DIRT DEFENDER CEILING FAN

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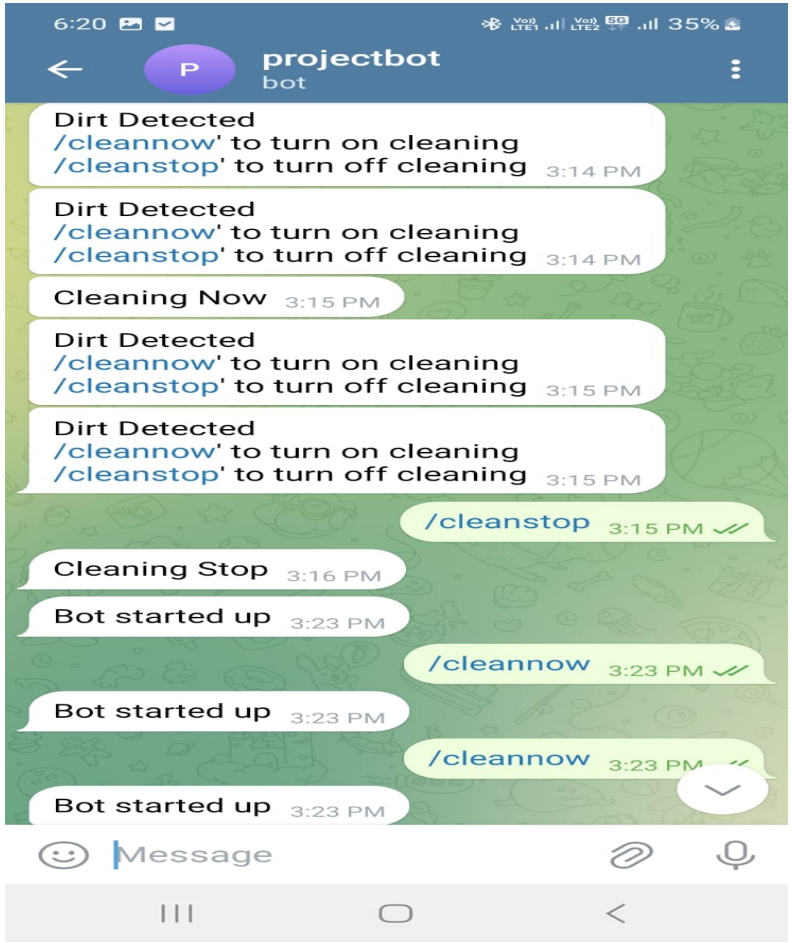
Monday 29th April, 2024

Overview

Summary of Stage-I

- Cleaning Mechanism is Activated and it notifies us through telegram bot. The Cleaning shaft moves in forward direction.
- We can give instructions like start and stop the cleaning on Telegram Bot.



Implementation

- There are three modules implemented
- 1. Sensor Module
- 2. Cleaning Mechanism
- 3. Telegram bot

