



AUTOMATED GREEN HOUSE

50
Years Of Excellence

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Introduction

LabVIEW is a software tool that helps people create programs by connecting visual blocks, making it easier to control machines and gather data without needing to write traditional code. It's often used by engineers and scientists for tasks like measuring temperatures, controlling motors, or automating tests.

Arduino is a small, inexpensive computer that you can use to build your own electronic projects. It comes with both the hardware (a microcontroller board) and the software you need to write and upload programs. It's popular for hobbyists and beginners because it's easy to use and can control things like lights, sensors, and motors, making it great for projects and learning about electronics.

Objectives:

The main goals of an automated greenhouse system are to optimize plant growth by maintaining ideal environmental conditions, enhance efficiency by automating routine tasks and resource use, and increase productivity by ensuring consistent, year-round cultivation. The system aims to be scalable for different greenhouse sizes and plant types, while providing remote monitoring and control capabilities for convenience and quick response to issues. Additionally, it focuses on enabling data-driven decisions through comprehensive data collection and analysis, ensuring consistent and reliable operation to maximize plant yield and quality.

Materials and Methods

Hardware Setup:

The temperature sensor is connected to the Arduino with VCC to the 5V pin, ground to ground, and output to analog pin A0. It uses a relay and motor to control a fan based on the sensor's temperature readings.

The moisture sensor, connected to the Arduino's 5V, ground, and analog pin A0, controls a pump via a relay.

The MQ5 smoke sensor, connected to Arduino's 5V, ground, and analog pin A1 (excluding the digital pin), uses a relay to activate a motor for a fire suppression system when smoke is detected.

The LDR, with VCC connected to Arduino's 5V, ground to ground, and signal to digital pin 8, measures light intensity.

The ultrasonic sensor has VCC connected to 5V, ground to ground, trig to digital pin 10, and echo to digital pin 11, with a buzzer connected to digital pin 6 and ground.

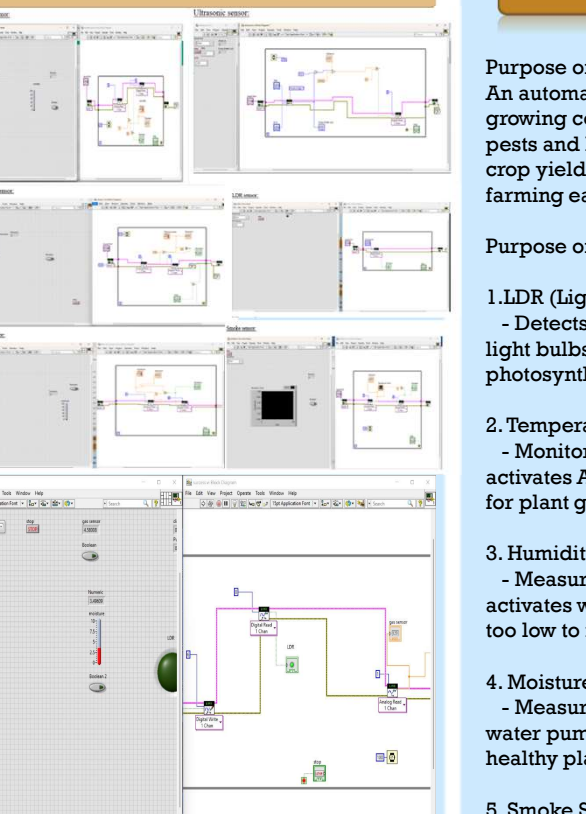
A sensor with VCC to 5V, ground to ground, and data to analog pin A1 controls an LED on a breadboard and a pump via a relay connected to a digital pin.

Software Configuration

LabVIEW Version 2014 and Arduino.

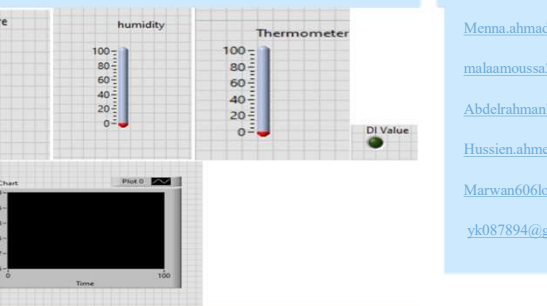
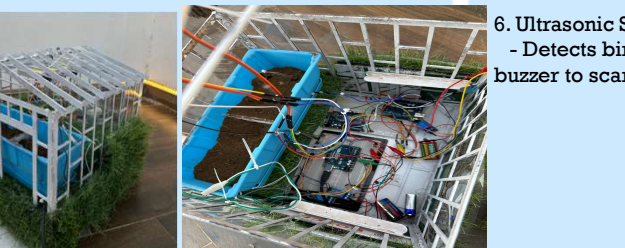
Implementation

LabVIEW VI



Automated greenhouse system

Results



Discussion

Purpose of an Automated Greenhouse:
An automated greenhouse optimizes growing conditions, protects plants from pests and bad weather, and increases crop yield and efficiency, making farming easier and more sustainable.

Purpose of Each Sensor:

- 1. LDR (Light Dependent Resistor):**
 - Detects sunlight levels; activates UV light bulbs if light is insufficient to aid photosynthesis.
- 2. Temperature Sensor:**
 - Monitors ambient temperature; activates AC to maintain ideal conditions for plant growth.
- 3. Humidity Sensor:**
 - Measures water vapor levels; activates water sprinklers if humidity is too low to regulate plant water loss.
- 4. Moisture Sensor:**
 - Measures soil moisture; activates water pump if soil is dry to ensure healthy plant growth.
- 5. Smoke Sensor:**
 - Detects smoke or fire; activates fire extinguishers to control fires in emergencies.
- 6. Ultrasonic Sensor:**
 - Detects birds near crops; activates buzzer to scare birds away.

Future Improvement / Conclusion

Implementing an automated greenhouse system using LabVIEW optimizes plant growth through precise monitoring and control of environmental factors like temperature, humidity, and light. LabVIEW's intuitive interface and LINUX toolset for Arduino integration enhance operational efficiency, improve crop yields, and ensure better resource management, making it a sustainable and scalable solution for modern agriculture.

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