M.Kumarasamy College of Engineering
NAAC Accredited Autonomous Institution
Approved by AICTE & Affiliated to Anna University
ISO 9001:2015 Certified Institution
Thalavapalayam, Karur, Tamilnadu.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

18EEP301L-MINOR PROJECT III

FINAL REVIEW

AUTOMATED TARPAULIN ROLLER FOR POULTRY FARM

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ABSTRACT

This research focuses on the development of an intelligent system utilizing embedded frameworks and smartphone technology for monitoring and managing chicken farms. The proposed system aims to control environmental parameters and automate feeding and water supply, offering a cost-effective, asset-saving, and quality-oriented approach to poultry farming. By leveraging smart devices and IoT technologies, this system can replace manual labour, addressing industry labour challenges and introducing semi-automation. The system encompasses tasks such as feeding using a container, water supply through nipple waterers, temperature and humidity regulation with fans and heaters, automatic lighting, tarpaulin roller and real-time environmental monitoring accessible through IoT cloud data. This technology-driven solution holds promise for enhancing productivity and efficiency in poultry farming and broader agricultural applications.

OBJECTIVE

- ✓ The implementation of this idea in Poultry Industry will enhance the overall efficiency and productivity.
- ✓ As this project proposes solar energy in operating all the electrical appliances in poultry industry
- ✓ Helps to reduce CO_2 emission.
- ✓ To implement automation for lighting, feeding, and watering processes in the poultry farm.
- ✓ To develop systems to continuously monitor and maintain a healthy environment for poultry birds, especially chickens, on the farm.

PROBLEM STATEMENT

Most poultry farms need lots of human labour to maintain. Unhygienic farms raising chickens may produce low-quality meat. Feeding and watering several times a day may be tedious. The poultry farm environment may not be ideal.

DESCRIPTION

In our project, the tarpaulin sheet used in the poultry farm is lifted up and down automatically without man power by using dc motor based on the atmospheric condition. The DHT sensor, rain sensor and anemometer sensor are used in this project. According to the temperature and humidity level sensed by DHT sensor the microcontroller will drive DC motor to move tarpaulin sheet up/down and will on/off the fan & sprinkler. Anemometer sensor will sense wind velocity and operate the tarpaulin sheet according to the requirement. The green energy from solar cell will operate DC Motor, lights, fans and sprinklers.

DESCRIPTION

According to the temperature variation in the poultry farm DC motor will lift up and put down the tarpaulin sheet. The consumer/farmer/owner/user can change the fixed temperature according to their poultry conditions. By using DHT sensor which sense both temperature and humidity, we can sense the air flow in the poultry and according to the result it will on/off the fan and sprinkler. Animo sensor will sense the wind velocity and operate the tarpaulin sheet according to the requirement. The solar panel will generate the power operate the tarpaulin sheet ie DC Motor, lights, fans and all the other devices/machines used in the poultry farm.

EXISTING SYSTEM

- Automated feeder and drinker are already available and implemented in many poultries. But there is no Automated Tarpaulin Roller for Poultry Farm.
- But Tarpaulin roller is available in many new poultry farms.
- In this also manpower is required for for the tarpaulin roller.

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PROPOSED SYSTEM

The entire system's program logic is stored within this microcontroller. Integrated within the system is a DTH11 temperature and humidity sensor. When the temperature rises above a certain threshold, indicating high temperature, the system triggers a fan. Conversely, when the temperature drops below a specified threshold, signaling low temperature, the system activates a heater (a prototype LED is used to simulate this). Recognizing the inverse relationship between temperature and humidity, the system adjusts humidity levels accordingly. As the temperature rises, humidity decreases, and vice versa. There is a fixed temperature if there is increase or decrease in temperature the automated tarpaulin operation will takes place.

COMPONENTS USED

LDR Sensor:

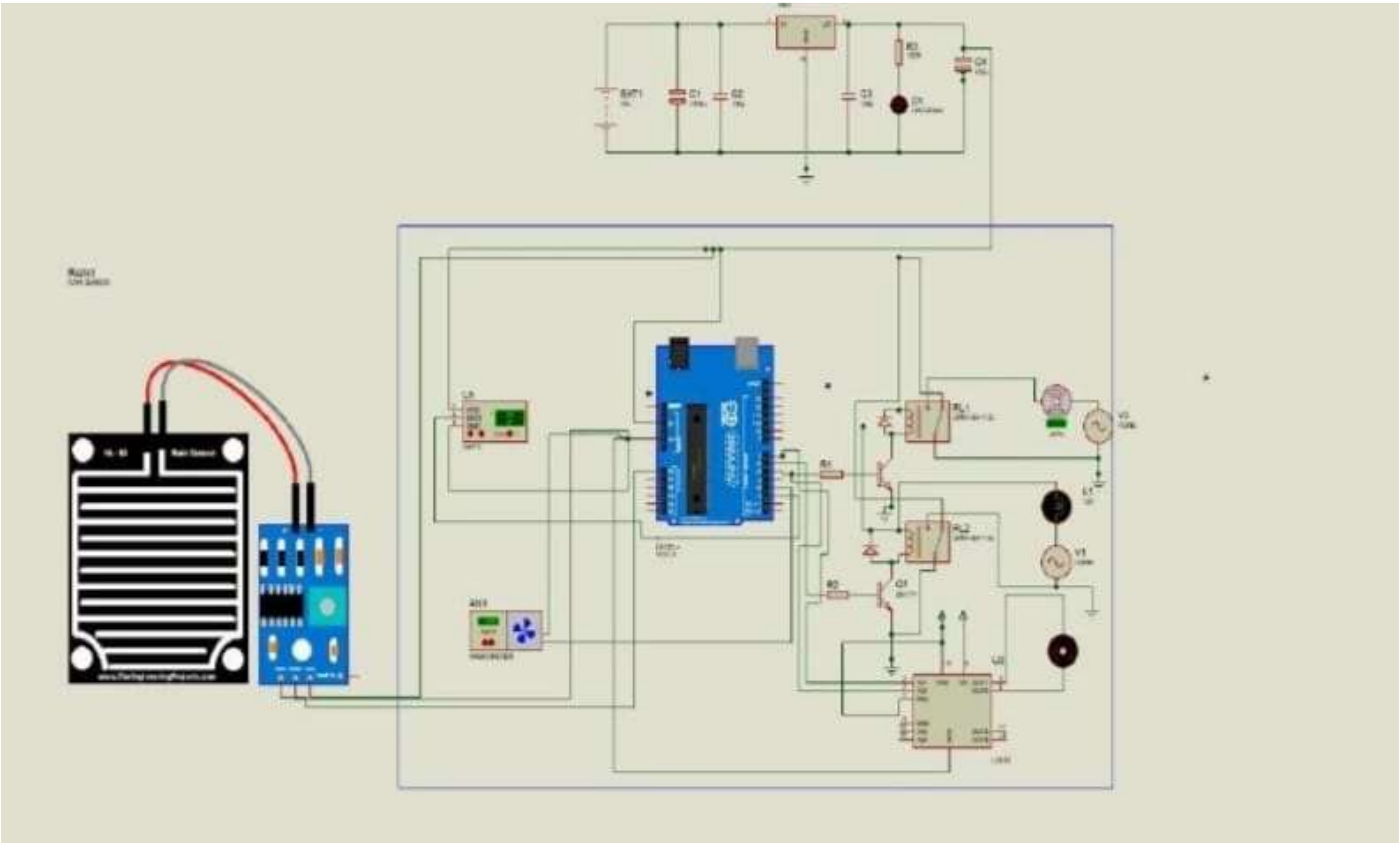
LDR (Light Dependent Resistor) sensor is a type of photocell that changes resistance based on light levels. In low light, its resistance is high, and in bright light, its resistance decreases. LDRs are used in light-sensing applications like streetlights and camera exposure control.

COMPONENTS USED

DHT 11 sensor:

DHT11 sensor, a fundamental and cost-effective digital temperature and humidity sensor that utilizes a capacitive humidity sensor and a thermistor to measure ambient air conditions. It generates a digital signal on the data pin and can also provide an analog signal on the analog pin for temperature readings. This sensor is widely used for monitoring environmental parameters in various applications due to its simplicity and affordability.

CIRCUIT DIAGRAM



CIRCUIT DIAGRAM CONNECTION:

we used the NodeMCU microcontroller for our circuit setup. The DHT11 temperature and humidity sensor is connected to the NodeMCU through the D2 data pin to monitor temperature and humidity levels, and this data is sent to a website. An LDR sensor is connected to the NodeMCU using the A0 analog pin to detect ambient light levels. Additionally, we integrated an ultrasonic sensor with the NodeMCU through the D4 data pin for measuring distances, and an LED is connected to the NodeMCU through the D6 data pin for visual indication. We used an L298 motor driver with the NodeMCU, connected through Journal of IoT in Social, Mobile, Analytics, and Cloud, March 2024, Volume 6, Issue 1 47IoT based Smart Poultry Management Systemfour data pins (D0, D1, D2, D3), to control a DC motor attached to the OUT3 and OUT4 terminals of the motor driver. Furthermore, a servo motor operates using the 3V output and is connected to the D8 data pin of the NodeMCU.This description outlines the detailed circuit connections enabling sensor interfacing and motor control using the NodeMCU microcontroller.

