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Green Growth Management by Using Arm Controller

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Abstract
The main aim of this system is to detect the soil content like moisture, humidity, phosphorus by using sensors and also monitor the temperature and sunlight in the agricultural field. This system can provide the efficient amount of water through drip irrigation and phosphorus for plant by collecting sensors information .The main aim of this system is to increase productivity of the plant through proper amount of water and fertilizers.
Keywords—soil moisture; humidity; temperature; light intensity; phosphorus.

I. INTRODUCTION

Today the most major problems due to globalization the Indian farmer faces is quality management of their agriculture products which is very poor as compared to other country farmers due to lack of nutrients or malnutrition of plants. The major reason why they faces this problem is due to uncontrolled amount of feeding of the nutrients in excess or in very less amount even without satisfying the needs of plants .So in turn results into poor quality in fruits, vegetable lagging in color, size, test and even quantity. Also nutrients required are in micro and major amount so a precise control is must which must be maintained throughout the crop duration, which is only the solution to obtain high yield and quality at par.

So this system contributes mainly to provide ability to farmers to take actions to overcome almost all problems above as per the necessity of farming operations, like adding water to various selected plots, providing furtigation to each an every plant as per the of plants need in periodic cycle daily or at various times in week. Also times and plants water needs. Also farmer can check the temp, moisture, humidity, and light intensity to justify weather conditions before taking any decisions of watering, farmer can select various fertilizers. This providing excellent controlled time management and administration ability, this provides ability to control the concentration of dosages to plant. Although fertigation is used with virtually all types of irrigation systems, its advantages are most pronounced when it is combined with fairly high frequency irrigation management. That means solid-set sprinkler system, linear moves and center pivots, and all types of drip/micro irrigation.

II. PROPOSED SYSTEM DISCRIPTION

The working of this system is based on two important points that are the whole plant cycle of each plant is composed of number of stages and the requirement of each plant varies during each stage. So, it is mandatory to provide the essentials i.e. the contents required by the plant properly as per the need and at the needed time. In short, we can say proper management for plant's efficient growth. So, starting with the working we will be having the database of each plant having contents as mentioned. Database Contents the number of stages of each plant's cycle and requirements of that plant during each stage. Once, the plant is selected the next task is to sense the contents of soil. We will be sensing for Temperature, Phosphorous, Light intensity, Moisture, Humidity. Sense contents of soil as mentioned above for Changing in requirements for various stages of plant's cycle and changing requirements during each stage of plant's cycle.

Once, we sensed i.e. we came to know the contents of the soil, our task is to supply the necessary contents to maintain the requirements of plants up to mark for proper growth. On calculation of net required amount in terms of fertilizer and water (moisture), our task will be to actually supply these requirements to the field. For supplying the essentials we are having a drip irrigation system for efficient utilization. This drip irrigation system is connected by means of solenoid valves.

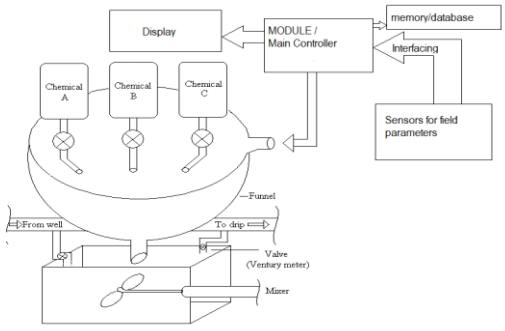


Fig. Proposed sysem diagram.

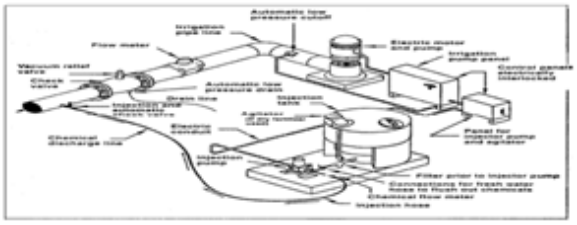


Fig. 2. Conceptual diagram.

