Agricultural Environmental Sensing Application Using Wireless Sensor Network

Manish Giri, Pranoti Kulkarni, Anuja Doshi,Kanchan Yendhe,Sushma Raskar

Abstract— **India is defined for the agriculture system. India ranks second in agriculture activities. To maintain such a big industry it is important to increase the productivity of farms. India faces many problems in agriculture system and one of the major problems is the optimum use of water. We use the irrigation system to overcome the problem in agriculture. Farms heavily depend on the rain because they lack the access to irrigation facilities. Their crop yields are highly unreliable due to the variability in both rainfall amount and its distribution apart from this, on the various factors such as weather, water, soil, etc.**

Here we describe the wireless sensor networks for improved water management and for controlling their parameters of farm such as *temperature, soil, moisture, Co2 and humidity.* The target population is the resource poor farmers in the semi-arid areas .Wireless sensor network might help them to store and utilize the rain water, to increase their crop productivity, to reduce the cost for cultivation and make use of real time values .

Index Terms*— *Wireless sensor network, Zigbee, Efficient, monitoring

I. INTRODUCTION

The Wireless Sensor Network is a self-configuring network of small sensor nodes (so-called motes) communicating among them using radio signals, and deployed in quantity to
sense the physical world. Sensor nodes are essentially small computers with extremely basic functionality. They consist of a processing unit with limited computational power and a limited memory, a radio communication device, a power source and one or more sensors. Agricultural Sensing is an oft-cited application for sensor networks. Sensor data can be integrated into electronic agricultural records and can be retrieved for later analysis. Wireless sensors would permit data acquisition at higher resolution and for longer durations than existing monitoring solutions. The communication protocols for data transfer can enhance efficiency in agricultural. The installed sensor networks can also monitor and detect changes in field. These small sensor nodes allow the subject a greater freedom of movement and allow identify pre-defined symptoms earlier.

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II. LITERATURE SURVAY

The COMMON-Sense project (Community-Oriented Management and Monitoring of Natural resources via a Sensor network) aims at designing and developing an integrated network of sensors for agricultural water management in the semi-arid rural areas of India. Indeed, this system will have an effect on yield at the local level but, in addition, it will allow collecting extensive data that can be used to better understand the effects of water and other environmental parameters on agriculture, and thus to develop replicable strategies. Technically speaking, the COMMON-Sense network consists in a wireless network of ground sensors that record periodically the state (moisture,
Watermark, etc.) of the soil. In the system design, sensors record data on a periodic basis and send them in a multi-hop fashion to a centralized processing unit where computations are performed, stored and used.

- Netsens has designed a new monitoring system called Vine Sense based on WSN technology and oriented towards user.
- Remote sensing is also increasingly being used for large-scale environmental monitoring programs like the State of the Environment Report and state-wide projects in irrigation

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III. PROBLEM IN EXISTING SYSTEM

In agriculture resource utilization is limited. Monitoring the continuous environmental changes on the basis of consuming process. Especially in a climatic case user needs to continuously monitor the status of multiple parameters at the same time. Monitoring multiple input on same resource is difficult activity in real time.

IV. PROPOSED SYSTEM

A crop yield heavily depends on unpredictable natural factors like monsoon, floods, and especially drought. The last factor has recently become a major problem for farmers. Additionally, many marginal farmers still make use of archaic agricultural techniques and so do not have the possibility to compete with large western multinationals. In this context, an efficient water management technique to avoid wastes can
mitigate the above mentioned effects. Main concept in these systems is a sensor node, small microcontroller integrated with number of sensors. In our system we are using Zigbee Serial1 module having range of 100ft Indoor & 300ft Outdoor. Job within this project is mainly to develop the application for gathering of sensor data towards a sink in this wireless sensor network. Moreover we have to integrate the application with a MAC/Routing layer and with a network programming tools. The server side application and user interface will have to be reprogramming to work with the new system.

