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Implementation of Smart farming using IoT

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Abstract— Basically different developing countries across world are using traditional methods of agriculture techniques for a long time. Because of technical advancements, smart farming which can be automated and implemented with IoT. So automation can precisely control the energy consumption, water wastage and also detects the level of harmful gases in field with much reliability. As the IoT is developing rapidly and it can be widely applied in all wireless technologies. In this paper the introduction of smart farming technique may limit many problems for the farmers like: bearing from hot sun, rain and night times burdens etc., By means of an electronic system with embedded devices. A detailed implementation of smartest techniques in agriculture is illustrated and all the advantages are clearly explained. We hope that by using the disruptive IoT technology across multi industries including agriculture reduces waste and cost of implementation by enhancing the quality and quantity of agriculture products using Atmega328 microcontroller, Esp8266 Node MCU SOC with in-built wi-fi module and different types of sensors.

KEYWORDS: IoT, Esp8266 NODEMCU, Atmega328, sensors, wireless technology.

I. INTRODUCTION

Basically plants are responsible for presence of oxygen needed for human and also for the many living organisms survival on this planet. At the same time the agriculture is also important to human beings because it forms the basis for food and for the sustenance of entire mankind on earth. Smart farming technique helps human beings grow the most ideal food crops and raise the right animals in accordance to environmental factors. Agriculture plays a vital role in India's economy. Over 62% of the rural households in India depends on agriculture as their basic means of livelihood. Agricultural export occupies 15% of the country's exports. So the farmer's and even the country economy will be ruined if there are no proper yields from the agriculture, due to lack of knowledge of the soil nature, timely unavailability of water. Thus the government should take necessary steps for a better irrigation. It is a smart farming stick based on IOT (Internet of things) technology that has paved the way for creating each and every aspect into smartest way of approach for the fruitful results. The main theme of this project is to propose a new smart IOT based agriculture technique assisting farmers in getting live data like: Temperature, soil moisture, smoke detection for efficient environmental conditions monitoring which will enable them to do smart farming and increase their overall productivity and quality of products. This project is combined with Atmega328 micro controller, bread board mixed with several sensors along with Blynk app handling for better results with the less burden to farmers.

II. RELATED WORK:

HISTORY:

Before IOT we used the RFID tags and readers n order to pass the information from one place to other place. After the advancement in sciences they used the IOT technology to monitor the simple things like just to check whether the level of drink in the refrigerator is up to the level or not so that the users in that area could access the information updated. Later on they used to connect the sensors and integrate different operations using this open source .Now we can connect this to various embedded systems so that we can monitor them and control them from the place where we are.

OVERVIEW:

- The main aim of the project is to detect the field ability so that efficient crop production can be achieved from the field.
- To monitor the temperature from time to time and update in website through IOT.
- To design an embedded system used to monitor the agricultural fields.
- To design a system that is user -friendly and cost effective system.
- To design an open source application that can enable the user to integrate the things that can sense the data and update in the application.

LITERATURE SURVEY

Based on: Balaji Bhanu, J. V. N. Ramesh [1] the system designed sensor networks to detect the conditions of forming

and increasing the quality and yield. By placing sensors in the farm to measure the water level, humidity, temperature, gases etc., by using the processors like Atmega328. In this project the sensor node failure and energy efficiency are handled.

LIU Dan, Cao Xin [2], carried out intelligent agriculture green house monitor system based on Zig-Bee technology that performance data acquisition, processing and transmission functions. The main aim of the experiment is to realize the system to manage farm area and efficiency by reducing the cost and energy consumption.

Jess Lowenberg DeBoer [3], proposed an experiment for the precision agriculture and sustainability that explains the irrigation control rescheduling based on wireless sensor networks. Still there are some drawbacks as wsn is under research with high power consumption if any node failure is observed.

→METHODOLOGY:

The technology used in this project is Arduino Uno as basic device used to integrate various sensors and update the entire information into the website through an open source cloud using Node MCU (i.e., MICRO CONTROLLER UNIT) This is the basic open source that everyone can access in which we will be given a channel on to which the entire information will be updated for every particular period of time as per the scheduled session in the program. The output of the moisture sensor will be scaled into further values and the soil with more moisture content will have less scaled value and vice versa. The optimum temperature required for a crop to get the best production is up to 27^{o} C, this is measured in the RH percentage 60-70% is optimum range and accordingly the output voltage will be noted and compared with that to optimum temperature fixed. The gas detection system will be measured in parts per million and the range of operation is about 200-10000ppm the threshold value will be around 2000ppm.