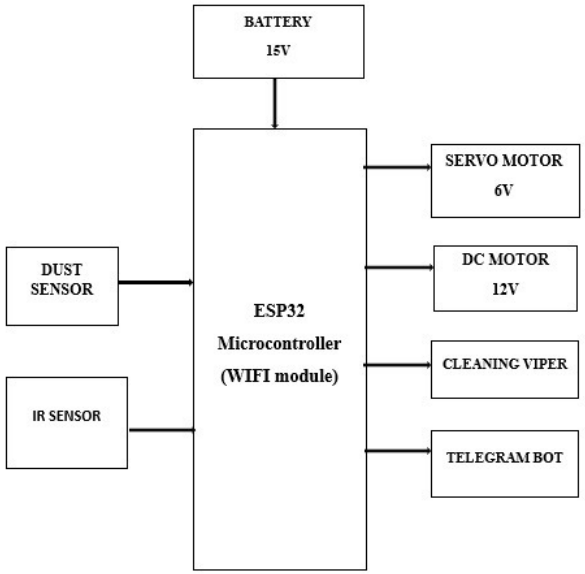


Figure: Architecture

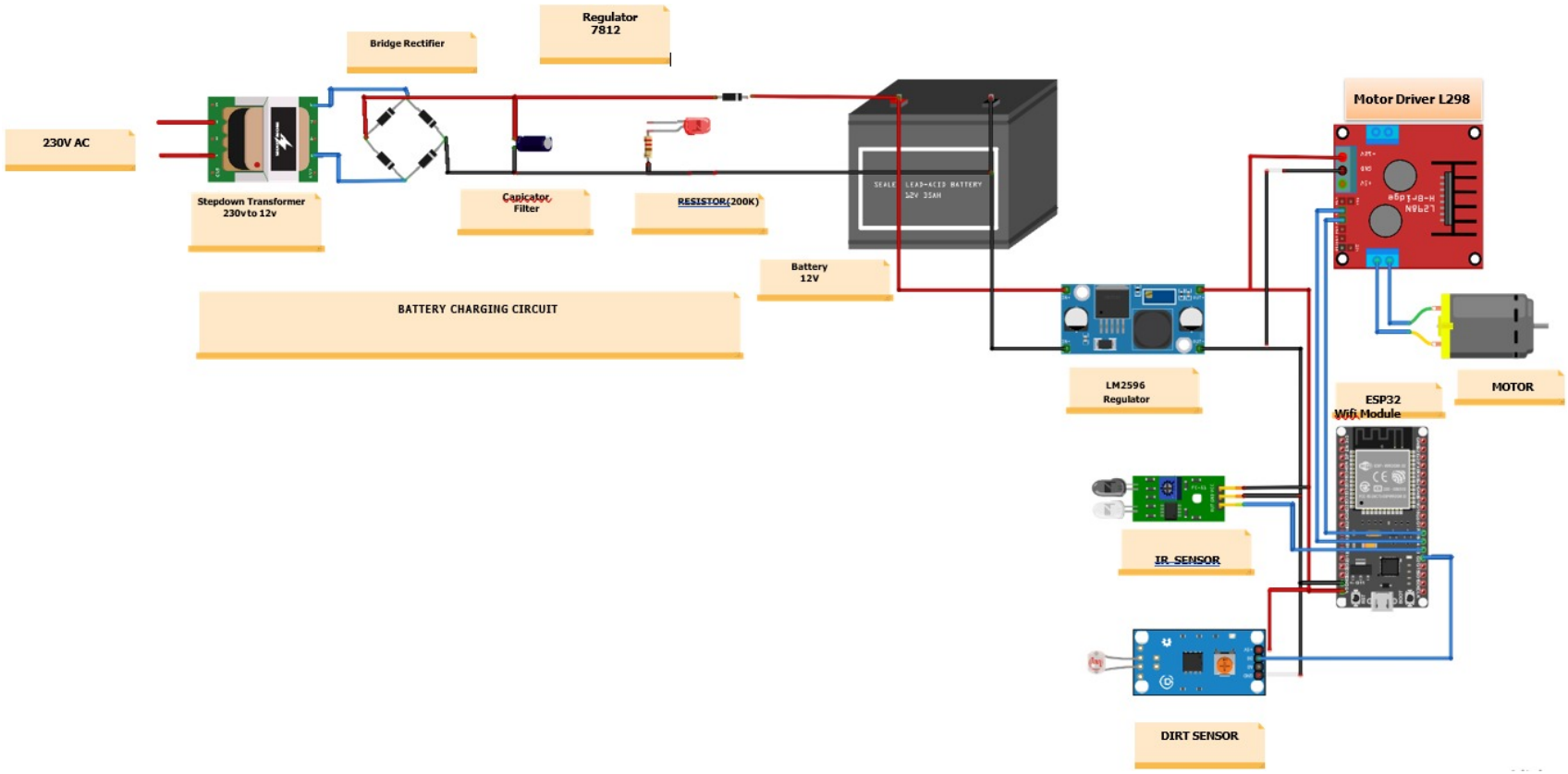


Figure: Circuit Diagram

Automated Mechanism

- **ESP32(Wifi Module):** ESP32 microcontroller can be used for making a dirt defender ceiling fan by integrating motor control functions, sensor inputs(dirt sensors and proximity sensors) and wifi connectivity. ESP32 can execute algorithms to activate the cleaning mechanism based on sensor readings.
- **Proximity Sensor:** When the proximity sensor detects the edge, it can trigger an action to stop the movement.
- **Dirt Sensor or IR Sensor:** Dirt Sensor is used to detect the accumulation of dust on the fan blades. When it detects a certain threshold of dirt, it triggers the self-cleaning mechanism.
- **Servo Motor:** The servo motor is programmed to initiate cleaning actions by integrating it with arduino.
- **DC Motor:** DC Motors are used to move wipers that clean the fan blades.

