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SMART SOIL EXAMINER TO ASSIST FARMER IN THE FIELD OF AGRICULTURE

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Abstract - This technical assistance program will help farmers to improve the crop yield by providing information with regard to soil testing based on wireless sensor network in agriculture such as monitoring environmental conditions like soil moisture, soil temperature and soil fertility. It also tries to maintain database of farmer, their field with present, previous and standard crop details. Using "Information decision making technology" farmers are guided to improve their agricultural production and they are also provided with the information related to current crop rates in marketing sector through direct link to government marketing sites. And the results are messaged to the farmer with the help of GSM.

Keywords - Crop yield, soil testing, soil moisture, soil temperature, soil fertility, soil nutrients (NPK), database, zigbee.

INTRODUCTION

Nowadays farmers are facing many problems due to shortage of soil testing units and lack of knowledge to utilize the technology. Because of wrong predictions desired yield is not been obtained. For ages, agriculture has always had a very special place in the life style of an Indian Agriculture and its associated activities contribute about 5.7% of Indian gross domestic products. However, in spite of all the development, the agriculture methods that Indians use are still way old. Soil fertility is the measure factor to be looked for getting better yield. Measure constrain in promoting balanced use of fertilizers includes inadequate soil testing facilities, wide gap in dissemination of knowledge, lack of awareness among farmers about benefits of balanced fertilization.

This technical program maintains database of farmer, their field with present, previous and standard crop details. Using "Information decision making technology" farmers are guided to improve their agricultural production and they are also provided with the information related to current crop rates in marketing sector through direct link to government marketing sites.

With the proposed work crop health and yield shall be improved and farmers are updated regularly with cultivation information and marketing through media. Using these inputs farmer can grow the suitable crop and can get desirable yield & profit.

LITERATURE SURVEY

Muhamd Azman Miskam, et.al. , published a paper entitled "Preliminary Design on the Development of Wireless Sensor Network for Paddy Rice Cropping Monitoring Application in Malaysia" [1]. This paper presents the preliminary design on the development of WSN for paddy rice cropping monitoring application. The propose WSN system will be able to communicates each other with lower power consumption in order to deliver their real data collection. The main objective of the new design architecture is to cater the most important and critical issue in WSN, that is power consumption.

Narasimhan , v. Lakshmi, et.al. , published a paper entitled "Greenhouse Asset Management Using Wireless Sensor-Actor Networks" [2]. Greenhouse plays an increasingly important role in modern horticulture in order to meet the needs of the world's growing and demand driven economy. The primary issue of greenhouse based horticulture is to manage the greenhouse environment optimally in order to comply with the economic and environmental requirements.

Hui Liu, et.al. , presented a paper entitled "Wireless sensor network technology" [3]. This paper can provide optimal and integrated solution for distributed data collecting, delivering and analyzing in tough croplands environment. A wireless sensor network for cropland environmental monitoring is designed according to cropland application requirements. It consists of a set of sensor nodes for data sensing, a sink node for data aggregating and long-distance transmitting, and a base station for data storing and analyzing.

BLOCK DIAGRAM

Figure 1 show the block diagram of sensing unit used in this project. This uses simple components like sensors, display units, RF Tx & Rx, ARM7 processors, Voice Bank and speaker etc., which are easily available in market and smaller in size which makes it portable. The sensor section used in this system gives accurate values of all the parameters necessary to test the soil fertility. Once the necessary parameter values are obtained they are sent to Technical Base Station via zigbee transmitter, those values are processed using all the necessary information given by the software.

