Design And Development of Solar Powered Rainfall Parameter Monitoring System

Dineshkumar.R[1], Niruban Chakravarthy.K[2], Kumaresan.K[3], Ramkumar.S[4]
[1, 2, 3, 4] Dept of Electrical and Electronics Engineering
[1, 2, 3, 4] Kongunadu Polytechnic College, Dindigul, TamilNadu, India.

Abstract- *In India utmost of the people is dependent on agriculture. For effective planning in agriculture rainfall monitoring is utmost significance. So farmers are always interested in the Weather augur. As farmers stay in remote areas, they have to wait for the news updates in television, radio or additional other. So that farmers can take early decision for his ranch. Rainfall monitoring system using Arduino UNO which measured rainfall parameters like ambient air temperature, humidity, Snow status and rain. The rainfall monitoring system has a display to check all parameters and the same weather data are displayed in television. The rainfall monitoring system is easy to handle, lightweight, and low cost as compared the other weather station.*

Keywords- Agriculture, Arduino UNO, Temperature, Humidity, Snow and Rain, LCD display.

I. INTRODUCTION

The rainfall monitoring system is a major instrument installed at remote areas. The real-time performance weather can be fluently cover with the help of the weather monitoring system. We can use weather data to get perceptivity about remote areas. Weather monitoring using Arduino UNO which may measure rainfall parameters like Ambient air temperature, Relative moisture, Air pressure, wind speed, wind direction, Solar radiation, and rain. But we are measured rainfall parameter like Temperature, humidity, snow status and rain fall. This rain fall system specifically developed for farmers where dimension Temperature, humidity, snow status and rain fall. The rainfall station has an onboard display installation to check all parameters. In this paper we've used Arduino controller, LCD display(20*4),rain sensor, humidity sensor and LDR module to monitor all rainfall data's the same time data are display to LCD display. Arduino module to cover all data and control the operation of the system.

DHT 11 sensor sense the ambient air temperature and humidity, rain sensor sense the rain fall status and snow status and LDR module which is used to mention day/night time.

II. RAINFALL MONITORING SYSTEM OVERVIEW

The rainfall monitoring system consists of Arduino Uno board with atmega328p microcontroller, DHT11 sensor, rain sensor, LDR module, and LCD display for monitoring.

A. Arduino UNO

Arduino is an open source electronics prototyping platform based on flexible, easy-to-use hardware and software. It is intended for artists, contrivers, potteries and anyone interested in creating interactive objects or surroundings. Arduino Uno is based on ATmega328 microcontroller (MCU).It consists of 14 digital input/output pins, six analogue inputs, a USB connection for programming the on board MCU, a power jack, an ICSP header and a reset button. It is operated with a 16MHz crystal oscillator and contains everything demanded to support the MCU. It is very easy to use as you simply need to connect it to a computer using a USB cable, or power it with an AC-to-DC appendage or battery to get started.

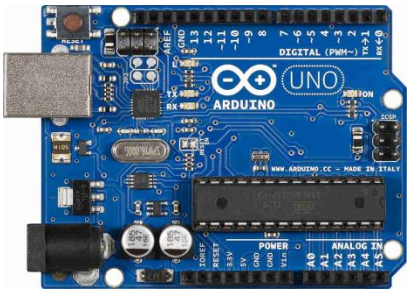

Fig. 1. Arduino UNO

B. LCD Display

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating parcels of liquid chargers. Liquid chargers do not emit light directly, rather using a backlight or glass to produce images in color or snap.

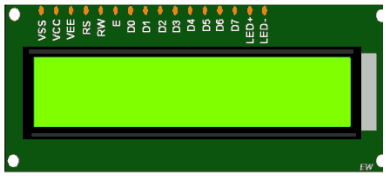

Fig. 2. LCD display

C. DHT 11 sensor module

Moisture is the measure of water vapor present in the air. The position of moisture in air affects various physical, chemical and natural processes. In industrial applications, moisture can affect the business cost of the products, health and safety of the employees. So, in semiconductor industries and control system industries measurement of moisture is veritably important. moisture measurement determines the amount of moisture present in the gas that can be a admixture of water vapor, nitrogen, argon or pure gas etc.

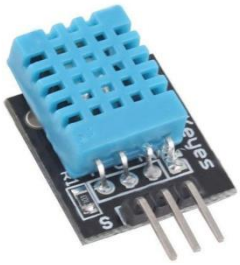

Fig. 3. DHT 11 sensor module

C. Rain sensor module

Currently, conserving water as well as its proper usage is essential in everyone's life. Then a sensor videlicet rain sensor which is used to descry the rain and induce an alarm. So, we can conserve water to use it latterly for different purposes. There are several styles available for conserving water like harvesting, etc using this system we can increase the position of underground water.

