International Journal of Enhanced Research in Science, Technology & Engineering
ISSN: 2319-7463, Vol. 11 Issue 4, April-2022, Impact Factor: 7.957

A Review of an Automatic Rain Sensing Umbrella

Basima Nudhrath[1], Shibina[2], Sreelekshmi B[3], Thasleema N S[4], Reshmi Krishna Prasad[5]

[1,2,3,4] UG Student, Department of Electronics & Communication Engineering,Dr. APJ Abdul Kalam Technological University, Kerala, India
[5]Asst. Prof, Department of Electronics & Communication Engineering,Dr. APJ Abdul Kalam Technological University, Kerala, India

ABSTRACT

An umbrella is much needed product in rainy season. The problems associatedwith umbrellas is that it needs to be carried separately along with your other stuff and it occupiesone hand all the time. Also umbrellas are to be kept separately in buckets which leads to peopleforgetting about umbrella in many cases and loosing them. The aim of this the system is to makea smart umbrella which can reduce human effort due to its functionality and can target the market due to its unique design, is really important in modern society at risk of rainfall and wind without coverage in place. The purpose of this project is to make such an umbrella that is reallysensitive in the incidences of rain and sunlight at domestic and market level. This umbrella covers the entire bag and human during the rain and sunlight. This umbrella operates with the help of different sensors like temperature sensors, and water sensors. The opening and closing of umbrella is being controlled through a motor. Motor can give a quick and instant response tothe shaft so that shaft can play a major role of power transmission for opening and closing of umbrella. Motor provides required rpm to the shaft. Whenever temperature of the atmosphere increases, temperature sensor sends signal to Arduino which is control unit box. Then Arduino sends signal further to the motor so that motor may activate and deliver required rpm to the coupling shaft. This project is a cost-effective way of providing automated control of rain. 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.

Keywords: Rain Sensor, DHT11, Motor, Arduino

INTRODUCTION

An umbrella is much needed product in rainy and sunny season. The problems associated with umbrellas is that it needs to be carried separately along with your other stuff and it occupies onehand all the time. Also, umbrellas are to be are kept separately in buckets which leads to peopleforgetting about umbrella in many cases and loosing them.

Natural resource parts square measure related to everyday activities like downfall and sun light-weight that has each positive likewise as negative impact on our lives and property. The sun emits radical violet energy that is one amongst the sources for fat-soluble vitamin, staggering the expansion of on cogenes and additionally utilized by plants throughout chemical process that is indirectly supply of food for all living creature. downfall additionally having its terribly negativeimpact and like destruction and harm of nursery bed herbs or plants and varied decorative flowers, skin condition in humans, fever and illness, and increase in mortality of living stocks, structural and materialistic deformation of properties like materials.

Automatic sensor based umbrella can be used during rainy, summer, snow fall and dense foggyseason. The idea is to design an umbrella that can be open and shut automatically with the help of Arduino programming. In present research work is come over with a smart rain sensing system can detect the rain and opens up the umbrella's link support. A raindrop sensing system is addingin this smart system, which gives a reading proportional to the amount of rain pouring on it.

Fig:1 Umbrella with Motorised bag

Technology develops day by day speedily. The last word goal is to create human tasks easier. because the technology developing often, folks return up with new instrumentality. Folks have interest to search out a lot of advanced ideas. Automation system is far importance in human standard of living. Essentially it reduces the humanly add production of products and services. The automation have several benefits like it replace human operators involving in robust or monotonous work for e.g. gap and shutting of associate umbrella mechanically through sensors and a microcontroller. It's associate advance technology during this time. Within the society are need to face numerous style of drawback. The downside of the present system is restricted batterylife and therefore the existing system is formed of plastic material, that is employed because theroof of the umbrella. The work to be eluded any facilitate of a permanent employee. Automation system primarily wont to minimize human efforts and time .All folks wish a number of our workto be done fleetly and with none effort.

