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AUTOMATIC PROTECTION OF CLOTHES FROM RAIN

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Abstract: Drying clothes may be challenging due to the unpredictability of the weather, and when it rains, the issue will only grow worse. Undoubtedly, those who work worried about their clothes that were dried outside. With the help of this project, an intelligent outdoor clothing hanging system will be developed which can quickly identify the atmosphere, including that of the occurrence of rainfall and sunshine, and provide clothing with cover from the elements. Also, the system has the ability to automatically collect the clothes in the sun and do the opposite in the rain. The device will mechanically gather the clothes when the appropriate amount of time has passed for drying. As a result, there is an electromechanical system that continuously monitors the sun's rays and the rainy season and removes clothing from the sun's rays to prevent becoming wet. Due to public demand, there are numerousnew inventions being invented nowadays. The advancement of new technologies aids in this. new inventions that have been created as a result of public demand. The advancement of new technologies supports this. This is due to the fact that individuals today are too busy running their homes or working long hours to complete all of their domestic chores, including picking up their clothes from the line. One of the answers to this issue is an Internet of Things (IoT)-based roof top forClothing Stand. Human comfort and demands are growing proportionally to the development of science and technology.

Keywords: IoT, Rain sensor module, DC motor, ESP8266, Clothing stand**.**

I. INTRODUCTION

Seasonal changes are difficult to predict in modern times, especially in the rainy season. How can we force our clothing to be exposed to the sunlight as soon as it is accessible whenit is so rare to find sun during rainy season? As a result, human involvement and continuing oversight are required. It wouldn't be efficient to keep someone on the lookout forsunrays all the time. employees who are not at home. This product will work even on cloudy or rainy days. Following that, the rain sensor will serve as a connecting circuit. This product's DC gearbox motor's job is to control whether the motor turns left or right. In order to protect clothing from getting wet, there is an electromechanical system that continuously monitors thesun's rays and the rainy season.

One of the most fundamental demands of society today is housing. The major goal of a smart home is to ensure that residents may feel safe and comfortable both inside and outside the building. Additionally, a smart home is designed to be environmentally friendly, avoid social issues, use space efficiently, maintain privacy, and recycle waste water. An intelligent smart home system features a built-in computer system that can keep track of a variety of daily activities. It includes household appliances, sensors, actuators, analyzers, and data processors, and it can be used wirelessly or wirily. Due to unpredictable weather conditions like rain, it can be difficult for people these days to dry their garments outside. People occasionally neglect to remove their outerwear when it's raining outside. Naturally, those who are employed worry about their garments that have been air dried. some People frequently lack the time necessary to manage their routines as a result. As a result, this prototype completes and checks off every item on the scenario's problem checklist. The controller for this Arduino UNO prototype was chosen from the beginning. It is a test platform for affability in all circumstances. In this project, the rain sensor serves as an input module by sensing the rain. The driving module for the top is the motor. An ESP8266 IOT module is used to construct a notification system for user convenience. When the option to remove the clothes is chosen, a separate external mechanism is employed to raise the dry clothing. Clothing retention is done primarily for climate control because it is momentarily protected inside the shelter. Since the clothing aren't entirely dry, they should stay put on the stand, which is supported by a rope to allow for movement.

The Arduino UNO will have all of the programming and code installed that will provide instructions to operate this system correctly and will automatically retrieve-out the clothing on sunny days and retrieve-in the garments on rainy days. In order to carry the garments to the covered area, thisinvention also includes a DC gearbox motor that can travel forward and backward.

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II. LITERATURE SURVEY

The survey was critical to our study since it enabled us to assess the available products for rain-protected clothing.Many problems were found throughout the study, such as the fact that the present goods must be controlled continuously, which implies that when nobody is home to activate the switch, the clothes would rapidly become wet and the device will be worthless. Also, if a disabled person lives in the house, the disabled person will have no abilityto use the present items. The fixed washing rack is the current item on the marketplace that lacks sensors. It's a sleek and effective take on the standard folding drying rack.This contraption lets you display things.

As a result, we decided to develop an abstract model that does not require manual method and includes rain sensors that function at all hours of the day and night.. This conceptuses a sensor to detect water to improve the drying rack. Water is detected by the sensor. The motor will turn clockwise and the rack will be hauled out when the water sensor determines there hasn't been any precipitation. The garments will be protected by the rack while the motor rotates anticlockwise.