Fig. 4. Rain sensor module

III. CONNECTION DIAGRAM

The rainfall station is powered by 12V DC. This is also fed into a DC-DC buck converter that takes the 12V input and outputs 9V. The 9V is also fed into the Arduino board. The DS18B20 requires a 4k7 pull-up resistor that is not shown here. This sensor also requires 2 resistors. The colors shown here match the cable that was supplied with the anemometer. The anemometer requires a 4k7 resistor that is not shown here (not used in our project).Rain sensor connected to digital pin of Arduino it measured rain fall and snow status. In connection illustration rather rain sensor we used moisture sensor, LDR module connected to digital pin 4 of Arduino it used to find day/night.

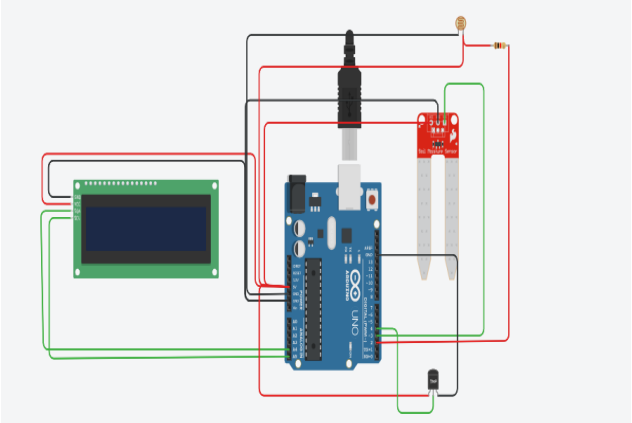

Fig. 5. Connection diagram

IV. DESIGN AND DEVELOPMENT

An effective Rainfall monitoring system is presented in the design. This system has two main modules: the hardware and the software. The hardware system consists of an Arduino Uno board, DHT11 sensor, rain sensor, LDR module.

This system uses an Arduino Uno board since it is an open-source electronics platform based on easy to-use hardware and software. The open source development is a dependable means of designing and developing. Further, the Arduino board is integrated with DHT 11 sensor to descry detecting the change in temperature and humidity, and rain sensor detect the rain fall and snow status. As an output, the system will show in 20*4 LCD display. We will be able to dissect the temperature, humidity, rain fall and snow status fluently through LCD
display.

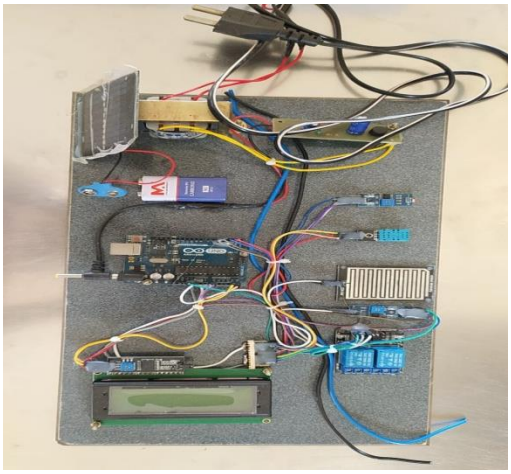

Fig.6. Design of Proposed system

V. RESULT

In the rainfall monitoring system fully shown here. Initially Arduino connected 5V supply and Arduino provide supply to other sensor and LED's. Then Arduino read data from various sensors and reused. The proposed system is enforced. Sensor data is being covered over the LCD display. In this rainfall monitoring system whenever there is no rain fall and snow it should indicate, and if rain is detected at any section indicate the system on LCD. The enforced system sends real-time sensor data at a regular sample interval to the LCD display.

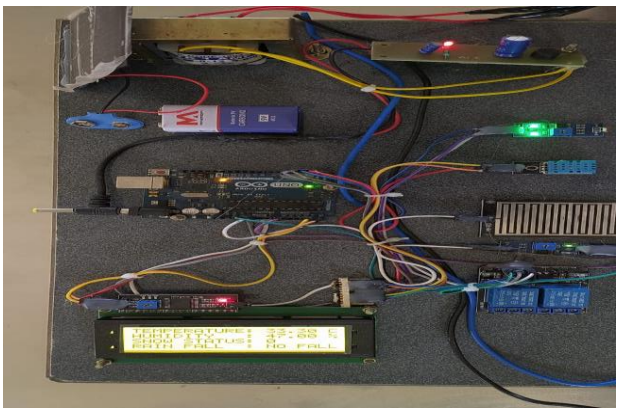

Fig.7. Result of Proposed system

VI. CONCLUSION

Weather is an everyday circumstance, but the mood of a situation is determined by the average rainfall of a region over an horizon less scale. Weather changes concerning the position on the globe of a place, so indeed narrow changes have the possibility of bringing about abundant things ahead of bureaucracy. The increasing cruel state of being active and increasing manufacturing has had a severe effect on the rainfall environment in recent years. Over time, the perfection or correctness that existed was deeply moved or hurt emotionally. To cover the changes, a conclusive plan needs to be prepared.

To accomplish this, we used a alternate-hand Arduino Uno and various sensors such as the DHT11, LDR sensor, and raindrop sensor. The sensors slightly sense the weather limit and keep ahead of communicating it to the LCD display.

VII. ACKNOWLEDGMENT

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