LITERATURE REVIEW

Design and Modeling of Automated Rain Sensing Umbrella.
Automatic sensing element primarily based umbrella are often used throughout rainy, summer, snowstorm and dense foggy season. It will useful to not solely save the lifetime of fabric, street vegetable the vegetables, fruits however in some things additionally save the human life. The concept is to style associate degree umbrella that may be open and shut mechanically with the assistance of Arduino programming. In gift analysis work is intercommunicate with a wise rain sensing system will discover the rain and exposes the umbrella's link support. A driblet sensingsystem is adding during this sensible system, which supplies a reading proportional to the numberof rain gushing on that. The sensible system consisting of a rack and pinion system, the rack is fastened to umbrella specified once a sensing element senses the surpassing price of raindrops, it provides a symbol to the pinion hooked up to a motor. Then the motor starts rotating and therefore the umbrella get opens. The aim of gift study is complete dominant, style and modelingof umbrella. The results of this analysis is associate degree acceptable technology to push the technology with multidisciplinary approach for the client.

Design of an Automated Umbrella Actuated through Water and Temperature Sensors.
The aim of this thesis is to create a sensible umbrella which might scale back human effort thanksto its practicality and might target the market thanks to its distinctive style, is basically vital in fashionable society in danger of precipitation and wind while not coverage in situ. the aim of thisproject is to create such AN umbrella that's extremely sensitive within the incidences of rain anddaylight at domestic and market level. Specifically, in summer season the ground of open areas gets therefore heat thanks to sun lightweight that produces problem for operating. This umbrellacovers the whole hall throughout the rain and daylight. This umbrella operates with the assistanceof various sensors like temperature sensors, water sensors and wind sensors. The gap and shuttingof umbrella is being controlled through a motor. Motor will provides a fast and instant responseto the shaft in order that shaft will play a serious role of power transmission for gap and shutting of umbrella. Motor provides needed rev to the shaft. Whenever temperature of the atmosphere goes on top of 35°, temperature detector sends signal to Arduino that is management

unit box. Then Arduino sends signal additional to the motor in order that motor could activate and deliverneeded rev to the coupling shaft. This project may be a cost-efficient means of providing machine-controlled controlled shade from high intensity daylight and rain. So, the issues of open and large areas will be resolved by victimisation such varieties of machine-controlled umbrellas.

Automatic Garden Umbrella Prototype with Light and Rain Sensor Based on ArduinoUno Microcontroller.
Park may be a inexperienced open house wide utilized by the community to hold out varied activities starting from recreation, playing, sports, and different passive activities. Current atmospheric condition are typically unsure. This makes folks inconvenient once it rains suddenly,particularly once outdoors like in parks. As a result of if they do not straightaway take shelter once it rains, it will build the body sick, besides that, fresh water will injury the non-waterproofgadgets they carry. In different conditions, once the weather is bright, and also the sun is shininghot, it will build folks feel hot and lazy to try and do outside activities within the park. Therefore,Associate in Nursing automatic umbrella tool was created that functions as a shelter within the garden. during this tool, there's a light-weight device module and conjointly a rain device, that iscontrolled with the Arduino Uno microcontroller as Associate in Nursing computer file processorAssociate in Nursing an L298N motor driver, that functions to control the speed Associate in Nursing direction of the DC motor rotation (to the proper and left) as an umbrella drive. Once the motor rotates to the proper, the umbrella can open, whereas once the motor rotates to the left,the umbrella can shut once more.

Rain Sensing Automatic Car Wiper System.
Today's automobile wipers square measure manual systems that employment on the principle of manual change. Thus here we have a tendency to propose Associate in Nursing automatic wiper system that mechanically switches ON detection rain and stops once rain stops. This project brings forward this technique to automatize the wiper system having no want for manual intervention. For this purpose we have a tendency to use rain detector beside microcontroller anddriver IC to drive the electric motor. This technique uses rain detector to observe rain, this signalis then processed by microcontroller to require the specified action. The rain detector works on the principle of victimization water for finishing its circuit, thus once rain falls on that it is circuitgets completed and sends out a sign to the microcontroller. The microcontroller currently processes this information and drives the motor IC to perform needed action. The motor driver IC currently drives a servomotor to simulate as a automobile wiper.

