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GREENHOUSE MICROCLIMATIC REAL-TIME MONITORING EMBEDDED WIRELESS SENSOR NETWORK(WSN)USED IN AGRICULTURE

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Abstract— The system is a low-cost greenhouse real time monitoring is used to increase the food production. Because day by day the population goes on increasing manner and requirement of the food go on increasing, so, for fullfilment of the requirement we have to increase the productivity. With this system we can increase the food production with minimum effort and minimum use of man power. System measures various parameters like NPK, humidity, temp, co_2 sensors. Soil condition check by different parameters and decide fertilizer requirement of soil and ultimately useful to manage content of same in chemical mixing during formation of fertilizer.

Keywords—N, P, K (nitrogen, Pottasium, Phosphate).

INTRODUCTION

Precision agriculture creates new opportunities for Managing farm with higher control of input and output. It allows farmers to optimize resources, maximize yields and minimize wastes released to the environment. To practice precision agriculture, farmers have to know parameters relevant to their crop growth. Climate is one of the most important environmental parameters that determine the yields of ranch. Hence, microclimatic real-time monitoring system is usually used as a tool for obtaining such information. Wireless sensor network technology has been known for scalability, carefree operation .

With the help of this technology we can increase the production and and reduces the man power. Our population is increasing but Agriculture field is decreasing so for decrease in field we have to improve the production. The production is depend on the various parameter such as fertilizer. The fertilizer and the environment is most important. The environmentis changing due to change in environment we have feed the fertilizer But our aim is to sence the parameter and then provide the fertilizer.

One of the most basic and thus critical and major problems of human is food. This intensification leads to increasing greenhouses' scale and to the creation of 'greenhouse parks'.

While the size of these structures increases, the use of Geographical Information Systems (GIS) brings the ability to visualize and manage all the geo-referenced data produced by wireless sensing nodes. Precision agriculture requires monitoring of air and soil parameters that play an important role in crops growth. Farmers can access in real-time the data using ethernat.

II. THE GOALS OF THE SYSTEM DESIGN

Modular Design:- In this module design we have composed of various sensors like NPK,humidity.temp.co_2 based on various applications.

Low-cost and Stable network:-The system uses low-cost and wireless communication network to achieve intelligent management without the construction of large communication devices

Data Analysis System:-According to different environment, we have to analysis the data.This system required following sensors to measure the various parameter

1) **Humidity Measurement:-** To measure humidity, amount of water molecules dissolved in the air of environment, a smart humidity sensor is used. A capacitive humidity sensor changes itscapacitance based on the relative humidity (RH) of the surrounding air. Relative humidity(RH) is the percentage of actual vapor pressure (P) compared to saturated vapor pressure(Ps). As the relative humidity increases the capacitance also increases. The variablecapacitance is converted into usable voltage.SY-HS-220 is used as a humidity sensor. These module convert relative humidityto the output voltage. SY-HS-220 has 3 pins and the pins are Vcc, Vout and GND

