Auto Clothes Dryer using IOT and Artificial Intelligence

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Abstract -Drying of clothes in rainy season have become a domestic concern in recent years .In this proposed system we are continuously monitoring the area where we dry out our clothes especially when it's raining and upload the data over IOT. This can prevent the clothes which are suspended out for drying will not remain wet and also prevent stinking of the wet clothes and also eradicate the skin problem which may be the result of wearing humid clothes. This project is automated completely and has zero human interference.People often forget to lift the suspension of clothing during the day rain. For people who working, they don't have to worry about their clothes that have been dried outside. People often don't have time to manage their routine. This project develop for working couple, it is hard to find time to have laundry day where the cloth is dried through the whole day because the weather can change from sunny to rainy days.

Key Words:PIC Microcontroller, DC Motor, Rain sensor, moisture sensor, IOT web server.

1.INTRODUCTION

People are now-a-days working in corporate companies they go for work in morning and come only at night they wash clothes in machines and they suspend it in open terrace and they are unable to lift the suspension of clothing during the day rain. For people who working, they don't have to worry about their clothes that have been dried outside. People often don't have time to manage their routine. This project is developed for working couple, it is hard to find time to have laundry day where the cloth is dried through the whole day because the weather can change from sunny to rainy days. This projects use Microcontroller PIC 18f4520 to install all program 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. This part needs DC motor to convert electrical power into mechanical power for retrieve-out and retrieve-in all the clothes. Rain sensors that use in this project can measure day condition whether it is sunny or rainy day more accurately. Moisture sensor is use to sense cloth dry or wet. Rain detector use to sense whether it rain or not at outside by detecting rain water from impedance sensor locate at the rod. DC fan use to dry wet clothes. The dry-time of the clothes will be setup using push button and it will automatically retrievein 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 Display.

By using IOT web server user can monitor cloths condition as well as rain condition anywhere and anytime.

1.2. LITERATURE REVIEW

This literature review explains about relevant past research and project development which is used the almost similar system for this project.

A. Outdoor Retractable Laundry Hanger:

This system in figure.1below could work perfectly solved problem drying our laundry and make the clothes dry under the sun or indoor when it rains. We no longer need to carry heavy bamboo poles out of our windows again. Outdoor laundry system equipped with German technology and parts are simple to use by our owner family members. This system is highly suitable for residents staying in high rise flats and apartments due to limited space constraints. This system work simply on a German gas spring and roller bearing from Japan, this system sit flat to the ceiling when not in use, and it makes maximum use of the air space in our home, kitchen or in your utility yards. It makes your home look neater thus giving you more space to move around. The gas spring act to let the system move up and down using a pull and push stainless steel rod handle and it will lock at upward and downward position. The laundry hangers it on the roller bearing on the bottom part of the system, and it allows the laundry system to move in and out of the window for the sun and wind to dry your ready washed clothes. This system features were suitable for bed sheet and blanket drying and for heavy weight load upto25kg.

B. Rain Tracker Rain Gauge – Model RG-10

The Rain Gage RG-10 senses using beams infrared light. The RG-10 uses the same underlying principle used in millions of automotive rain sensing wind shield wiper controls, most of which employ technology originally developed in our labs. The technology that was designed to sense tiny amounts of water in the harsh automotive environment, made it a bit more rugged yet, and applied it to the RG-10. The result is a general-purpose rain sensor that may be configured for many applications. Include with a DIP switch that allows it to be setup for the mode of operation that best matches the application. The DIP switch sets the mode, the nature of the output, and the function of the auxiliary output. The RG-10 is suitable for almost any application that requires reliable and sensitive rain sensing, including automatic retraction of awnings, boat and ship window wiper control, and wiper control for specialized vehicles and equipment.

C. Temperature Control System:

This project about temperature control system which is a particular system for server room. This system consists of temperature sensor, PIC, LCD (Liquid Crystal Display), driver circuits, AC air heater and AC motor. To switch on the AC heater three drivers are used for triggered process and another two used for triggered levels of the motor. This motor operated based on two levels of speed and functioning for controlling the temperature value inside of a regular room automatically. This system would operate based on values or ranges of the temperature inside the room that would be detected by using the temperature sensor. If the temperature in the first ranges ($0\degree$C to $15\degree$C) the air heater will be operated to heat the very cold server room. Second range between ($16\degree$C to $25\degree$C) made this system not been able because it is achieving normal range of temperature.

