
# Walchand College Of Engineering, Sangli.

**(An Autonomous Institute)**

**Department**
**of**
**Computer Science and Engineering**

**Mini-Project Synopsis**
on

## Temperature & Motion Sensing Smart Fan

By

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## 1. Problem statement

Design and develop an intelligent Temperature & Motion Sensing Smart Fan utilizing IoT technology to enhance energy efficiency and user comfort. The primary challenge is to create a cost-effective and user-friendly system capable of dynamically adjusting fan speed based on real-time temperature fluctuations and human presence within a specified area. The solution should integrate seamlessly with IoT platforms

## 2. Abstract:

In the era of smart technology, the integration of Internet of Things (IoT) has revolutionized conventional appliances. This paper introduces a cutting-edge innovation, the "Temperature & Motion Sensing Smart Fan," designed to enhance user comfort and energy efficiency. Utilizing IoT technology, this smart fan incorporates temperature and motion sensors, enabling intelligent and automated operation. The system collects real-time environmental data through sensors, allowing the fan to adjust its speed dynamically based on the ambient temperature. Moreover, motion sensors detect human presence, enabling the fan to power on or off automatically, conserving energy when the room is unoccupied.

3. **Literature Survey**

Automatic Temperature Controlled Household Electric Ceiling Fan
.
https://www.researchgate.net/publication/323384762_Automatic_Temperature_Controlled_Household_Electric_Ceiling_Fan#:~:text=An%20automatic%20temperature%20controlled%20household,to%20enhance%20convective%20heat%20transfer.

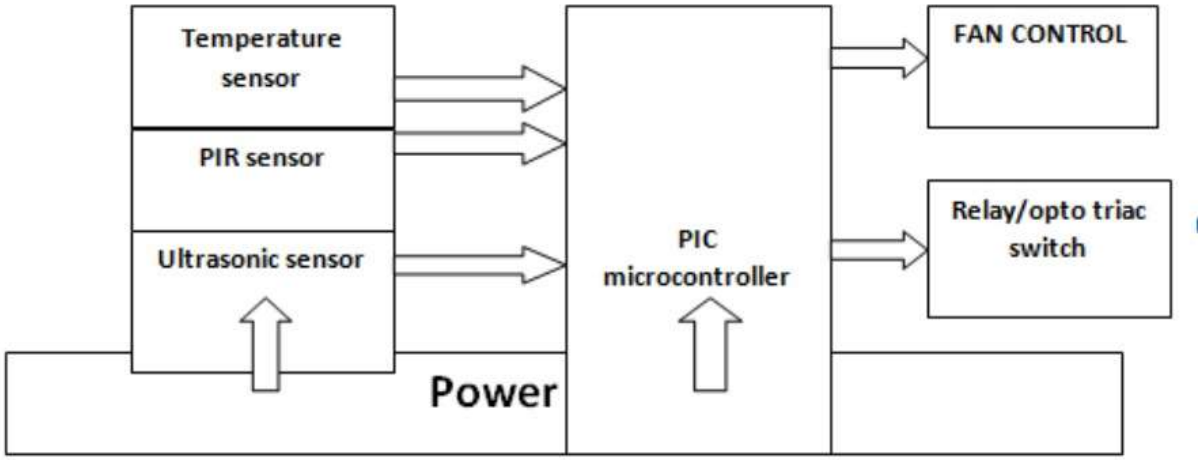
IoT-based Smart Home Automation: A Comparative Analysis
Ranjeeta Kaur; Prashant Vats; Manju Mandot
https://ieeexplore.ieee.org/document/9596421

4. **Objectives:**

Key goals of this project include:

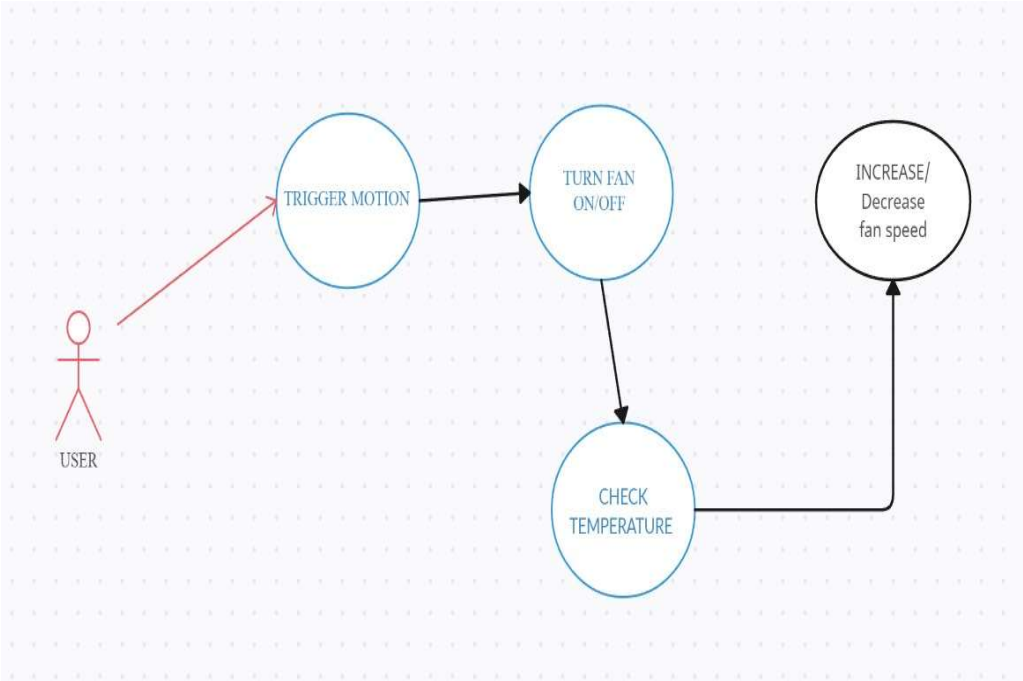
1. Develop a Temperature & Motion Sensing Smart Fan prototype utilizing IoT technology.
2. Implement sensors to accurately detect room temperature and motion presence.
3. Integrate IoT modules for real-time data transmission and remote control functionality.

## 5. Functional Block Diagram :




## 6. UML diagram:

### USE CASE Diagram:



## 7. Methodology :

Designing a smart fan system using a temperature sensor and a PIR sensor involves several phases, including planning, hardware setup, software development, testing, and documentation. Below is a methodology to guide you through the project:

**1. Project Planning:**

a. Define Objectives: Clearly define the objectives of your project, such as creating an energy-efficient fan that responds to temperature and human presence.

b. Scope: Determine the specific features and capabilities of your smart fan, such as the temperature threshold for fan activation, fan speed control, and PIR sensor sensitivity.

c. Materials and Components: Create a list of the materials and components you'll need, including the fan, temperature sensor, PIR sensor, microcontroller (e.g., Arduino), power supply, wires, and housing for the system.

**2. Hardware Setup:**

a. Connect Sensors: Wire the temperature sensor and PIR sensor to the microcontroller following the manufacturer's specifications and guidelines.

b. Assemble the Smart Fan: Integrate the fan into your setup, ensuring that it's safely connected to the microcontroller for control.

**3. Software Development:**

a. Sensor Data Acquisition: Write code to read data from the temperature sensor and PIR sensor connected to the microcontroller.

b. Control Logic: Develop the control logic for your smart fan, considering the following:

- Implement temperature-based control: Decide how the fan speed or activation will vary with temperature.
- Implement motion-based control: Determine how the PIR sensor data will affect fan behavior.

**4. Testing and Troubleshooting:**

a. Unit Testing: Test the temperature and PIR sensors separately to ensure they are functioning correctly.

b. Integration Testing: Test the entire system to verify that the fan responds appropriately to changes in temperature and human presence.

Remember that flexibility is key in project development. You may need to revisit and adjust certain aspects of your methodology as you encounter challenges or find opportunities for improvement during the project's implementation. Document your progress throughout the project to create a comprehensive record of your work.

**8. Outcomes / Deliverables:**

A mini-project based on a temperature and motion-controlled fan using Arduino can have various valuable outcomes. Here are some of the potential outcomes you can expect from this project:

1. Fully Functional Smart Fan:The primary outcome is a functional smart fan that can automatically adjust its speed or turn on/off based on temperature and motion detection using the Arduino as the control unit.

2. Temperature Sensing: An outcome would be the ability to accurately measure and monitor room temperature using a temperature sensor (LM35) and display this data on an interface or an LCD screen.

3. Motion Detection: The project should successfully detect human motion using a PIR (Passive Infrared) sensor and trigger the fan accordingly.