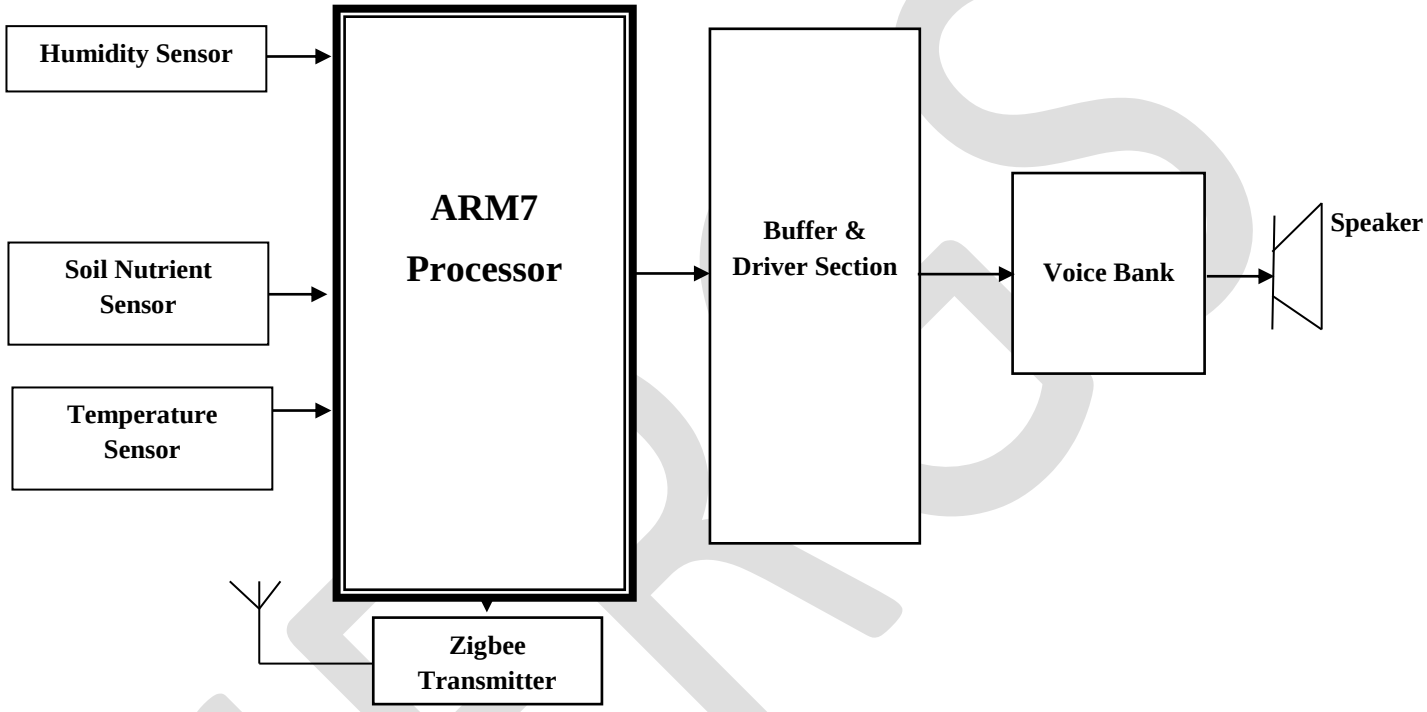

Figure 1: Block Diagram of the Sensing Unit

Figure 2 shows block diagram of the technical base station used in this project, where zigbee receiver receives the parameter sent by transmitter and these values are compared with the standard crop details when the user presses the button on the sensing section, the respective responses are obtained quickly. The necessary assistance information stored in voice bank is triggered by RF unit as a voice output. And also an alert message is sent to the farmer's cell phone.

