AUTOMATED FAN WITH SPEED CONTROL USING TEMPERATURE SENSOR

A STEM PROJECT REPORT

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BONAFIDE CERTIFICATE

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ABSTRACT

This paper proposes an innovative system for automatic speed control in electronic devices using the LM35 temperature sensor. The primary objective is to regulate the speed of cooling fans or other cooling mechanisms in devices based on real-time temperature measurements. The LM35 sensor, known for its accuracy and simplicity, provides precise temperature data that is crucial for efficient speed control.

The system's architecture involves integrating the LM35 sensor with a microcontroller that processes the temperature readings and determines the appropriate speed for the cooling mechanism. Through an intelligent feedback loop, the microcontroller continuously adjusts the fan's speed to maintain a preset temperature threshold. As the temperature rises, the fan speed increases.

The experimental results demonstrate the system's efficacy in maintaining a stable temperature range during varying load conditions. The paper concludes that the automatic speed control using the LM35 temperature sensor is a valuable addition to electronic devices, contributing to their reliability and efficiency while preventing potential damage caused by overheating.

***Key words*: LM35 Sensor, Real-time temperature , Fan speed control, Microcontroller , Cooling mechanism .**

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LIST OF ABBREVIATIONS

ACRONYMS	ABBREVIATIONS
ADC	**A**nalog to **D**igital **C**onversers
C	**C**elsius
DC	**D**irect **C**urrent
f	**F**requency
IDE	**I**ntegrated **D**evelopment **E**nvironment
LCD	**L**iquid **C**rystal **D**isplay
LED	**L**ight **E**mitting **D**iode
MHz	**M**ega**h**ertz
PWM	**P**ulse **W**idth **M**odulation
RPM	**R**evolutions **P**er **M**inute
V	**V**olt
VHF	**V**ery **H**igh **F**requency

CHAPTER 1

INTRODUCTION

1.1 Introduction

In today's fast-paced world, the demand for efficient and intelligent control systems in various applications is rapidly increasing. One such area is the field of automatic speed control, where advancements in technology have paved the way for more sophisticated and reliable solutions. This project introduces an innovative Automatic Speed Control System that utilizes the LM35 temperature sensor to achieve precise and adaptive speed regulation in mechanical systems.

The LM35 temperature sensor is a popular and highly accurate integrated circuit sensor that measures ambient temperature. By interfacing this sensor with a microcontroller or embedded system, we can harness its capabilities to create a responsive speed control mechanism that adapts to changing environmental conditions.

Furthermore, the Automatic Speed Control System employing the LM35 temperature sensor offers versatility, as it can be integrated into various industrial and domestic setups. Applications range from greenhouse temperature control, industrial process automation, and electronic device cooling to automotive radiator fan speed modulation.

Throughout this project, we will explore the underlying principles of the LM35 temperature sensor, microcontroller programming, and the design of the speed control algorithm. The resulting system will not only demonstrate the practicality and reliability of the Automatic Speed Control System but also highlight the significance of integrating smart sensor technology into modern engineering solutions.

In conclusion, this project amalgamates the accuracy of the LM35 temperature sensor with intelligent control algorithms to realize an Automatic Speed Control System with diverse real-world applications. By enabling devices to operate optimally under varying temperature conditions, this system contributes to energy conservation, increased efficiency, and prolonged device life. As we delve into the project's development, we aim to unlock the potential of cutting-edge automation, further propelling us into an era of smarter and more sustainable technology.

1.2 Problem Identification

- Most human feels the badly designed about changing the fan rate level physically when the room temperature changes.
- Due to the careless of human being , electricity consumed by electronics become as large in world wide.
- Programming errors : If there is an error in program , the output is not effected 100% efficiency is not achieved

1.3 Need of the Project

The major need of this project is to conserve the electricity of the people we use and also reduce the risk factors like shock during rainy season and also make the home as smart home automatically it detects the temperature of the home and adjust the fan level as comfortable for the people who are using this automated fan system in their home and it automatically turns off when the particular temperature is reached and it can also being set by the people as well.

1.4 Objective

To implement the smart agricultural system that can be used to control the field activity by monitoring the real time data of the agricultural field on the web server which is collected from various sensors and to ON/OFF the fertilizer sprayer and motor and to reduce the work of on-time monitoring scenario for the farmers. It is designed to send automotive information of the field condition

1.5 Organization of the Project

The report emphasizes on the strategy of Intelligent Management of the electricity conservation and enable real-time temperature monitoring through a display or remote access. This feature allows users to stay informed about the current temperature status and fan operation. The basic organization of the report is as given below

Chapter 1: Deals with the introductive view to the project and facilitates acquaintance with the terminology

Chapter 2: Deals with the Literature survey for better understanding of the relevant project ideas and their conceptual ideas for the enhancement of the project work.

Chapter 3: Deals with the existing system and its relevance to our novel approach. The knowledge from existing systems helps in the enhancements and reliable commission of the project.

Chapter 4: Deals with methodology involved and the steps of execution of the project. It describes the hardware and software requirements and steps of implementation of the system.

