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# **TEMPERATURE BASED FAN SPEED CONTROLLER AND**

# **MONITORING WITH ARDUINO**

### Nikhil Asware<sup>\*1</sup>, Shashank Ahire<sup>\*2</sup>, Chinmay Kadam<sup>\*3</sup>, Omkar Wadne<sup>\*4</sup>

\*1,2,3,43rd Year, Information Technology(IT), Jayawantrao Sawant Polytechnic(JSP),

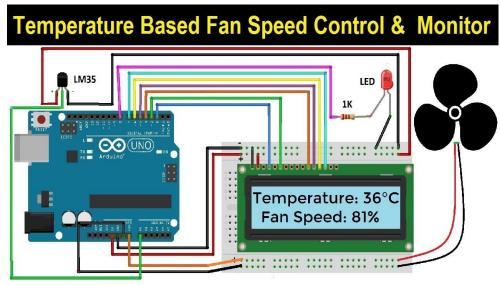
Pune, Maharashtra, India.

### ABSTRACT

"Temperature Based Fan Controller And Monitoring With Arduino" states that it is a standalone automatic fan speed controller that controls the speed of an electric fan based on temperature requirements. The system uses embedded technology and a closed-loop feedback-control system to control the fan speed efficiently and reliably. The project is compact and uses a few components, making it suitable for various applications such as air-conditioners, water-heaters, ovens, and more. The temperature and fan speed levels are displayed on an LCD panel. The project aims to save energy/electricity.

## I. INTRODUCTION

Temperature Based Fan Controller And Monitoring With Arduino" outlines the project's significance and objectives, emphasizing the need for energy-efficient control systems. It introduces the concept of using temperature sensors and feedback control to optimize fan speed based on temperature requirements. Key components like Arduino, temperature sensors, and an LCD display are discussed, highlighting their roles in creating a user-friendly system. Arduino's advantages as the microcontroller are mentioned.



#### **NEED OF THE STUDY**

The study of Temperature Based Fan Controller And Monitoring With Arduino addresses several needs and requirements in various applications:

**1. Energy Efficiency:** The system aims to optimize energy consumption by controlling the fan speed based on the temperature requirements. By dynamically adjusting the fan speed according to the sensed temperature, the system can provide efficient cooling or heating solutions while conserving energy.

**2. Temperature Regulation:** The system provides precise temperature control by monitoring the temperature using a temperature sensor and adjusting the fan speed accordingly. This ensures that the desired temperature is maintained within a specific range.

**3. Automation:** The study focuses on developing an automated system that can regulate the fan speed based on temperature without manual intervention. This automation eliminates the need for constant monitoring and manual adjustment of the fan speed.



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**4. User-Friendly Interface:** The system incorporates an LCD display to provide real-time temperature readings and fan speed information. This user-friendly interface allows users to easily monitor and control the fan speed based on the temperature.

**5. Cost-Effectiveness:** The study utilizes Arduino, a cost-effective and versatile microcontroller platform, as the core component of the system. Arduino boards are affordable, widely available, and easy to program, making them suitable for various applications.

**6. Versatility:** The system can be implemented in different environments and applications where temperature control and fan speed regulation are required. It can be adapted to various cooling or heating systems, such as air-conditioning, ovens, and water heaters.

**7.** Accuracy and Reliability: The study aims to develop a temperature-based fan control system that provides accurate and reliable temperature readings and precise control over the fan speed. This ensures that the system responds effectively to temperature changes and maintains the desired thermal conditions.

# II. RESEARCH METHODOLOGY

The research and methodology of the project "Temperature Based Fan Controller And Monitoring With Arduino" involve the use of an Arduino system to control the speed of a fan based on temperature.

Here is a detailed overview of the research and methodology based on the available search results:

**1. Temperature Sensor**: The project utilizes a temperature sensor, such as the LM35, to measure the temperature. The LM35 sensor provides accurate analog temperature readings and is commonly used in Arduino projects for temperature sensing.