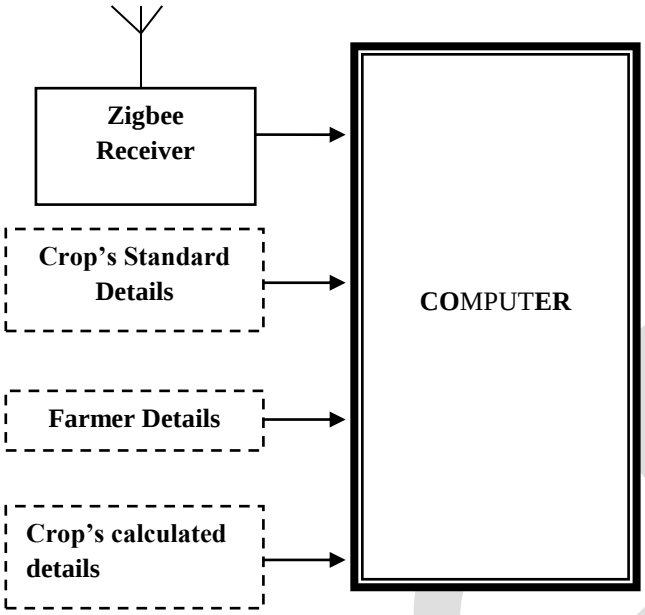

Figure 2: Block diagram of the Technical Base Station

FLOWCHART

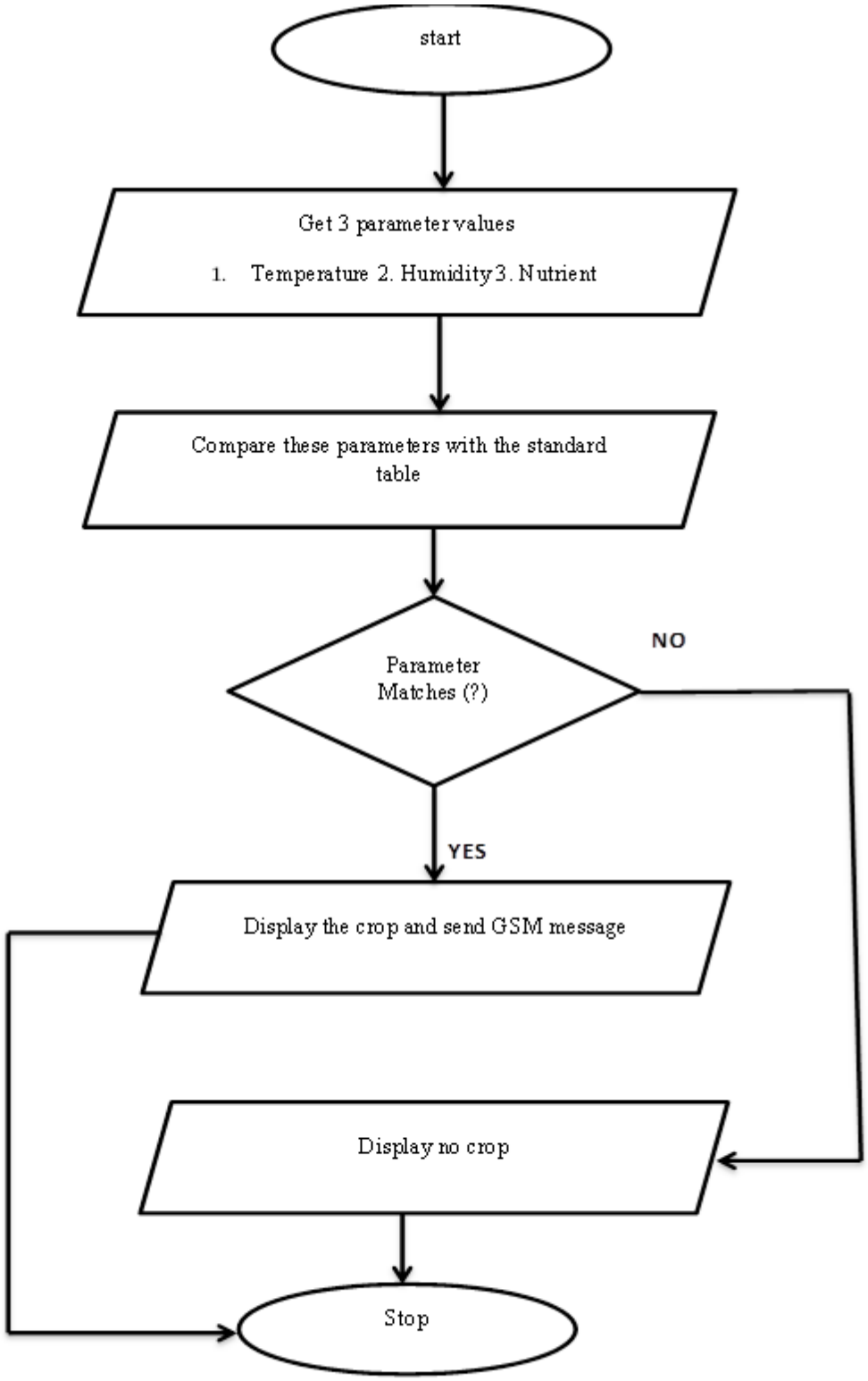

Figure 3 shows the flowchart of the project

Figure 3: Flowchart of the project

ADVANTAGES

[1] Easy to implement and portable: This project uses simple components like sensors, display units, electrodes etc which are easily available in market and smaller in size which makes it portable.
[2] Economic and User-friendly: As we are using low cost materials in the system, it makes it economic and its operation is simple so that farmers can easily use it.
[3] Approximately accurate results: The sensor used in this system gives accurate values of all the parameters necessary to test the soil fertility.
[4] Correct assistance with respect to derived results: Once the necessary parameter values are obtained on display, those values when entered in the Base Station, all necessary information will be given by the software.
[5] Quicker result analysis: When the user presses the button on the keypad, the necessary values are obtained quickly. In assistance software too quick response can be obtained.
[6] Robust and Long-life: Since maintenance is less and no hazardous components are used, makes this system effective and reliable.

APPLICATIONS

[1] In Agriculture to help Farmers for testing soil fertility.
[2] To survey land without any others help.
[3] Determination of type and quality of soil before cultivation.
[4] Horticulture.
[5] Nursery plantation.
[6] In maintenance of farmer details.
[7] It can be used to provide details about estimated yield to the government.

RESULTS

Figure 4 shows the result displayed on the GLCD for the parameters namely temperature=31^0C, humidity=16 and pH level=20, whenever user presses the switch at the sensing unit.

Figure 4: Result for temperature=310 C, humidity=16, pH=20