This system required following sensors to measure the various parameter as

A. Humidity Measurement

Humidity is important factor of any green house. Here P-Hs-220 humidity sensor is used. The result of this humidity sensor is related to output voltage. At 20% relative humidity, the output voltage is 660 mV, while at 90% relative humidity; the output voltage is 2970 mV, i.e. 2.97 V. The output of the Humidity is connected to the ARM 9 processor at pin no.35, which is the analog input (AD 1.2) of the ARM 9 processor.

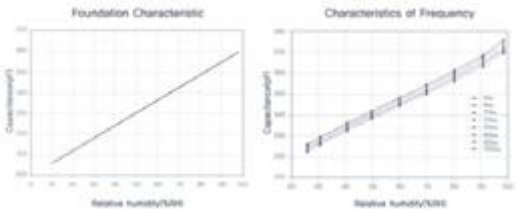


Fig. 3. Graph of humidity sensor.

B. Moisture sensor

Capacitive type moisture sensor nominal capacitance 330 - 20pf ,response time <10 sec ,operating temperature 30 to80°C,operating frequency nominal 20kHZ ,accuracy: +2% to -2% .

C. LM35 Temperature sensor

LM35 Temperature sensor is the temperature sensor used to sense the temperature from agricultural field .It having Linear + 10 mV/°C Scale Factor ,Calibrated Directly in °Celsius as well as centigrade ,0.5°C Ensured Accuracy (at +25°C) ,Rated for Full −55°C to +150°C Range , Operates from 4V to 30 V.

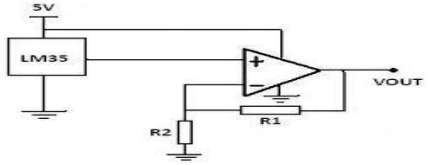
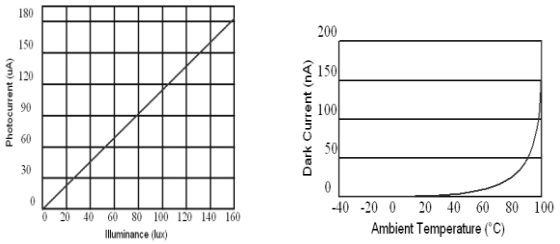


Fig.4. LM35 sensor

D. Light Intensity Measurement-LLS05-A

To measurement light me, LDR is used. LDR means Light Dependent Resistor. As light intensity goes on increasing, the resistance decreases, and vice versa. In this system, In this system designed a voltage divider network using LDR and a impedance. As the intensity goes on changing, the voltage drop across the LDR also changes, and hence potential is proportional to the intensity of light. Voltage amplifier amplifies this change in potential.



Fig,5.. Graph of LLS05-A

E. NPK Measurement

The use of micro-sensors[5] for in-field monitoring of environmental parameters is of great interest, particularly semiconductor-based micro-sensors. These sensors have many advantages over other sensors. The advantages include smaller size, robustness, less output impedance, fast response. Multiple sensors can be incorporated in the same substrate. Hence these could be used in applications such as in situ monitoring, or on-line or on-the-go measurements.

The sensor uses Ion Selective Field Effect Transistors (ISFETs) based micro-sensors useful for measuring primary macronutrients in soil.

NPK micro-sensors have precision agriculture to assist in (1) Collecting spatial information, (2) precision irrigation, (3) variable-rate technology (automated fertiliser) and (4) supplying data to farmers.

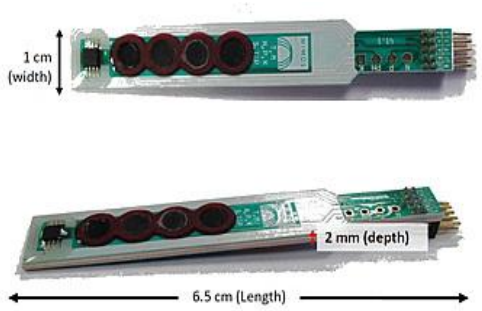


Fig.6.NPK sensor

A multiple sensor system with pH-ISFET-based sensors was reported by Artigas *et al.*. Those sensors and a reference electrode were implemented in a special probe applied directly in soil that permitted the easy handling of sensors and the protection of their sensitive area. Ionic membranes for ISFETs were based on photo curable
polymers which provided long-term stability of the sensors. Those were stable over nine months in

aqueous solutions and up to two months inserted in soil as shown in figure..

