACT

The main aim of this project is to monitor and analyze the growth of plants using automatic garden maintenance system and also the system is powered by solar. In recent days, smartertechniques are deployed for improving the field of agriculture by providing healthy products.Embedded system is operated with the assistance of MATLAB software which is popularly used in multiple fields. According to this concept, the images of the plant are captured and processed in digital image processing.The dryness of leaf or diseases affected in the leaf are found and the dataswill be sent to the hardware. The hardware can also receive different datas from temperature and humidity sensor ,water level sensor and soil moisture sensor.The collected datas are sent to the cloud through WiFi for database management and analyze the datas and provides the feedback through SMS.

Keywords:*IoT, Arduino,WiFi,GSM, Sensors*

1.INTRODUCTION:

Agriculture is the backbone of India'sEconomy. In today's world as we see rapid growth in global population, agriculture has become more important to meet the need of a human race.However agriculture requires irrigation and with every year we have more water consumption than rainfall,it becomes critical for the growers to find ways to conserve water while still achieving the highest yield. Generally the current irrigation systems are manually operated. Those systems are replaced with the automated and semi-automated techniques suggested an automated concept of irrigation to use the water efficiently and effectively. Sensor based automatic irrigation system is based on soil moisture sensor that will measure the level of moisture in the soil and sends the signal to the arduino and accordingly it will irrigate the crops.

Lawns make up the largest irrigated crop by surface area in North America, and carry with it a demand for over 9 billion gallons of freshwater each day. Despite recent developments in irrigation control and sprinkler technology, state-of-the-art irrigation systems do nothing to compensate for areas of turf with heterogeneous water needs. In this work, we overcome the physical limitations of the traditional irrigation system with the development of a sprinkler node that can sense the local soil moisture, communicate wirelessly, and actuate its own sprinkler based on a centrally-computed schedule. A model is then developed to compute moisture movement from runoff, absorption and diffusion.

2.LITERATURE SURVEY:

DR.M.NewlinRajkumar, S.Abinaya, Dr.V.Venkatesa Kumar proposed a overview about IoT technologies and applications related to agriculture and proposed a novel irrigation management system. This system uses arduino to detect the dampness content of the earth and the temperature,humidity and soil moisture sensor values are sent to the farmer through GSM.[1]

Dweepayan Mishra, Arzeena Khan, Rajeev Tiwari, ShuchiUpadhay proposed a programmed water system for the terrains which will reduce manual labour and optimize water usage which increases the productivity of crops.UsingIoT the datas are analyzed and proper recommendations are given.

Sanjay Kumawat, MayurBhamare, ApurvaNagare, AshwiniKapadnis proposed an automatic irrigation system to save time, money and power of the farmer.The sensors are mainly used to give an interrupt signal to the micro controller whenever the changes occurs. The soil pHproperty plays a major role and it is used to define the degree of acidity or basicity.The phone camera is used to capture the image,with the help of this image pH value is determined.The pH value reduces crop destruction.[3]

Pushkar Singh, SanghamitraSaikia proposed and demonstrated an economical and easy way to use arduino based controlled irrigation system.Thedatas from water flow sensor,temperature sensor and soil moisture sensor are linked to an interative website in which the values from the sensors are compared with the standard values to help the farmer to yield maximum and quality crops.[4]

PavanKumarNaik, ArunKumbi proposed an Arduino based automatic irrigation system using Iot.Temperature, humidity and soil moisture sensors are used to detect the various parameters of the soil.Based on the soil moisture value the irrigation is done using motor.All the datas will be displayed on user android application.[5]

3.EXISTING SYSTEM:

3.1Smart Irrigation System using IoT

This project is to develop a smart irrigation monitoring system using arduino.The parameters involved are mainly temperature and soil moisture.This system is a substitute to classical farming method. It helps the farmer to know his field's status in his home or residing in any part of the world.This system not only provides comfort but also reduce energy,efficiency and time saving. Arduino is the digital heart of the system.Theobjective of the paper is to control the water motor automatically and also to watch the live streaming of farm on android mobile using WiFi.This provides real time information on the field irrigation.Here the water is supplied based on the actual needs for the crops. Hence, it reduces logging and water shortage.When the pre-ordinated range of the moisture and temperature sensors differs,the controller turns ON the pump.The android application controls the pump over GSM network via SMS and Bluetooth.This system can be implemented on a large scale for farming purposes.