Manual Mechanism

- **Telegram Chatbot:** Users send commands or requests like cleannow to the bot and ChatId is used for interaction between users and the dirt defender system via the telegram bot.
  - cleannow to start or turn on cleaning.
  - cleanstop to stop or turn off cleaning.

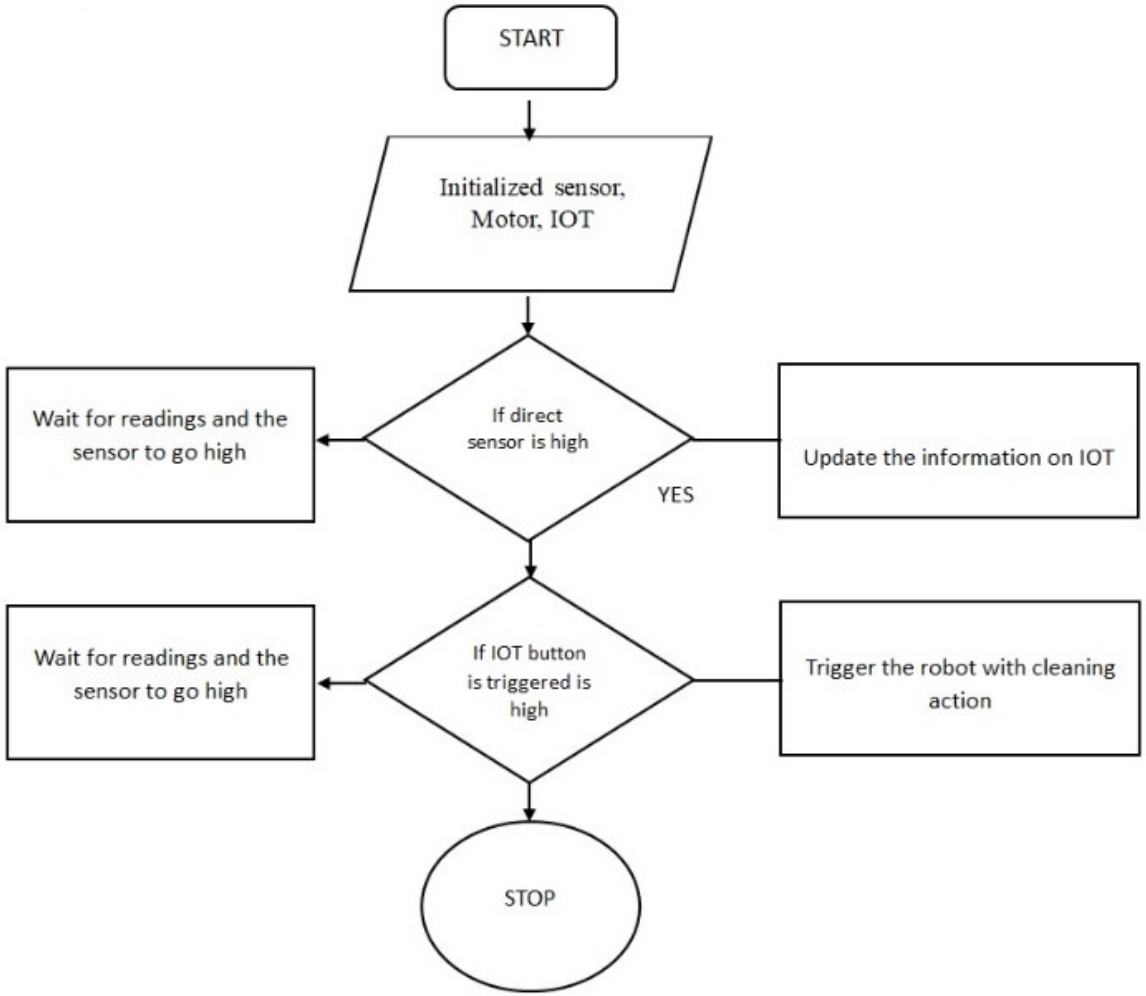
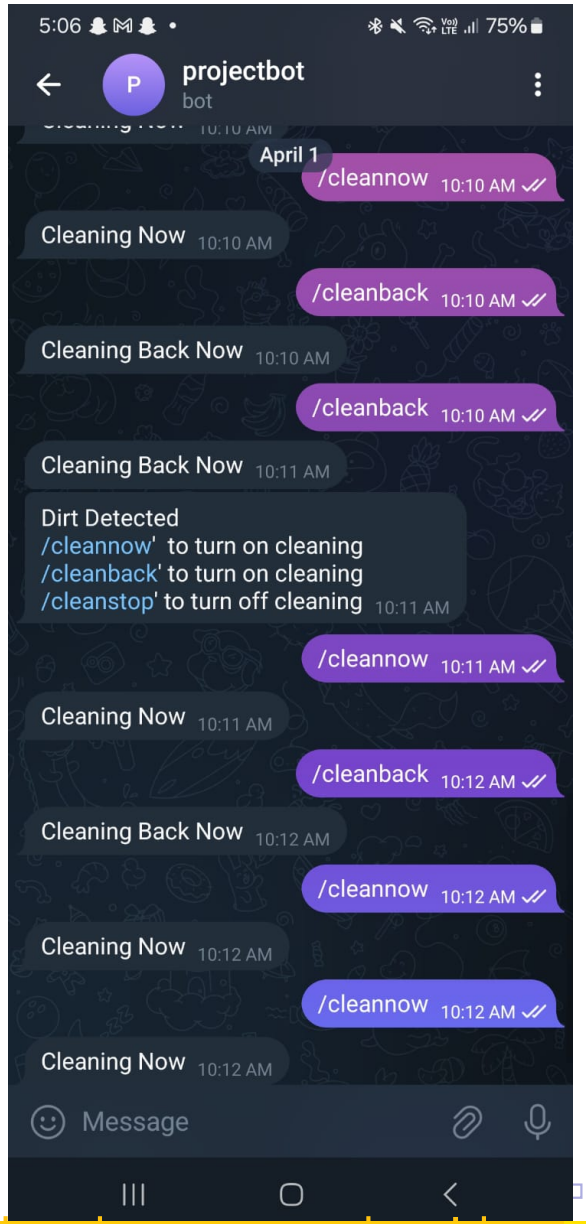


