TEAM PLEXTRON

Team Members

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Problem Statement

Automatic temperature & humidity monitoring and control and automation for optimal indoor comfort.

Description

Solution caters to a broad range of users, including homeowners, businesses, and individuals seeking to improve the comfort and functionality of their indoor and outdoor spaces. Whether you want to create a cosy home environment, enhance workplace productivity, or reduce energy bills. The project's methodology utilises the Indus IoT board and kit to seamlessly connect sensors, actuators, and controllers. Data from light sensors, temperature sensors, and user inputs are processed in real-time by the Indus IoT board to make intelligent decisions for controlling blinds, lights, and fans. The project's key features include: Temperature and humidity levels play a crucial role in determining the comfort of an indoor space.

Our system will continuously monitor these parameters and make real-time adjustments to heating, cooling, and humidity control systems. The Indus-IoT board's powerful sensors and processing capabilities enable precise monitoring and adaptive control, ensuring occupants enjoy optimal comfort throughout the day, regardless of external weather conditions. The Indus-IoT board's light sensors and occupancy detectors will work in harmony to ensure that blinds and shades are adjusted in real-time. This system is designed to optimise natural lighting, providing a harmonious balance between privacy, energy efficiency, and the well-being of occupants.

Users should be able to set Room temperature as per comfort of the user. To maintain the condition system will adapt to a humidity use of humidifier and heater, to give a true feel of preset atmosphere. System calculates and balances atmosphere and control accordingly to current parameters, LCD Display to show current parameters of the room.

Hardware used

Push Buttons (On Board) : as user Interface data read by HAL_GPIO_INPUT(port,PIN) function

Analog Potentiometer: as user Interface data read by ADC_readValue(channel1)

Temperature and Humidity sensor: as sensor element read data by I2C Protocol with library Provided

Peltier Module: as Heating and Cooling Element, forward bias for Cooling and Reverse bias for heat.

Piezo Humidifier: as air humidifier operated via Relay

Relay Module: as switching Device operated with 4 GPIO Pins

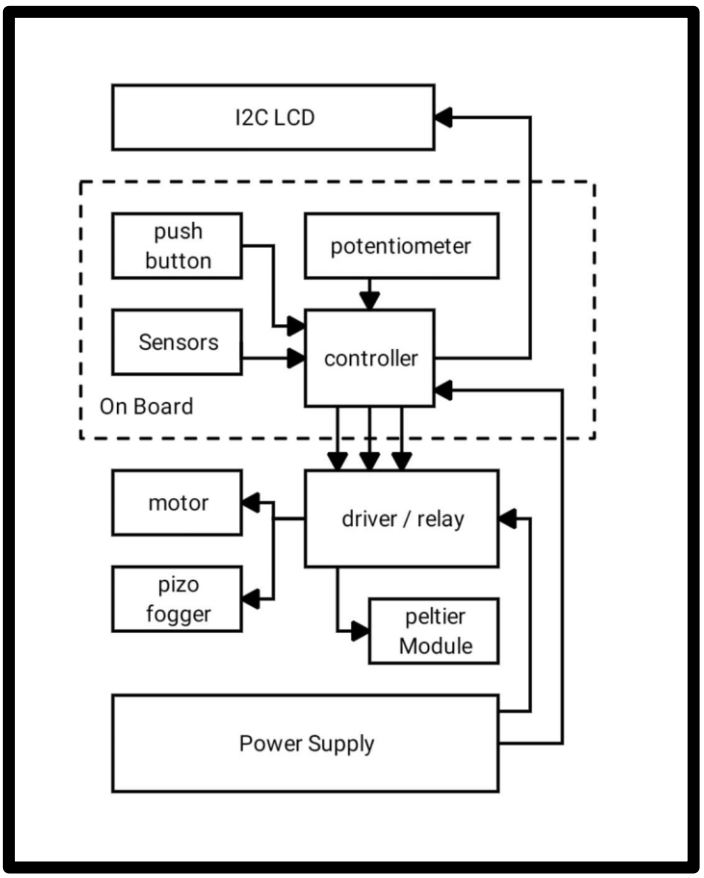
DC Air Blower: to blow air operated by Relay.

I2C LCD: used to assist with User interface with a custom library operated with I2C protocol.