Chapter 5: Deals with the system and the complete process description, regarding the interfacing of hardware being used for sensing the temperature and fan speed control.

Chapter 6: It puts forward the results and analysis of the working of the fan and controls the speed according to the live room temperature.

Chapter 7: Deals with the conclusion we obtained and the scopes for future work on the project.

1.6 Summary

Automated fan speed control using a temperature sensor finds versatile applications in various industries. In computer systems, it ensures efficient cooling by adjusting fan speed based on temperature, preventing overheating and enhancing performance. In home appliances, such as refrigerators and air conditioners, the system optimizes energy consumption and maintains consistent temperature levels. Industrial processes benefit from this technology by enhancing equipment reliability and reducing maintenance costs through precise temperature regulation. Additionally, in automotive applications, it enhances engine cooling and minimizes fuel consumption. Overall, the automated fan speed control using a temperature sensor offers energy efficiency, component protection, and improved performance across multiple sectors.

CHAPTER 2

LITERATURE SURVEY

2.1 Introduction

The innovative ideas and concepts which helped for the proposal of this intelligent management were taken from the following papers and journals. This has helped in gaining information regarding the works and procedures of the existing systems. Encapsulating the advantages and disadvantages of various existing systems henceforth helped in modifying the project.

2.2 Base paper

[1] M. Saad, H. Abdoalgader, and M. Mohamed , Automatic Fan Speed Control System Using Microcontroller, 6th Int'l Conference on Electrical, Electronics & Civil Engineering (ICEECE'2014) Nov. 27-28, 2014 Cape Town (South Africa)

[2] K. Singh, M. Dhar, P. Roy, Automatic fan speed control system using Arduino, ISSN: 2456-4184 International Journal of Novel Research and Development(IJNRD)4 April 2017

[3] V. Vats and U. Kumar, Speed control of fan based on room temperature by using programmable logic controller , International Journal of Recent Scientific Research Vol. 6. Issue,4, pp.3537-3539, April, 2015.

[4] M.P. Andersen, H.-S. Kim, D.E. CullerHamilton: A Cost-effective, Low Power Networked Sensor for Indoor Environment MonitoringProceedings of the 4th ACM International Conference on Systems for Energy-Efficient Built Environments (2017).

[5] B. LEVARDA and C. BUDACIU, “The Design Of Temperature Control System Using Pic18f46201,” ICSTC, PP 282−286, 2010.

[6] J.E. Johnson, P.F. Maccarini, D. Neuman, P.R. Stauffer, "Automatic Temperature Controller for Multielement Array Hyperthermia Systems," IEEE Transactions on Biomedical Engineering, pp. 1006-1015, 2006.

[7] T, Fu, X. Wang, G. Yang, "Design of Automatic- Temperature-Control Circuit Module in Tunnel Microwave Heating System," In Proceedings of the IEEE International Conference on Computational and Information Sciences, pp. 1216-1219, 2010.

[8] Data sheet, LM35 Precision Centigrade Temperature Sensors, National Semiconductor, Nov., 2000

[9] T. C. Lun, Microcontroller for Variable Speed BLDC Fan Control System, Freescale Semiconductor.

CHAPTER 3

AUTOMATED FAN SPEED CONTROL

3.1 Introduction

Electric fan is one of the most popular electrical devices due to its cost effectiveness and low power consumption advantages. It is a common circuit and widely used in many applications. It is also one of the most sensible solutions to offer a comfortable and energy efficient. In fact, the fan has been long used and still available in the Market.

Nowadays, the demand for accurate temperature control and air freshening control has conquered many of industrial domains such as process heat, automotive, industrial places or office buildings where the air is cooled in order to maintain a comfortable environment for its occupants. One of the most important concerns involved in heat area consist in the desired temperature achievement and consumption optimization. Fan can be controlled manually by pressing on the switch button. where in this method, any change in the temperature will not give any change in the fan speed. except the usage change the speed of the fan which is manually. So, an automatic temperature control system technology is needed for the controlling purpose in the fan speed according to the temperature changes.

Many researches focusing on automatic temperature control system application in different fields will gain the benefits.

3.2 Process Description

Sensor Installation

Select a suitable location for the temperature sensor, preferably in an area that accurately represents the ambient temperature affecting the device. Install the temperature sensor securely, ensuring it has proper access to measure the surrounding temperature effectively. Connect the sensor to the controller using appropriate wiring and connectors.

Controller Setup

Install and configure the controller software on a computer or microcontroller capable of processing temperature data. Establish communication between the temperature sensor and the controller. Set up the desired temperature range and corresponding speed adjustments for the device.

Calibration

Calibrate the temperature sensor to ensure accurate readings within the desired temperature range. Perform test runs to verify that the speed control unit responds correctly to the temperature readings.

Temperature Monitoring and Data Collection

The temperature sensor continuously monitors the ambient temperature.The controller collects temperature data at regular intervals.

