GREENHOUSE MONITORING AND CONTROLLING OF SYSTEM BASED ON MICROCONTROLLER

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ABSTRACT

Monitoring and control of greenhouse environment play an important role in greenhouse production and management. To monitor the greenhouse environment parameters effectively, it is necessary to design a measurement and control system. The objective of this project is to design a simple, easy to install, microcontroller-based circuit to monitor and record the values of temperature, humidity, soil moisture and sunlight of the natural environment that are continuously modified and controlled in order optimize them to achieve maximum plant growth and yield. The controller used is a low power, cost efficient chip manufactured by ATMEL having 8K bytes of on-chip flash memory. It communicates with the various sensor modules in real-time in order to control the light, aeration and drainage process efficiently inside a greenhouse by actuating a cooler, fogger, dripper and lights respectively according to the necessary condition of the crops. An integrated Liquid crystal display (LCD) is also used for real time display of data acquired from the various sensors and the status of the various devices. Also, the use of easily available components reduces the manufacturing and maintenance costs. The design is quite flexible as the software can be changed any time. It can thus be tailor-made to the specific requirements of the user. This makes the proposed system to be an economical, portable and a low maintenance solution for greenhouse applications, especially in rural areas and for small scale agriculturists

Keywords*: Green house monitoring and controlling, greenhouse monitoring, microcontroller.*

1. INTROD UCTION.

The proposed system is an embedded system which will closely monitor and control the microclimatic parameters of a greenhouse on a regular basis round the clock for cultivation of crops or specific plant species which could maximize their production over the whole crop growth season and to eliminate the difficulties involved in the system by reducing human intervention to the best possible extent. The system comprises of sensors, Analog to Digital Converter, microcontroller and actuators .When any of the above mentioned climatic parameters cross a safety threshold which has to be maintained to protect the crops, the sensors sense the change and the microcontroller reads this from the data at its input ports after being converted to a digital form by the ADC . The microcontroller then performs the needed actions by employing relays until the strayed-out parameter has been brought back to its optimum level. Since a microcontroller is used as the heart of the system, it makes the set-up low-cost and effective nevertheless. As the system also employs an LCD display for continuously alerting the user about the condition inside the greenhouse, the entire set-up becomes user friendly. Thus, this system eliminates the drawbacks of the existing set-ups and is designed as an easy to maintain, flexible and low cost solution.

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2. PROPOSED SYSTEM.

An attractive thing of our proposed system is that, it has extension in its concepts in a successful way. Here we have combined our all previous concepts for an effective and good productivity of plants. Both automatic controlling (microcontroller based) takes place here. Automatic controlling process is get takes place continuously, when any of input module ie., sensors does not work properly required actions is not get performed. At that time we can use microcontroller wireless sensor network based controlling process. The upper lines which I have denoted in bold is an great and successful changes made in this paper

3. BLOCK DIAGRAM

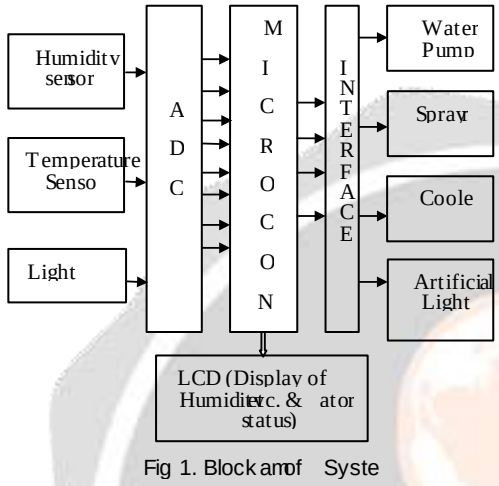

Fig 1. Block amof Syste

Fig 1: Block Diagram of the proposed system.

Step # 1: Identify measurable variables important to production. It is very important to correctly identify the parameters that are going to be measured by the controller's data acquisition interface, and how they are to be measured.

Step # 2: Investigate the control strategies. An important element in considering a control system is the control strategy that is to be followed. The simplest strategy is to use threshold sensors that directly affect actuation of devices.

Step # 3: Identify the software and the hardware to be used. Hardware must always follow the selection of software, with the hardware required being supported by the software selected. In addition to functional capabilities, the selection of the control hardware should include factors such as reliability, support, previous experiences with the equipment (successes and failures), and cost [2]

4. CONCLUSION

A step-by-step approach in designing the microcontroller based system for measurement and control of the four essential parameters for plant growth, i.e. temperature, humidity, soil moisture, and light intensity, has been followed. The results obtained from the measurement have shown that the system performance is quite reliable and accurate. The system has successfully overcome quite a few shortcomings of the existing systems by reducing the power consumption, maintenance and complexity, at the same time providing a flexible and precise form of maintaining the environment.

The continuously decreasing costs of hardware and software, the wider acceptance of electronic systems in agriculture, and an emerging agricultural control system industry in several areas of agricultural production, will result in reliable control systems that will address several aspects of quality and quantity of production. Further improvements will be made as less expensive and more reliable sensors are developed for use in agricultural production. Although the enhancements mentioned in the previous chapter may seem far in the future, the required technology and components are available, many such systems have been independently developed, or are at least tested at a prototype level. Also, integration of all these technologies is not a daunting task and can be successfully carried out.

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5. REFERENCES

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