A. Outdoor Laundry Foldable Hanger

The method shown in figure 1 below could precisely address the issue of cleaning our dirty clothes and enable us to dry the garments indoors or in the sun when it rains. We don't have to lug the cumbersome poles made of bamboo outdoors of our windows anymore. Our operator family members may easily operate the outdoor laundry system equipped with German components and technology. Due to restricted space, this method is especially well suited for occupants of high-rise residences. The system relies only on a German gases spring and a Japanese roller bearing, and when not in use, it sits flat against the ceiling to make the most of the available space in your house, kitchen, or utility yards. You have more room to go around since your home seems more organized. The system may be pulled or pushed up and down with the help of a stainless steel rod handle, and the gas spring acts to lock it in either position. The laundry hangers are attached to the system's bottom roller bearing, which enables it to slide inside and outside of the window so that the sun and breeze can dry your freshly washed garments. This system's capabilities made it suited for drying bed sheets and blankets as well as large loads up to 25 kg.

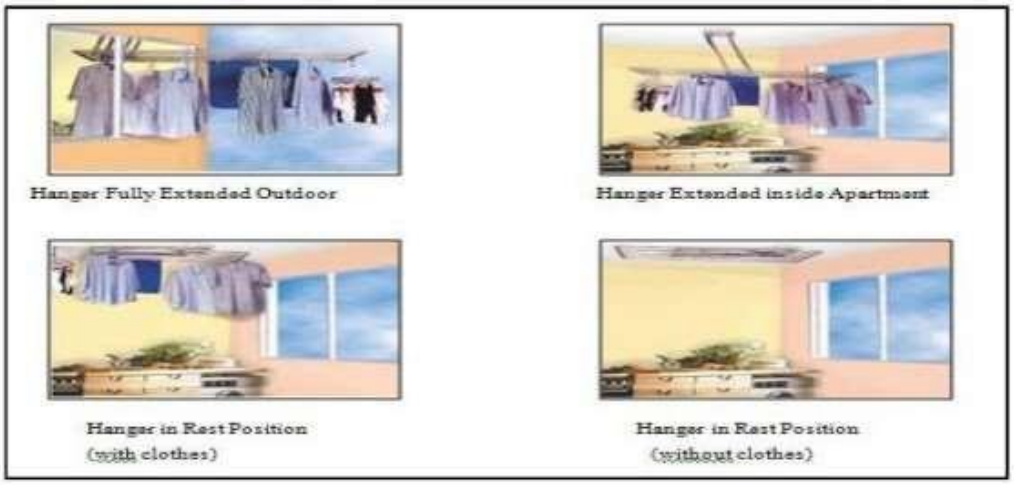

Figure 1 Outdoor Laundry Foldable Hanger

B. Model RG-10 Rain Tracking Rain Gauge

The Rain Gauge RG-10 detects rain using infrared laser beams. The RG-10 use the same core concept as millions of automobile rain sensor wind shield wipers controls, the majority of which use technology developed within our labs. The method that was created to detect minute amounts of liquid in the tough automotive environment was improved and applied to the RG-10. As a result, a general-purpose rain gauge may be adapted for a variety of purposes. Include an input/output (DIP) switch which enables it to be configured for the optimal mode of operation for the application. The DIP switch controls the mode, type, and purpose of the auxiliary input. The RG-10 is appropriate for practically any application that demands dependable and highly sensitive rain sensing, such as automated awning retraction, yacht and cruiser window wiper control, and wiper control for specialised vehicles and equipment. Many of the limitations of traditional tipping buckets rain gauges are overcome with the RG-10. Tipping buckets are still considered the gold

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standard for precision and simplicity, and we used one for calibrating the RG-10. However, before the initial drop even reaches the tipping bucket, a lot of water acquires on a rain gauge collecting funnel. Because the RG-10 detects the droplets directly, it can detect a significantly lower amount of water.