Figure 5 shows the result displayed on the GLCD for the parameters namely temperature=14^{0}C, humidity=17 and pH level=20, whenever user presses the switch at the sensing unit.

Figure 5: Result for temperature=14^0 C, humidity=17, pH=20

Figure 6 shows the message alert for the parameters temperature, pH level, and humidity which is sent by GSM modem

Figure 6: GSM message alert

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CONCLUSION

In this project, we proposed real-deployment of smart soil examiner to assist farmer in the field of agriculture which is designed and implemented to realize agriculture. The end users can modify the operation to a variety of experimental setups, which will allow the farmers to reliably collect the data from locations previously inaccessible on a micro-measurement scale. And such a system can be easily maintained and installed. This project successfully applies the wireless sensor networks on agro-ecology fields by investigating environmental situations. The complete real-time and historical environment information is expected to help the agro-ecological specialists achieve efficient management and utilization of agro-ecological resources.

REFERENCES:

[1] Miskam, MuhamadAzman, Azwan bin Nasirudin and InzarulfaishamAbd., Rahim "Preliminary Design on the Development of Wireless Sensor Network for Paddy Rice Cropping Monitoring Application in Malaysia", European Journal of Scientific Research Vol-37 No.4 (2009), pp .649-657, ISSN 1450-216X, 2009.

[2] Narasimhan, V. Lakshmi, Alex A. Arvind and Ken Bever, "Greenhouse Asset Management Using Wireless Sensor-Actor Networks", 2007.

[3] Hui Liu, ZhijunMeng, Maohua Wang, "A Wireless Sensor Network for Cropland Environmental Monitoring". International Conference on Networks Security, Wireless Communications and Trusted Computing, Vol-1, pp 65 – 68, 2009.