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Greenhouse Monitoring

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ABSTRACT: The objective of the project is to eliminate the drawbacks of the greenhouse & is designed as easy to maintain flexible &low-cost solution. The proposed system is an embedded system which will monitor & control the microclimatic parameters off 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.

KEYWORDS: Block Diagram,Working, Component used, Discussion.

I.INTRODUCTION

A greenhouse is a building in which plants are grown for commercial or research purposes. These structures range in size from small sheds to very large buildings, with different types of covering materials, such as a glass or plastic roof and frequently glass or plastic walls; it heats up because incoming visible solar radiation (for which the glass is transparent) from the sun is absorbed by plants, soil, and other things inside the building. Air warmed by the heat from hot interior surfaces is retained in the building by the roof and wall. In addition, the warmed structures and plants inside the greenhouse re-radiate some of their thermal energy in the infrared spectrum, to which glass is partly opaque, so some of this energy is also trapped inside the glasshouse. However, this latter process is a minor player compared with the former (convective) process. Thus, the primary heating mechanism of a greenhouse is convection. Ventilation is one of the most important components in a successful greenhouse. If there is no proper ventilation, greenhouses and their plants can become prone to problems The main purposes of ventilation are to regulate the temperature to the optimal level, and to ensure movement of air and thus prevent build-up of plant pathogens that prefer still air conditions. Ventilation also ensures a supply of fresh air for photosynthesis and plant respiration, and may enable important pollinators to access the greenhouse crop. Ventilation can be achieved via use of vents - often controlled automatically - and recirculation fans. Embedded green house monitoring and control is proposed to provide a highly detailed micro-climate data for plants within a greenhouse environment with an innovative method of growing temperate crops in a tropical environment using microclimatic conditions. The greenhouse was equipped with conventional wired sensors that provide readings of the air temperature, light intensity and nutrient solution temperature in the mixing tank. The acidity and concentration of the nutrient solution were manually measured, and adjusted accordingly, and high resolution data, collected with the deployment of a network of wireless sensors to provide sufficient data to develop a model for the growth of these crops under aeroponic conditions. The proposed system is an embedded system which will 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 using 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 2 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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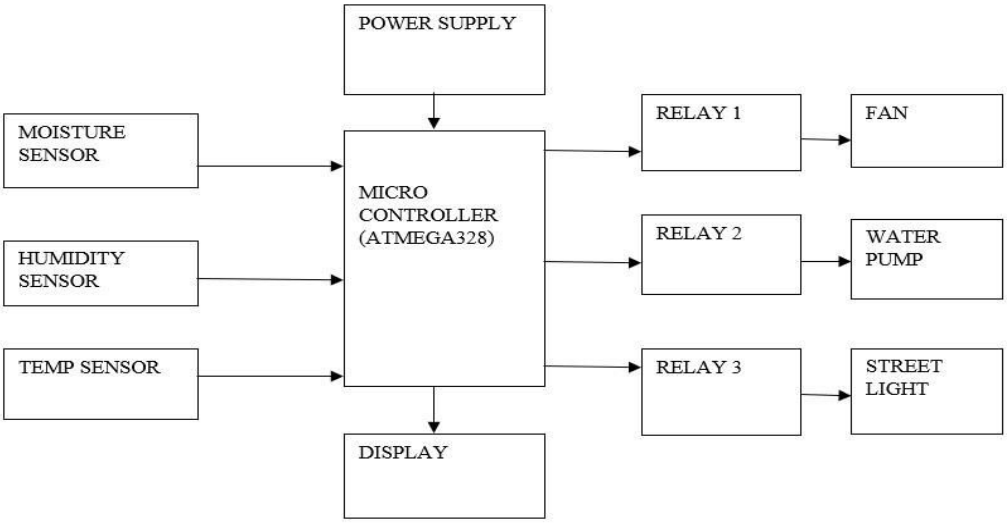
II.WORKING



Block diagram

Greenhouses protect crops from too much heat or cold and help to keep out pests (Gill et al., 2006). Light and temperature control allows greenhouses to turn in arable land into arable land, thereby improving food production in marginal environments because greenhouses allow certain crops to be grown throughout the year, greenhouses are increasingly important in the food supply of high latitude countries(Thomas et al., 2001). One of the largest greenhouse complexes in the world is in Almeria, Spain, where greenhouses cover almost 50,000 acres (200 km2).

