

EN1190 Engineering Design Project

Temperature Sensitive Switch

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Abstraction

In many households and workplaces, fans are often left running unnecessarily—especially during the night or in unoccupied rooms—leading to discomfort and significant energy waste. Users frequently wake up feeling too cold or forget to turn off the fan, resulting in excessive power consumption.

We propose a **smart plug-based temperature-sensitive switch** that:

- Turns the fan ON/OFF based on temperature and humidity
- Allows scheduling via a mobile app
- Enables remote control for convenience

Our goals are:

- **Energy Efficiency**
- **User-Friendly Operation**
- **Affordability**

Modules We Use

- **Microcontroller:** ATmega328
- **Relay Module:** MD0486
- **Bluetooth Module:** HC-05
- **Sensors:** DHT11 (Temperature and Humidity)
- **Display:** LCD 1602

PCB Design

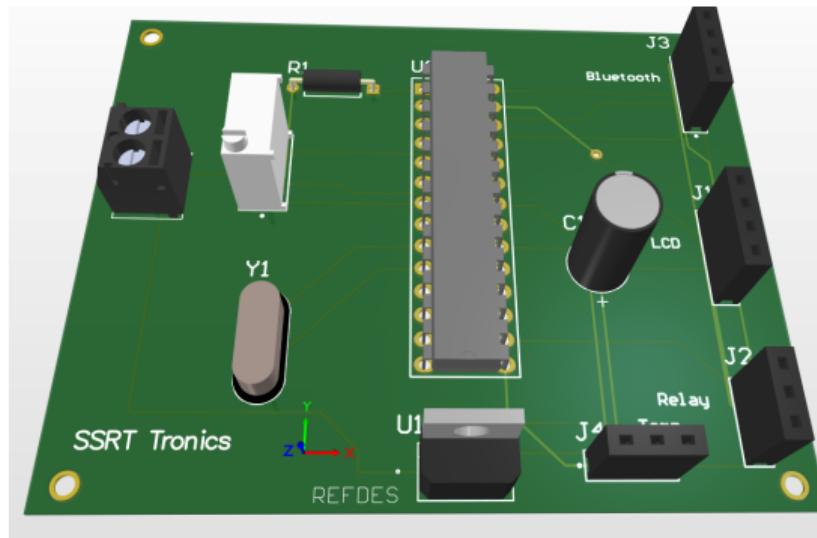


Figure: PCB 3D

PCB Design

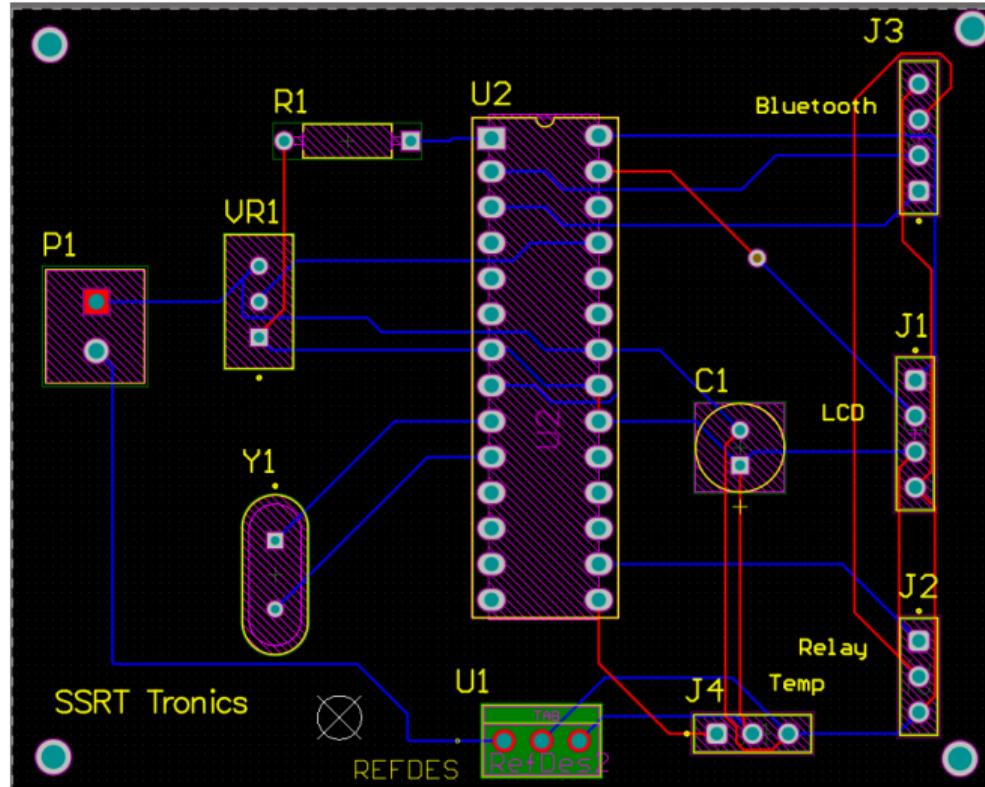


Figure: PCB 2D

Enclosure Design Sketch

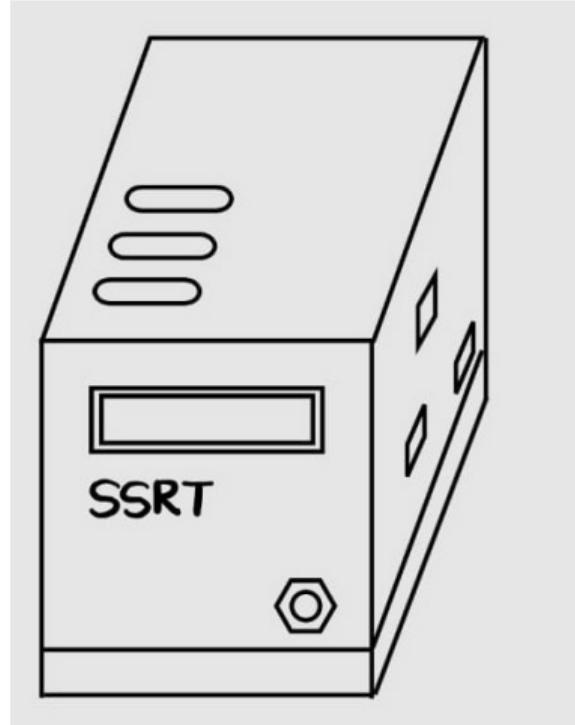
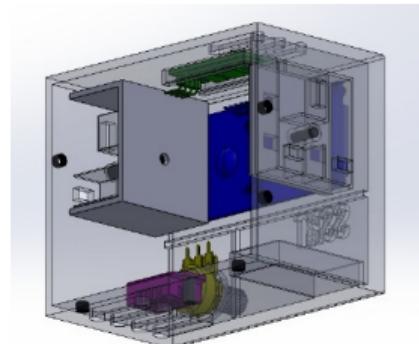
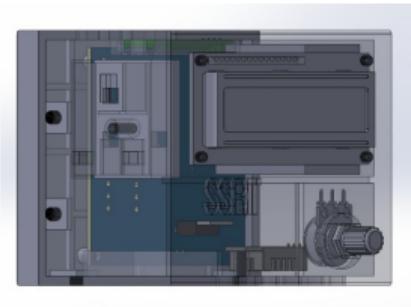


Figure: Sketch

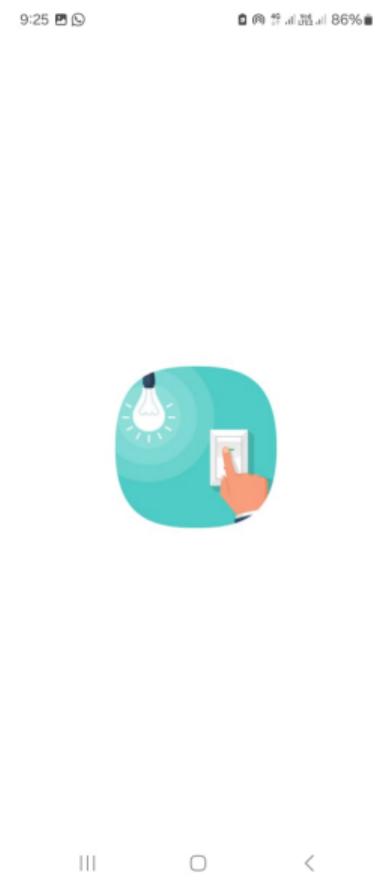
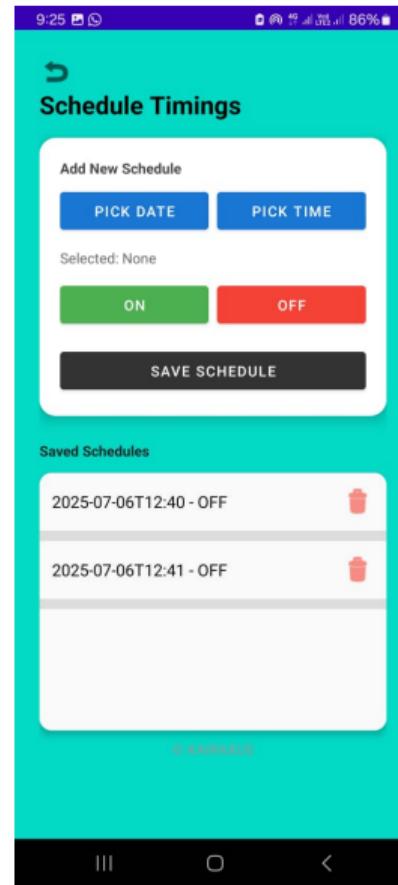
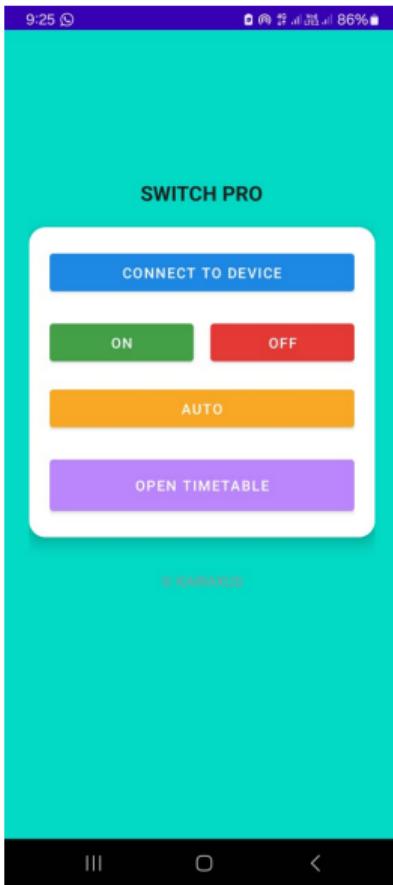
Enclosure Design Final



