

DIRT DEFENDER CEILING FAN

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Introduction

- Traditional fans can be noisy and require manual cleaning, often spreading dust and allergens, diminishing air quality.
- DirtDefender Ceiling Fan not only saves you time and effort but also enhances indoor air quality for a healthier environment.
- Utilize IoT Technology for a healthier and more convenient living environment.



Problem Statement

- Conventional ceiling fans often accumulate dust and allergens, contributing to poor indoor air quality and demanding frequent manual cleaning.
- The lack of efficient self-cleaning mechanisms results in time-consuming maintenance tasks and compromises the overall health and comfort of living spaces.



Literature Survey

<i>sno</i>	<i>NameOfThePaper</i>	<i>Author</i>	<i>Description</i>
1.	Automatic cleaning system for a ceiling fan blade	Herman H. DeLaHoz, Martin Hupfl	An automatic cleaning system for a ceiling fan having a plurality of fan blades extending outwardly from a central motor driven hub comprising a plurality of cleaning units.
2.	User and Market Research with Proposed Concepts for Ceiling-Fan Dust Cleaning	Marilyn Supriya Albert, Sudarshan Katti, Arunachalam Muthiah	this paper aims to obtain information regarding the user's experience with existing ceiling-fan cleaning tools/equipment and propose few new designs for addressing the user's problems.

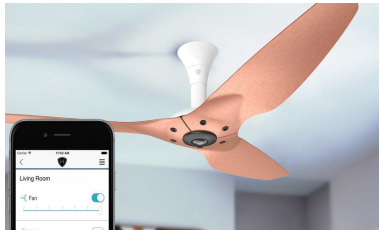
Table: Literature Survey

Proposed System

- Self-Cleaning Mechanism: incorporates automated brushes and a dust collection system.
- Smart Sensor Integration: Integrate advanced sensors to detect dust accumulation levels.
- IoT Connectivity and Control: Enable the fan to connect to a user-friendly app.

Tools & Technologies

- Wipers.
- Optical sensors.
- Dust collection modules or compartments.
- Energy-efficient motors.
- Internet of Things (IoT) Integration.



Feasibility Study

- As of now, there were no specific self-cleaning ceiling fan products available in the market.
- The feasibility of integrating automated cleaning mechanisms and smart sensors into the design of the Dirt Defender Ceiling Fan is promising, considering the advancements in sensor technology and the availability of durable, energy-efficient components.
- With careful design and engineering considerations the functionality and desirability of the Dirt Defender Ceiling Fan in the market can be elevated.

Societal Impact

- The integration of advanced technology in household appliances(Ceiling fans) sets a precedent for the adoption of innovative and sustainable solutions.
- improves indoor air quality, promoting a healthier living environment and contributes to a more convenient and time-saving approach to household maintenance .



Partial Implementation

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File Edit Sketch Tools Help

sketch_dec04a

```

#include <WiFi.h>
#include <WiFiClientSecure.h>
#include <UniversalTelegramBot.h>
#include <ArduinoJson.h>
#include <servo.h>

// Network credentials
const char* ssid = "dell";
const char* password = "12345678";

// Initialize Telegram BOT Token and Chat ID
#define BOTToken "5982198371:AAEL3cD2U6IyORf9zI0D_s15-X85MXyhKbc"

#define CHAT_ID "1328704992"

WiFiClientSecure client;
UniversalTelegramBot bot(BOTToken, client);

const int LDR = 15;
const motorP = 2;
const motorN = 4;

int LDRState0 = 0;

int botRequestDelay = 1000;
unsigned long lastTimeBotRan;

Servo servol;
  
```

Compiling sketch...

sketch_dec04a | Arduino 1.8.19 (Windows Store 1.0.57.0)

