AUTOMATIC REGULATION AND CONTROL OF FAN AND SMART CURTAIN

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Abstract: This paper presents the design and implementation of an automatic fan regulation and smart curtain system aimed at enhancing energy efficiency and user comfort. The system integrates temperature and light intensity sensors with microcontroller-based automation to dynamically adjust fan speed and curtain positioning. The fan speed is regulated based on ambient temperature, ensuring optimal cooling while conserving energy. Simultaneously, the smart curtain responds to light intensity, adjusting its position to maintain appropriate indoor lighting conditions . The proposed system offers an affordable and sustainable solution for smart home applications, combining ease of use with significant energy savings. Experimental results demonstrate its effectiveness in achieving the desired automation objectives.

Keywords:Automatic, Sensor ,Smart Fan, Smart Curtain.

I. INTRODUCTION

In view of growing demands for more efficient and automated systems within smart homes due to emerging technological advancement and increased awareness toward environmental concerns, traditional practices for regulating fans and curtains have proven ineffective and bothersome with the excessive consumption of energy while ensuring minimum user comfort. It's an effort through this paper to present a solution through automatic regulation for fans and smart curtains.

The main purpose of an automatic curtain opener and closer is to offer convenience and ease of use. With a simple push of a button or through programmable settings, users can effortlessly control the opening and closing of curtains, adjusting the amount of natural light and privacy in a room. This technology is particularly beneficial for individuals with limited mobility as it eliminates the physical effort required to handle heavy or high curtains [1].

And also the Switching on and off control according to human detection and Speed control of the fan according to temperature. Fan speed will be changed automatically according to temperature using LM35 and fan will be turned on when the temperature will appear to 270 C and when human will enter the room. Fan will be turned off when human will leave the room[6].

II. LITERATURE SURVEY

[1]Rucha Badge et al has proposed "Automatic Curtain Management". The prototype was able to run smoothly after connecting with the mechanical part. Since we have used a timer for the DC motor to stop and start moving, the time for the motor to roll must be calibrated before use. According to the findings, the difference between our calculations, however, in reality, the motor and the mechanical parts, which are connected using strings have friction between both of them, and some error in the timing of the motor movement. Using the HC-05 Bluetooth module allows for remote control of your curtain system via a smartphone or other Bluetooth-enabled device. This provides flexibility and convenience in managing the curtains.

[2]B L Thanmai et al has proposed "Temperature Control Fan using Aurdino". Arduino based temperature-controlled fan is implemented. Thus, here fan speed has been controlled by using Pulse Width Modulation and Arduino board according to the temperature sensed by the help of Temperature. PWM technique is found to be the best technique for

controlling the fan speed using the sensed temperature. The system is working properly. The speed of fan depends on the temperature and there is no need for regulating the fan speed manually again and again.

[3]Yi-Bo wong et al has proposed "Control system based on Aurdino". By detecting and analyzing the factors that include the sunlight illumination, time, temperature, humidity and outdoor environmental conditions, the designed control system of curtains has the characteristics of high intelligence, compact, multi-functionalization, which are expected to have been widely used in high-grade office buildings, convention centers, hotels and other places.

[4]Dr.Sonthosh Kumar Allemki et al has proposed "Automatic Curtain Operation for Bedridden Person". The literature survey for the "Automatic Curtain Operation System for Bedridden Individuals through Embedded Systems" underscores the interdisciplinary nature of the project, combining elements of embedded systems, assistive technology, and home automation. Previous research has demonstrated the efficacy of embedded controllers such as Arduino and Raspberry Pi in facilitating automation in home environments. Studies on sensor integration, particularly infrared and ultrasonic sensors, showcase their effectiveness in detecting user presence and environmental conditions. Additionally, the integration of motorized curtain systems aligns with existing smart home trends, ensuring a seamless blend with modern living spaces.

[5]Snehashis Das et al has proposed "Automatic Temperature controlled fan". This project presents the major features and functions of the various concepts that could be used in this field in detail through various categories. Since this initial work cannot address everything within the proposed framework and vision, more research and development efforts are needed to fully implement the proposedframework through a joint effort of various entities.

