

RAIN SENSING MOTORIZED UMBRELLA-II

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Abstract:

An umbrella is much needed product in rainy season. The problems associated with umbrellas is that it needs to be carried separately along with your other stuff and it occupies one hand all the time. Also umbrellas are to be kept separately in buckets which leads to people forgetting about umbrella in many cases and losing them. Well we here design a smart solution to all umbrella related problems with a customized solution. Our proposed device is a bag pack that has an integrated umbrella with auto rain sensing. The umbrella does not need to be carried separately and both hands of the user are free even when the umbrella is open. Even opening the umbrella is an automatic operation with no manual efforts needed.

INTRODUCTION

A product that is in high demand during the rainy season is an umbrella. Due to the fact that it must be handled separately from the rest of your belongings and that it always requires the use of one hand, umbrellas provide a number of logistical challenges. Additionally, umbrellas need to be stored in buckets that are kept apart from one another, which causes individuals to forget about umbrellas and, in many instances, lose them themselves.

Well, here at our company, we come up with a clever answer to any and all issues that are associated with umbrellas by providing a unique solution. The bag pack that we have presented is equipped with an umbrella that can detect rain automatically and is incorporated into the bag. In addition, the user is able to use both hands even while the umbrella is open, therefore there is no need to carry the umbrella separately. A human effort is not required in order to open the umbrella since it is an automated function.

It is common knowledge that the term "technology" is continually evolving on a daily basis. In the end, the objective is to simplify the jobs that humans do. As a result of the rapid advancement of technology, people are constantly producing new pieces of apparatus. The search for more complex ideas is something that people are interested in.

The Rain Sensing Motorized Umbrella Bag is a solution to the issue of handling wet umbrellas, which is a common problem in today's society, where convenience and practicality are intertwined. This forward-thinking device offers consumers a hassle-free experience during wet days by integrating technology and functions in a clear and smooth manner.

Conventional umbrellas, albeit being essential for providing protection from precipitation, can become a nuisance once they are brought inside. In homes, businesses, and public spaces, the presence of situations such as dripping water, slick flooring, and the need to fold and store items manually all add to the discomfort and possible dangers that may be present. When it comes to managing umbrellas, the annoyance is compounded by the possibility of forgetting them or losing them. The Rain Sensing Motorized Umbrella Bag is designed to overcome these difficulties by including a number of cutting-edge accessories. The motorized mechanism of the



umbrella bag is activated when it senses condensation, which is made possible by the rain sensors that are included inside the bag. By enclosing the umbrella in a bag that is impervious to water, this mechanism quickly prevents water from leaking onto floors and other items. A revolutionary product that offers a combination of convenience, safety, and environmental concern, the Rain Sensing Motorized Umbrella Bag is a game-changer in the way that we manage wet umbrellas. This forward-thinking approach establishes a new benchmark for contemporary living in wet regions by demonstrating how technology may be used to overcome common issues.