4.PROPOSED SYSTEM:

In the proposed system we can monitor the plants using image processing method and that data's are stored in IoT and external sensor's are used to monitor the plants exact status.It can be operated automatically.More operations can be performed using Automation. It has intelligence to avoid flooding of field. According to the requirement of the crops, the threshold will be set, if the environmental conditions like temperature, soil moisture, water level conditions and humidity goes below or above the threshold value, the IoT sense the changes in the parameters and are monitored simultaneously and all the datas are transmitted to the farmers. Water shortage is one of the biggest problem in the world. Knowing when and how much to water is the two important aspects of watering process. The system uses continuous soil measurements to complement climatic parameters to precisely predict the irrigation needs of the crop. This project involves three fields namely Digital Image Processing, Internet of Things and Embedded. The image of the leaf is captured and processed in digital image processing. The processed datas are then sent to the hardware. Four sensors are used for monitoring the leaf status. The sensors are water level sensor, temperature sensor, soil moisture sensor and humidity sensor. The system provides water only when the water level goes beyond the reference. The outputs are updated in

cloud using Wifi module for database management and analyze the datas and provides the feedback through SMS. The outputs can also be viewed through LCD. The entire system is powered by Solar power.

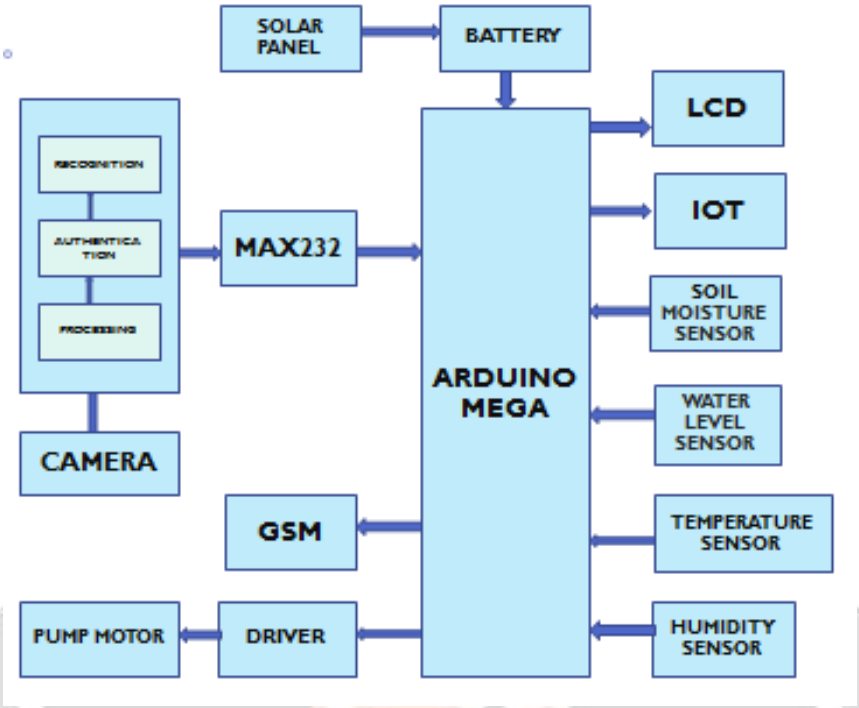


Fig-1 Block Diagram of the proposed system

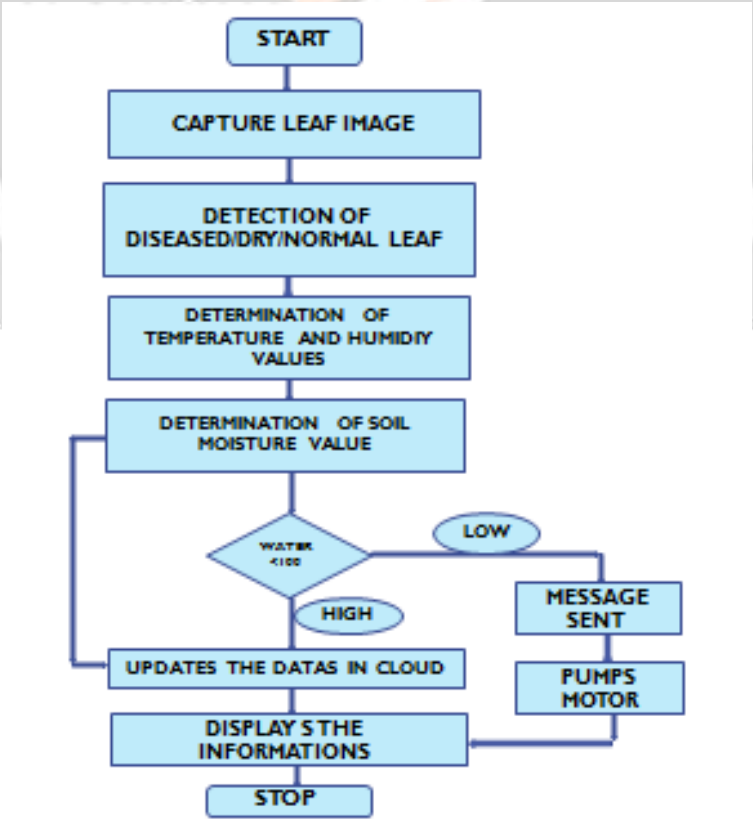


Fig-2 Flow Chart of the proposed system

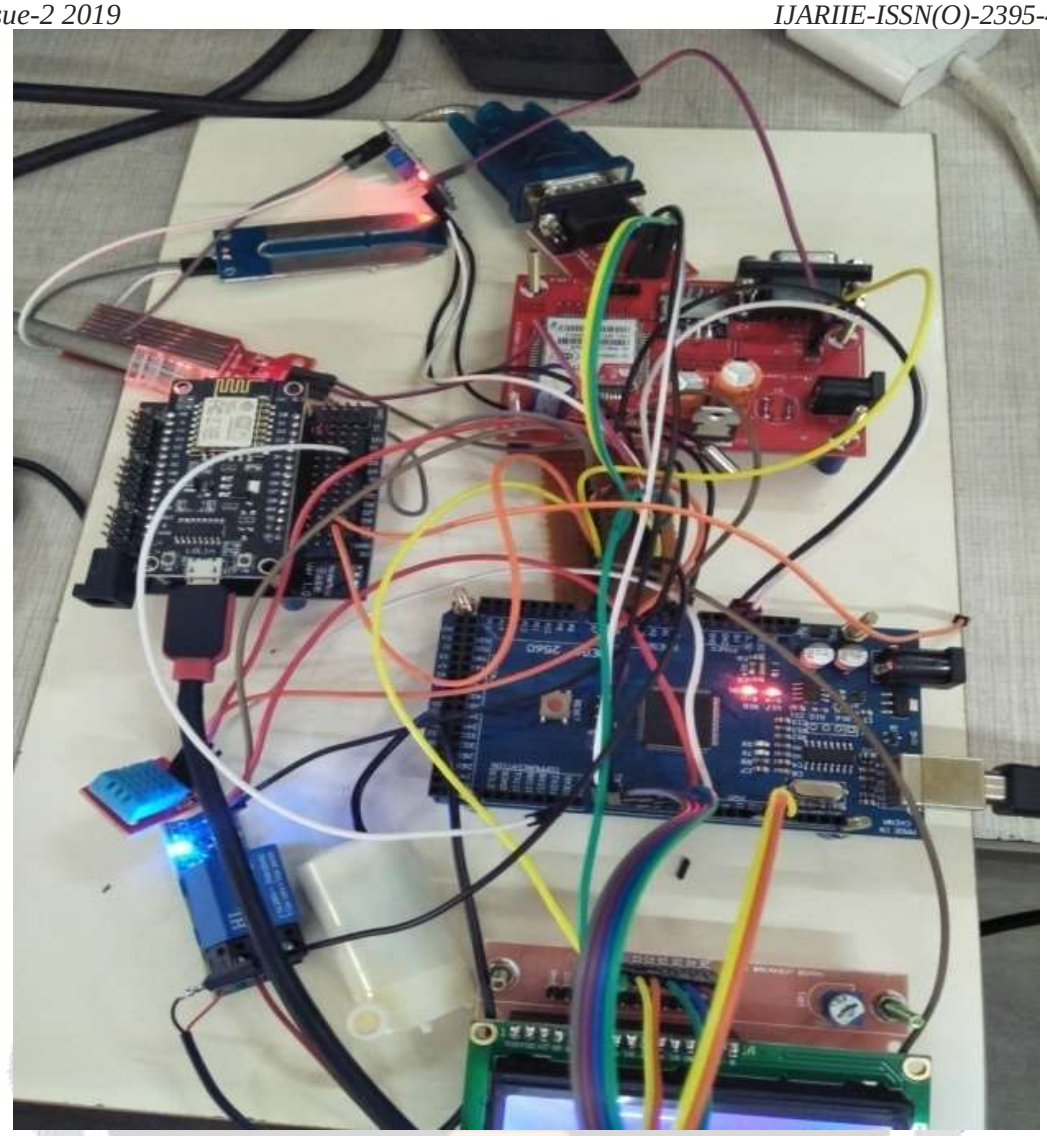
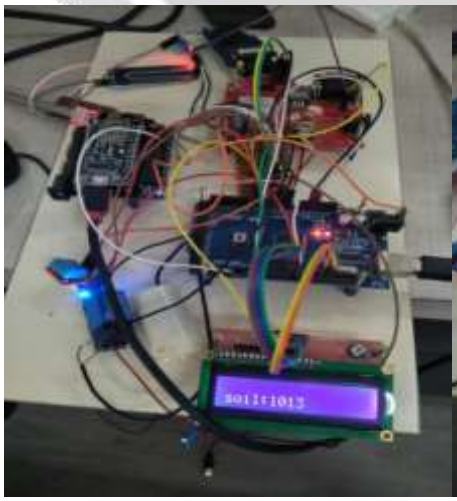