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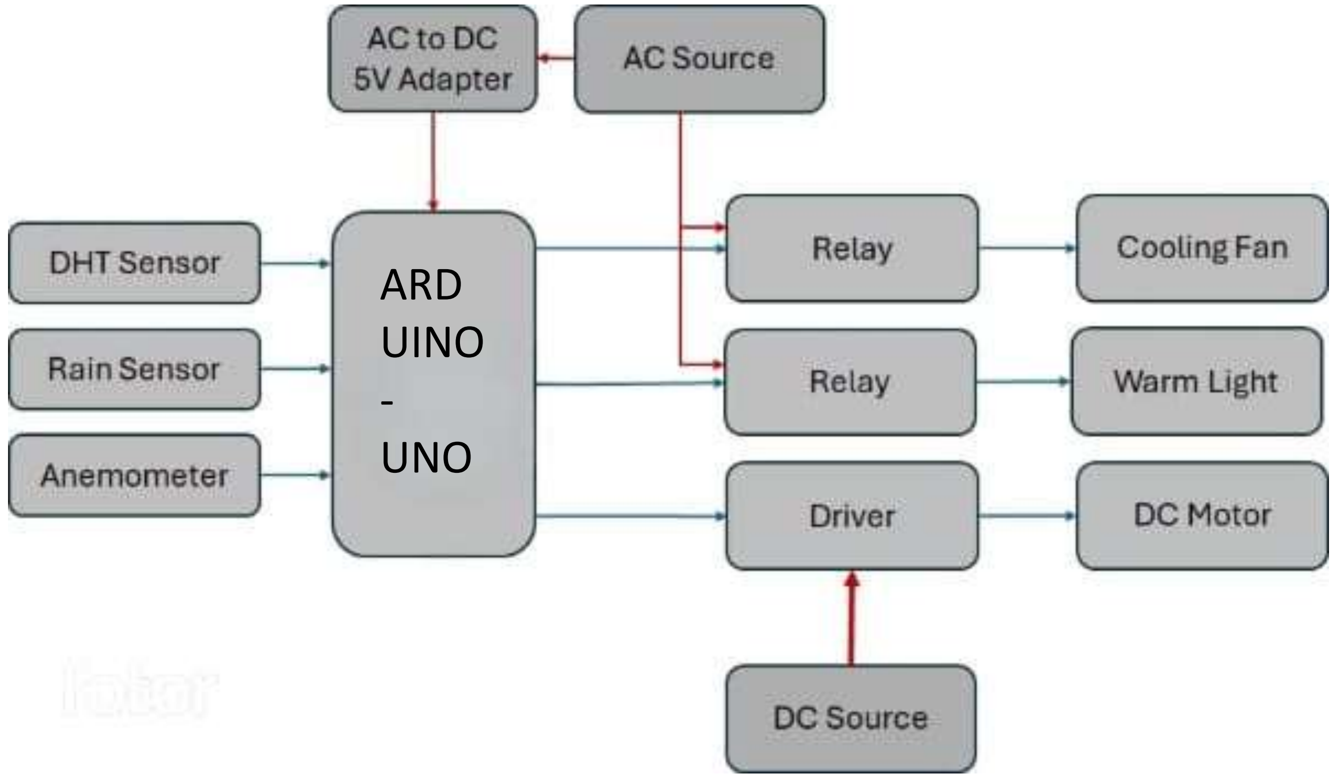
BLOCK DIAGRAM



FUTURE SCOPE

IoT Integration and Smart Farming Applications:

- ✓ The future of poultry technologies is expected to witness continued advancements in IoT integration, cloud-based technologies, and smart farming applications, leading to improved efficiency within the poultry sector.
- ✓ Affordability and Accessibility: The future enhancement of smart poultry farming systems aims to make these technologies less expensive and more accessible, not only for large-scale poultry operations but also for small and backyard chicken farmers, potentially leading to increased profitability and ease of management.
- ✓ Incorporation of Additional Features: Future enhancements may involve the integration of additional features such as fire alarm systems, automated fire extinguisher systems, and comprehensive information management systems, including reminders for vaccination and worker-related information.
- ✓ Intelligence and Robotics: The application of artificial intelligence and robotics in poultry farming is anticipated to play a significant role in farm management, data collection, and process optimization, potentially leading to improved efficiency and profitability.

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COST ESTIMATION

S.NO.	COMPONENT NAME	QUANTITY	COST
1	Arduino uno	1	600
2.	Geared DC Motor	1	400
3.	DHT-11 Digital Temperature and Humidity Sensor	1	300
4.	Relay	2	300
5.	Temperature sensor	1	200
6.	Cooling Fan , Lamp	As requried	400
		Total	**2200**

MAIN COMPONENTS USED

- Arduino uno
- Geared DC Motor
- DHT-11 Digital Temperature and Humidity Sensor
- Rain Sensor
- Anemometer sensor
- Relay
- Cooling Fan , Lamp

Conclusion:

The prototype of the smart poultry management system was successfully designed according to planned procedures and an appropriate circuit diagram. The output of the project was exactly as per intentions within the expectations and margin of error. The prototype was able to maintain environmental conditions like temperature, humidity, and lighting and send the data to the remote server, SmartThings, for remote monitoring. The prototype was also able to bring automation in food and water supply to the poultry farm using sensors and motors.