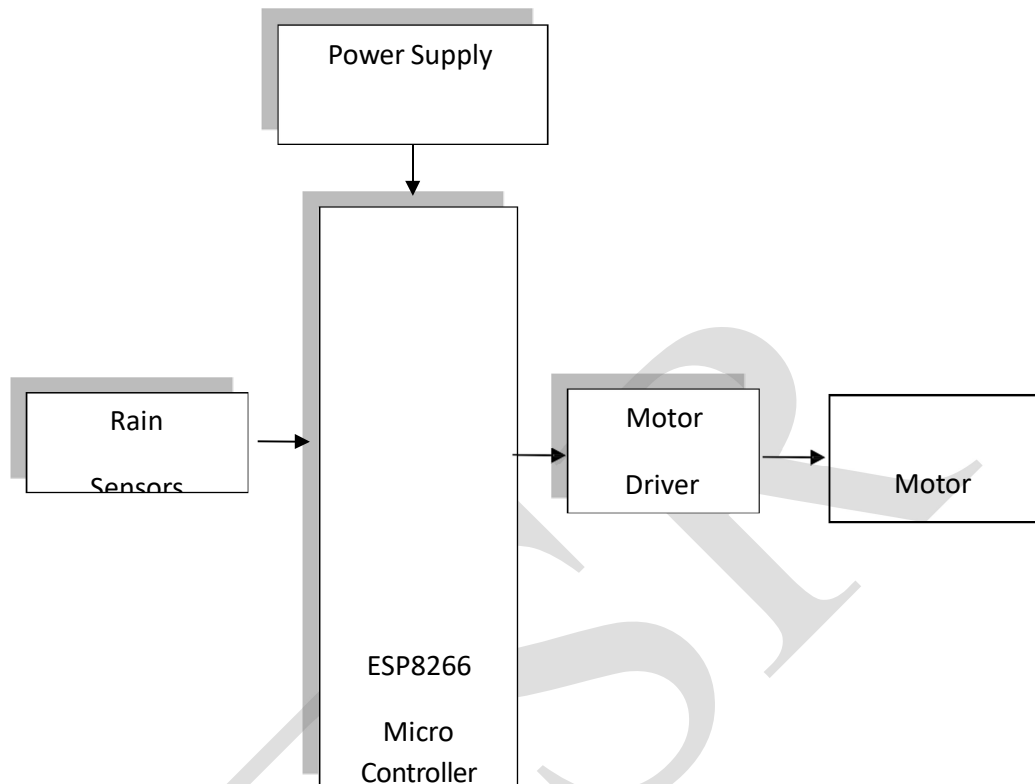
When it comes to the handling of wet umbrellas in interior spaces, the Rain Sensing Motorized Umbrella Bag is a revolutionary concept that was created to ease the process. Due to the fact that they need manual folding and storage, traditional umbrellas, despite their ability to effectively protect against rain, sometimes cause annoyance once they are brought inside. Rain-sensing technology, which automatically detects wetness and initiates a motorized mechanism to encapsulate the umbrella in a waterproof bag, is one of the high-tech characteristics that the umbrella bag has. It is designed to answer these issues. In addition to reducing the likelihood of water leaking into floors and possessions, this streamlined approach avoids the inconvenience of manually handling wet umbrellas. The umbrella bag station is suited for use in a variety of contexts because to its small size, which makes it acceptable for use in entrances, lobbies, and throughout public buildings. Customization possibilities also make it possible to design solutions to match the interests of a wide range of users and the requirements of several businesses. The umbrella bag not only improves convenience and safety, but it also encourages environmental awareness by requiring acceptable disposal procedures for umbrellas, reducing the amount of water waste and littering, and promoting responsible disposal practices. Taking everything into consideration, the Rain Sensing Motorized Umbrella Bag is a major improvement in umbrella management technology. It establishes a new benchmark for efficiency and user experience in environments that are prone to rain.

An umbrella that is fitted with sensors that detect rain and automatically open or shut the umbrella depending on the amount of precipitation is referred to as a rain detecting motorized umbrella. A motorized mechanism is often included in this kind of umbrella, which enables it to open and shut without the need for any help from a person. The rain sensors are able to detect the existence of rainfall as well as the intensity of the raindrops, which then causes the motorized mechanism of the umbrella to either extend or retract the canopy in accordance with the measurements. Those who regularly find themselves caught in the rain are likely to find this technology to be a preferable option since it provides both convenience and protection against unexpected rain showers. However, certain versions may come with extra features such as built-in LED lights for improved visibility during nighttime operation, as well as wind sensors to avoid damage in instances when there is a strong gust of wind.

A rain-sensing motorized umbrella bag is one example of the extraordinary advances that have been made possible by the combination of technology with commonplace things in recent years. In order to revolutionize the method in which people shield themselves from unexpected rain showers, this cutting-edge umbrella combines rain sensor technology with a motorized mechanism. The most important components of this cutting-edge product will be discussed in this brief summary that we have prepared for you.