[6]Ayesha Siddika et al has proposed Aurdino based Automatic fan Control system using PIR and LM 35 sensor. This paper elaborates the design and construction of fan speed control system to control the room temperature and turned on/off control automatically with the human detection. The temperature sensor was carefully chosen to gauge the room temperature, and motion sensor was chosen for detect the human Besides, the microcontroller had been used to control the fan speed using the fan speed in rpm and the Arduino was successfully programmed using C/C++ Language to compare temperature with standard temperature and set fan speed and their values displayed on LCD. Moreover, the fan speed will increase automatically if the temperature room is increased.

III. METHODOLOGY
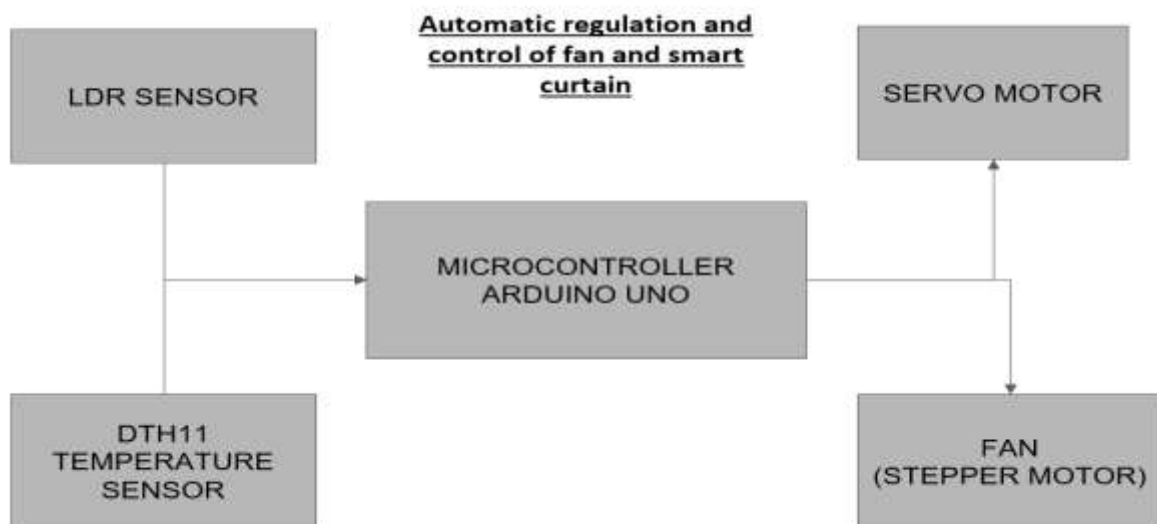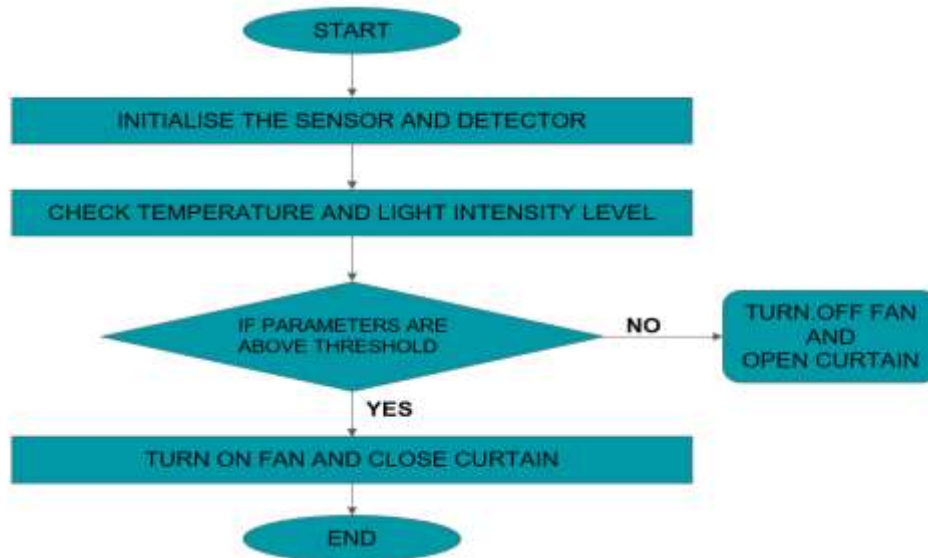
A.BLOCK DIAGRAM

FIGURE [1]-Automatic regulation and control of fan and smart curtain

Figure [1] represents the block diagram of Automatic Regulation Of Fan and Smart Curtain System in which we have used the components like AurdinoUNO,DTH11sensor,LDRsensor,Servo motor ,Stepper motor.