The detection surface is made up of a transparent compound lens. Infrared light beams bounce off the exterior surface and move around inside the lens. The beams are produced by electronic circuits pulsing infrared emitters, and the received beams are amplified. Techniques for digital signal processing assist remove the impacts of light disturbances by extracting tiny signals. The RG-10 was created over a long period of time for auto windscreen wiper controls with rain sensing. The RG-10 included drop detection as well. Use this option if you wish to interpret external data on your own. Each detected dip will cause the output to pulse once.

C. System to Control Temperature

This project is about a specific temperature control system for server rooms. Temperature detector, the PIC, the LCD screen (Liquid Crystal Display), controller circuits, AC air heater, and AC motor make up this system. Three drivers are utilised for the triggered process and two more are used for the prompted levels of the motor to turn on the AC heater. This motor's operation was based on two speed levels, and it had the ability to automatically regulate the temperature in a typical room. The values or range of the room's temperature that the temperature sensor would be able to measure would be the basis for this system's operation.

The air heaters will be turned on to heat the extremely chilly server room if the initial temperature ranges from 0 to 15 degrees Celsius. This system was unable to handle the second range between (16 C and 25 C) since it is able to handle the regular range of temperature. When the temperature is between 26 and 40 degrees Celsius, the level 1 motor will be activated to lower the temperature value. The engine will be activated at level 2 and speed up for this level if the temperature rises over 40 C. In order to keep the room's temperature at a certain level, both output devices are crucial. This system fits within the category of automated system.

If the server room's air was impacted by the weather outside, a problem would inevitably arise. The motor and gas heater are crucial in keeping the server room at a comfortable temperature. The air conditioner malfunctioned, raising the temperature in the room and raising the ambient temperature most crucial. The room became hotter or more humid since the air conditioner malfunctioned and the temperature outside. When the temperature drops too low, the outputs are controlled according to the possible temperature ranges that the temperature sensor may detect. For reading data and accept the signal from the sensor, PIC programming is crucial. Additionally, it will keep the room's temperature comfortable for users while doing so.

D. Adaptable Awnings

All of the hefty, American-made stock components that make up a rollout awning are thick, white epoxy- or PVC-coated, full-bath dipped frames. Alloys are more durable than pure aluminium and have the ability to rebound to their original shape when under pressure. Awnings and thin, light-weight components made in Germany, Italy, France, or China may be imported by other businesses. Models for conditions with little wind and little rain, but our roll awning will never employ such subpar techniques.

When placed outdoors on a wall in high humidity and windy places, the corrosive electrical current that never turns off in the tubes of steel can cause corrosion. The whole steel main frame and all of its linked parts, including the arms, shoulders, elbows, and wrist connection points, remain charged and sizzling and are prone to freezing up, requiring continual lubrication, or simply deteriorating and corroding over time. The Triple-Angled- Elbows on these awning arms, together with Triple-Springs that are internally watertight sealed to provide Triple Strength and additional rigidity for optimal usage on windy beach fronts. These brackets are made of a robust, thick aluminium alloy and have a thick epoxy/PVC coating for total weather resistance.

E. A Suspended Clothesline's State of Balance

When clothing are cleaned, they are stretched to dry on an elastic cord or wire called a clothesline. Whether inside or outside, it is often extended between two locations (such as two rods) above the ground level. Analysing the state of balance of a hanging clothesline may be used to show engineering mechanics concepts concerning force systems in equilibrium. A mirrored force system is demonstrated with a strung clothesline.

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When all forces are directed along one axis, a force system is said to be parallel. Since only the gravitational loads resulting from the mass of the objects that hang operate in this instance, all forces operating on the iron pipe are vertical. The hung clothesline is essentially a parallel three-dimensional (3D) force system in space.

It may, however, be condensed into a two-dimensional (2D) system. In a free body diagram (FBD), the forces of tensile in the angel bars are denoted by T, and the hangers containing shirts are denoted by W. Don't consider the steel pipe's weight and make your analysis inflexible. The shirts were soaked, and hangers were attached to each one of them.

F. Studies dealing with laundry drying

Several factors may cause laundry to be dried indoors as opposed to outside, including:

- Unfavourable Weather
- Physical Impairment
- Insufficient space to fit a line
- Reduce the UV rays of the sun's toxicity to textiles.
- Legal limitations
- To decrease indoor air temperature and increase indoor humidity
- To protect one's confidential

Indoor drying equipment come in a variety of styles. In an apartment, a drying system or clotheshorse might assist conserve space, or laundry lines can be hung in the cellar during the winter. Small loads can be hung across equipment or a shower curtain pole with ease. Due to the lack of direct light from the sun and the convective aid of the wind, interior drying takes longer than outside drying.