III. THE SOLENOID VALVES

A solenoid valve is an electromechanical valve for use with liquid or gas. Solenoid valves are the most frequently used control elements in fluidics. Their tasks are to shut off, release, dose, distribute or mix fluids. They are found in many application areas. Solenoids offer fast and safe switching, high reliability, long service life, good medium compatibility of the materials used, low control power and compact design. For operation of valve and proper mixing we required a special type of pump called centrifugal pump.

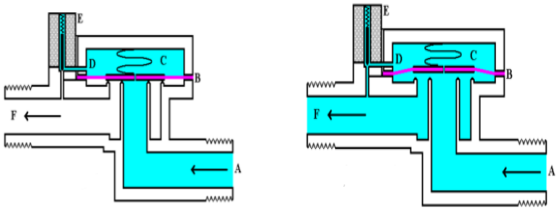


Fig.1.Valve in open and close form.

IV. PROPOSED RESULTS

For agriculture the cost of Phosphorus-NPK sensor, temperature, moisture, humidity, light intensity sensor [5] is need to be low. Also required stability must be high of the membrane needs to be high, especially when such sensor implement harsh environments; furthermore the sensitivity should be high.

The benefits of the sensor compared to traditional industrial standard technologies are having longer membrane lifetime, and durability, increased sensitivity, platform flexibility that with minor hardware changes different parameters can be monitored.

This system is mainly focus on measurement of amount of phosphate, temperature, moisture, humidity, light intensity from plant. All results are measured in electrical form. We can then plot the graph of each parameter across with morality for analyse the volume of parameter.

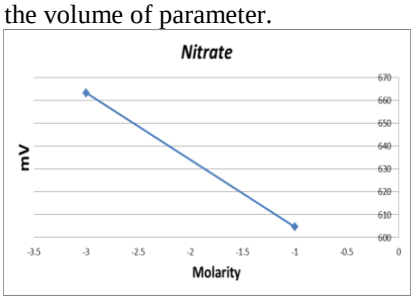


Fig.1. Proposed Result for nitrogen

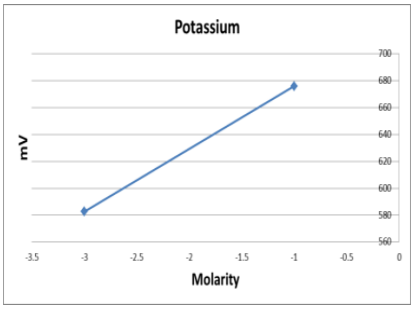


Fig.2. Proposed Result for Pottasium

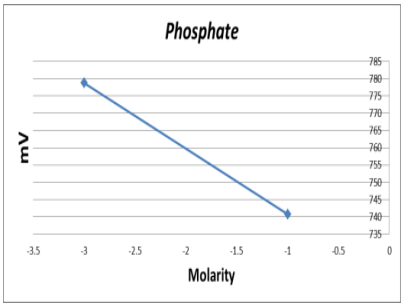


Fig.3. Proposed Result for Phosphate

V. CONCLUSION

This System results in the designing, development and optimization of a real time solution for application to the agricultural monitor and controlling. This system utilizes sensor for phosphate, temperature level detection, Moisture, Humidity, Light intensity of Agricultural environment. It included Real-time valve controlling and pump operation and Agricultural Parameters measurement using Sensor for Agriculture plant. So by using this system productivity of plant increases and efficient use of water through sensor data. The quality of product is also improved through efficient use of fertilizer.

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