Fig-3 Prototype of Proposed System

5.EXPERIMENTAL RESULTS:



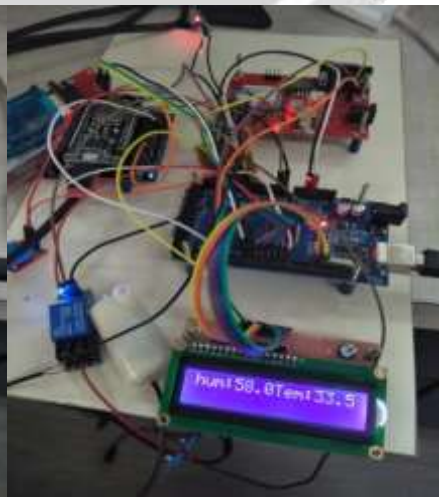


Fig-4 Displays Soil Moisture Value **Fig-5**Displays Humidity and Temp value

Fig-6 Displays Water Level Value

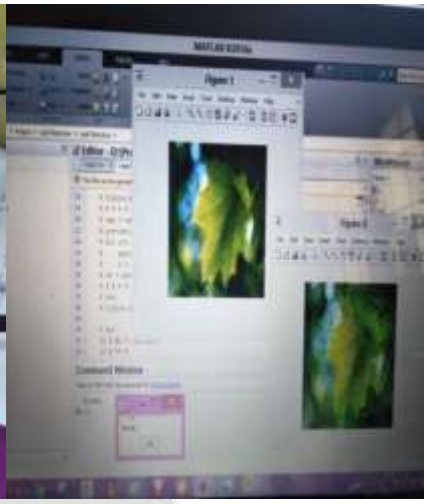


Fig-7 Simulation Result of a Normal Leaf

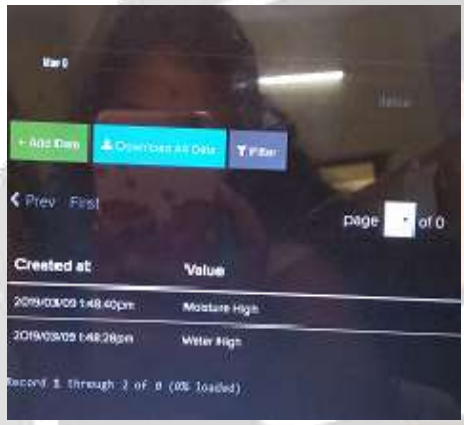


Fig-8 Moisture and Water levels updated in cloud

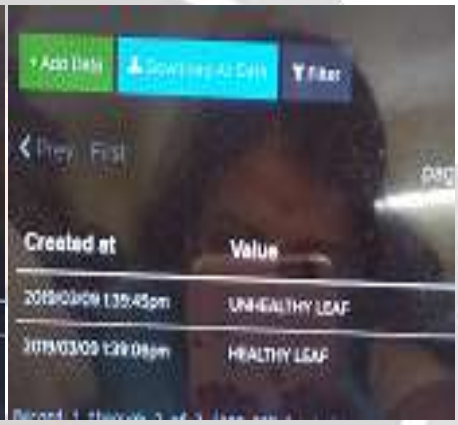


Fig-9 Healthy and Unhealthy leaf updated in cloud

6.CONCLUSION:

The proposed system is completely automatic and reliable.There is no need of manual labour as the system is automatic. Water can be conserved and saved using this system. The crops can be maintained properly with its suitable threshold values of water and temperature. The detection of diseases in the leaf is an added advantage for the system. The system can be implemented over a larger area using solar power with comparatively minorinvestment as solar power is used for implementation. The IoT based solar powered automatic garden maintenance system can be used for agriculture in future.

7.REFERENCES:

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