

**JABATAN KEJURUTERAAN ELEKTRIK**

**MINI PROJECT**

**DEC50132**

**TITLE:**

**AUTOMATIC ROOF COOLER**

|  |  |
| --- | --- |
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TABLE OF CONTENTS

* **Title**
* **Introduction**
* **Scope**
* **Problem Statement**
* **Schematic diagram**
* **Circuit**
* **Arduino coding**
* **Result**
* **Discussion and analysis**
* **Recommendation**
* **References**

**REPORT MINI PROJECT**

**TITLE:** AUTOMATIC ROOF COOLER

**INTRODUCTION**

In the hot summer, the heat is unbearable, the roof is baked in the sun, and the temperature rises, which will not only affect the indoor temperature, but also shorten the service life of the roof. To cope with the high temperature in summer, automatic roof sprinkler coolers came into being and became people's secret weapon to keep cool in the summer. The working principle of the automatic roof sprinkler cooler is to absorb the heat in the air by spraying water mist, thereby achieving a cooling effect. Specifically, water mist absorbs a large amount of heat during the evaporation process, thereby reducing the temperature of the surrounding environment. The automatic roof sprinkler cooler has a significant cooling effect. The automatic roof sprinkler cooler can effectively reduce the roof surface temperature, and the indoor temperature will also be reduced accordingly, making the body more comfortable.

The automatic roof sprinkler cooler is also energy-saving and environmentally friendly. Compared with the traditional air conditioning system, the automatic roof sprinkler cooler is more energy-saving and environmentally friendly and will not cause environmental pollution. After that, the installation and maintenance are simple. The installation and maintenance of the automatic roof sprinkler cooler are relatively simple and convenient to use.

Automatic roof sprinkler coolers can be widely used on the roofs of various buildings, including military dormitories, villas, factories, warehouses, etc.

**SCOPE**

The scope of the project is focused on the automatic sprinkler cooler on the roof. The focus of the project was to ensure that the government could install cooling systems for military barracks at a low cost without installing air conditioning.

**Problem statements**

there is a lot of waste that happens in the world, one of which is the waste of water, electricity. This causes a country to experience an economic decline. With this, I want to make a tool so that the waste can be avoided. This tool can also help in cooling the temperature of a place and save on usage water because this device uses rainwater that will be recycled to be used to cool the roof of the house.

**Schematic diagram**

A diagram of a circuit

Description automatically generated

**CIRCUIT**

A diagram of a temperature sensor

Description automatically generated

**Arduino coding**

#include "WiFi.h"

#include "ESPAsyncWebServer.h"

#include <Adafruit\_Sensor.h>

#include <DHT.h>

const char\* ssid = "realme 10";

const char\* password = "91781978";

#define DHTPIN 22

#define DHTTYPE DHT11

DHT dht(DHTPIN, DHTTYPE);

AsyncWebServer server(80);

#define FAN\_PIN 13

#define PUMP\_PIN 12

#define BUZZER\_PIN 14

#define RELAY\_PIN 26

#define FAN\_THRESHOLD 20

#define PUMP\_THRESHOLD 35

#define BUZZER\_THRESHOLD 40

String readDHTTemperature() {

float t = dht.readTemperature();

if (isnan(t)) {

Serial.println("Failed to read from DHT sensor!");

return "--";

} else {

Serial.println(t);

return String(t);

}

}

String readDHTHumidity() {

float h = dht.readHumidity();

if (isnan(h)) {

Serial.println("Failed to read from DHT sensor!");

return "--";

} else {

Serial.println(h);

return String(h);

}

}

const char index\_html[] PROGMEM = R"rawliteral(

<!DOCTYPE HTML><html>

<head>

<meta name="viewport" content="width=device-width, initial-scale=1">

<link rel="stylesheet" href="https://use.fontawesome.com/releases/v5.7.2/css/all.css" integrity="sha384-fnmOCqbTlWIlj8LyTjo7mOUStjsKC4pOpQbqyi7RrhN7udi9RwhKkMHpvLbHG9Sr" crossorigin="anonymous">

<style>

html {

font-family: Arial;

display: inline-block;

margin: 0px auto;

text-align: center;

}

h2 { font-size: 3.0rem; }

p { font-size: 3.0rem; }

.units { font-size: 1.2rem; }

.dht-labels{

font-size: 1.5rem;

vertical-align:middle;

padding-bottom: 15px;

}

</style>

</head>

<body>

<h2>ESP32 DHT Server</h2>

<p>

<i class="fas fa-thermometer-half" style="color:#059e8a;"></i>

<span class="dht-labels">Temperature</span>

<span id="temperature">%TEMPERATURE%</span>

<sup class="units">&deg;C</sup>

</p>

<p>

<i class="fas fa-tint" style="color:#00add6;"></i>

<span class="dht-labels">Humidity</span>

<span id="humidity">%HUMIDITY%</span>

<sup class="units">%</sup>

</p>

</body>

<script>

setInterval(function ( ) {

var xhttp = new XMLHttpRequest();

xhttp.onreadystatechange = function() {

if (this.readyState == 4 && this.status == 200) {

document.getElementById("temperature").innerHTML = this.responseText;

}

};

xhttp.open("GET", "/temperature", true);

xhttp.send();

}, 10000 ) ;

setInterval(function ( ) {

var xhttp = new XMLHttpRequest();

xhttp.onreadystatechange = function() {

if (this.readyState == 4 && this.status == 200) {

document.getElementById("humidity").innerHTML = this.responseText;

}

};

xhttp.open("GET", "/humidity", true);

xhttp.send();

}, 10000 ) ;

</script>

</html>)rawliteral";

String processor(const String& var){

if(var == "TEMPERATURE"){

return readDHTTemperature();

}

else if(var == "HUMIDITY"){

return readDHTHumidity();

}

return String();

}

void setup(){

Serial.begin(115200);

dht.begin();

WiFi.begin(ssid, password);

while (WiFi.status() != WL\_CONNECTED) {

delay(1000);

Serial.println("Connecting to WiFi..");

}

Serial.println(WiFi.localIP());

server.on("/", HTTP\_GET, [](AsyncWebServerRequest \*request){

request->send\_P(200, "

**Result**

A screenshot of a device

Description automatically generated

A screenshot of a phone

Description automatically generated

**Discussion and analysis**

### The project of automatic roof coolers presents an innovative solution to improve indoor comfort and energy efficiency in buildings, particularly in hot climates, by leveraging technology to dissipate heat and promote air circulation. While offering benefits such as reduced energy consumption and improved occupant comfort, the project faces challenges including initial installation costs and effectiveness in diverse climate conditions. Through comparative analysis with other cooling technologies, examination of case studies, and consideration of future advancements, stakeholders can make informed decisions about implementing automatic roof coolers, supported by cost-benefit analysis and tailored recommendations to optimize their performance and economic viability.

### **Recommendation**

The recommendation of “Automatic roof sprinkler cooler”is if there is better equipment, it is recommended to use a water pump with higher power consumption to pump more water to achieve rapid cooling effect.

REFERENCES

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