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PARAMETER BASED SYSTEM FOR BETTER YIELD FROM CROP AND AUTOMATIC IRRIGATION SYSTEM

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ABSTRACT :
The continuously increasing population in India demands for the rapid improvement in food production technology. Indian economy is mainly based on agriculture. While farming, some important soil parameters such as PH , moisture, humidity and temperature are measured for getting high yield from soil. The method which is used for measurement of these parameters is completely based on chemical process on soil sample. The process is generally carried out in near Agriculture Office. Soil Parameter Monitoring with Automatic Irrigation System include the measurement of these parameters on the field so that the farmer does not need to go somewhere else. This system also consist of a fully automated irrigation system which will turn on and off a water pump as per the level of moisture in soil.

***KEY WORDS**: PH sensor ,Moisture sensor ,Humidity sensor ,Temperature sensor , Water level sensor ,Sunlight sensor ,LCD ,Motor, Microcontroller.*

1. Introduction

Estimating the nutrients present in the soil is an importantfactor for better crop management. Currently there exist several portals giving farmers information and suggestions for better crop management by estimating the soil nutrients Tradditionally farmers collect soil samples from theirfield/farm and send it to nearby soil nutrients testing laboratory.The soil testing lab checks for the nutrients presentin the soil and suggest suitable crops. We have observed thatthis procedure poses several challenges. Firstly scheduling of soil testing procedure is time consuming due to large test samples. Secondly the nutrients present in the soil will change over a period of time thereby reducing the yield/crop. To overcome the above limitations we propose to develop an automated crop prediction system by accurately estimating the soil nutrients.

2.PROBLEM DEFINATION

Farmer doesn't know about how to increase the productivity without investing more money they just take crops on current climate conditions. To increase the productivity of crop by analysis the soil parameter depending on current situation of soil to get the maximum profit to farmer.

3.BLOCK DIAGRAM

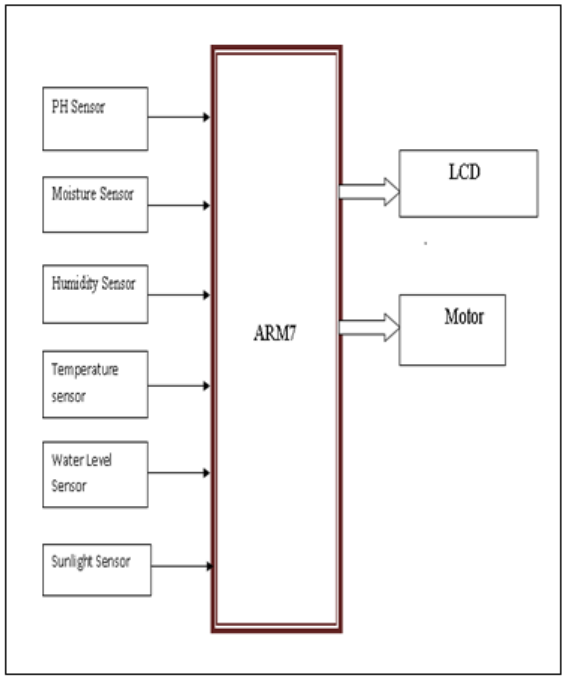

Fig. 1 Block diagram of parameter based system for better yield from crop and automatic irrigation system

4. WORKING

In this project we used Different types of sensors are used to measure the parameter of the soils. Initially the output of sensor given to the input terminal of ARM controller. parameter of the soil include PH,humidity, moisture, temperature, waterlevel, sunlight,and salinity of water.All these parameter are sensed by using appropriate transducer and signal conditioning circuit. Controller that takes the different analog values from sensor and converts it into digital and then provide to the LCD. The ARM Controller that contains programs will decide the best crops by the making use of Decision Support System and when the temperature of soil is going to maximum limit of that value then the motor will be start and provide water to the crop by using the sprinkler/drip system.

Maintaining appropriate level of moisture in the soil is the main aim of the system. Plants are very sensitive to water level, water deficiency can be hazardous to the plants or excess water is also harmful to plants. Hence the system is designed such that it will help to maintain appropriate moisture level according to the plant requirement. The system senses the soil moisture, atmosphere humidity and temperature and depending on the sensed data the system will take the corrective action whether to start or stop the valve of the drip irrigation system. The valves are controlled by using relay and the relay is drive by using ULN 2003.

The system also detects the nitrogen, Phosphorus, Potassium present in the soil by using pH_EC sensor. A setup is built which helps to measure the nitrogen, Phosphorus, Potassium in the soil and which is sensed by the sensor. Nitrogen (N), Phosphorous (P), Potassium (K) is one of the important macronutrient which helps for plant growth. Hence it is necessary to monitor the nitrogen, Phosphorus, Potassium content of the soil. Depending on the nitrogen, Phosphorus, Potassium content present in the soil suggestions are given to the farmer whether it is according to requirement or not. pH of the soil is also detected. It is also one of the important factor which affects the nutrient availability for plants.

Hence pH of the soil is monitored. Depending on the pH value suggestions are given to the farmer whether is according to the requirement or not. The system is interfaced with keypad. Keypad is used to set the threshold points depending where the system is installed. So that system can be used under any conditions. All the sensed data from the soil is send to LCD for displaying purpose. The data from controller is send to personal computer (PC) through serial communication using UART 0. The data fetched on PC can be used for analysis purpose and the database is also maintained. Thus the system will help to monitor, control and analyses.

