IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

SENSOR BASED SMART INCUBATOR

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Abstract : A controlled atmosphere is provided by the highly automated and user-friendly Smart Incubator for hatching eggs, rearing chicks, and a variety of medicinal uses. fitted with sensors to keep an eye on and regulate vital parameters like humidity and temperature. Because of its sturdy construction and easy-to-use controls, even inexperienced users may easily maintain and use this device. For improved monitoring in farming, hatching, and medicinal applications,our project- the Smart Incubator is an invaluable instrument.

IndexTerms **- humidity sensor; DHT11; Remote Monitoring;**

I.INTRODUCTION

Babies born before 37 weeks of pregnancy are called premature babies. Premature babies need a womb-like environment to cope with their external environment. In fact, mammals are allopatric. In other words, the body temperature is set at the same level regardless of the ambient temperature. Because the growth of organs and enzymes in babies is limited, special care is needed to cope with the external conditions of the body such as temperature, humidity, light and air levels. Babies are deficient in interpreting sweat. Babies have a relatively large surface area, low thermal conductivity, and low mass as heat sinks. Newborns have a limited ability to protect themselves from heat by changing positions and do not have the ability to adjust clothing in response to heat stress. The baby must be kept in a device called an incubator to provide a womb-like environment. An infant incubator is a device in a sturdy box that allows babies to be kept in a controlled environment for medical care. Infant incubators provide constant temperature, relative humidity and oxygen concentration. The relative humidity must follow the value established according to the number of days of incubation.

The moisture sensor detects whether there is moisture on our hands and displays the moisture using LEDs. The circuit can be used to detect emotions, and stress can be a false positive. Heart rate does not reflect emotions and stress, blood pressure and body temperature, but increases skin moisture. When your body is wet, your immunity decreases. When a person lies down, the body's energy decreases. Therefore, the stress level can be determined by the resistance of the skin. When you lie down, physical changes occur and your body's resistance decreases. You can relate this to the results of a general question: Reducing the amount of moisture in the air is very important in many industrial and domestic applications. Any type of semiconductor factory requires adequate humidity control throughout the manufacturing process. There are a variety of medical applications that require moisture balance, including anesthesia and hatching equipment. Monitoring humidity is important when cleaning the air and distributing food. In the agricultural industry, the amount of moisture is very important for plants, soil protection, etc. Homes need moisture management that matches the building's conditions. In all these situations, humidity sensors are used to indicate the level of humidity in the air. Many terms are needed to describe the humidity.

II. WORKING PRINCIPLE

A temperature controller is a device that controls heaters or other devices by comparing signals from sensors to establish values and perform calculations based on deviations from these values. A device that can process signals from sensors other than temperature, such as humidity, pressure, and flow, is called a controller. Electronic controllers are also called digital controllers.
The thermostat controls the temperature so that the measured value is equal to the set value, but the response varies depending on the characteristics of the controlled element and the method of operation of the thermostat. The main component of feedback control system is built into the temperature controller. A feedback control system can becreated and temperaturecontrolled by combining a temperature sensor with a controller suitable for the controlled object. The humidity controller has several control modes. Limiting control (control control,bangbang control) sets a reference point, or limit, when it reaches, and indicates a process change that ends or begins. Linear control corresponds to a different input signal than a variable control signal. Signal conditioning, filtering and amplification are used to produce the correct output power signal. Proportional, tracking, and derivative (PID) control requires real system feedback. Feedforward power is a direct power load of the reference signal. This type of control method can be opened Joop or used with

advanced PID control. Fuzzy logic is a type of control that allows variables to have fuzzy values (absolutely true) rather than bina ry states (absolutely true or absolutely false). Advanced, or nonlinear, control includes algorithms such as adaptive gain and neur al networks.
The requirements for translation are:
Number of inputs
Number of outputs
Types of inputs
Types of outputs
Number of regions (if applicable)
Number of inputs is the total of signals sent to the humidity controller. The number of outputs is the sum of all outputs used to co ntrol, load or modify a process. Input types for humidity controllers include direct current (DC) voltage, current loops, analog sig nals from resistors or potentiometers, frequency inputs, and switch or relay inputs. Output types include analog voltage, current lo op, switch or relay output, voltage or frequency. Some humidity controllers can also send inputs or receive outputs in serial, paral lel, Ethernet, or other digital formats that indicate process changes. Others can send inputs and receive outputs of data converted t o industrial fieldbus protocols such as the CAN bus, PROFIBUS or SERCOS. PROFIBUS is a registered trademark of PROFIBU S International. Humidity controllers differ in terms of user interface and compliance. Many products include traditional digital pa nels and analog components such as drives, switches, and meters. For remote purposes, computer, web, Internet, or network-enabled humidity controllers are also available.

Fig 1: Prototype of Sensor Based Smart Incubator

III. COMPONENTS REQUIRED

SL NO	COMPONENTS NAME	QUANTITY	PRICE (In Rupees)
1	Miniature Circuit Breaker (MCB)	1	160
2	ESP 8266	1	250
3	DHT 11	1	160
4	Channel Relay	2	200
5	Servo motor	1	160
6	OLED Display	1	550
7	Water Vaporizer	1	140
8	Cooling Fan	1	140
9	Breadboard	1	100
10	SPDT Switch	1	50
11	Regulator	1	260
12	RGB LED Light	3	50
13	12V AC to DC power supply	1	270
14	Connecting Wires	20	100
15	Buzzer	1	50
16	USB	1	100
Total component cost (In Rupees) = 2740*			

*Prices may vary.

IV. ADVANTAGES OF THE INVENTION

Industrial temperature controllers work just like in domestic applications. Basic temperature controllers control industrial or lab oratory heating and cooling. In typical applications, the sensor measures absolute temperature. Temperature controllers are use d in various industries to control processes or manufacturing processes. Common uses of temperature controllers in industry in clude plastic injection and extrusion machines, refrigeration machines, packaging machines, food processing, food storage, an d blood banks. The
Humidity Controller monitors and maintains accurate humidity levels in environmental testing applications, food storage areas, and electronic equipment rooms. These include quick and full display functions, data entry and graphing functions. Humidifier

s that provide heating and cooling are also available. The multi-function product can be used to control thermoelectric heaters, thermistors or thermocouples. or control resistance temperature detectors (RTDs), resistance heaters or heating elements. Suppliers generally specify whether the humidity controller is design ed for use with liquids, solids, dusts, gases, vapors, or vapors. Some humidity controllers have a printed circuit board (PCB). O ther products are designed for mounting in cabinets, DIN rails, walls, chassis, niches or cabinets. Real-time controllers are board- or board-level devices with integrated connections and the entire case or cabinet.

V. FUTURE SCOPE

- Remote Monitoring: The Smart Incubator can be equipped with a remote monitoring function for better use.
- Real-time alerts: This allows users to troubleshoot and increase the chances of a successful rejection.
- Integration with IoT:Itcan provide a more complete system. IoT sensors can be used to collect data about the incubator's envir onment and send it to the incubator's computer for analysis.
- Mobile applications: can be developed by joining the smart incubator.

Overall, the scope of smart incubators is huge and exciting.

VI. CONCLUSION

From this topic we can conclude that this model is suitable for incubation systems and hatchery equipment to control temperature and humidity. Even in the agricultural field, it is necessary to measure moisture and soil moisture to protect farms. In domestic w ork, it is important for the ventilation of buildings, cooking cycles in heating ovens, etc. This program can help you optimize and control the temperature. For efficient growth and production in various fields such as agriculture, health and medicine.

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