Speed Control Logic

The controller compares the current temperature readings with the predefined temperature range. Based on the temperature data, the controller determines the appropriate speed adjustment required to maintain optimal performance or safety.

Speed Adjustment

The controller sends speed control signals to the speed control unit, which adjusts the speed of the device accordingly. The actuator receives the control signals and translates them into physical speed adjustments (e.g., changing engine RPM, motor speed, or fan velocity).

Monitoring and Display (optional)

If a display unit is available, it shows real-time temperature readings and speed adjustments for better monitoring and system transparency.

Safety Measures

Implement safety features to prevent excessive speed adjustments in response to abrupt temperature fluctuations. Include fail-safe mechanisms to handle sensor malfunctions or communication issues.

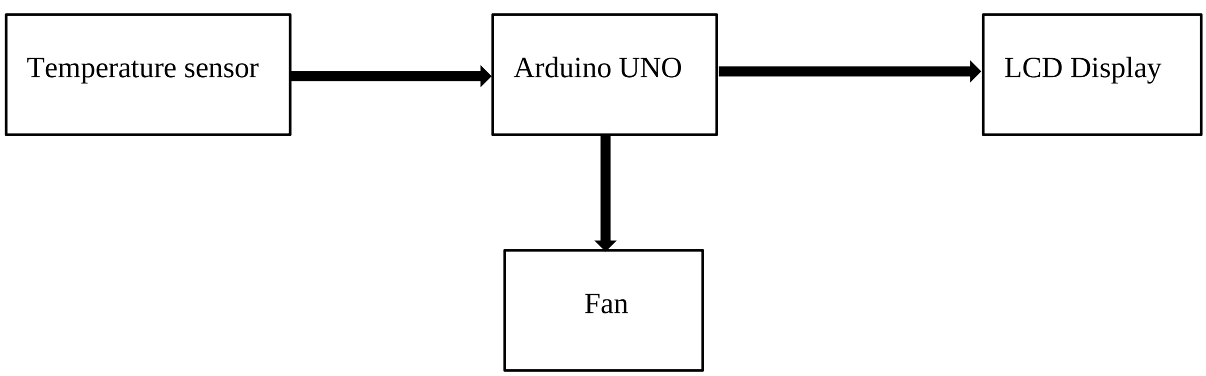

Fig 3.1 Functional Block Diagram for Fan Speed Control System

3.3 Analysis of Automated Fan speed control

- **Energy Efficiency**: Fan speed control based on temperature ensures that the fan operates only when necessary, reducing energy consumption compared to fixed-speed fans that run continuously. This results in cost savings and a more environmentally friendly cooling solution.

- **Improved Thermal Management**: By adjusting the fan speed according to the ambient temperature, the system can maintain a consistent and optimal temperature within the desired range. This prevents overheating and ensures the efficient cooling of components, leading to enhanced performance and reliability.

- **Noise Reduction**: Fan speed control prevents fans from running at maximum speed at all times, reducing the noise generated during low cooling demands. This creates a quieter environment, making it suitable for noise-sensitive applications or residential settings.

- **Extended Equipment Lifespan**: By operating the fan at lower speeds when cooling demands are minimal, fan speed control reduces mechanical wear and tear, resulting in a longer lifespan for the fan and other cooling system components. This leads to lower maintenance costs and increased equipment reliability.

3.4 Summary

As a result, the fan operates at higher speeds during elevated temperatures for effective cooling and slows down when the temperature is within acceptable limits, leading to energy savings, reduced noise, improved thermal management, and extended fan lifespan.

CHAPTER 4

INTELLIGENT MANAGEMENT FOR WORKING PROCESS

4.1 Introduction

The benefits of such an intelligent management system are multifold. Firstly, it significantly enhances energy efficiency by avoiding unnecessary power consumption during periods when full cooling capacity is not required. Secondly, the dynamic speed control enables the system to adapt to varying environmental conditions, optimizing cooling efficiency throughout the day and across different seasons. Moreover, the system's ability to remotely access and control the fan speed through modern interfaces, such as smartphones or web applications, adds an unprecedented level of convenience and flexibility for users.

4.2 Methodology

The various hardwares like LM35 temperature sensor ,2N2222 transistor ,LCD display ,IN4007 diode are connected to the arduino board. Here arduino board acts as a master control for this automated system.The 12v battery is connected to the arduino board as a power supply to this system.Temperature is input for this system .After the data collection the temperature sensor will send the input to the arduino board which we can able to see the data which are sending to the board and it starts to progress.The arduino borad in programmed by using the software called arduino IDE.By those values collected it makes the fan speed and make the fan control and energy conservation by to ON/OFF with the help of relay for limiting the power from the supply at their requirements.