STEPS FOLLOWED IN ALGORITHM:

- The system is to be placed in the area to be under inspection.
- The sensors places will collect the information, converted to the required type and then sent to the Arduino.
- With the program written already in the controller verifies whether the values are up to the threshold value or not.
- Displays the status on the LCD display and if any unwanted gases detected will intimate through buzzer.
- All the sensed information will be updated on the screen for every particular period of time.
- Finally all the data sensed will be updated to the website through open source NodeMCU unit in which the code is written that relates this device to the website so that all the data will be displayed in the website.
- This data can also be accessed through the open source application named 'Thing speak'site and 'Blynk App; which is background connected to the NodeMCU
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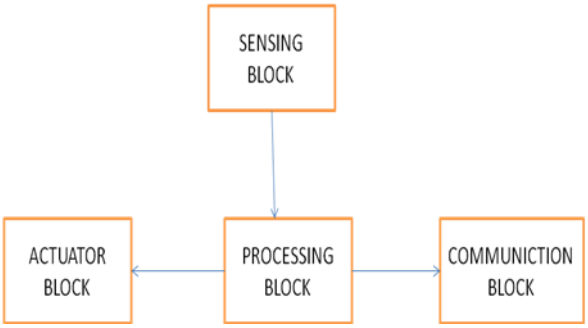
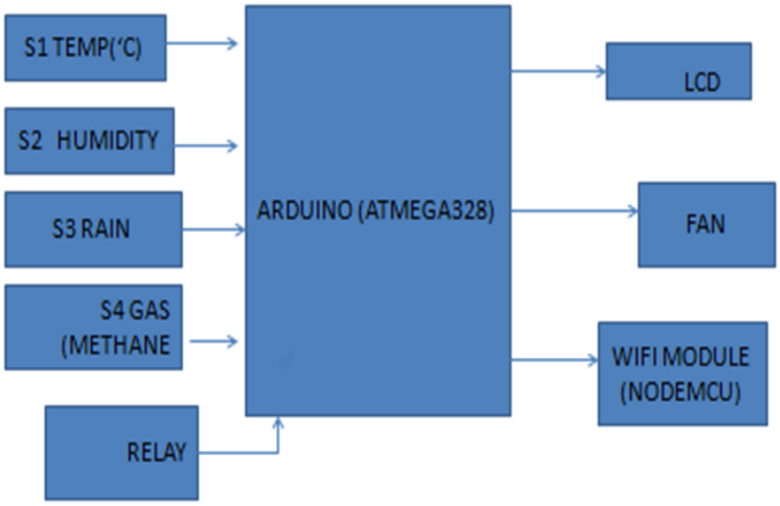
III. IMPLEMENTATION:

- By programming the device with Lua scripting language (light weighted multi paradigm programming) or embedded c, the controller verifies whether all the libraries and files are included and later on it verifies for correct instructions.
- After compilation and successful uploading of our programming into device, it checks for values whether they are up to the threshold value or not.
- Displays the status on the LCD display
- All the sensed information will be updated on the screen for every particular period of time.
- Finally all the data sensed will be updated to the website through open source NodeMCU unit in which the code is written that relates this device to the website so that all the data will be displayed in the website by using 'Things speak'.

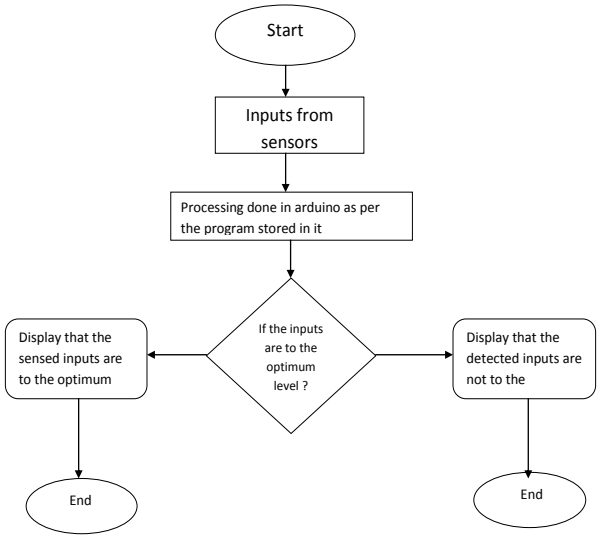
SYSTEM ARCHITECTURE:



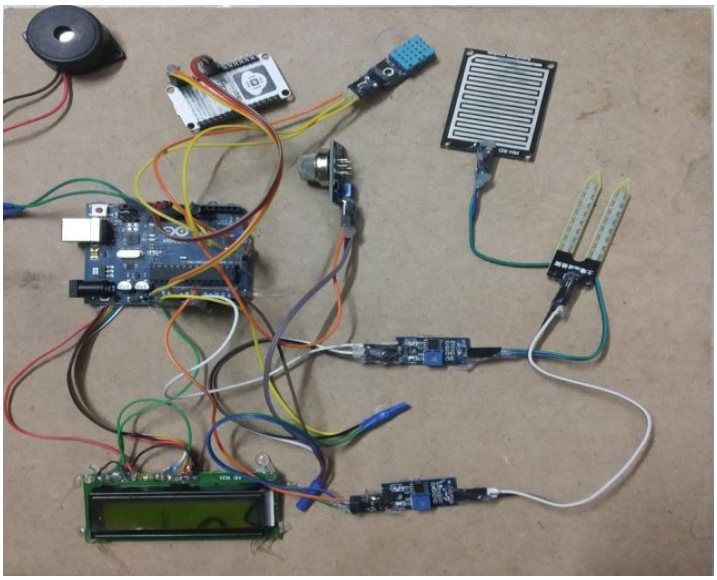
Block diagram:



FLOW PROCESS:



PROPOSED SYSTEM:



IV. Advantages Of Smart Farming :

By using traditional approach of agriculture implementation involves a lot many of problems such as:

- High power consumption.
- Lot of energy is wasted.
- High efforts of farmers is involved that in turn burdens the farmers in many ways of his living.
- Leading to "inefficient" utilization of groundwater and electricity.

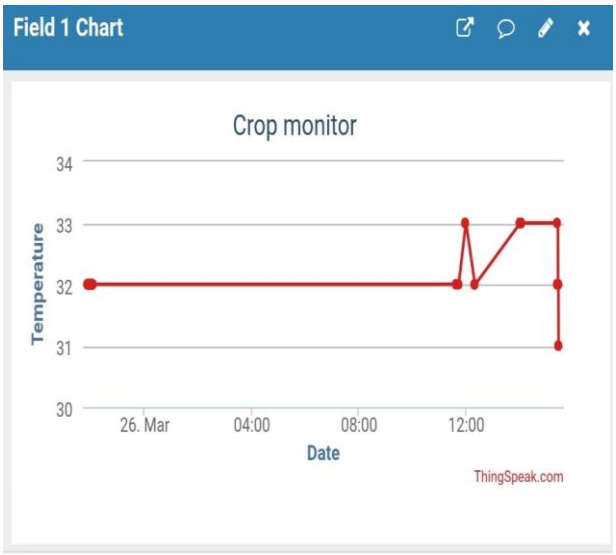
So, the smart way of implementing agriculture resolves many problems for the farmers. For example:

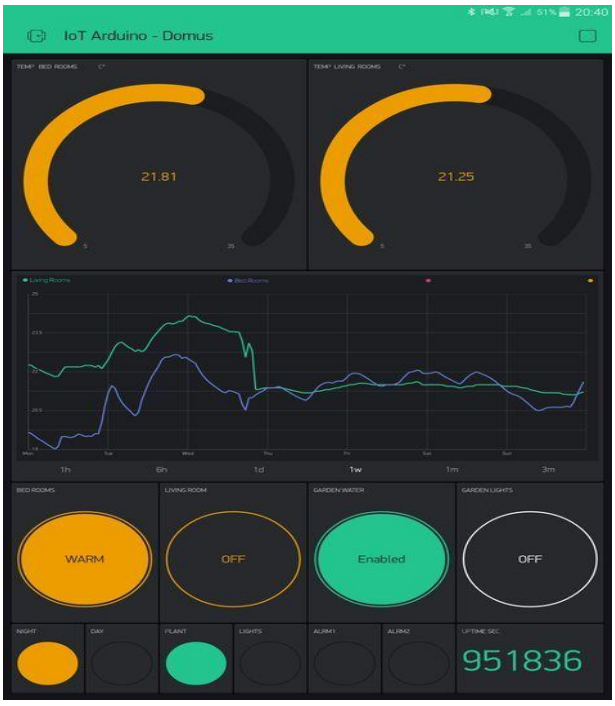
- By using automatic updates by using Iot people can know about soil conditions in the farm, the farmer can decide that fertility of soil, just by sitting in their home and can monitor all agriculture related parameters. So this helps farmer to utilize their time wisely in knowing regarding new agriculture techniques.

Smart farming helps in improving:

- soil fertility
- energy optimization
- time management
- Smart irrigation and controlling.
- Cost effective method
- Produces high quality of production etc.,

V.RESULTS:





VI. FUTURE SCOPE:

Can be extended in such a way that proper scheduling can be programmed and watering can be done till moisture content reaches the optimum level.

- Other poisonous gases can be detected and actuation provided to the present so that reduces the unwanted gases in the farm.
- The device accessing wi-fi range can be improved so that it can access the information from device through website.

VII. CONCLUSION:

- We can conclude that this system can provide assistance to the farmers technically. This can help the users who cannot continuously monitor the field and also provide information so that to protect the field from various effects. This also provides the information about the rain status trough rain drop sensor and the temperature at which the crop is growing and the moisture level in the soil. Thus the device collects the entire information and updates the information collected to the website and application.

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