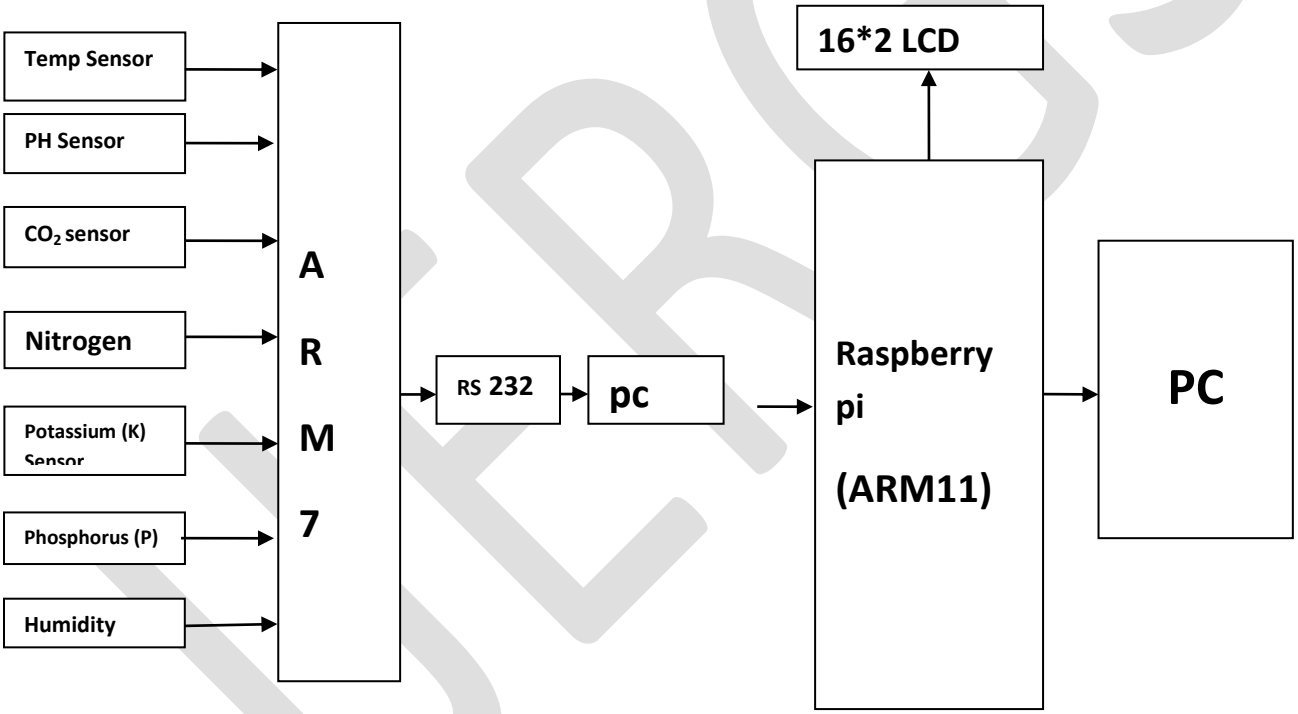

FIG.BLOCK DIAGRAM

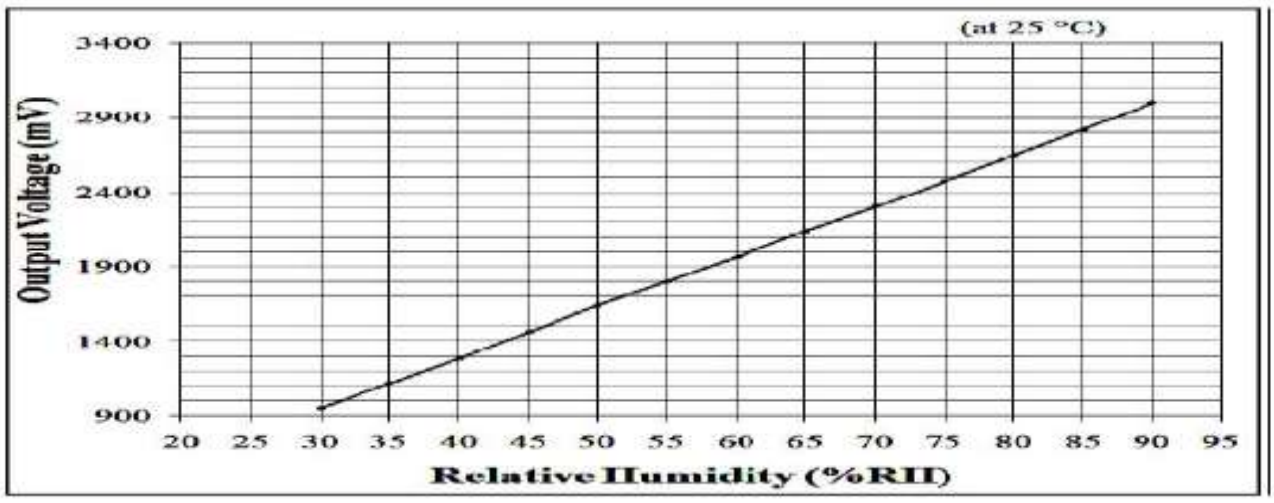

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Fig.Relative humidity

2) **CO2 Measurement:-**

A portable, field deployable sensor for continuous data monitoring of Carbon Dioxide and Oxygen inenvironment has been developed within this handheld data monitoring system. Subsequent toautonomous field trials and sensor validations, this sensor will be integrated with PSoC from Cypress.The Oxygen sensor, SK-25 from Figaro had been used (Fig. 2) because it has a linear dynamic outputrange between 0-30% Oxygen and excellent chemical durability. This sensor is based on uniquegalvanic type of oxygen sensor makes stable output signal and virtually no influence from CO2

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Fig.CO_2 sensor

3) **LM35 Temperature sensor:-**

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user isnot required to subtract a large constant voltage from its output to obtain convenientCentigrade scaling. The LM35 does not require any external calibration or trimming toprovide typical accuracies of ±1⁄4 °C at room temperature and ±3⁄4 °C over a full−55 to +150 °C temperature range. Low cost is assured by trimming and calibration at thewafer level.

4) **NPK Micro sensors [5]:-**

Water is the most important and miraculous substance on Earth. Its molecules H-O-H form a boomerang shapewith the O- end slightly negative and the H2+ end slightly positively charged. These charged boomerangs are attracted to one another, forming islands of cohesion, such that water forms a liquid at temperatures where life thrives, whereas it should really have been a very volatile gas like hydrogen sulphide (H2S) which has almost twiceits molecular weight. At the surface of Earth, water occurs in solid form (ice), liquid (water) and gaseous form(steam or water vapour). In cold areas all three phases co-exist. Water is also unique in that it is both an acid (with H+ ions) and a lye (with OH- ions). It is thus both acidic and basic (alkaline) at the same time, causing it to be strictly neutral as the number of H+ ions equals that of the OH ions. Because of its strong cohesion, only few water molecules dissociate (split) in their constituent ions: hydrogen ions (H+) and hydroxyl ions (OH-). Chemists would insist that H+ ions are really H3O+ ions or hydronium ions.