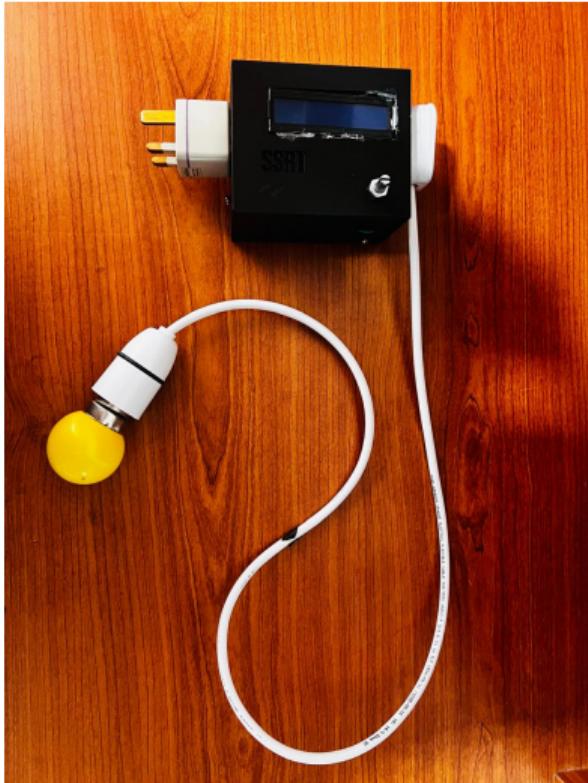
Switch Pro App for controlling Device

To enhance usability and remote control, we developed a dedicated mobile application named Switch Pro. The app allows users to easily connect to the smart plug via Bluetooth and control the fan manually or automatically based on environmental conditions. It features clear ON/OFF buttons, an AUTO mode for sensor-based operation, and a built-in timetable function to schedule fan activity. With a clean and user-friendly interface, Switch Pro provides seamless interaction, making our smart switch more convenient and efficient for daily use.

Switch Pro App for controlling Device



Final Product



Applications and Extensions

Our temperature-sensitive smart switch has a wide range of practical applications in both residential and commercial environments. It can be used to control exhaust fans, heaters, or any electrical appliance where temperature-based automation can improve comfort and save energy. The device is especially useful in bedrooms and offices where climate conditions vary.

As an extension, this smart switch can be adapted to work with **any standard electrical appliance**, allowing users to automate power control based on a **custom timetable** set through the mobile app. This transforms regular appliances into smart devices, offering convenience, improved energy management, and integration with future smart home systems.

Final Budget

Component	Price (Rs.)
DHT11 Sensor	390
Relay Module	150
LCD Display (I2C)	600
ATmega328P IC	450
HC-05 Bluetooth	860
Enclosure	1000
Hi-Link Power Supply	1100
Potentiometer	60
PCB (for 1 out of 5)	3300/5
Total Cost	5270

Table: Component unit prices with total cost

Team Task Allocation

Name	Task Allocation
R.K.T.Dissanayake (230164K)	Mobile app development, Soldering, Assembling, Enclosure Testing
R.M.S.H.Ratnayake (230548R)	Mobile app development, Circuit Design, PCB Design, Sensor integration and testing
M.N.N.Shehan (230613M)	Enclosure Design, Circuit Analysis, Component Selection, Code Debugging
U.G.R.B.Tennakoon (230629R)	Microcontroller Programming, Circuit Design, PCB Design, Sensor integration and testing

The End