BLOCKDIAGRAM & EXPLANATION



Phase 1 – In the phase 1 out will be interfacing rain sensor with the microcontroller, whenever it rains the sensor gets triggered and this information is sent to esp32 which then displays the information on the LCD and triggers the motor. The whole operation is powered by power supply which provides 12v to run the motor and regulated to 5v for other electronics.

Rain Sensor :

The Raindrops Detection sensor module is used for rain detection. It is also for measuring rainfall intensity. Rain sensor can be used for all kinds of weather monitoring and translated into output signals and AO.

Raindrops Detection Sensor Module Rain Weather Module for Arduino, etc. Rain sensor can be used to monitor a variety of weather conditions and turned into several fixed output signal and Analog output.

It includes a printed circuit board (control board) that “collects” the raindrops. As raindrops are collected on the circuit board, they create paths of parallel resistance that are measured via the op-amp. The lower the resistance (or the more water), the lower the voltage output. Conversely, the less water, the greater the output voltage on the analog pin. A completely dry board, for example, will cause the module to output 5V.



Pin Descriptions: There are altogether 22 pin counts, the definitions of which are described in Table 2 below

NO.	Pin Name	Function
1	RST	Reset the module
2	ADC	A/D Conversion result. Input voltage range 0-1v, scope: 0-1024
3	EN	Chip enable pin. Active high
4	IO16	GPIO16; can be used to wake up the chipset from deep sleep mode.
5	IO14	GPIO14; HSPI_CLK
6	IO12	GPIO12; HSPI_MISO
7	IO13	GPIO13; HSPI_MOSI; UART0_CTS
8	VCC	3.3V power supply (VDD)
9	CS0	Chip selection
10	MISO	Salve output Main input
11	IO9	GPIO9
12	IO10	GPIO10
13	MOSI	Main output slave input
14	SCLK	Clock
15	GND	GND
16	IO15	GPIO15; MTDO; HSPICS; UART0_RTS
17	IO2	GPIO2; UART1_TXD
18	IO0	GPIO0
19	IO4	GPIO4
20	IO5	GPIO5
21	RXD	UART0_RXD; GPIO3
22	TXD	UART0_TXD; GPIO1

Table 3.1: Definitions of All pins

SOFTWARE SPECIFICATION

Arduino IDE: A Comprehensive Overview

The Arduino IDE is an open-source software development environment used for writing, compiling, and uploading code to Arduino microcontroller boards. Here's a detailed look at its features, functionality, and usage:

1. User Interface:

The Arduino IDE features a simple and intuitive user interface designed to be beginner-friendly.

It consists of a text editor for writing code, a message area for displaying compiler output and error messages, and a toolbar for common functions.

2. Code Editor:



The code editor provides syntax highlighting for different programming languages supported by Arduino, such as C and C++.

It includes features like auto-indentation, code completion, and line numbering to aid in code writing and editing.

3. Sketches:

In Arduino terminology, a program or piece of code is referred to as a "sketch."

Sketches in the Arduino IDE consist of two essential functions: `setup()` and `loop()`. The `setup()` function is executed once when the program starts, while the `loop()` function runs continuously in a loop after `setup()` is completed.

4. Library Manager:

The Arduino IDE includes a Library Manager, which allows users to easily install, manage, and update libraries of pre-written code for various sensors, actuators, and other components.

Users can search for libraries by name, install them with a single click, and update them to the latest versions when available.

5. Board Manager:

The Board Manager enables users to add support for different Arduino boards and microcontrollers to the IDE.

Users can select their specific Arduino board model from a list and install the necessary board definitions, which include hardware-specific configurations and libraries.

6. Serial Monitor:

The Serial Monitor is a built-in tool in the Arduino IDE for debugging and communication with the Arduino board via the serial port.

It allows users to send data from the Arduino to the computer and vice versa, enabling real-time monitoring of sensor readings, debugging output, and communication with other devices.

7. Compilation and Upload:

The Arduino IDE compiles sketches into machine-readable code (hex files) using the AVR-GCC compiler.

