STM 32 BASED GLOBAL PROCESS MONITORING THROUGH WIRELESS COMMUNICATION FOR AGRICULTURE ENVIRONMENT

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ABSTRACT:
The design and development of a smart monitoring and controlling system for agriculture environment in real time has been reported in this project. The system principally monitors parameters such as temperature, moisture level, humidity and water level of the agriculture field. The system can monitor the status send, if the conditions get abnormal. The concerned authority can monitor and control the system through web interface. This system finds a wide application in areas where physical presence is not possible all the time. The system will be used with STM 32 processor used in the implementation of sensor module and other communication environment. The system offers a complete, low cost, powerful and user friendly way of real-time monitoring and remote control of agri field. A prototype model is developed and tested with high accuracy result.
Keywords: STM32,

I. INTRODUCTION

Society in the daily endeavors has become so dependent on automation. It is more difficult to imagine life without such automation engineering in current environment. Now it covers a number of unexpected areas in system research. In recent environmental protection engineering, traffic engineering, safe system, agriculture, building engineering, and medical engineering are but some of the areas where automation is playing a vital role as well application. In new approach of automation engineering is a cross sectional discipline where it mainly requires exact, proportional knowledge in hardware and software research development and their applications in particular field. Past of topic automation engineering was mainly understood as control engineering dealing with a number of electrical and electronic components. Some applications are built to collect and send data through a modem to a server Wireless based industrial automation is a prime concern in our day-to-day life. The approach to Wireless Network for Industrial Applications standardized nowadays. Intelligent and low-cost automation of industrial processes are crucial in order to improve process efficiencies, deliver quality products, and ensure timeliness and accuracy of systems.

Wireless technologies are increasingly employed in automation in latest research, and they are also diversified in the field of wireless communications. The progress made in wireless technology gives an excellent opportunity in an ideal location in the field of communication. If internet connection is supplied to embedded devices, the demand will increase owing to their remote access capacity. By utilizing the inbuilt Easy IOT server, users may monitor and control remote systems. In our everyday lives, wireless industrial automation is a primary problem. The Wireless Network method has now been standardized for industrial applications. Smart and low-cost automation of industrial processes is essential to enhance process efficiency, provide high-quality products and assure system timeliness and accuracy. Wireless is expected to be one of

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the fastest growing process automation technologies in the field.

The contemporary world is in a transition stage where problems concerning global issues, such as global warming and alternative energy sources, are combined with new challenges demanding immediate solutions. Society's focus has shifted from economic growth to sustainable development, where environmental, social, and economic aspects are considered together, rather than separately. Policies that promote sustainability in all sectors of the economy (manufacturing, agriculture, and services) are now considered as a part of good governance.

Problems such as climate change, population growth, and poverty (especially hunger), occur in a context of a gradual depletion of natural resources and the fear of diminishing coal energy reserves. These are some of the global issues that are thought to require multidisciplinary approaches in order to be addressed successfully. The system focuses on agricultural production and cultivation. This overall process has a significant role in fulfilling the basic human need for food. The production, preparation, packaging, distribution, etc. of food also generates a lot of income. The aim of this project is to exploit modern technologies and tools to improve monitoring and management of crops, in order to improve the efficiency and sustainability of farming and food production. To this end, we have designed a system for precision agriculture, which relies on a wireless sensor network combined with a service to provide individual farmers with access to data that they find useful. The system utilizes wireless sensor nodes that collect and transmit data about the quality of the water supply, the soil, and other parameters in an agricultural field. While such sensor-based systems have been investigated earlier, one of the key innovations to be explored in this paper is the combination of these sensors systems with a service-driven business model to increase their ease of use and to amplify the gains that can be realized via an integrated system. The goal is to give a farmer a more complete picture of the current and historic crop status in order to foster better informed decision making. It is expected that such decisions will benefit both farming and irrigation by saving time and resources. Factors such as the diversity of conditions which vary depending on location (for example weather, presence of insects, and disease) combined with the inability to predict the future characteristics of the environment during the different seasons over time complicate the decision making process and require specialized knowledge. This project gives an attempt to bring some of micro-environmental sources of information into the decision making process of farmers. The primary Objectives of this paper are to design and develop real time monitoring and control system for agriculture environment, statistical model development for improving smart farming. The main objective is to design and develop real time monitoring and control system for agriculture environment and to develop statistical model for improving smart farming.

Mrutyunjaya Sahani, [et.al, 2015] the design and development of a new smart monitoring and controlling system for kitchen environment in real time developed with comparative good architecture. As per explain in the paper proposes a new Raspberry pi based kitchen monitoring system through webpage with ZigBee based technology with detail. In the designed and implemented a compact wireless sensor network with internet capability of environment. System can monitor the status of kitchen and send email and/or an alert SMS via GSM network automatically to users with detail data. It has the capability to control through internet.

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More specifically, the work can be split into the four following parts: 1. Literature study and design & conduct a survey, 2. Design of a prototype solution, 3. Implementation of the prototype, and 4. Evaluation of the resulting prototype. The literature study provides the background information that is necessary for understanding the feasibility of the design and the previously implemented solutions. The survey utilizes questionnaires and interviews with farmers and agricultural scientists to understand the actual needs and problems. The design of the prototype is based on the prior research and the knowledge gained by interviews, thus giving an optimal architecture and evaluating the best-suited protocols for this application. The implementation follows the rules and guidelines specified during the design. The result of this design should be a prototype that could be adapted to address potential changes in requirements due to the addition of new requirements or deeper interpretation of the needs that arise. Regarding the evaluation of the system, a testing procedure should consider the end-to-end performance in order to find out if there are any problems concerning the system's functionality or robustness. Additionally, a test case scenario should be utilized to attract people whom are interested in or worked with similar applications in order to solicit ideas for future work or to further develop and evaluate the proposed system.

