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Clothes Hanging System

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***Abstract*-The unstable weather condition can make difficulty in drying clothes and the situation will become worse if it is raining. For people who are working, surely they worried about their clothes that left dry outside. This project introduces smart outdoor clothes hanging system that can automatically detect the atmosphere conditions and the presence of rain and the sunlight and provide the shelter for the clothes to protect them rain and also automatically retrieve out the clothes when it is the sunny day and oppositely retrieve in the clothes when it is a rainy day.The dry-time of the clothes will be counted and it will automatically retrieve-in the clothes when the dried-time is finished. This project will make use of various sensors such as rain sensor, LDR sensor and moisture sensor for detecting rain,light intensity and dryness respectively. Day conditions will display sunny, cloud or rainy.Soft iron plate is placed for placing the wet clothes and their movements are controlled by gear motors which are placed on either side. This hanger system can be used in hospitals, hostels and home.**

***Abbreviation*- LDR, Light Dependent Resistor.**

***Keywords*-Atmosphere conditions; rain sensor; LDR sensor; moisture sensor; Soft iron plate; Gear motors.**

I.INTRODUCTION

These days, the precarious climate can be troublesome to individuals to dry their clothes at outdoor due to unlikely weather condition such as rain. Sometimes, people also often forget to lift their clothes during the rainy days from outdoor. For people who are working, of course they worry about their clothes that have been dried outside. some Therefore, people often do not have time to manage their routine. On this cases, of ideas are created to prevent drying clothes which are exposed to rain that can move forward and backward to avoid clothes from getting.

Then, name of this product developed is **"Smart Outdoor Clothes Hanging System"** that can run automatically by using microcontroller as a main function to control component in this product. All programs and coding will be installed to Arduino UNO that will give instructions to conduct this system properly and will automatically retrieve-out the clothes when it is the sunny day and oppositely retrieve-in the clothes when it is a rainy day. In addition, this project uses DC gearbox motor to moves forward and backward so that it can move the clothes to the unexposed area. Besides that, the advantage of this product is, it can collect the clothes automatically when it is totally moisture free by shifting the metal plate upside down. Moreover, this product makes it easier for workers who are not at home.

This product will function when raining or dark day. Then rain sensor will function as a connecting circuit. The function of DC gearbox motor in this product is to determine the motor movement rotates left or right. It is intended to change the position of clothes from rain

exposure. LDR sensors will be used to detect light. Moisture sensor will be used to detect total dryness and functioning for retrieval of clothes placed on the metal plate. When the weather is dark, clothes will be moving to a place that is not exposed from rain or night. Retainment and removal of clothes is decided according to the dryness of clothes and also need of the people.An external mechanism is used separately to uplift the dried clothes when removal of clothes is chosen as option.Retainment of clothes is done mainly for the climatic conditioning as it is temporarily protected inside the shelter.Since the clothes are not completely dried ,they are supposed to retain itself upon the stand which is supported by rope for movement .

1. Problem statement

Unstable weather condition can make difficulty in drying clothes and the situation will become worse if it' sraining.Huge mass usage of clothes continuously in sectors like hospitals,hostels and other industries require efficient system to take dried clothes then and there when it is dried.Our proposed system helps those industries in an effective manner.

2. Proposed system

The proposed system will automatically retrieve-out the clothes when it is the sunny day and oppositely retrieve in the clothes when it is a rainy day. This project is done by developing the circuit of Light Dependent Resistor which could detect the sunny day and rain detector circuit to

detect whether it is rainy day and programming the controller to control the motor to retrieve-out the clothes when it is sunny day and retrieve-in the cloth when it is rainy day.The rain detector sensor if it rains, will sense the water droplets on the device and will send value to the program controller.

3. Existing system

The existing system will convert DC motor to electrical power into mechanical power for retrieve-out and retrieve-in all the clothes. Temperature sensors that use in this project can measure temperature and day condition whether it is sunny or rainy day more accurately. LDR (Light Dependent Resistor) sensors use to detect light. Rain detector use to sense whether it rain or not at outside by detecting rain water from impedance sensor locate at the rod. The dry-time of the clothes will be setup using push button and it will automatically retrieve-in the clothes using DC motor when the dried-time is finished. For status display, this project will be display the day condition, temperature and dry-timer using LCD (Liquid Crystal Display) or indicator lights such as LED (Light Emitting Diode).

II. METHODOLOGIES

1.Embedded system:

An embedded system is a combination of computer hardware and software, either fixed in capability or programmable, designed for a specific function or functions within a larger system.Embedded systems are computing systems, but they can range from having no user interface (UI) for example, on devices in which the system is designed to perform a single task to complex graphical user interfaces (GUIs), such as in mobile devices. User interfaces can include buttons, LEDs, touchscreen sensing and more. Some systems use remote user interfaces as well.Industrial machines, agricultural and process industry devices, automobiles, medical equipment, cameras, household appliances, airplanes, vending machines and toys, as well as mobile devices, are possible locations for an embedded system.