This system required following sensors to measure the various parameter

1.Humidity Measurement

Humidity is one of the necessary parameter of any agriculture field .There are several type of humidity sensors, we use P-HS-230 sensor to detect humidity in environment. The output of humidity is proportional to output voltage. At 30% relative humidity, the output is 990 mV, while at 80% relative humidity; the output is 2640 mV, i.e. 2.64 V. The output of the sensor is connected to the ARM processor at pin no.35, this output of sensor is analog and applied to ARM processor.

2.pH Measurement

A pH scale measure is truly, a particular meter that measures the generated voltage of a pH scale electrodes. Here Alpha pH scale five hundred Transmitter with pH scale conductor (EC100GTSO05B) the necessity of such measure is associate degree electronic equipment with high input electrical resistance and has the gain of voltage-pH conversion. The quality pH scale probe generate voltage regarding 59mV per pH scale .So a pre-amplifier is needed with high input electrical resistance input and with gain = 16.7 to offer 1 V per pH scale.

3. Moisture Measurement

Tensiometer with electrical device (Soil wet sensor) is employed that having wet Tension vary 0-100 Centibar, Output 4-20 mA , Power needs 12 to 24 VDC ,Current Consumption 20 mA soap.

4. Temperature device

LM36 sensor is used for measurement. LM36 is the temperature device accustomed sense the temperature from field .It having Linear + 10mV/°C multiplier ,Calibrated Directly in ° Celsius (Centigrade) ,0.5°C Ensured Accuracy (at +25°C) ,Rated for Full −55°C to +150°C vary, Operates from 5 to 30 V.

5. PH EC sensors

This sensor is used to measure nitrogen, Phosphorus, Potassium.The use micro-sensors for in-field observation of environmental parameters is of nice interest, notably semiconductor-based micro-sensors, owing to their several benefits over standard sensors like tiny size, robustness, low output resistance and fast response. They will more be integrated in electronic equipment and multiple sensors within the same substrate and consequently they will beenforced in compact probes for specific applications e.g., in place observation, or on-line or on-the-go measurements. The sensors area unit victimization ion Selective Field impact Transistors based mostly micro-sensors, for environmental applications and area unit useful for measure primary macronutrients in soil. Selected target ions embody measure potassium, phosphate and nitrates. Needed samples

area unit in tiny volumes and such sensors are often integrated in compact flow cells for continuous measurements.

6. Light Intensity Measurement

For Intensity measure, LDR is employed. LDR is light Dependent device. As light will increase, the resistance decreases, and contrariwise. During this project, I actually have designed a resistance network using LDR and a resistance. Because the intensity changes, the voltage drop across the LDR conjointly changes, and thus potentials proportional to the sunshine intensity. Electronic equipment amplifies this modification in potentia

Fig. 14. Automated irrigation systems for the experimental production of: sage (top left), thyme (top right), origanum (bottom left), and basil (bottom right) in San Jose del Cabo, Los Arados, El Pescadero, and El Comitan, respectively.

5.FUTURE SCOPE

The irrigation system can be adjusted to a variety of specificcrop needs and requires minimum maintenance. The modularconfiguration of the automated irrigation system allows it tobe scaled up for larger greenhouses or open fields. In addition,other applications such as temperature monitoring in compostproduction can be easily implemented. The Internet controlledduplex communication system provides a powerful decision-making device concept for adaptation to several cultivationscenarios. Furthermore, the Internet link allows the supervisionthrough mobile telecommunication devices, such as a smart-phone.Besides the monetary savings in water use, the importanceof the preservation of this natural resource justify the use ofthis kind of irrigation systems.

6.RESULT

Depending on the database as shown in the above figure the system decides which crop to be taken in the particular area. If the moisture lavel is below the threshold value , then the system automatically starts the motors for irrigation.

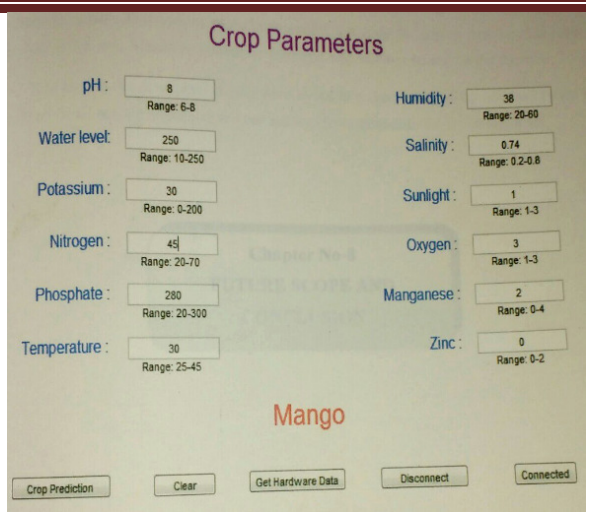

Fig. Database for crop parameters.

7.CONCLUSION

The main objective of this paper is to design a fully automated irrigation system. The system provides a real time feedback control system which monitors and controls all the activities of drip irrigation system efficiently. The system valves are turn ON or OFF automatically depending upon the moisture content. The system also provides the efficient information regarding the soil pH and soil nutrients. Thus the system monitor, and control. Using this system, one can save manpower, water to improve production and ultimately increase profit.

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