DATA SHARING SYSTEM

In Data Sharing System we are going to used for transferring the data from one node to another node in this data sharing system we are going to sence the various parameter and with the help this parameter the wireless communication. In this system we use different parameters such as soil temperature, Humidity ,Pressure,NPK Sensor etc.

At NPK micro-sensors for precision agriculture the cost of each sensor needs to be low and the stability of the sensor membrane needs to be high, especially when such sensor deployed harsh environments; furthermore the sensitivity needs to be high, and they also need to be supported by robust data management systems to be able to collect the data, manipulate it for decision support analysis in fertilizer management.

We have taken this problem for my M.E. project and decided to develop a system “Greenhouses Microclimate real time monitoring based on wireless network” because our aim of the project is to reduce the man power and increases the food production .For increasing the production we will required the main nutrients such has NPK. We have use that NPK and other type of sensors to improve the food production.

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IV. RESULTS

At NPK -sensors for agriculture the cost of each sensor needs to be low and the stability of the sensor needs to be high, especially when such sensor deployed harsh environments; the sensitivity fo these sensors should be high, and they also need to be supported by robust data management systems to be able to collect the data, manipulate it for decision support analysis in fertilizer management.

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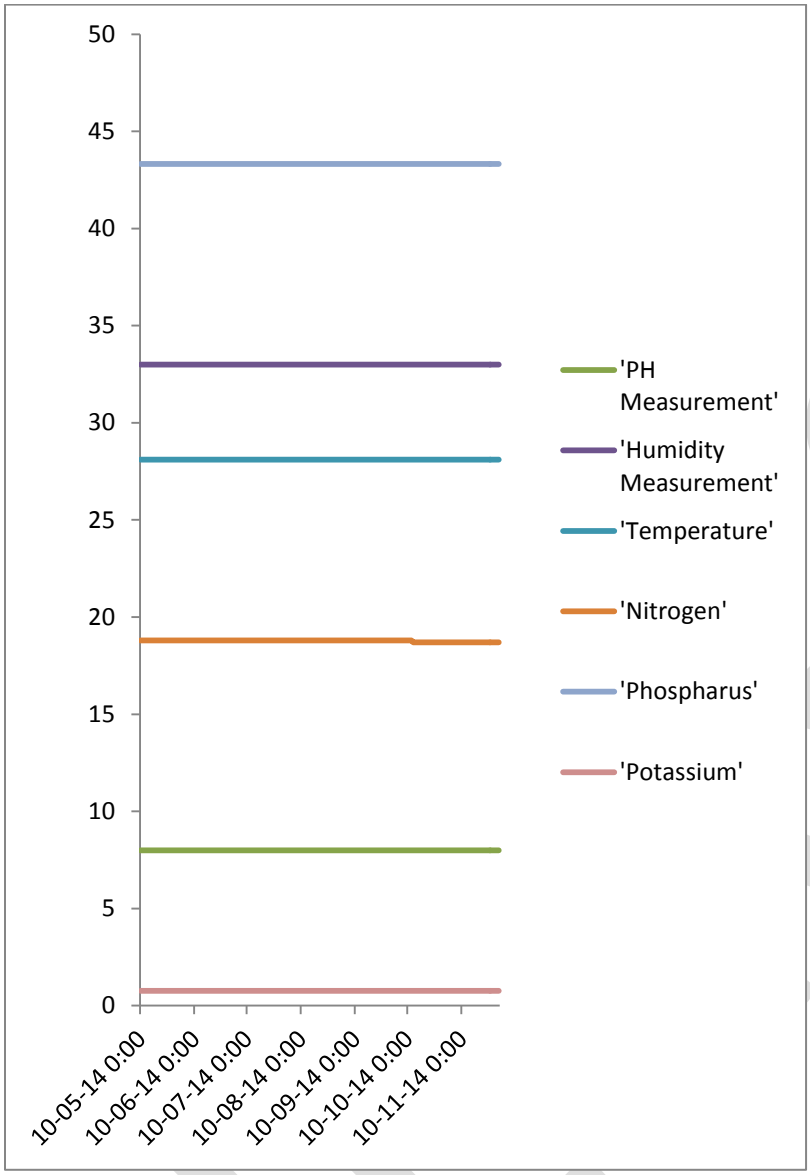

Fig.Time Vs various parameters.

CONCLUSION

We present an embedded system design of wireless sensor monitoring system for sensing and computation of global warming indicators. Four commercial sensors had been integrated with ARM processor to monitor and compute the level of existence of parameters (like CO2, temperature and humidity and NPK) in atmosphere using information and communication technologies. Prototype operates for data gathering and data dissemination using five modes and preliminary test prove that the developed prototype is capable to monitor and compute CO2, temperature ,NPK and humidity parameters in the deployed environment and has several advantages in term of low cost, flexibility, user friendliness and energy efficiency.

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