Study of Environment Climate for Temperature, Humidity and Pollution Online Using NodeMCU ESP8266 and Web application

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Abstract: **The system proposed an advanced solution for weather monitoring using NODEMCQ ESP8266. The System refers to IoT to make its real time data easily accessible over a very wide range. The system deals with nursing the weather and climate changes like temperature, humidity, light intensity and even carbon monoxide levels in the air and also detect rainfall in atmosphere using multiple sensors. The website is made to display all the weather reports and live changes are displayed on the website.**

Keywords: **NODEMCQ ESP8266, Sensors, Website, Weather, live**

1. INTRODUCTION

A system is considered as a smart system when the device equipped with sensors that connected to NodeMCU ESP8266 and various software applications that becomes a self-protecting and self-monitoring system. Sensor devices are positioned at different locations to collect the data to forecast the behavior of a particular area of interest. The main aim of this project is to design and implement a resourceful monitoring system through which the required parameters are monitored remotely using internet and the data gathered from the devices are stored in the MySQL (using XAMPP Cross platform Server on webserver).
At client side the registered users can able to display the results and reports with the web browser.

2. Literature Review

1. Real Time Weather Monitoring System Using Iot (et. al. 2021) Puja Sharma1 and Shiva Prakash2 Department of Information Technology and Computer Application Madan Mohan Malaviya University of Technology, Gorakhpur. ITM Web of Conferences 40, 01006 ICACC

2. IOT based Real Time Weather Predication System using NODEMCU 12-E ESP266 and Lab View (et. al. 2021) Roopa M L, Varsharani, Prathima S M, Rashmi H C, Students, BE, Department of ECE, GSSSIETW, Mysuru, Karnataka, India, International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181

3.Development of IoT Based Weather Reporting System (et. al. 2020) A F Pauzi1 and M Z Hasan Faculty of Engineering Technology, University Malaysia Perlis, Malaysia International Conference on Technology, Engineering and Sciences (ICTES)

4. Iot Based Weather Monitoring System Using MQTT (et. al. 2018) Gaurva A. Badge, Vijay M. Purohit EXCT Vidylankar Institute of Technology, Mumbai, India. International Journal of Advances in Science Engineering and Technology, ISSN (p): 2321 –8991, ISSN (e): 2321 –9009

5. Smart weather monitoring and real time alert system using IoT (et. al. Oct 2018) Yashaswi Rahut, Rimsha Afreen, Divya Kamini Student, Computer Science Department, SRM Institute of Science and Technology, Ramapuram Chennai, India International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056. Volume: 05 Issue: 10

3. Problem analysis and Likely Benefits based on Literature Reviews

Arduino don't have wifi module so it can't send data to webserver and also it little bit costly as compared to NodeMCU ESP8266. NodeMCU ESP8266 work same as Arduino which has small size .Also some project uses Blynk website to display output also not connected to self-made website. No pcb is made for the project.

4. Objectives

For nature environmental study:
- ✓ To detect, record and display various weather parameters such as temperature, humidity.
- ✓ To monitor the weather and gives notification (email message) to the people.
- ✓ To provide minimum cost smart weather monitoring system.

Technical Aspect:
- ✓ To study the effective use of various environmental related sensors, its working and results.
- ✓ To study various NodeMCU ESP8266 kits, its interface with coding.
- ✓ To create our database worldwide to record past, present and future environment results for future environment forecasting.
- ✓ To provide support of web and database to system

5. Methodology Used:

- **Module 1: Circuit diagram and design of PCB and assembly of components**

In this module we will made the design of hardware and circuit diagram is created for the project .All the circuit are mounted on breadboard and sensors are connected to Nodemcq ESP8266. Check the circuit diagram is properly working or not. Also understand all other connectivity issues of input sensors and databases in respect of Nodemcq.

