



AHSANULLAH UNIVERSITY OF SCIENCE & TECHNOLOGY

Project Proposal On

“Smart Weather Station”

CSE 3216: Microcontroller Based System Design Lab

SPRING 2021

Group: A2

Submitted To

Mr. Farzad Ahmed

Lecturer,

Ahsanullah University of Science &
Technology

Ashna Nawar Ahmed

Lecturer,

Ahsanullah University of Science &
Technology

Submitted By

Name	ID
Ashfigun Mustari	18.02.04.067
Nosheen Nawar Afnan	18.02.04.071
Tajruba Tahsin Nileema	18.02.04.079
Rushmia Ahmed	18.02.04.080

Date of Submission: 8 March, 2022

Table of Contents

Introduction	3
Objectives	3
Social Values	3
Required Components	5
Working Procedure.....	5
Budget Comparison	6
Contribution of Team Members	8
Challenges of the Project.....	8
Conclusion	8

Introduction

A Smart Weather Station is a facility consisting of instruments and equipment which can be used to measure atmospheric conditions so as to provide weather forecasts information and to study the weather. Generally, in the worldwide, the weather is very important for people life in numerous situations of rainy, hot, dry, dusty, and windy weather state. We must know these states before going anywhere to take precautions. These precautions can be implemented by modern electronic and monitoring technologies.

Arduino is an open source board that contains individually a physical programmable circuit boarding (microcontroller) with a part software, or IDE which works in a PC, and writes with upload PC code in the board (Arduino board). To develop a low-cost smart weather station we need three separate modules which are data collection, data storage, and data communication. These modules communicate serially with each other and are controlled by three separate microcontrollers (Arduino Uno). The idea behind this work is to monitor the weather parameters, weather forecasting, and warn the people from its disastrous effects.

Objectives

The Smart Weather Station is developed as a weather predicting system that can read various weather parameters such as temperature, humidity, atmospheric pressure, dust density in the air, storm and detect rainfall. The aim of developing this project is to provide an accurate weather forecast, alarm people in case of a natural disaster or unfavorable weather conditions, and observe and analyze periodic changes in the climate that may lead to global warming.

Social Values

Global warming has led to unpredictable climates. To cope up with such changes in the weather and climate and stay prepared ahead of time, the Smart Weather Station can play a great role by

recording and analyzing weather patterns to study climate changes and provide weather forecasts. The Smart Weather System is designed with the view to help people by providing the most accurate weather information, many more helpful benefits.

- **Providing Accurate Weather Forecasts**

With the right sensors, the Smart Weather Station can read various weather parameters such as temperature, humidity, and wind speed and dust particles in the air in real clock time and provide accurate weather forecast.

- **Accessing Weather Information Anywhere**

As our Smart Weather Station is portable, it can be placed in houses, or any other remote areas that don't get accurate weather readings.

- **Helping People to Take Precautionary Measures**

The Smart weather station is designed to notify in case of rain, storms, and tornados, any many other unfavorable weather conditions that will help people to take precautionary measures against the destructive rains, winds, severe high or low temperature, upcoming storms, and tornados. The use of weather stations will also help to cope with the frost and high temperature in summer.

- **Raising Awareness**

Since the global warming has led to unpredictable climate conditions, our smart weather station will read the weather data and analyze the changes in the climate to make people aware of any upcoming big changes in the climates that may change lives of people.

Required Components

- Arduino Uno
- Breadboard
- DHT11 (Temperature and humidity sensor)
- M-M Jumper Wires
- M-F Jumper Wires
- Grove - (water sensor)
- Optical Dust Sensor
- BMP180 Pressure Sensor Module
- LCD Display
- Buzzer

Working Procedure

This project presents a design of a weather monitoring system. It stores data collected at some pre-determined sampling interval, with the date and time stamps for later retrieval with real-time notifications for supervision and analysis for different environment parameters like temperature, humidity, wind speed, water detection, rainfall, dust particles in the air many more. It measures the parameters over time and saves all that data to an SD card for easy analysis.

Building this device includes designing and planning what components to be used as well as wiring and soldering everything together into a working device. Then the microcontroller will be

programmed as per our requirement. Whenever the condition of the weather will be very bad, this smart weather station will alarm the user by playing its buzzer.

Budget Comparison

Estimated Budget

Equipment	Quantity	Budget (BDT)
Arduino Uno	1	670
Breadboard	1	117
DHT22 sensor	1	490
Jumper Wires	many	200
Grove-(water sensor)	1	71
Optical Dust Sensor	1	605
BMP180 Pressure Sensor Module	1	290
USB Cord	1	150
LCD Display (20*4)	1	525
Buzzer	1	15
Total Cost		3133

Actual Cost

Equipment	Quantity	Price (BDT)
Arduino Uno	1	795
Breadboard	1	117
DHT11 sensor	1	165
Jumper Wires	50	125
Grove-(water sensor)	1	225
Optical Dust Sensor (GP2Y1010AU0F)	1	865
BMP180 Pressure Sensor Module	1	185
LCD Display (16*2)	1	269
Prototype (PVC Board, glue etc.)		250
Buzzer	1	20
Total Cost		3016

Difference of cost = (Estimated Budget – Actual Cost)

= BDT (3133-3016)

= BDT 117

Contribution of Team Members

We, 4 members of our group, worked together in the varsity campus, from the very first, to come up with the project idea, setting up our project plan, connect the components, coding the system, and building the prototype till the end of completing the project. Hence, the contribution of all the team members was equal.

Depending on it, the percentage can be,

- Ashfiqun Mustari – 18.02.04.067 – 25%
- Nosheen Nawar Afnan – 18.02.04.071 – 25%
- Tajruba Tahsin Nileema – 18.02.04.079 – 25%
- Rushmia Ahmed – 18.02.04.080 – 25%

Challenges of the Project

Collecting all the required components was the great challenge. After buying many components, we found out that many of them were not working properly. Then we had to found out the components which were able to work properly for our project. While coding, we faced many errors in our code. Then we added many libraries to solve those errors.

Conclusion

The developed low-cost Arduino-based smart weather station is effective in collecting some chosen weather element, transmitting the data, processing the data into information, and outputting the information in digital format. The system is portable due to the Arduino microcontroller, unlike the conventional weather station. Till now, nothing is changed from the original plan and it requires more updates in the future.