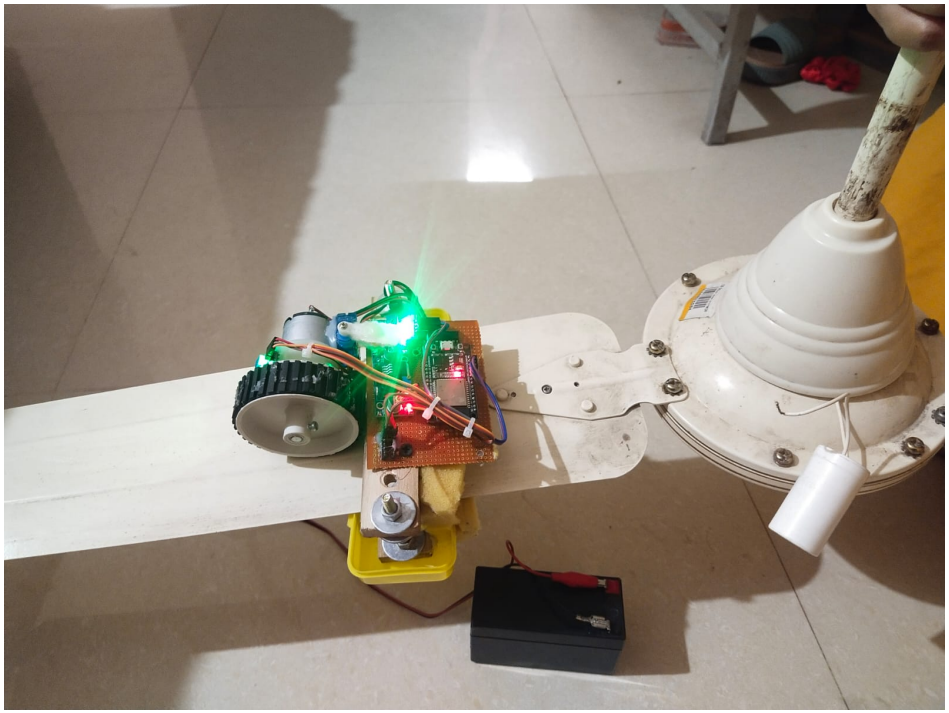
Figure: Work Flow

Functionality of the project

- Automated dust detection triggering cleaning process.
- It is user-friendly mobile app for easy control.
- Effective cleaning mechanism with integrated dust collection..
- The project begins with sensor and IoT initialization, ensuring a structured setup.
- IoT triggers cleaning upon high sensor signal, ensuring timely and reliable activation.
- Cleaning mechanism is activated and notification got in Telegram bot.

Integration





Cleaning mechanism

Results and Discussion

Table: PERFORMANCE EVALUATION OF THE PROPOSED SYSTEM

Criteria	**Evaluation**
Cleaning Efficiency	90%
User-Friendliness	85%
Response Time to Commands	10 seconds delay during startup.
Effectiveness	effective in removing dust

Table: COMPARISION BETWEEN PROPOSED SYTEM AND TRADIONAL METHODS

Aspect	**Proposed System**	**Traditional Methods**
Automation	Yes	No
Reduced Physical Effort	Yes	No
Improved Safety	Yes	No
Potential Cost Savings	Yes	No
Cleaning Efficiency	Yes	No
User-Friendliness	Yes	No
Real-Time Monitoring	Yes	No
Environmental Impact	Yes	No
Customization	Yes	No

Table: COST ESTIMATION OF THE PROPOSED SYSTEM

Components	**Price**
ESP32	300
Servo SG90	70
DC Motor	30
Motor Driver	80
Transformer	80
LM2596 Regulator	50
Bridge Rectifier	30
Capacitor Filter	20
LED	10
LDR Sensor	30
IR Sensor	30
Battery	300
Total Cost	1020

Project Execution

To view the project implementation video, click on project execution

One Page Report

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R&D SHOWCASE 2024

DIRT DEFENDER CEILING FAN

ABSTRACT

Dirt Defender Ceiling Fan system, a revolutionary solution for the hassle of cleaning fan blades in homes and commercial places. This innovative system utilizes advanced sensors to detect dust accumulation, triggering a dedicated mobile app for user control. The system's integrated dust collection mechanism efficiently stores the removed dust. This practical approach ensures fan blades remain dust-free, without the usual cleaning challenges.

UNIQUENESS

- Autonomous Cleaning
- Advanced Sensors
- Dust Collection
- User-friendly

METHODOLOGY

The Methodology uses sensors(LDR and IR) on fan blades for dust and edge detection, communicating with a central control unit(ESP32). A motor-driven cleaning mechanism with gentle brushes ensures effective cleaning based on algorithms and Integration of a Telegram bot enables remote control via simple commands.

Cleaning Mechanism

Results & Analysis

SOCIETAL USE

The Dirt Defender Ceiling Fan system addresses key SDGs related to health, energy efficiency, innovation, sustainable infrastructure, and responsible consumption, making it a valuable contribution to sustainable development efforts. It has significant societal benefits by improving indoor air quality, reducing allergens and dust particles circulated by ceiling fans. This leads to a healthier living environment especially for individuals with respiratory conditions.

CONCLUSION

The Dirt Defender Ceiling Fan system uses advanced technology and smart sensors to detect dust on fan blades. With its smart sensors and mobile app integration, cleaning fan blades is now effortless and hassle-free. By eliminating the need for manual cleaning, this innovative system offers unparalleled convenience and efficiency for users.