4.3 Functional Block Diagram

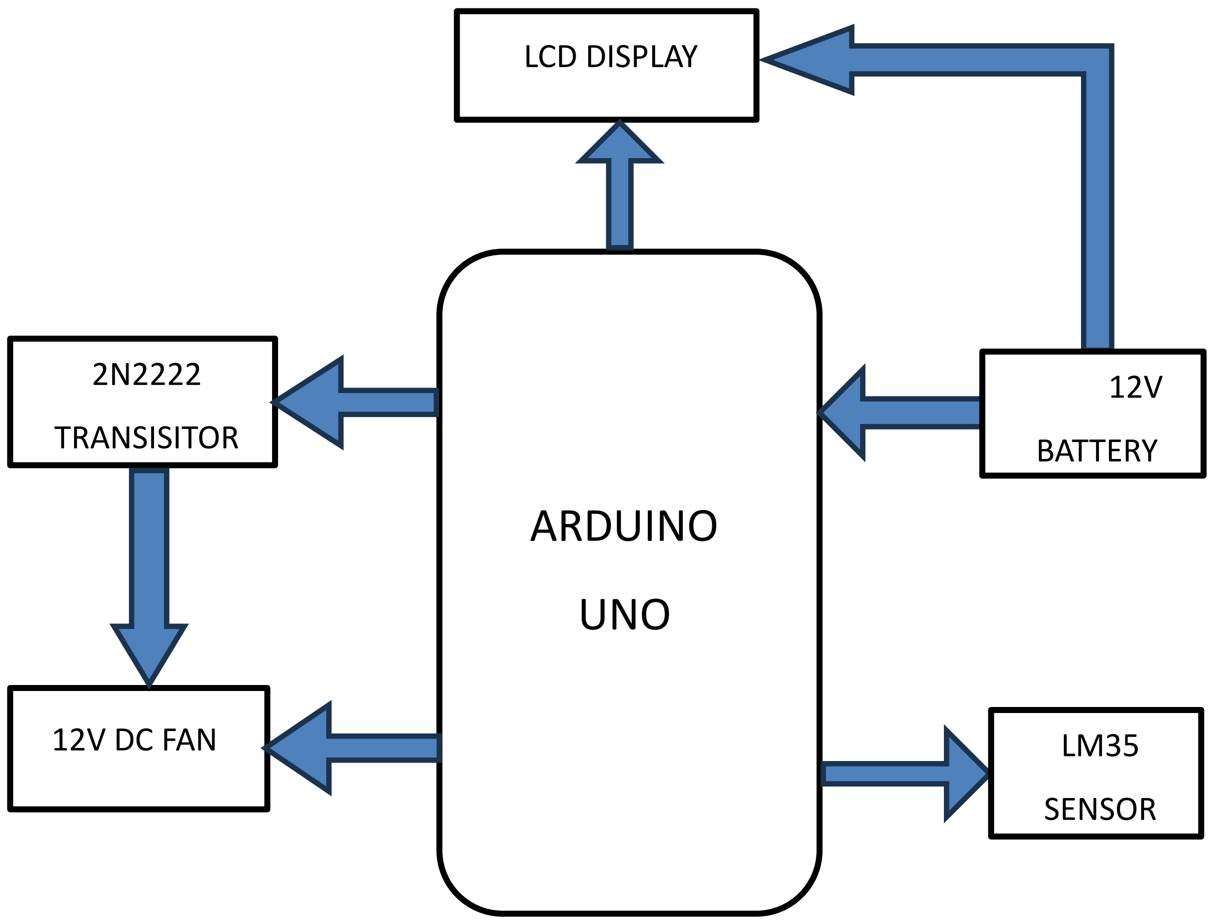

Fig 4.1 Functional Block Diagram

The Figure 4.1 shows the functional block diagram. The automated fan speed control system employs the LM35 temperature sensor to measure the ambient temperature and convert it into an analog voltage signal. A microcontroller processes this signal, calculates the appropriate fan speed based on the temperature data, and generates a corresponding PWM signal. The fan speed control circuit regulates the power supplied to the cooling fan based on the PWM signal, adjusting its speed accordingly. This continuous monitoring and real-time adjustment ensure efficient cooling while conserving energy and prolonging the fan's lifespan based on the changing environmental conditions.

4.4 Hardware Description

4.4.1 Arduino UNO

Arduino Uno is an open-source microcontroller board based on the ATmega328P microcontroller. It is one of the most popular and widely used boards in the Arduino family due to its simplicity, affordability, and versatility. The board was developed by Arduino.cc and has gained immense popularity in the maker and hobbyist communities.

Fig 4.2 Arduino UNO

4.4.2 Temperature sensor

The LM35 series is an integrated circuit sensor where obtained voltage is linearly proportional to Centigrade. LM35 temperature sensor is shown in Figure 4.3. The LM35 has an advantage over linear temperature sensors calibrated in ºKelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. LM35 does not require any external calibration or trimming to provide the typical accuracies of ±¼ ºC over a full -55 to ±120ºC temperature range.

Fig 4.3 Temperature sensor

4.4.3 DC Fan

A DC fan, also known as a direct current fan, is an electrical device designed to generate airflow by converting electrical energy from a direct current power source into mechanical rotation. These fans are widely used for cooling purposes.