Smart shed: An Automatic Shed System Based on Rain , sensor and Light Intensity.
In the era of technology, huge quantity of sensing devices and microprocessors square measure accessible. The mix of each are often used for automation of assorted applications. This paper aims to propose Associate in Nursing Arduino primarily based automatic shed system "Smart Shed", that depends upon 3 environmental factors: water, temperature and intensity of sunshine. If any issue is detected higher than a particular threshold the shed can mechanically be applied otherwise it'll be removed while not human intervention. 3 detectors: water sensor for raindetection, light-weight dependent electrical device (LDR) for activity intensity of sunshine and LM35 for activity temperature square measure used. Arduino mega 2560 sense setting mistreatment sensors and relying upon detected values applies or removes shed. The potency ofthis technique is found to be just about ninety fifth.

Smart Helmet Wiper.
An improvised helmet style that is integrated with a electronic equipment for automatic rain sensing mini wiper set on the attention protect. The presence of a sensible helmet wiper can create2 wheeler riding easier and safer in season since the driving force won't be daunted by the continual rain drops distressful his/her vision. The wiper can mechanically begin as shortly because it detects the presence of rain drops on the rain sensing element mounted on the highestof the helmet. Additionally to the present the wiper are ready to alter its speed of wiping in line with the intensity of precipitation mechanically. In some things manual shut down of the wiper is additionally attainable by a switch which can be set within the ear protect. Commands to the wiper are given with the assistance of Arduino Nano and power can provided by reversible Li Batteries

Fabrication of Automated Sensor Controlled Umbrella
This creation is Associate in Nursing umbrella in programmed gap and motility approach with its bar within the center, that has completely different areas. Automatic umbrella square measure employed in completely different aspects. It will be employed in tiny parks, mosques, and field grounds etc. It's a really low cost, straightforward and reasonable project which might be employed in multiple functions. We tend to try and build a example which might be detected byrain and lightweight. This mega project is put in in Masjid-e-Nabwi by German architectures, that was a undefeated project. This project contains of Arduino programming to run Motors by sensors. The whole dominant of this project and fabrication was our task. And creating it an inexpensive and straight forward mechanism for domestic purpose.

Sunlight and Rainfall Activated Retractable Roof
Natural weather components like rain and daylight play very important roles in our daily living.It additionally has negative consequences like skin disorders, fever, destruction of crops, structural and aesthetic deformation of properties and mortality in animals. To regulate these elements interaction with the atmosphere, measures like

automotive parks, inexperienced homes and shades are used. The draw back to those solutions embody the employment of permanent structures thereby limiting its usage thanks to area. This is often additionally to total isolation to the very important components. To forestall total isolation from the weather whereas additionally sanctionative area re-use, a retractile roof that would be activated by either of 2 weather components (rain or sunlight) was developed. Formula was developed to coordinate the operating of the system that consisted of rain, sunlight, and distance sensors to spot the atmospheric phenomenon supported set thresholds, and take correct action by gap or closing the roof. Associate in Nursing LDR was wont to build a lx meter Associate in Nursing confirm the daylightintensity whereas Associate in Nursing supersonic and a rain sensing element were wont to severally sight presence of an object and rain. The system is controlled by Associate in Nursing Arduino Uno and stepper motor was used for folding and evolution the roof with 2 switches aiding the information of direction of future attainable rotation.

Rainy Weather Recognition from in- vehicle Camera Images for Driver Assistance

In this paper, we proposed a method to recognize weather conditions when driving by detecting raindrops on the windshield from in-vehicle images that use a subspace method. In experimental results using actual images, we obtained good results when extraction of the image features waseasy. By restricting the detection to the sky area, we also achieved good results when the detection was difficult. Hence we confirmed the efficacy of our method. In the future we will consider a robust method that detects raindrops in background areas using inter-frame information. In addition, although we restricted the target area for the raindrop detection using image features, we considered using visible positional information, which can be obtained froma so-called “eye camera.” Therefore in the detection area we will include the area near the viewof drivers. Moreover, evaluation of the method under various rainy weather situations according to time, place, and rainfall is another subject.