2. Internet of Things build on Embedded System base:

While some embedded systems can be relatively simple, a growing number either supplant human decision-making or offer capabilities beyond what a human could provide. For instance, some aviation systems, including those used in drones, are able to integrate sensor data and act upon that information faster than a human could, permitting new kinds of operating features.The embedded system is expected to continue rapidly growing, driven in large part by the internet of things (IoT). Expanding IoT applications such as wearables, drones, smart homes, smart buildings, video surveillance, 3D printers and smart transportation are expected to add to fuel embedded system growth.

3.Arduino in Embedded System Programming:

The Arduino is an open-source computer hardware/software platform for building digital devices and interactive objects that can sense and control the physical world around them. Itis a microcontroller board based on the ATmega328. It has 14 digital Input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to Support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. The Uno and version 1.0will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions.

III. RESULTS AND DISCUSSION

In this,it contains three sensors;first is rain sensor ,second sensor is LDR and third sensor is moisture sensor.The rain sensor function as a rain detector and LDR sensor function during sunny day.Figure 6.1 shows the smart cloths hanging system.It contains of shelter,shaft, soft iron plate represents as a place to put the cloth,function to move hanger outside and inside and iron rod to hold the soft iron plate.The location of the motor1 and motor2 as depicted in Figure 6.2(a)&(b).

Fig 1 smart cloths hanging system.

The Fig 1 displays the proposed system of smart outdoor cloths hanging system.It helps to product the cloths from the rain.

Fig 2(a)&(b)position of motor1 and motor2.

Fig 2(a)&(b) displays the location of the motor which is used in the proposed system.It is used to move the soft iron plate inside or outside the shelter.Next step is on the hardware design.Thearduino is connected via USB to detect rain sensor and LDR.Rain sensor and LDR sensor was connected from arduino(input) as a switch.When the rain sensor detect water,the shaft which attach to the motor will be rotated and caused the soft iron plate to move inside the shelter.The Fig 6.3 displays the connections of sensors with Arduino.

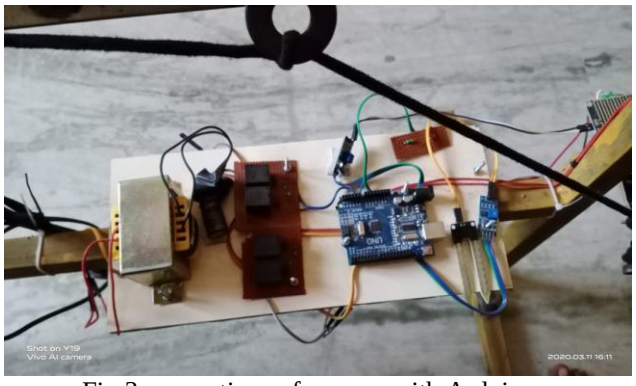

Fig 3 connections of sensors with Arduino.

The Fig 3 displays the connections of sensors with Arduino board. Here the rain sensor,LDR and the moisture sensors are connected.In order for smart outdoor cloths hanging system project to function very well with arduino,the 2 cases are identified as shown in Table-1. First case,When LDR detect the light (ON) and no water detect (Rain sensor OFF) the cloths move outside.Secondcase,when rain sensor is ON and LDR is OFF the cloths move inside which is in real situation in raining day.We provided results we have got after interfacing and combining software and hardware.Fig 4 is the prototype of the project.

Fig 4 prototype of the project.

IV. CONCLUSIONS

A smart system for clothes hanging in outer space and preventing dried clothes from natural atmospheric condition such as rain through the movement of clothes from outer space to shelter is designed for the user.. It comprises of three major parts namely, mechanical part, electrical and electronics part and analytical part. The mechanical & electrical and electronics part give a complete shape and perform different functions in the system. The raw data is collected by the LDR sensor and converted to sensor value which is analyzed for checking the moisture content of the clothes.From this retrieval and removal function of clothes is decided.

In this appliance, the machine operates automatically by sensing the conditions given ,hence there is no need for user to operate separately. This can be helpful for working people.They can be stress free as they don' t need to worry about the condition of clothes.It also helps to extend the validity of clothes, because if clothes get wet frequently by rain,its quality get diminished. Thus it can be used in the applications such as homes, hotels, hostels and hospitals etc..

V.FUTURE WORK

For now we have designed the prototype which is done with movement of clothes from outer space to the shelter. For a better designing and a more compact version, we will design the system that may contain clips for holding clothes and can be developed for larger application. Thus we will achieve a more reliable and lighter device at a lower cost .In addition to that ,timer can be added if same material type of clothes are used such as mask and aprons in hotels and hospitals.Alert messages can also sent to the user' s mail Id through SMTP.

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