Fig 4.4 12V DC fan

The principle behind a 12V DC fan is based on the conversion of electrical energy into mechanical energy using direct current (DC).The motor contains coils of wire and magnets, and when the current flows through the coils, it generates a magnetic field**.**

4.4.4 LCD Display

Real-time Temperature Display: The LM35 temperature sensor continuously measures the ambient temperature. The Arduino or microcontroller connected to the LM35 reads the temperature data and displays it on the LCD. Users can easily view the current temperature in degrees Celsius or Fahrenheit, providing them with valuable information about the environment's thermal condition.

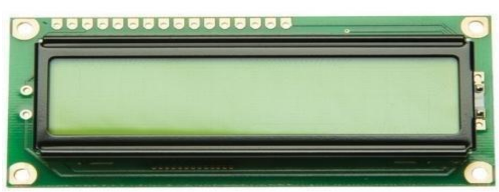

Fig 4.5 LCD Display

Pin Description:

Pin no	Function	Name
1	Ground (0V)	Ground
2	Supply voltage; 5V (4.7V – 5.3V)	VCC
3	Contrast adjustment; through a variable resistor	VEE
4	Selects command register when low; and data register when high	Register Select
6	Sends data to data pins when a high to low pulse is given	Read / write
7	8-bit data pins	DB0
8		DB1
9		DB2
10		DB3
11		DB4
12		DB5
13		DB6
14		DB7
15	Backlight VCC (5V)	Led+
16	Backlight Ground (0V)	Led-

Table 4.1 LCD Pin Description

4.4.5 2N2222 Transistor

The 2N2222 from Multicomp Pro is a through hole, low power bipolar transistor in TO-18 metal can package. This NPN silicon planar switching transistor is used for switching, linear DC power supply and VHF amplifier applications.

Fig 4.6 2N2222 Transistor

Specifications

Collector emitter breakdown voltage is 30V at IC = 10mA, IB = 0

Continuous collector current (Ic) of 800mA

Power dissipation is 500mW at Ta = 25°C

Operating junction temperature range from -65°C to 200°C

Collector emitter saturation voltage is 1.6V at IC = 500mA, IB = 50mA

DC current gain is 30 at IC = 500mA, VCE = 10V

Collector base breakdown voltage is 60V at IC = 10µA, IE = 0

Transition frequency is 250MHz at IC = 20mA, VCE = 20V, f = 100MHz

4.4.6 Power supply

An input of12V supply is given as the input power supply to the source. A regulated power supply is an embedded circuit it converts unregulated Supply into DC. Its function is to supply a stable voltage to a circuit or device, that must be operated within certain power supply limits. The output from the regulated power supply may be alternating or unidirectional, but is nearly always DC (Direct Current).

4.4.7 1N4007 Diode

The 1N4007 diode is a widely used rectifier diode belonging to the 1N400x series of diodes. It is commonly employed in various electrical and electronic circuits for rectification purposes.

Fig 4.7 1N4007 Diode

Specifications

Maximum Recurrent Peak Reverse Voltage 1000V

Maximum RMS Voltage 700V

Maximum DC Blocking Voltage 1000V

Average Forward Current: 1.0A

Peak Forward Surge Current: 30A

Maximum Instantaneous Forward Voltage: 1.0V

Maximum DC Reverse Current At Rated DC Blocking Voltage: 5.0μA @ 25°C

Typical Junction Capacitance: 15pF

Typical Reverse Recovery Time: 2.0us

Mounting Type: Through Hole

Operating Temperature: -55°C ~ 150°C

4.4.8 LED

When a current travels through a light-emitting diode, it emits light. Electrons recombine with electron holes in the semiconductor, producing energy in the form of photons. The energy required for electrons to pass the semiconductor's band gap determines the colour of the light.

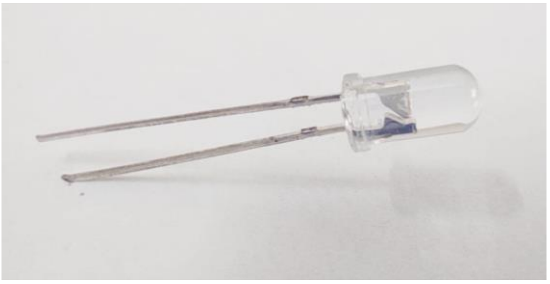

Fig 4.8 LED

4.5 Software Description

The software requirements of the project are follows

4.5.1 Arduino IDE

The Arduino Integrated Development Environment (IDE) is a user-friendly software application designed for programming Arduino microcontrollers. It features a code editor with syntax highlighting and auto-completion, a compiler for converting Arduino code to machine-readable format, a library manager for easy installation of code modules, a serial monitor for debugging and communication, and a board manager to support various Arduino board types. With a vast community and example sketches, the Arduino IDE empowers users to create diverse projects, from simple experiments to complex electronics and robotics endeavors.

4.6 Summary

this chapter deals with the component details which are employed in this system for automated fan control usng LM35 temperature sensor. The various stepes involved in the total system are being discussed. In this project the automated fan control is done through the control of arduino board and means of the sensor and data information displayed on the LCD display.In this chapter also discussed about the implementation of the hardwares using in the system.