PROPOSED METHODOLOGY

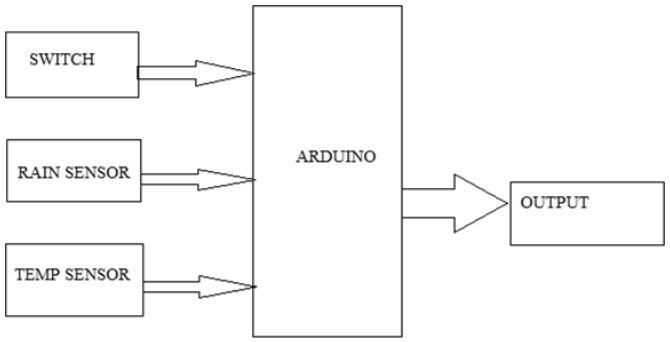

Fig:2 Block Diagram

The proposed system is an automatic rain sensing umbrella ,which senses the rain and temperature automatically. The rain is detected by the rain sensor and temperature sensor sense the temperature. Then automatically open and close the umbrella with the help of a motor. The sensor was interfaced to the Arduino Uno as indicated in above figure.2. The working of the model is dependent on the intensity of rain. The water sensor on the sensing the intensity in real as rain intensity increased and becomes more than the previous value then produce the signal to motor controller to start motor which ultimately opens up the umbrella.

CONCLUSION

After completing the present work with all the process involved in designing the automated umbrella which can be of reasonable cost analysis and effective way to providing the shelter andsafety to the man who hold the umbrella . It reduces human work. The designed model is not only smart but also intelligent as it will take decision about folding and unfolding of umbrella. The system can be control by Arduino and stepper motor used for folding the umbrella. 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. It also used in future after some of modification algorithm can be developed to coordinate Working system of rain to identify weather condition based on set value. The designed system prototype can be used along with the renewable source of energy. The system can be controlby Arduino and stepper motor used for folding the roof with two or more switch fix along with the knowledge of next future direction.

REFERENCES

[1]. Deepak Gupta, Ayush Gupta, Nishikant Singh, Quazi Mohd Affan, Atul Kumar, "Design and Modeling of Automated Rain Sensing Umbrella" of Xi’an University of Architecture & Technology.vol.7,issue.6,2020

[2]. Meher Dev Gudela, Atharv Kulkarni, Abhishek Dhotre and Kshitiz Shrimali,"Design of an Automated Umbrella Actuated through Water and Temperature Sensors", Journal of Mechatronics and Robotics 2020,Volume 4:191,210

[3]. Yudi Irawan Chandra,Marti Riastuti, Kosdiana,Edo Prasetiyo Nugroho,"Automatic Garden Umbrella Prototype with Light and Rain Sensor Based on Arduino uno Microcontroller", International Journal of Artificial Intelligence & Robotics Vol.No.2,2020,pp.42-51

[4]. Sakshi karande, Vaishnavi Shrikhande, Renuka Joshi, Prof. Halcherikar R.R, "Rain Sensing Automatic Car Wiper System"IJARIIE-ISSN(O),Vol-5 Issue-2 2019

[5]. Sarika Kanetkar, Ankit Rathore, Krati Maheshwari, Prasanna Dubey, Ankit Saxena,"Smart Helmet Wiper"2020 IEEE International Students'Conference on Electrical,Electronics and Computer science

[6]. Maryam omar, Omar Bin Samin, Imran Ahmed, "Smartshed: An Automatic Shed System Based on Rain ,sensor and Light Intensity" Internationl conference,Bangkok, Thailand,5-6 April,2019

[7]. Jawad Haider Gillani, Saud ul Saqlain, M Yousaf, Hamza Ahsan, "Fabrication of AutomatedSensor Controlled Umbrella"JUNE ,2018.

[8]. Alkali, A.H., Dada, E.G., Kida, A.M. and Ali, A.A.,. "Sunlight and Rainfall Activated Retractable Roof", International Journal of Computer Engineering and Applications, 12(11), pp.1-12, 2018.

[9]. H. Kurihara, T. Takahashi, I. Ide, Y. Mekada, H. Murase, Y. Tamatsu, and T.Miyahara"Rainy weather recognition from in-vehicle camera images for driver assistance"in IEEE intelligent vehicles symposium,2005,pp.205-210