D. Rollout Awnings

Rollout awning is made up of all heavy American made stock components, thick, white epoxy /PVC coated/ full bath dipped over heavy aluminum alloy frames. Alloy is stronger than plain aluminum and has an elastic quality under stress to return to shape. Other companies may import German, Italian, French, or Chinese awnings &components that are light weight, thin models for light wind and no rain only but this rollout awning will never use these inferior systems.
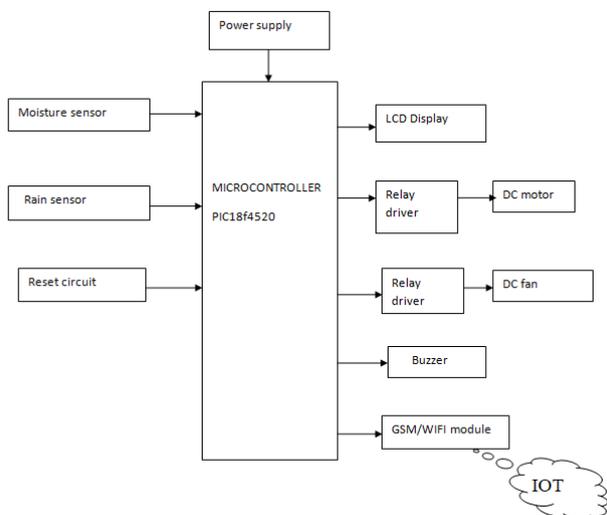
2. PROPOSED SYSTEM

Fig -1: Block Diagram

This projects use Microcontroller PIC microcontroller to install all programs 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. By using moisture sensor input cloths will automatically dry by DC fan. This part needs DC motor to convert electrical power into mechanical power for retrieve-out and retrieve-in all the clothes. Based on rainy season and sunny season it will control the auto roof. The decision making capability carried out by PIC 18f4520A. For status display, this project will be display the day condition, moisture and dry-

timer using LCD (Liquid Crystal Display) or indicator lights such as LED (Light Emitting Diode).

2.1 PIC 18f4520 microcontroller:

Data Memory up to 4k bytesn Data register map - with 12-bit address bus 000-FFF

- Divided into 256-byte banks

- There are total of F banks

- Half of bank 0 and half ofbank 15 form a virtual (oraccess) bank that is accessibleno matter which bank isselected – this selection isdone via 8-bits

- Program memory is 16-bits wide accessed through a separate program data bus and address bus inside the PIC18.

- Program memory stores the program and also static data in the system.

- On-chip   External

- On-chip program memory is either PROM or EEPROM.

- The PROM version is called OTP (one-time programmable) (PIC18C) The EEPROM version is called Flash memory (PIC18F).

- Maximum size for program memory is 2M n Program memory addresses are 21-bit address starting at location 0x000000

Fig -2: PIC18f4520 Microcontroller

2.2Rain Sensor:

It is used for the detection of rain. It can also be used for measuring the intensity of the rain. It has both digital output as well as analog output. This module measures the moisture through analog output pin and when the threshold of moisture exceeds too much it provides a digital output. The more water or the lower resistance means lower output voltage. Whereas, the less water means higher resistance, i.e, high output voltage on the analog pin.

Fig -3: Rain Sensor

2.3 Moisture Sensor:

This sensor measures the volumetric content of water inside the soil and gives us the moisture level as output. The sensor is equipped with both analog and digital output, so it can be used in both analog and digital mode. In this article, we are going to interface the sensor in both modes.
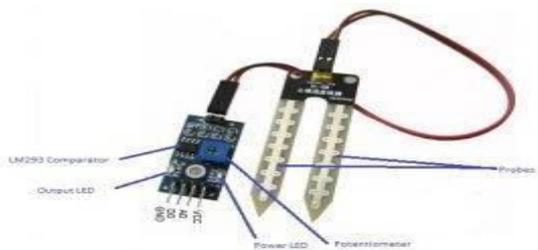

Fig -4: Moisture Sensor

2.4. GSM module:

This GSM modem has a SIM800A chip and RS232 interface while enables easy connection with the computer or laptop using the USB to Serial connector or to the microcontroller using the RS232 to TTL converter. Once you connect the SIM800 modem using the USB to RS232 connector, you need to find the correct COM port from the Device Manger of the USB to Serial Adapter. Then you can open Putty or any other terminal software and open a connection to that COM port at 9600 baud rate, which is the default baud rate of this modem. Once a serial connection is open through the computer or your microcontroller you can start sending the AT commands.