CHAPTER 5

PROPOSED SYSTEM

5.1 Introduction

With the advancement in technology, intelligent systems are introduced every day. Everything is getting more sophisticated and intelligible. There is an increase in the demand of cutting edge technology and smart electronic systems. Microcontrollers play a very important role in the development of the smart systems as brain is given to the system. Microcontrollers have become the heart of the new technologies that are being introduced daily. A microcontroller is mainly a single chip microprocessor suited for control and automation of machines and processes.

Today, microcontrollers are used in many disciplines of life for carrying out automated tasks in a more accurate manner. Almost every modern day device including air conditioners, power tools, toys, office machines employ microcontrollers for their operation. Microcontroller essentially consists of Central Processing Unit (CPU), timers and counters, interrupts, memory, input/output ports, analog to digital converters (ADC) on a single chip. With this single chip integrated circuit design of the microcontroller the size of control board is reduced and power consumption is low. This project presents the design and simulation of the fan speed control system based on the temperature.

A temperature sensor has been used to measure the temperature of the room and the speed of the fan is varied according to the temperature. The duty cycle is varied from 0 to 100 to control the fan speed depending upon the temperature, which is displayed on Liquid Crystal Display.

5.2 Temperature sensor selection

Temperature sensor selection is a crucial aspect of designing an automatic fan speed control system. The choice of the right temperature sensor depends on several factors, including accuracy, sensitivity, range, response time, and cost.

The LM35 is a temperature sensor manufactured by Texas Instruments that operates on the principle of a voltage output proportional to the temperature it senses. This analog sensor has been widely adopted for temperature measurement and control in various electronic projects and industrial applications due to its simplicity, accuracy, and ease of use Furthermore, the LM35 does not require any external components such as calibration resistors or signal conditioning circuits, which reduces the overall complexity and cost of the system.

It operates on a single power supply voltage, typically ranging from +4V to +30V, making it compatible with various electronic systems.Furthermore, the LM35 does not require any external components such as calibration resistors or signal conditioning circuits, which reduces the overall complexity and cost of the system. It operates on a single power supply voltage, typically ranging from +4V to +30V, making it compatible with various electronic systems. By the above specifications we choose lm35 sensor.

5.3 Flow of working process

The automated fan speed control system using a temperature sensor operates by continuously reading the ambient temperature through the sensor. Upon obtaining the temperature value, it determines the appropriate fan speed level based on predefined temperature ranges. The system then adjusts the fan speed accordingly, ensuring efficient cooling and maintaining a comfortable environment. The process repeats in a loop, continuously monitoring the temperature and updating the fan speed as needed, providing an automated and hassle-free solution for temperature regulation.