The moisture loss from the garments will chill the interior air and raise the level of humidity, this may or may not be desired. Slight increases in humidity help most individuals feel more comfortable in cold, dry weather. Rise in humidity makes most individuals feel much hotter in hot weather.

Elevated humidity can also promote the growth of fungus, which can lead to health issues. A typical laundry load will convert around 4965 kilojoules of outside temperatures into latent heat stored in evaporated water, as shown below. Once the spinning process in a laundry machine, a normal 4 kilogram load of clothes can include 2.2 kg of water.

Weigh the clothing while they are wet and again after they have dried to figure out the amount of temperature has been generated transferred in cleaning a load of laundry. The volume of the water evaporated from them is the difference.

Several factors affect drying time and can influence whether to use a dryer or a clothes line.

- The ambient temperature: a rise in temperature shortens the drying time
- Wind speed - When drying clothing inside, some people place a fan close by
- The ambient humidity - a reduction in humidity will shorten the drying time
- Direct sunlight - often, only the exterior area will be subjected to direct sunlight, hence individuals typically wear their heaviest clothing on this line.
- fabric thickness

When the ambient temperature is considerably below the freezing threshold, laundry can be dried outside. First, the garments will stiffen as a result of the washing items' moisture freezing. The clothing will thereafter become dry when the frost on them sublimates into the atmosphere.

It takes a while, and drying them indoors is often quicker; but, since heat is removed from the air while interior drying, there is a compromise among velocity and energy consumption.

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III. COMPARISON OF DIFFERENT TECHNIQUES

Table 1 Relevant studies on advantages and disadvantages of Automatic protection of clothes from rain,

RELATED WORK	TECHNIQUE	ADVANTAGE	DISADVANTAGE
Automatic Clothes Retriever (ACR)	The user may regulate the hanger, check temperature and humidity, and dry their clothing while doing so using ACR on their smartphone	utilised a microcontroller to dry clothing automatically, linked to the internet via a mobile application, and allows users to check on the drying system remotely	ESP32 is harder to handle than the ESP8266 because it's more complex
Automatic retractable roof for clothesline With notification system	The whole system's functions will be controlled by an Arduino board.	The water level may be readily and safely controlled.	It is challenging to install and can be fairly pricey.
Clothes Hanging System	The system will automatically collect the garments when it is sunny and the reverse when it is raining, thanks to the usage of an Arduino UNO board that will provide instructions on how to operate it effectively	By flipping the metal plate upside down, it may automatically gather the clothing when it is completely moisture-free. Additionally, this item makes it simpler for employees who aren't at house	Whether it travels from dark to light or from light to dark, there is a certain delay in the changing of the resistance value. Due to this, LDRs can't be used in situations where the visible signal fluctuates quickly
Smart automation system using arduino and rain Drop sensor	The automated roof uses a rain sensor and a soil moisture sensor to function	The whole system's activities will be controlled by Arduino, which will conserve power and increase production in both wet and dry weather.	Mobile phones must be turned off in several locations, including airports, petrol stations, and hospitals, due to electromagnetic interference

IV. CONCLUSION

At the conclusion of this research, we were able to build a system that can better address the issue of drying wet clothes, particularly during the rainy season. There will be moisture in the clothes as a result of the foul odor if clothes are washed and dried in a washing machine. As a result, they were agitated and disturbed. Additionally, skin issues could exist. Finally, this technique avoids the aforementioned issues and produces positive results. We are able to advance toward the new technology thanks to this project. With this technique, we automatically protect our clothing from the rain without requiring any human assistance. As a result, it offers the chance to be comfortable, lowers human effort, and saves time. We may use it everywhere, including at home and at the office. This appliance functions autonomously by sensing the provided circumstances, hence there is no requirement for user to function independently. For those who are employed, this may be useful. They don't have to worry about the state of their clothes, so they can relax. Additionally, it helps clothes last longer because their quality degrades if they are constantly drenched by rain. As a result, it can be applied in settings including houses, hotels, hostels, and hospitals, among others.

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