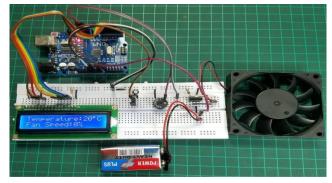
**2.** Arduino Uno: The Arduino Uno board is used as the microcontroller to process the temperature readings and control the fan speed. Arduino Uno is a popular and widely used development board that is compatible with various sensors and actuators.

**3. Fan Speed Control**: The fan speed is controlled using pulse width modulation (PWM) technique. PWM allows the Arduino to adjust the fan speed by varying the duty cycle of the signal sent to the fan. By changing the duty cycle, the average power delivered to the fan motor is adjusted, thereby controlling the fan speed.

**4. Display**: An LCD panel is used to display the current temperature and fan speed levels. The LCD panel provides a visual interface for monitoring the temperature and fan speed in real-time.

**5. Closed-Loop Feedback Control**: The project follows a closed-loop feedback-control system approach. The temperature readings from the sensor are continuously monitored, and the Arduino adjusts the fan speed based on the temperature readings. This ensures that the fan speed is dynamically controlled to maintain the desired temperature range.

**6. Power Consumption**: One of the objectives of the project is to reduce power consumption by varying the fan speed based on temperature. By adjusting the fan speed according to the temperature, the project aims to optimize energy usage and improve overall efficiency.



### III. RESULT AND DISCUSSION

The result and discussion of the project "Temperature Based Fan Controller and Monitoring With Arduino" involve the outcomes and findings of the implemented system. Here is a detailed overview of the result and discussion based on the available search results:



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**1. Temperature Monitoring**: The implemented system successfully measures the room temperature using a temperature sensor, such as the LM35. The LM35 sensor provides accurate temperature readings, allowing the system to monitor the temperature effectively.

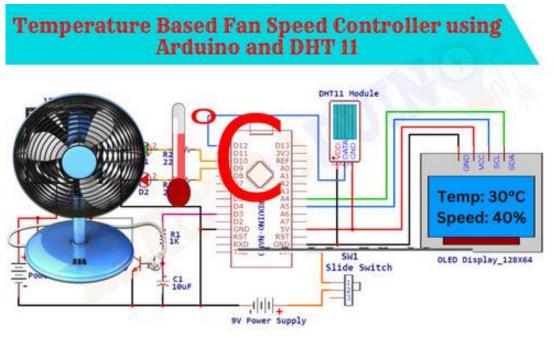
**2. Fan Speed Control**: The fan speed is controlled based on the temperature readings. By utilizing pulse width modulation (PWM) technique, the Arduino adjusts the fan speed to maintain the desired temperature range. This ensures efficient cooling while reducing power consumption.

**3. Display**: The system incorporates an LCD display to show the current temperature and fan speed levels. The LCD display provides real-time feedback, allowing users to monitor the temperature and fan speed easily.

**4. Power Consumption**: One of the objectives of the project is to reduce power consumption by adjusting the fan speed based on temperature. By dynamically controlling the fan speed, the system optimizes energy usage and improves overall efficiency.

**5. Hardware Components**: The hardware components used in the project include Arduino Uno, LM35 temperature sensor, LCD display, LED 16x2 display, DC motor, battery, resistors, potentiometer, capacitor, transistor, and diode.

**6. Conclusion**: The implemented temperature-based fan controller and monitoring system using Arduino successfully achieves the desired objectives of temperature control, fan speed adjustment, and power consumption optimization. By dynamically adjusting the fan speed based on temperature, the system provides efficient cooling while reducing energy consumption.



# **IV.** CONCLUSION

The conclusion of the project "Temperature Based Fan Controller And Monitoring With Arduino" is that the system successfully controls the fan speed based on temperature readings and monitors the temperature in real-time. It effectively measures the room temperature using a temperature sensor like the LM35 and adjusts the fan speed using PWM. The system optimizes energy usage, improves cooling efficiency, and provides real-time feedback through an LCD display. Overall, the temperature-based fan controller and monitoring system using Arduino offer an efficient solution for temperature control and fan speed adjustment in various applications.

## V. REFERENCES

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