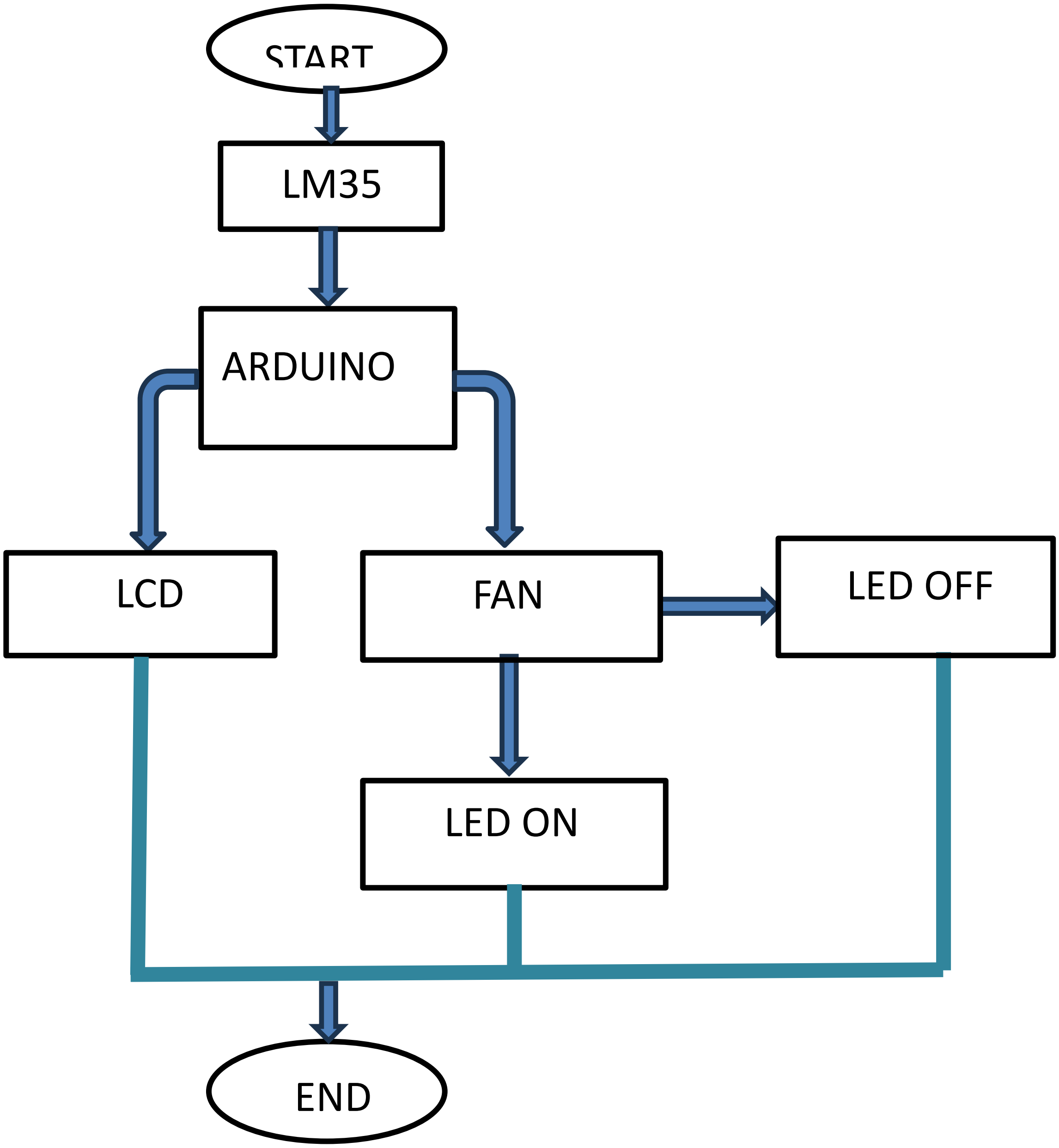

Fig 5.1 Flow of working process

5.4 Summary

Automated fan speed control using a temperature sensor is a system that adjusts the fan's speed based on the surrounding temperature. The temperature sensor continuously monitors the ambient temperature, and the fan's controller adjusts its speed accordingly to maintain a desired temperature range. This helps optimize energy usage and ensures efficient cooling or ventilation, preventing overheating and unnecessary fan noise.

CHAPTER 6

RESULTS AND DISCUSSION

6.1 Sensor Unit

In this chapter the sensors output is given such that they are placed and with the variations observed, the parameters have been observed.

6.2 Automated Fan Speed Control Using Temperature Sensor

Automated fan speed control using a temperature sensor is a system that adjusts the speed of a fan based on the ambient temperature in its surroundings. When the temperature rises, the sensor detects the change and signals the fan controller to increase the fan's speed.

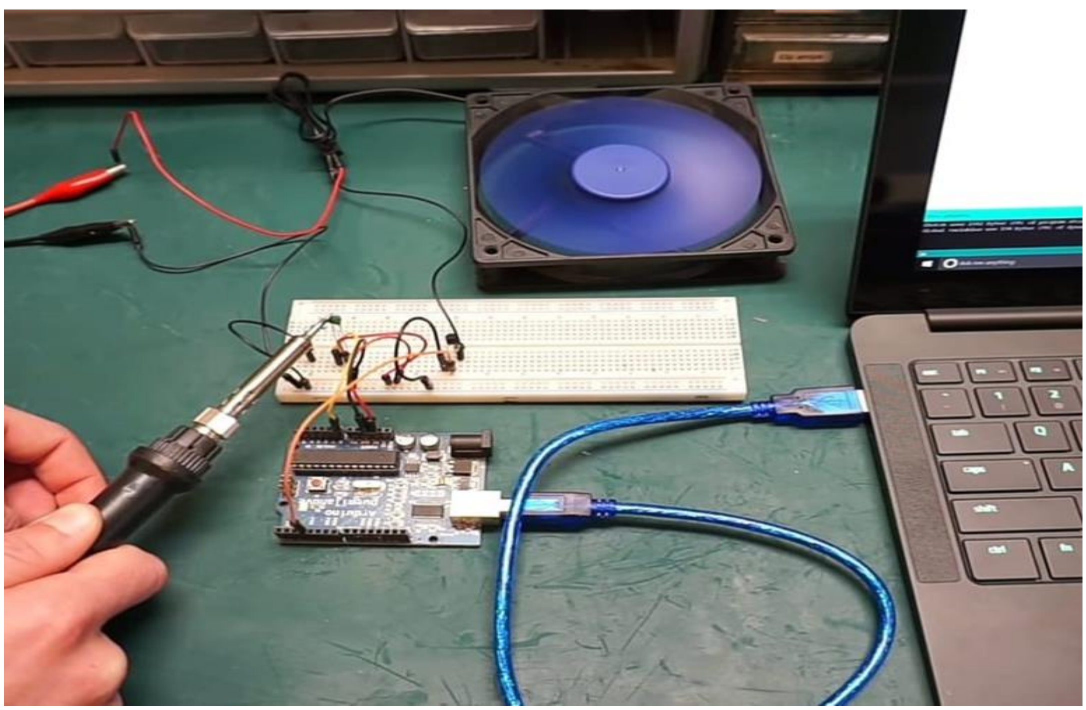

Fig 6.1 Experimental Setup

Automated fan speed control using a temperature sensor is a system that adjusts the speed of a fan based on the ambient temperature in its surroundings. When the temperature rises, the sensor detects the change and signals the fan controller to increase the fan's speed. The higher fan speed helps dissipate excess heat and maintain a comfortable temperature level. As the temperature decreases, the fan speed is reduced accordingly, conserving energy and reducing noise levels. This automation ensures efficient cooling and temperature regulation, providing a convenient and seamless experience without requiring manual intervention.