Sensors Used
- •DHt11 Sensor - Reads the temperature and humidity and Heat index from the environment.
- •Rain Sensor - Detect the Rain Condition of the environment. (Wet / Dry)
- •MQ-8 – Detect the Carbon monoxide from the environment.
- •LDR Sensor– Detects the light intensity in environment.

After Completion of circuit check the circuit is proper running or not using code (fetching code).

- •**Module 2: Interfacing and Connecting with Database**

After circuit making connect nodemcq to laptop/computer using USB cable and write the code (Database connectivity code) in Software Arduino IDE. Coding include all the sensor interfacing code and database connectivity code that mentioned in the requirement .In coding various sensors libraries are included like "DHT.h" etc .All the coding is done in c language .After completion of coding it test on in serial monitor of Arduino IDE Software.

Algorithm
1. Configure the net Connectivity with Device.
2. Code for the all the sensors.
3. Write PHP Script for connectivity with database
4. Create MySQL Database on XAMPP Server.
5. Send data from sensor to XAMPP Server.

- •**Module 3: Creating Website (User Module)**

After Connecting to database (MySQL) website is made to display all the sensors reading in effective way like graph, chart etc .All the readings are fetched from MySQL sheet and display on webpage dynamically. Live reading are display on webpages.

- •**Module 4: Admin Module**

In this model the Administrator can see the Dashboard that contains all the Registrations of the users, login of the users and all the reports of the readings etc. Admin can remove and add any new user to the system.

6. Place of Work

- ✓ **For environmental reading:**

At any location worldwide we can move and take readings for weather monitoring and forecasting its results using data visualization methods.

- ✓ **For Designing hardware and software:**
- • Electrical and electronics laboratories of ATS Sanjay Bhokare Group of institute Miraj (College).
- • Computer engineering laboratories of ATS Sanjay Bhokare Group of institute Miraj (College)

7. Facilities Required

Sr. No.	Name of Equipment	Specification	Cost	Available
1	Laptop / Desktop	i3 processor, 4 GB RAM, Kbd, Mouse, 540 GB HDD	Rs 30000	Yes
2	Nodemcu	Esp8266	Rs 426	Yes
3	Temperature Sensor (DH11)	Compatible to NodeMCQ	Rs 216	Yes
4	Light Sensor (LDR)	Compatible to NodeMCQ	Rs 50	Yes
5	Rain Sensor	Compatible to NodeMCQ	Rs 188	Yes
6	Carbon Monoxide Sensor (MQ-7)	Compatible to Arduino	Rs 269	Yes
7	Breadboard	Normal	Rs 100	Yes
8	Wires	Jumper Wires	Rs 100	Yes
9	Operating System	Windows 10 proper setup	-	Yes
10	Database	MySQL	-	Yes
11	Arduino Software	Arduino IDE	Freeware	Yes
12	Code Editor	Visual Studio	Freeware	Yes
13	Web Server	XAMPP Server	Freeware	Yes
14	Deployment Website	Netlify	Freeware	Yes
Total	Rs 31349			

8. Results and Performance measurements
✓ Display sensors data into webpage inform of graph and chart etc.

Feasibility Study
✓ **Operational Feasibility**-Live change in webpage when sensor reading changes, Authorized users can easily access the details

✓ **Technical Feasibility**- Store sensors data into database.

✓ **Economic Feasibility**- Building low-cost smart weather monitoring system.

✓ **Reliable** – As website is developed hence we will get results any time anywhere for any place on the world

9. Conclusion
To implement this need to deploy the sensor devices in the environment for collecting the data and analysis. By deploying sensor devices in the environment it will record real time weather condition data. It can cooperate with other objects through the network. Then the collected data and analysis results will be available to the end user on website and it can easily accessible. This is smart way to monitor environment and an efficient to monitor environmental weather changes.

References

1. Real Time Weather Monitoring System Using Iot (et. al. 2021) Puja Sharma1 and Shiva Prakash2 Department of Information Technology and Computer Application Madan Mohan Malaviya University of Technology, Gorakhpur. ITM Web of Conferences 40, 01006 (2021) ICACC

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