Irrigation is the important thing on a greenhouse system. The water we provide, which is the main element will make sure the plants survive on certain circumstances. As we all know, most of the gardener use the manual system to irrigate their plant but this system is not efficient. The plants will either die if there is not enough watersupplies to the plant or vice versa. Plus the gardener must often monitor their greenhouse to ensure the conditions of their plant are in the good health.

In order to maintain the condition and overcome the problem, the automatic watering system and remote monitoring is used. This will reduce the time if using automatic rather than manual way of watering. Fewer workers are needed to maintain the plants or crops. The sensors such as temperature sensor (Thermistor) and soil moisture probe are used to control the temperature and watering in the greenhouse.

The micro controller is the heart of the proposed embedded system. It constantly monitors the digitized parameters of the various sensors and verifies them with the predefined threshold values. It checks if any corrective action is to be taken for the condition at that instant of time. In case such a situation arises, it activates the actuators to perform a controlled operation.

In this project three sensors and two output modules connected to control the green house. Temperature sensors are used to monitoring the internal temperature continuously

And temperature is greater than 35 degree to exhaust fan are automatically on to maintain the temperature. Temp. Is below 35 degree to exhaust fan off automatically. Another sensor is soil moisture sensor this are used to control the plant irrigation. Soil moisture are continuously measure the water content in near to plant water content is lower than set value off sensor to water pump automatically on and water content are high to set level to water pump off automatically. Another sensor is humidity sensor this are used to measure the humidity in air and show on display.

III. COMPONENT LIST

1 Microcontroller
2 Display
3 Soil Moisture
4 Relay

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5 Temperature Sensor
6 Humidity Sensor
7 Exhaust fan
8 Water pump

IV. DISCUSSION

Power Supply:Power supply is supply of electrical power. A device or system that supplies electrical or other types of energy to an output load is called a power supply unit or PSU. There are different types of power supplies e.g. Battery power supply, unregulated power supply, linear or regulated power supply etc. DC voltage is needed for plate, screen grid and control grid. Similarly, the emitter and collector bias in a transistor must also be direct current. Batteries are rarely used for the purpose as they are costly and require frequent replacement. In practice, DC power for electronic circuits is most convenient obtained from commercial ac lines rectifier filter system called a DC power supply. 24 The rectifier filter combination constitution an ordinary DC power supply. The DC voltage from and ordinary power supply remains constant so long as AC main voltage or load is unaltered. However, in many electronic applications, it is desired that DC voltage should remain constant irrespective of changes in AC mains or load. Under such situations, voltage regulating devices are used with ordinary power supply. This constitutes regulated DC power supply and keeps the DC voltage at fairly constant value. In this report, we shall focus our attention on the various voltage regulating circuits and IC regulators.

Fixed Voltage Regulators: Voltage regulators seven voltage options. The 78XX series consist three terminal positive voltage regulators with seven-voltage option. These IC's are designed as fixed voltage regulator and with adequate heat sinking can deliver output currents in excesses of 1A although these devices do not require external components can be used to obtained adjustable voltage and currents. These IC's also have thermal overload protection and internal short circuit current limiting.The LM 78XX series is available in an aluminium TO-3 packed which will allow over 1.0A load current if adequate heat sinking is provided. Current limiting is including limiting the peak output current to safe value.

V. RESULT AND APPLICATIONS

Result:

Temp	Fan	Soil	Humidity
29.30	Off	0	38%
20.51	Off	3	39%
34.18	Off	0	38%
60.06	On	0	28.32%

Applications:
1. Monitor greenhouse environment.
2. Temperature monitor.
3. Humidity monitor.
4. Auto irrigation.