II. EXISTING SYSTEM

There are many parameters which must be taken into consideration and investigated in depth when designing a system that should improve cultivation procedures by making the whole process more effective and sustainable. In order to design and build a precision agriculture system that can be widely used by many users and applied in different contexts, many questions need to be addressed.

III. PROPOSED SYSTEM

The design and development of global process monitoring and controlling system for agriculture environment in real time has been reported. The system principally monitors parameters such as temperature, moisture level, humidity and water level of the agriculture field. This system finds a wide application in areas where physical presence is not possible all the time. The system offers a complete, low cost, powerful and user-friendly way of real-time monitoring and remote control of field.

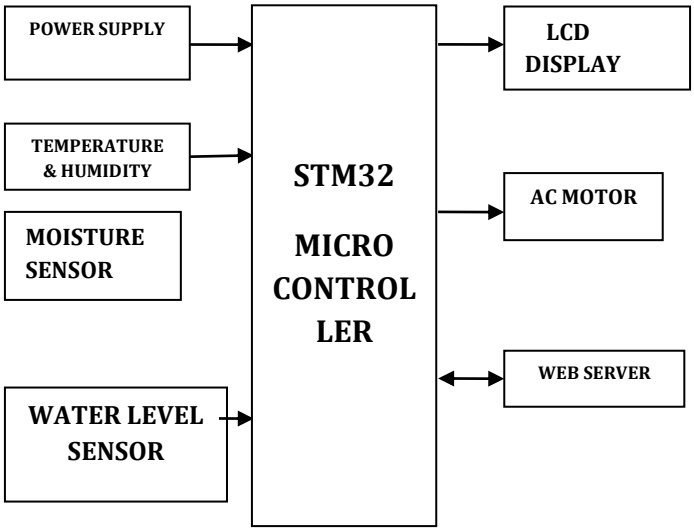

Figure 1: Block Diagram of proposed system

It proposes a low cost and efficient wireless sensor network technique to acquire the soil moisture, Humidity, temperature from various locations of field and as per the need of crop water motor is enabled. It proposes an idea about how automated irrigation system was developed to optimize water use for agricultural purposes.

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A fully automation accessing of irrigation motor where Prototype includes number of sensors node placed in different directions of Polly house farm field. Each sensor is integrated with a wireless networking device and data received. STM32 is used for send message through internet. Used closed loop irrigation system and determined irrigation amount based on distributed soil water measurements. Irrigation systems can also be automated through information on volumetric water content of soil, using dielectric moisture sensors to control actuators and save water, instead of a predetermined irrigation schedule at a particular time of the day and with a specific duration. The technological development in Wireless Sensor Networks made it possible to use in monitoring and control of greenhouse parameter in precision agriculture.

IV. SCHEMATIC DESCRIPTION:

Establishment of connection with about the use of sensor network which collects the data from different types of sensors and then send it to server using WiFi from STM32 and all these parameters can also be monitored using LCD display.

Step1: Initialize sensors and collect the data from sensors and store information in Arduino.

Step2: Compare sensor data with predefined threshold limits.

Step3: Store the data in web server for future research purpose.

Step4: Develop statistical model based on the data received through sensors placed at farm for improving smart farming.

This research will follow the inductive paradigm. The goal is to investigate the previously implemented systems and to find the most suitable technologies that can be applied to focus our research and to build a suitable and valuable system. Since it is not possible to make a hypothesis from the beginning and then justify this hypothesis at the end, the deductive method is not applicable. Since this study will examine wireless sensor network architectures and applications in the agricultural sector - a qualitative method will be used. This method will give us a better understanding of why and how the process should be designed. This system is useful for monitoring all activities related to farming

- Also useful to track the growth of plant
- This system maintains the moisture level to maintain the steady growth of plant so that production will be maintained.
- System will monitor the soil moisture level to control the drip irrigation system.
- This system is also useful to supply liquid fertilizers, for this purpose level maintenance of water and liquid fertilizer will be maintain.

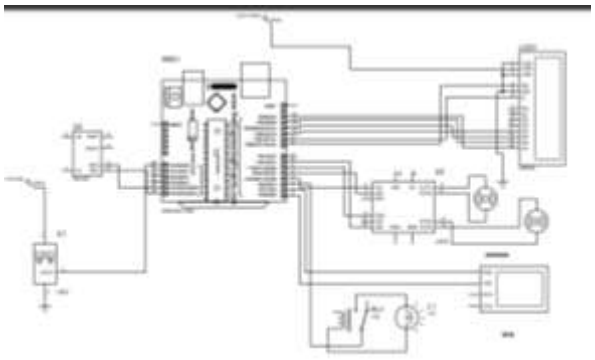

Figure2: Schematic diagram

V. Outcome:

- Environmental data can be monitored using various sensors.
- Statistical model based on the sensed data provides effective utilization of fertilizers and water resources.
- The system offers a complete, low cost, powerful and user friendly way of real-

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time monitoring and remote control of field.

VI. Conclusion:

The system principally monitors parameters such as temperature, moisture level, humidity and water level of the agriculture field.

Statistical model can be designed with the available data collected from various sensors.

Users can monitor and control the field motors based on the soil structure, crop status, irrigation, and insect and pest detection.

The system offers a complete, low cost, powerful and user friendly way of real-time monitoring and remote control of agri field. A prototype model is developed and tested with high accuracy result.

VII. FUTURE SCOPE

Our project can be improvised by using a sensor to note the soil ph value such that usage of unnecessary Fertilizers can be reduced. A water meter can be installed to estimate the amount of water used for irrigation and thus giving a cost estimation. Further, it also reduces the investment of farmers.

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