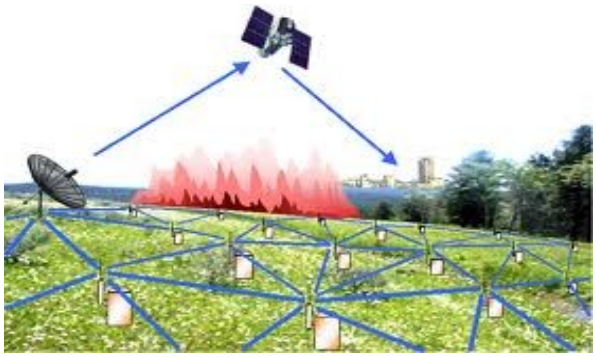

Fig. Wireless Sensor Network

A. *Analog to digital conversion result:*

The calculation of the conversion can be found in ADC. The result can be found in the following equation.

$$ADC = \frac{V_{IN} \cdot 1024}{V_{REF}} \quad (1)$$

V_{ref} - +5V

Where (V_{in}) is accepted the input and V_{ref} is the reference which is set +5V externally.

B. *Temperature :*

The equation is used for to find the tempreture.

Vout = Temperature (ºC)/ (100mV/ ºC)

Where,
Vout =1V
Temperature = 100 ºC.
The output voltage can be continually varying linearly

C. *Hardware :*

The LM35 series are precision integrated-circuit temperature sensors. the output voltage is linearly proportional to the Celsius temperature The LM35 does not require any external calibration to provide typical accuracies of ±1⁄4°C at room temperature and ±3⁄4°C, over a full −55 to +150°C temperature range .MG 811 is carbon dioxide sensor with Good sensitivity and selectivity to CO2, humidity and temperature dependency, long stability and reproducibility

LM35 also have following features:

1) Operates from 4 to 30 V

2) Less than 60-µA Current Drain

3) Low Self-Heating, 0.08°C in Still Air

4) Nonlinearity Only ±¼°C Typical

5) Low Impedance Output, 0.1 Ω for 1 mA Load

D. *Advantages of Proposed System:*

1) The cost estimation is very low where the device which has high power since we used the batteries for saving the power and cost over it.

2) Not required the manpower.

3) It has reliable communication.

4) Flexibility is more

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V. FUTURE SCOPE

Looking into the future, the practical deployment i.e. feasibility and simulation, analyzing the critical conditions of the sensors and creating a web based application will determine the extent that wireless sensor networks will be successfully integrated in agricultural sensing applications and research.

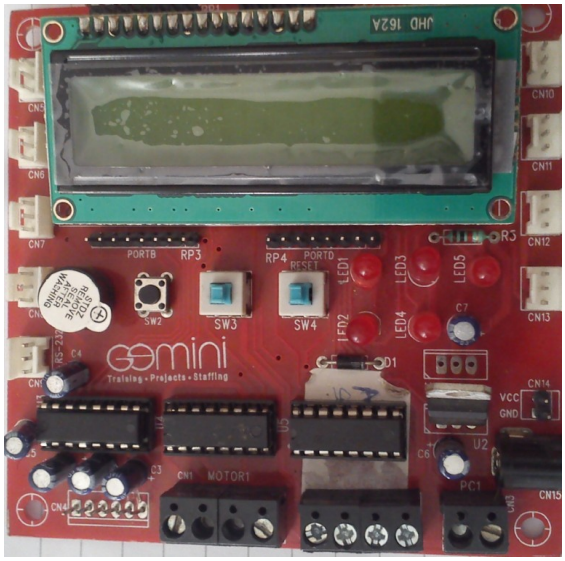
An excellent style manual and source of information for science writers is [9].

VI. USER INTERFACE

Providing the lcd kit for displaying result.

Result will displayed on LCD,
Vss - connected to ground.
Vcc - connected to +5v.
Rs - Register select
1- for data
0- For comment.
R/W –read/write.
E- Enable.
DB0 to DB7- 8 data lines.
LCD- +5v
LCD- grd

LCD connection:
RS- PB2
E- PB3
DB4- PB4
DB5- PB5
DB6-PB6
DB7-PB7



VII .CONCLUSION

We have included sensors for carbon dioxide in addition to previous work done in same area along with temperature, soil moisture and water level. In agriculture these are major parameters. Also these application sensors are regularly used in fields. Here we are implementing water management algorithm, it is easy to build, understand and simple to apply.

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