Once compiled, users can upload the code to their Arduino board via a USB connection or other supported interfaces, such as ICSP (In-Circuit Serial Programming).

8. Community Support:

The Arduino IDE benefits from a vast and active community of users, developers, and contributors who provide support, share knowledge, and create libraries and tutorials.

Users can access forums, online documentation, and community-driven resources to troubleshoot issues, learn new techniques, and collaborate on projects.

9. Cross-Platform Compatibility:

The Arduino IDE is available for multiple operating systems, including Windows, macOS, and Linux, making it accessible to users on different platforms.

It offers consistent functionality and user experience across platforms, allowing users to develop Arduino projects regardless of their operating system.

10. Extensibility and Customization:



The Arduino IDE is highly extensible and customizable, allowing users to add new features, tools, and functionalities through plugins and third-party contributions.

Users can create custom libraries, templates, and tools tailored to their specific needs or integrate existing plugins to enhance their development workflow.

In summary, the Arduino IDE is a versatile and user-friendly software development environment for programming Arduino microcontroller boards. Its rich features, extensive library support, and active community make it an excellent choice for beginners and experienced developers alike to create a wide range of electronic projects and prototypes

RESULTS AND DISCUSSION

Building a rain-sensing motorized umbrella using an ESP32 involves integrating the ESP32 microcontroller with rain sensors, a motorized mechanism for opening and closing the umbrella, and programming to control these components based on rain detection. Below is a basic guide for the hardware setup and functionality:

Components Needed:

ESP32 Development Board Rain Sensor Module

Motorized Umbrella (with motor and control mechanism) Motor Driver (if not included in the motorized umbrella) Power Supply (battery or power bank)

Jumper Wires

Umbrella Frame and Fabric Circuit Connection

Connect Rain Sensor:

Connect the rain sensor to the ESP32's GPIO pin. Rain sensors usually have two pins (VCC and Signal).

Connect the VCC pin of the rain sensor to the 3.3V output on the ESP32. Connect the Signal pin of the rain sensor to a GPIO pin on the ESP32.

Connect Motorized Umbrella:

Connect the motorized umbrella's motor and control mechanism to the ESP32. If the motorized umbrella has a built-in motor driver, connect it to the ESP32. If not, use an external motor driver (e.g., L298N) to control the motor.

Power Supply:

Connect the power supply (battery or power bank) to the ESP32 and the motorized mechanism.



Output 1:



Fig : When the kit is ON



Fig : When the umbrella is opened

Output 2:

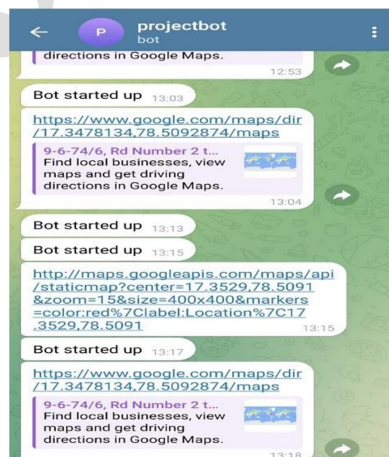


Fig : Location is traced

Conclusion:

We conclude that by implementing this system we can be save from the rain in much advance method with accuracy possible. In conclusion, this innovative rain-sensing motorized umbrella goes beyond merely providing protection from the elements. It incorporates advanced technology to detect rain, automatically deploying to shield you. Additionally, it has a built-in location tracking system that can be a lifesaver in emergencies. Should you find yourself in a precarious situation, the umbrella will pinpoint your location and promptly relay it to your family members via Telegram.

This ensures that your loved ones are always aware of your whereabouts and can take swift action if needed. The integration of rain detection and location tracking in a single device offers not only convenience but also enhanced safety. With this umbrella, you're protected from the rain and connected to help, blending functionality with peace of mind. This product stands out as a testament to how everyday objects can be transformed with technology to provide greater security and utility.

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