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sketch_dec04a

```
Servo servol;  
  
void setup() {  
  
    Serial.begin(115200);  
  
    pinMode(LDR, INPUT);  
  
    pinMode(motorP, OUTPUT);  
    pinMode(motorN, OUTPUT);  
  
    servol.attach(servoPin);  
  
    WiFi.mode(WIFI_STA);  
    WiFi.begin(ssid, password);  
  
    // Add root certificate for api.telegram.org  
    client.setCACert(TELEGRAM_CERTIFICATE_ROOT);  
  
    bot.sendMessage(CHAT_ID, "Bot started up", "");  
  
}  
  
void loop() {
```

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sketch_dec04a

```

    bot.sendMessage(CHAT_ID, "Bot started up", "");

}

void loop() {

    // put your main code here, to run repeatedly:
    LDRState0    = digitalRead(LDR);

    if (millis() > lastTimeBotRan + botRequestDelay) {
        int numNewMessages = bot.getUpdates(bot.last_message_received + 1);
        while(numNewMessages) {
            Serial.println("got response");
            handleNewMessages(numNewMessages);
            numNewMessages = bot.getUpdates(bot.last_message_received + 1);
        }
        lastTimeBotRan = millis();
    }

    if(LDRState0 == LOW)
    {
        bot.sendMessage(CHAT_ID, "Direct Detected", "");
        bot.sendMessage(CHAT_ID, "Press the command:", "");
    }
}

void handleNewMessages(int numNewMessages) {

    for (int i=0; i<numNewMessages; i++) {

```

```

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sketch_dec04a

void handleNewMessages(int numNewMessages) {

  for (int i=0; i<numNewMessages; i++) {
    // Chat id of the requester
    String chat_id = String(bot.messages[i].chat_id);
    if (chat_id != CHAT_ID){
      bot.sendMessage(chat_id, "Unauthorized user", "");
      continue;
    }

    // Print the received message
    String text = bot.messages[i].text;
    Serial.println(text);

    String from_name = bot.messages[i].from_name;

    if (text == "/start") {
      String welcome = "Welcome, " + from_name + ".\n";
      welcome += "Use the following commands\n\n";
      welcome += "/cleannow' to turn on cleaning \n";
      bot.sendMessage(chat_id, welcome, "");
    }

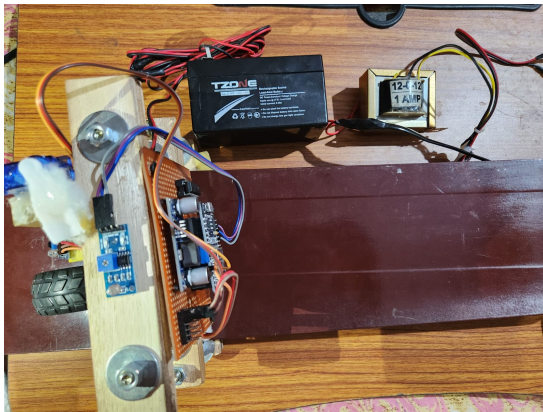
    if (text == "cleannow") {bot.sendMessage(chat_id, "Cleaning Now", "");
                           digitalWrite(relay, HIGH);}

  }
}

```

Code

Results





Status of Project Report and Publication References

- Project Report : Completed
- Publication : Not Started yet

Project Timeline

S.no	Plan of action	Duration
1	Problem identification	1st August - 31st August
2	Literature Survey	1st September - 30th September
3	Module Identification	1st October - 15th October
4	Module Implementation	16th October - 15th November
5	Report	16th November - 30th November

References

- Herman H. DeLaHoz, Martin Hupfl, "Automatic cleaning system for a ceiling fan blade" Patent Number: 6,022,192, Date of Patent: Feb. 8, 2000.
- Marilyn Supriya Albert, Sudarshan Katti ,Arunachalam Muthiah , "User and Market Research with Proposed Concepts for Ceiling-Fan Dust Cleaning" Ergonomics for Design and Innovation Conference paper, First Online: 07 June 2022.

Thank you