Temperature (ºC)	**Fan Speed (%)**
10	0
20	20
30	40
40	60
50	80
60	100
70	100

Table 6.1 Sensor Readings

6.3 Sensor and Fan Speed Reading on LCD

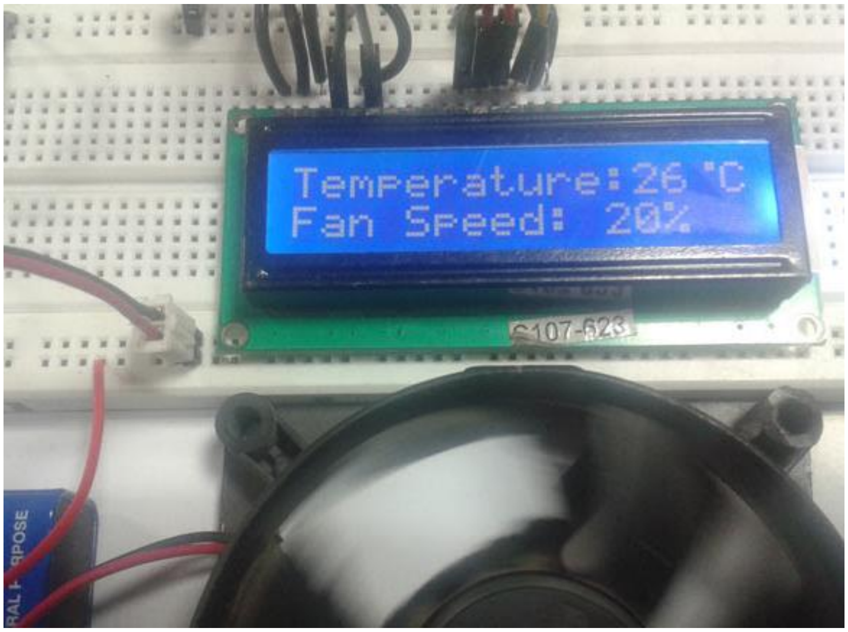

Fig 6.2 Sensor and Fan Speed Reading on LCD

As LCD Display is used for displaying the Sensor readings and fan speed as shown in the Figure 6.2.

6.4 Result and analysis

The results and analysis for the proposed automatic fan speed control using a temperature sensor would typically involve evaluating the system's performance under different conditions and scenarios. Here are some key aspects that would be included in the results and analysis:

- **Temperature-Fan Speed Relationship:**

The relationship between the temperature readings from the sensor and the corresponding fan speed adjustments should be presented. This could be in the form of a graph or a table showing how the fan speed changes as the temperature varies.

- **Response Time:**

The system's response time is critical in maintaining a comfortable environment. The analysis should include the time taken for the fan to adjust its speed in response to changes in temperature.

- **Power Consumption:**

The power consumption of the system during different fan speed levels and temperature ranges should be measured and analyzed to optimize energy efficiency.

- **User Experience:**

If possible, user feedback on the system's performance, ease of use, and overall satisfaction should be collected and analyzed.

- **Comparison to Manual Control:**

A comparison between the automatic fan speed control system and manual control (if available) should be made to determine the benefits and improvements offered by the automated system.

- **Limitations and Future Enhancements:**

The analysis should highlight any limitations or challenges encountered during testing and suggest possible improvements or enhancements for future iterations of the system.

6.5 Summary

The chapter deals with the results obtained from the proposed Intelligent management through the helps of various sensors and the web server. This irrigation practice was introduced for long distant monitoring of the field in an automated manner.

CHAPTER 7

CONCLUSION AND FUTURE SCOPE

7.1 Conclusion

In conclusion, the automated fan speed control system using a temperature sensor offers an effective and user-friendly solution for regulating fan speed based on ambient temperature. By continuously monitoring the temperature and adjusting the fan speed accordingly, the system ensures optimal cooling performance while maintaining a comfortable environment. The integration of a temperature sensor and microcontroller enables precise and automated control, eliminating the need for manual adjustments. This technology finds applications in various domains, including computers, home appliances, and industrial equipment, enhancing energy efficiency and extending the lifespan of cooling components. Overall, the automated fan speed control system presents a reliable and efficient approach to temperature management, contributing to improved user experience and reduced energy consumption.

7.2 Future Scope

1. We can monitor more parameters like humidity, light and at the same time control them.
2. We can send this data to a remote location using mobile or internet.
3. We can draw graphs of variations in these parameters using computer.
4. When temperature exceeds the limit, a call will be dialed to the respective given number by an automatic Dialer system.

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