REMOTE SOIL MOISTURE PARAMETER MONITORING AND LOGGING FOR CLASSIFICATION OF GERMS DEVELOPMENT CONDITIONS AND IRRIGATION

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ABSTRACT

The strength to monitor environmental conditions is vital to research in fields ranging from climate variability to agriculture and zoology. Being able to document baseline and changing environmental parameters over time is increasingly necessary and researchers are relying more and more on unattended weather stations for this target. A GSM Based Smart Sensing Platform for Monitoring Environmental Parameters has been planned and developed. The ‘Remote Soil Moisture Parameter Monitoring and Logging for Classification of Germs Development Conditions and Irrigation system’ consists of microcontroller based measuring units which collect the value of the temperature, relative humidity, and soil moisture. These units send their wireless data to a central station, which collects the data, stores and them into a database and information sends to the Farmer.

Keywords: Monitoring system, Wireless Sensor Network, GSM Technology etc.

I. Introduction

Water saving is the main aim of our project. Very small amount of water is useful for all living organisms and it’s the human being who is mainly responsible for wastage of water. There are many sources by which human makes the water hazardous for other living organisms plus there are many ways by which human being is responsible for wastage of water. One major reason of which is unnecessary wastage of water in agriculture field due to unawareness of farmers about sufficient supply of water. There are many plants that are very sensitive to water levels and they required specific level of water supply for proper growth, if this not they may die or results in improper growth.

It’s hardly possible that every farmer must possess the perfect knowledge about growing specifications of plants in case of water supply. In Indian economy seventy percent part is depend on agriculture and under this condition if there will be any system which will help to provide precise level of water to plants then it will definitely leads to beneficial for our economy. So to help them we are making an attempt by introducing our project “REMOTE SOIL MOISTURE PARAMETER MONITORING AND LOGGING FOR CLASSIFICATION OF GERMS DEVELOPMENT CONDITIONS AND IRRIGATION”. By using sensors in our project we will make them aware about changing conditions of moisture level according to weather so according to changing conditions of moisture they will be able to schedule the proper timing for water supply. In our irrigation system by knowing the status of moisture and temperature with the use of moisture and temperature sensors, water flow can be controlled by Microcontroller and a farmer is informed about the status of water pump (irrigation system) by message through GSM. Since the systems are automatic, they do not require continuous monitoring by labour.

In today’s life particularly in urban areas human are becoming busier and they don’t have time for looking towards garden. For such a people our system will be definitely useful and just by providing scheduled timing for water supply one can depend on our system for proper and required water supply. At the most one person is required for such work and so our system will go to save manpower. If this project is used at large level it leads to more manpower saving.

If one utilizes a person for this purpose then there are many chances that person will not accomplish his job, but this problem is not with our system. Once you on it will definitely perform its task with precise timing unless there is power failure, so our system will not work only under the condition of power failure.
II. LITERATURE REVIEW

2.1 Development of Environmental Monitoring System with Wireless Sensor Networks.

A.ghobakhhlou¹, S. zandi², P. Sallis³’s paper investigated the recent advances in remote wireless sensor devices, and how WSN of these devices could be combined with the internet and used in vineyard operations, such as management decision making, by monitoring environmental conditions. The proposed system architecture was developed and prototype hardware was built. The baseline of the proposed system architecture was implemented with the capability of monitoring environmental data from twenty five base stations in five countries. Power management need to be improved by introducing more intelligent and efficient algorithms to reduce unnecessary up-time and redundant data transmissions. Future work will employ more field installation of nodes with powerful base station to provide robust long-term monitoring of vineyards conditions. The network data security will also be taken into account in our future work.

2.2 Development of a Wireless Sensor Network for Monitoring Environmental Condition on a Farmland.

Ganiyu R.A.¹, Arulogun O.T.², Okediran O. O.³ said in conclusion, it can be deduced that the project which is the design and construction of the wireless sensor network for agricultural set-up was designed considering some factors such as economic application, design economy, availability of components and research materials, efficiency, compatibility and portability and also durability. The project factored into its implementation, the use of sensors, transceivers, and power supply unit. The performance of the project after test met design specifications. However, the general operation of the project and performance is dependent on the user who is prone to human error such as entering wrong timing. Also, the operation is dependent on how well the soldering is done, and the positioning of the components on the Vero-board. If poor soldering lead is used, the circuit might form dry joint early and in that case the project might fail. Also if logic elements are soldered near components that radiate heat, overheating might occur and affect the performance of the entire system. Other factors that might affect performance include transportation, packaging, ventilation, quality of components, handling and usage. The construction was done in such a way that it makes maintenance and repairs an easy task and affordable for the user. The designed wireless sensor network for monitoring environmental condition on farmland involves research in both microelectronics and embedded system design. And recommended for the purpose of the future research, development of a wireless sensor network on agricultural environment to monitor environmental conditions on a given farmland can be improved upon. The following areas were highlighted for this purpose.

i. A higher scale integrated circuit can be used so that other means of authentication could be used to cut across to the less privileged in the society (for example, visually impaired individual).

ii. It can also be recommended that the future research should be geared towards evaluation and simulation of three environmental parameters under consideration.

2.3 Smart Wireless Sensor Network for Monitoring and Agricultural Environment.

Prof. Mrs. S. S. Patil¹, Prof. V. M. Devande², Prof. J. J. Mulani³ found Zigbee-based agriculture monitoring system serves as a reliable and efficient system for efficiently monitor the environmental parameters. Wireless monitoring of field not only allows user to reduce the human power, but it also allows user to see accurate changes in it. This research focuses on developing devices and tools to manage, display and alert the weather/disaster warnings using the advantages of a wireless sensor network system.

III. RESEARCH METHODOLOGY

3.1 BLOCK DIAGRAM
3.2 FLOWCHART
3.2.1 Flowchart of Microcontroller:

A: Temperature
B: Humidity
C: Average Moisture Value of Four Sensors
E ≤ LTP Value Average Moisture level.
F ≥ UTP Value Average Moisture level.
G: Germs conditions are developing on crop.
H: Germs development conditions are controlled.

3.2.2 Flowchart of Visual Basic

Figure 3.2.2: Flowchart of Visual Basic
IV. IMPLEMENTATION

Figure 4.1: Setup

Figure 4.2: GSM Module

Figure 4.3: Hardware

Figure 4.4: Moisture sensing plates
V. RESULT AND ANALYSIS

Figure 5.1: Readings of Average Moisture, Temperature and Humidity.

When average moisture level goes below LTP value motor will ON. When average moisture level goes above UTP value motor will OFF. When average moisture, temperature and Humidity values are all between LTP and UTP then germs conditions are arrived so pesticide valve will ON otherwise it always OFF. The status of motor and valve is send to the farmer in SMS along with values of average moisture, Temperature and humidity.

Figure 5.2: SMS Form

VI. CONCLUSION

Remote Soil Moisture Parameter Monitoring and Logging For Classification of Germs Development Conditions and Irrigation system serves as a true and capable system for efficiently monitor the environmental parameters. Wireless monitoring of field not only allows user to reduce the human power, but it also allows user to see accurate changes in it. This research focuses on developing devices and tools to manage, display and alert the weather/disaster warnings using the advantages of a wireless sensor network system. The status of moisture, humidity and temperature is known through GSM with the use of moisture and temperature sensors, water flow. Conservation of water and labor. Since the systems are automatic, they do not require continuous monitoring by labor.
Adequate water management is a major concern in many cropping systems in semiarid and arid areas. Distributed in-field sensor-based irrigation systems offer a potential solution to support site-specific irrigation management that allows producers to maximize their productivity while saving water.

REFERENCES