Software Used

Cube IDE as programmer IDE and Debugger

Putty as serial utility tool



Block Diagram

Algorithm

1) Initialize sensors and Actuators
2) Get temperature and Humidity
3) If User Input available
    a. If user select Humidity: set humidity from POT
    b. If user select Temperature: set Temperature from POT
    c. Update on LCD
4) If Humidity < Target Value:
    a. Turn ON Humidifier
5) If Temperature < Target Value:
    a. Turn ON Blower
    b. Turn ON Heater on Peltier

6) If Temperature > Target Value:
    a. Turn ON Blower
    b. Turn ON Cooler on Peltier
7) Update LCD and loop back to Step 2

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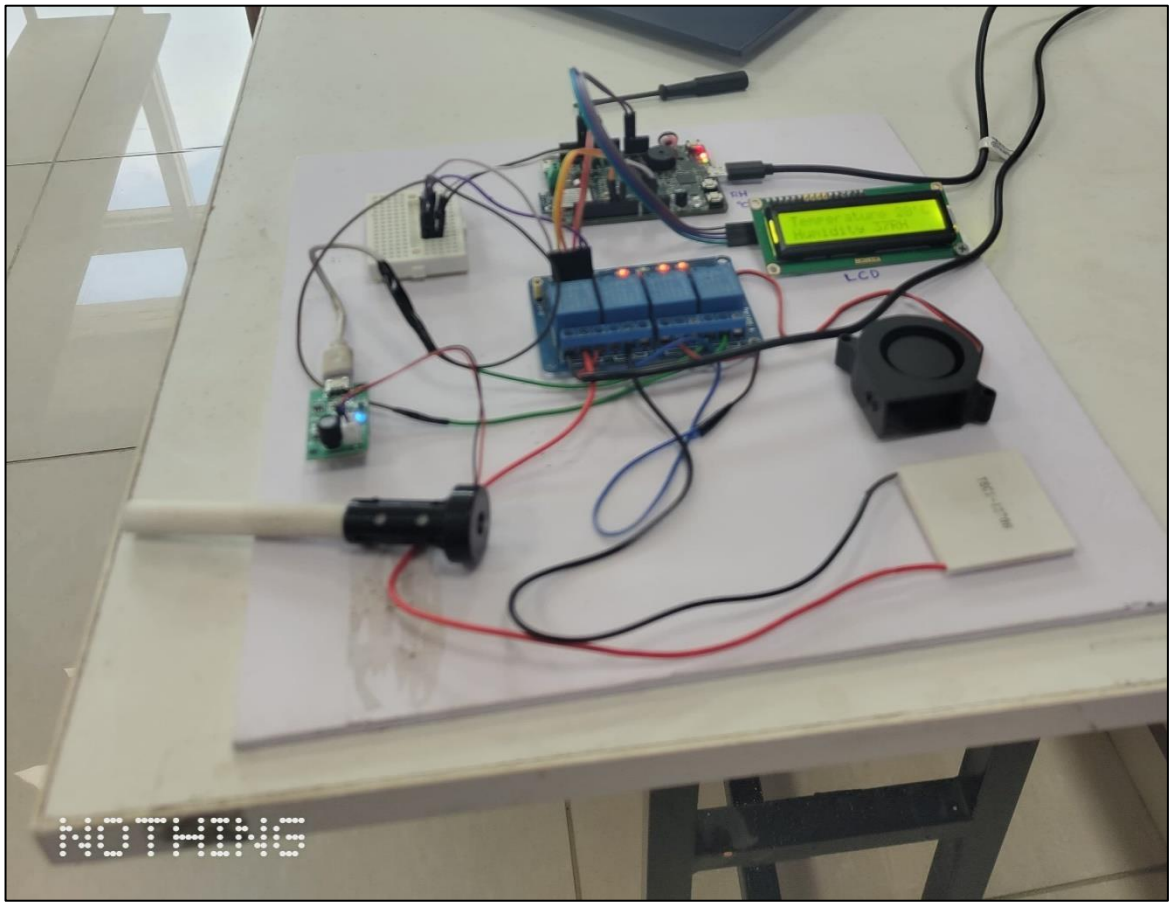

Output

- ❑ LCD Display Indicates current Temperature and Humidity
- ❑ Push Button 1 will set desired Temperature and Button 2 will set Humidity as per user's comfort.
- ❑ Controller will use combinations of actuator to maintain preset parameters.
- ❑ Functions and Parameters will be printed in Serial Monitor.

Source Code:

Complete Code is updated in the following GitHub repository

https://github.com/SiddharthKharvi/BMSC_CDAC_Hackathon