B.WORKING

First, a temperature sensor (e.g., DHT11) monitors the room's temperature, while a light sensor (e.g., LDR) detects ambient light intensity. The microcontroller processes these inputs and activates the fan if the temperature exceeds a predefined threshold or adjusts the fan speed using PWM for finer control. Similarly, the curtain is operated using a servo or stepper motor, opening when light intensity surpasses a set value and closing when it falls below another threshold. The system is tested individually and as a whole to ensure functionality under varying conditions, with optimizations for energy efficiency and safety measures, such as relays and circuit protection, implemented.

C.FLOW CHART

FIGURE[2] Represent the Flow Chart of the Automatic Regulation Of Fan and Smart Curtain System.

IV.   RESULT
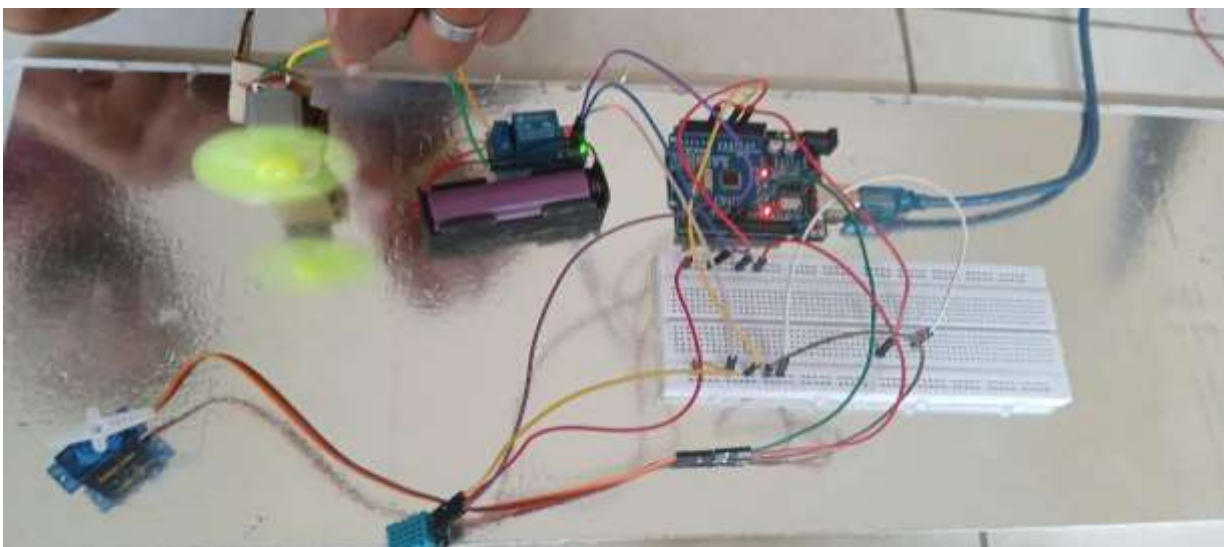
Figure[3]-Result of automatic regulation of fan and smart curtain.

V. CONCLUSION

By this project we can conclude that the Automatic Regulation and Control of Fan and Smart Curtain system is a cutting-edge solution that offers numerous benefits, including energy efficiency, convenience, and comfort. By integrating sensors, microcontrollers, and actuators, this system optimizes fan speed and curtain position to maintain a desired temperature, lighting, and ambiance. Suitable for various applications, such as smart homes, commercial buildings, industrial settings, agricultural environments, and healthcare facilities, this system enhances the value of properties while providing a comfortable and convenient experience. Overall, the Automatic Regulation and Control of Fan and Smart Curtain system is an innovative solution that improves energy efficiency, comfort, and convenience in various settings.

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