Fig -5: GSM Module

2.5. LCD display:

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD.
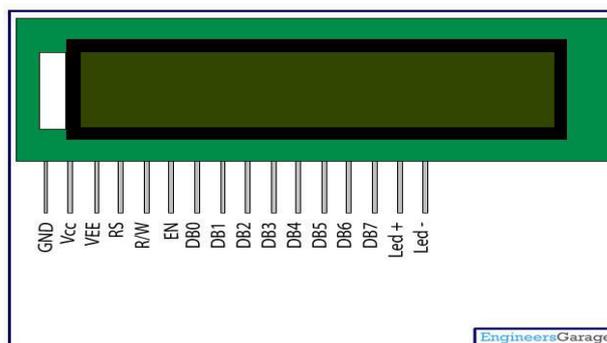

Fig -6: LCD Display

2.6. Relay Driver Circuit:

A relay driver circuit is a circuit which can drive, or operate, a relay so that it can function appropriately in a circuit. The driven relay can then operate as a switch in the circuit which can open or close, according to the needs of the circuit and its operation. Now that we're using a transistor to drive the relay, we can use considerably less power to get the relay driven. Because a transistor is an amplifier, we just have to make sure that the base lead gets enough current to cause a larger current to flow from the emitter of the transistor to the collector. Once the base receives sufficient power, the transistor will conduct from emitter to collector and power the relay.

With no voltage or input current applied to the transistor's base lead, the transistor's emitter-to-collector channel is open, hence blocking current flow through the relay's coil. However, if sufficient voltage and input current are applied to the base lead, the transistor's emitter-to-collector channel will close, allowing current to flow through the relay's coil.
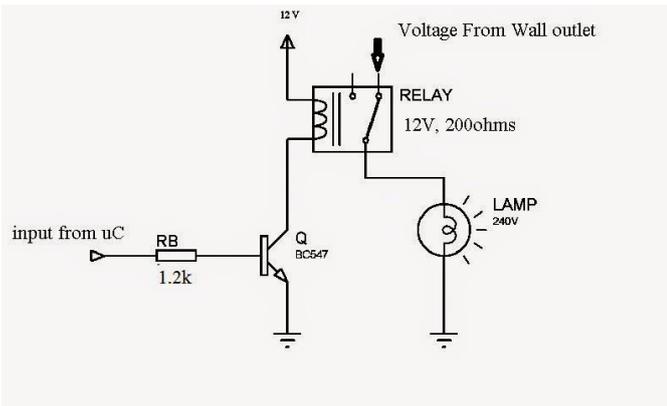
Fig -7: Relay Driver Circuit

2.7 DC Motor

A motor takes electrical energy and converts into mechanical energy. A geared DC motor has a gear assembly attached to the motor. The speed of motor is counted in terms of rotations of the shaft per minute and is termed as RPM. The gear assembly helps in increasing the torque and reducing the speed. Using the correct combination of gears in gear motor, its speed can be reduced to any desirable large number of closely spaced turns of wire that create the magnetic field.

Fig -8: DC Motor

3. CONCLUSIONS

At the end of this project we were able to design a system, which can solve the problem better idea for drying wet clothes especially in rainy season. If Clothes are washed and dry by the washing machine there will be wetness in the clothes because of that bad smell is occurred. So that irritated and disturbing themselves. And there may be skin problems. Finally this system avoid above problems and gives good result. This project consists of DC Fan to dry clothes. This Project enables us to carry towards the new technology. In this project we protect our clothes in rainy season automatically without need any human involvement. So it provides the comfort ability, reduces the human effort and saves the time. We can easily use in home, office and wherever it can be used based on our requirement .So it makes life easy to our next generation.

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