4. Variable Fan Speed: Depending on the room's temperature, you should be able to control the fan's speed, ensuring comfort and energy efficiency. This involves dynamically adjusting the fan speed in response to temperature changes.

5. Energy Efficiency: An important outcome is energy savings, as the fan should reduce energy consumption by only running when needed.

9. **Project Potentials:**

**1.Smart Climate Control:** Enable the fan to adjust its speed based on the ambient temperature. Higher speed for hotter temperatures and lower speed for cooler temperatures. Implement a user-defined temperature threshold, allowing users to set their preferred comfort level.

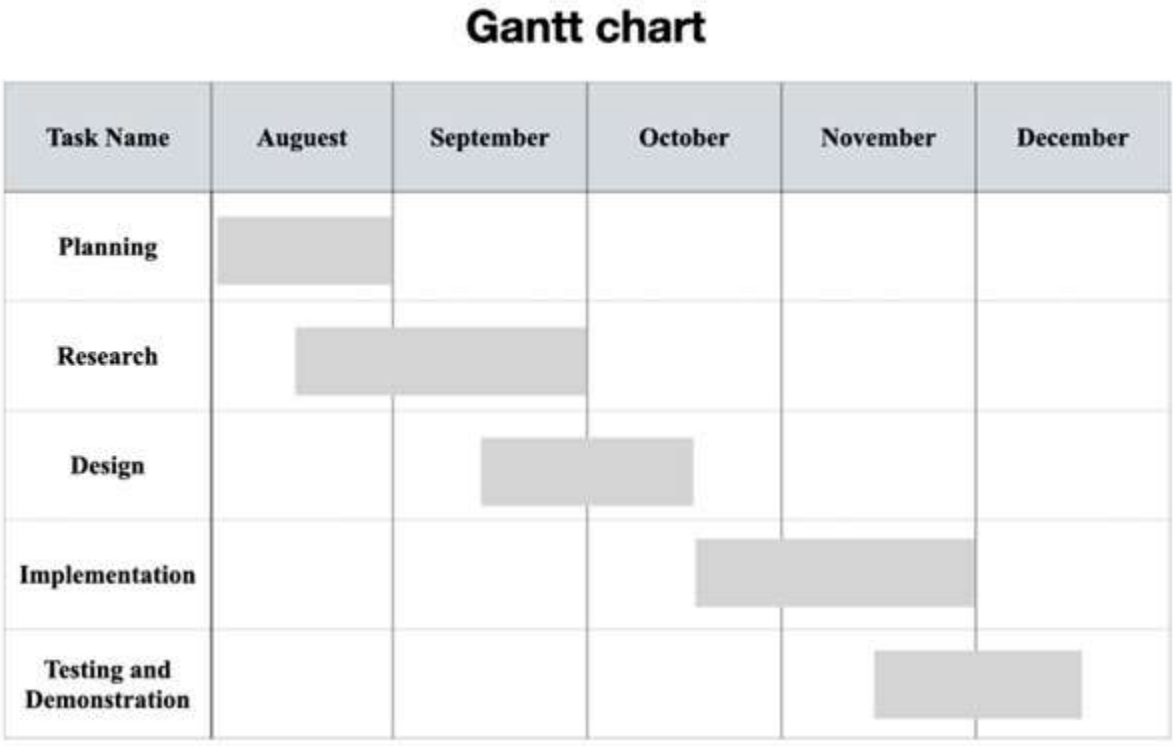
**2.Occupancy Sensing**: Use motion sensors to detect if there are people in the room. If no motion is detected for a certain period, the fan could automatically turn off to save energy. Implement machine learning algorithms to differentiate between human motion and other movements (like pets) for accurate occupancy detection.

**3.Energy Efficiency:** Implement energy-efficient fan motor technologies and PIR sensor to optimize energy consumption.

**4.Customization and User Experience:**

Implement LED lights or display panels on the fan to show real-time room temperature, humidity, and fan speed.

10. **Project plan** :




Budget: Approx 2000RS

11. **References :**

An overview of IoT architectures, technologies, and existing projects. Tomás Domínguez-Bolaño, Omar Campos, Valentín Barral, Carlos J. Escudero, José A. García-Naya
https://www.sciencedirect.com/science/article/pii/S254266052200107X

An IOT Based Smart Fan Module by Anup Bind1, Kiran Ashtankar2, Prof. Mahesh Chahare3
https://www.irjet.net/archives/V7/i4/IRJET-V7I4238.pdf