VI.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.

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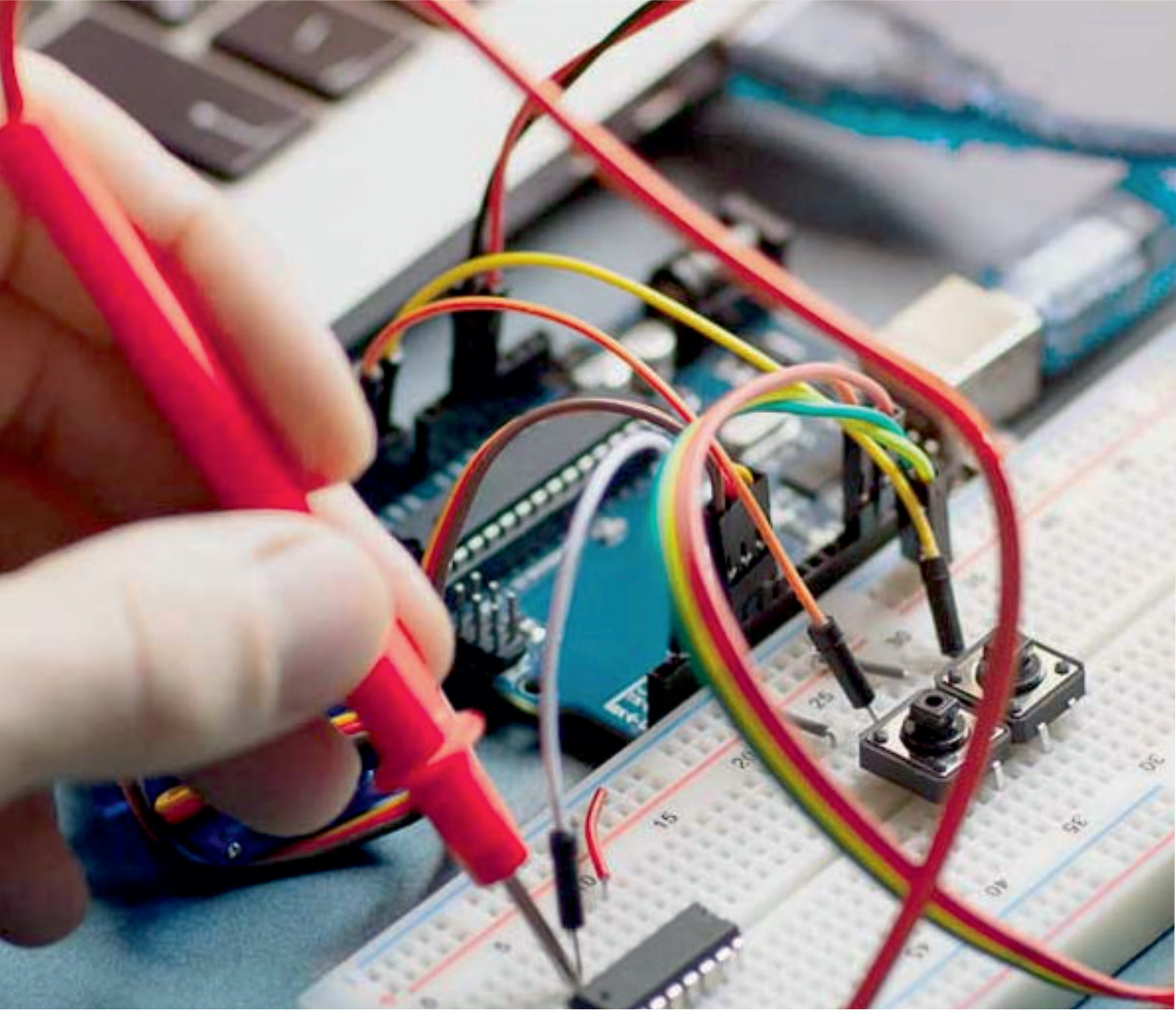

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