REFERENCES

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R. T. B. A. B. Soran and P. Kirci, "Designing a smart vacuum cleaner", IEEE Access, pp. vol. 2, pp. 217–220, 2021.

SDG - 3

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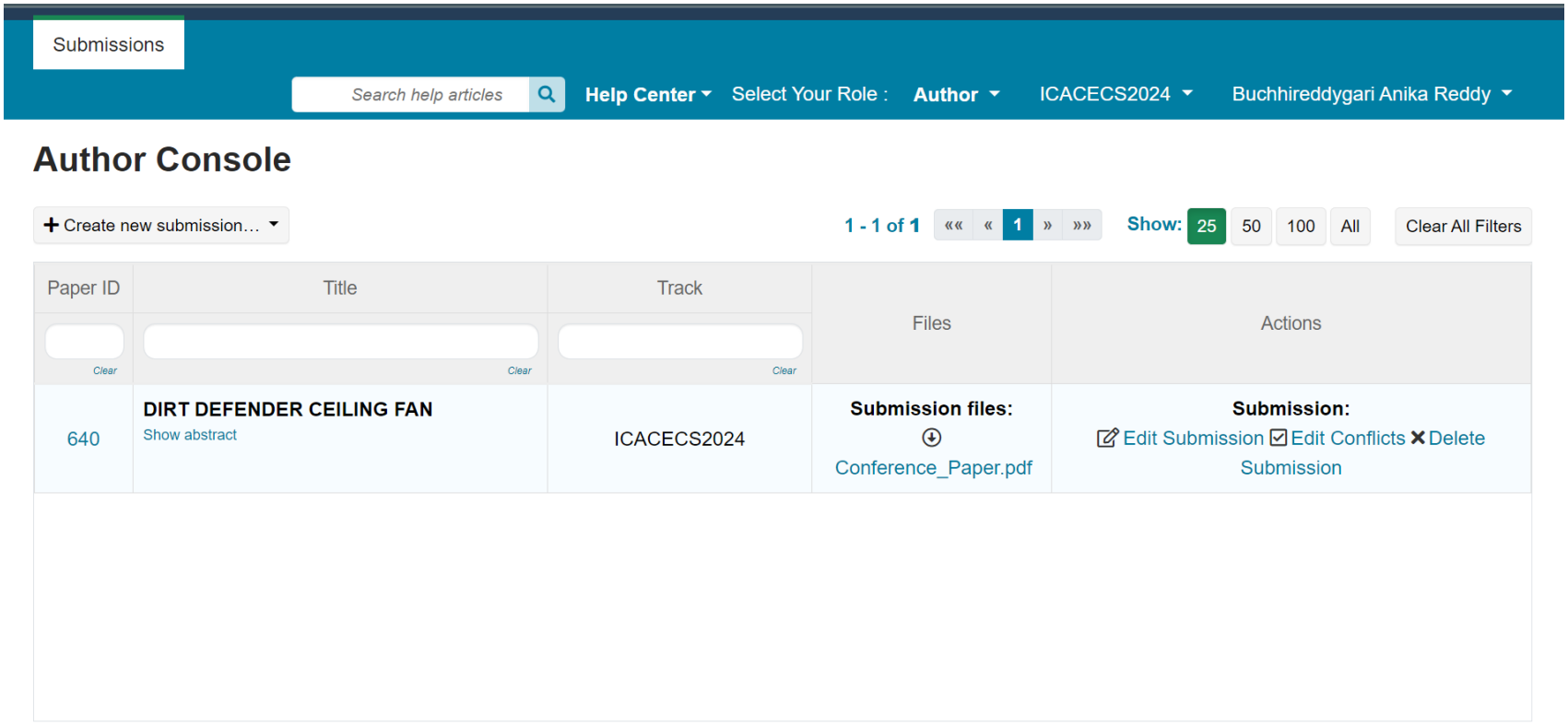
Conclusion

- Project : Completed.
- Publication : Completed and Submitted for ICACECS2024 Conference



Thank you