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ADVANCE WEATHER MONITORING AND REPORTING SYSTEM BASED ON IOT

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Abstract

The system proposed in this paper is an advanced solution for monitoring the weather conditions at a particular place and making the information visible anywhere in the world. The programmer behind this is the Internet of Things (IoT), which is an innovative and powerful solution for connecting things to the Internet and connecting a network to the whole world of things. The data modified from the implemented system will be accessible from anywhere in the world on the internet. During certain weather hazards, it would be very difficult to verify and track the weather parameter via wires and analogue devices in the agricultural region. The wireless sensors are used to verify and monitor the weather parameter to solve this issue here.

Keywords: *Intelligent system, IoT, Sensor, Monitoring, Weather, Environment, Guidelines.*

I. INTRODUCTION

The weather conditions are required to be monitored to maintain the healthy growth in crops and to ensure the safe working environment in industries, etc. IoT devices can be used to measure physical parameters pertaining to a physical object and upload them real-time to cloud storage where they can even be analyzed in real-time. Thus, the measured data can be observed from anywhere around the world using Internet-enabled devices. This can make monitoring possible even in difficult geographical terrains. It can also reduce the manpower requirement and thus the risk involved in visiting inhospitable sites. Present technical developments concentrate mainly on the control and monitoring of different activities. These are rapidly evolving in order to achieve human needs [1]. An appropriate environmental control system is necessary to track and assess the circumstances if the specified parameter level (e.g. noise, gas

and radiation levels) is exceeded. It is often called a smart environment when objects such as environments embedded with sensor sensors, microcontrollers and multiple software applications become an environment of self-protection and self-monitoring [2].

In such an environment the alarm or LED alerts automatically occur when some incident happens. The effects of environmental changes on animals, crops and humans can be tracked and monitored by a smart environmental monitoring system. This is one of the applications targeting smart environments by rendering the world collaborative with other goals using embedded intelligence. Human needs depend on the type of data obtained by the sensor devices and the various types of monitoring systems. The effects of environmental changes on animals, crops and humans can be tracked and monitored by a smart environmental monitoring system. This is one of the applications targeting smart environments by rendering the world collaborative with other goals using embedded intelligence. Human needs depend on the type of data obtained by the sensor devices and the various types of monitoring systems. The two categories to which applications are categorized are based on event detection and spatial process estimation. Initially, sensor systems are implemented in the environment to detect parameters (e.g., temperature, humidity, pressure, LDR, noise, CO and radiation levels, etc.) while acquiring, computing and controlling information (e.g., noise and gas levels variations in the specified levels). In order to predict the actions of a particular area of interest, sensor devices are placed at different positions to collect information. The idea of connecting all sensors to the internet is the Internet of Things (IoT). The primary aim of this document is to create and execute an efficient monitoring system that remotely monitors the necessary parameters using the internet and stores the information collected from the sensors in the cloud and then analyses an email and alerts an SMS whenever the threshold limit exceeds [3].

II. WEATHER MONITORING AND REPORTING SYSTEM

An IOT application is used to monitor the environment that helps monitor the environmental condition of any local area or a surrounding area, and with the help of the internet everyone can view the condition. In offering conditions for the environment, this application is more powerful and faster. This helps individuals or governments to take remedial measures if the environmental situation becomes unusual. The method of environmental condition monitoring provides a methodology for checking the condition and changes occur in the environment. User use Arduino, a sound sensor, a gas sensor, a temperature sensor, a humidity sensor, a pressure sensor, an IOT module. A humidity and temperature sensor can control and provide information about climate change. For agriculture, it is beneficial. Gas and sound sensors are used to track emissions in the atmosphere. Actually, air and noise pollution leaves the atmosphere more sensitive. Using this module, the user can define the polluted area and generate the consciousness of people to live in the pollution directly. Changes in the climate system cannot be precisely described or even unintentionally defined, but we can describe more

estimated environmental changes and update them in the cloud with the help of an IOT module [4].

This system uses many modules as follows:

Sensor Module: The sensor network is linked to a hefty amount of small sensor nodes that can be used as an effective tool for collecting information for different applications under different situations in this research, various sensors are incorporated that have their distinctive way of gathering information from the environment. An integrated circuit sensor (LM35) used for temperature measurement with a temperature-proportional electrical output (in ºC). The fan goes on if the temperature goes up and vice versa. The scale factor is 0.01V / ºC. The LM35 needs no external calibration or trimming and maintains an accuracy of +/-0.4ºC at room temperature and +/-0.8ºC in the range of 0ºC to + 100ºC. System utilizes moisture sensors DHT11. It provides outstanding quality, quick response, capacity to prevent interference, and cost-effectiveness. On the calibration of humidity, this sensor is highly precise. MQ-6 gas sensor's sensitive material is SnO, which has lower conductivity in clean air. The MQ-6 gas sensor is highly sensitive to Propane, Butane and LPG, as well as natural gas response. The Sensor could be used to detect various fuel gases, particularly methane; it is appropriate for separate applications at a low price [5].

A. Power Module: - The Power for the system can be provided via the adapter or the USB. Use the USB cable or an external power supply to power the Arduino board. Source of power can be selected automatically.

B. Controller Module: - This implementation is handled by Arduino UNO. The Arduino board converts the analogue data generated by the sensor into digital data. By receiving feedback from a variety of sensors, Arduino is created to track or understand the environment or environment and can impact its atmosphere by controlling lights, engines, and other actuators. Using the Arduino programming language and the Arduino creation framework, the board's microcontroller is configured. Arduino projects can be isolated or they can communicate with applications while running on a desktop.

C. IoT module: - The IoT board is intended to satisfy a variety of demands for online applications with numerous advantages that allow the embedded device designer to add internet connectivity to their applications easily, quickly and seamlessly. The UART update function and web page management of the module make them excellent for online wireless applications such as environmental sensors and mobile battery-operated wireless sensor network system information. The Lumisense IoT board is configured with an active internet link SIM900 GPRS modem, so it is fitted with a controller to process all UART data based on online GPRS data.

D. Light Dependent Resistor (LDR): An LDR is a light-controlled variable resistor. The LDR's strength is reduced by the increasing light intensity falling on it. It has an analog output that is an input to the nodemcu's A0 pin [6].

E. Raindrop module: - It is used for detecting rain. It can also be used for rain intensity measurements. It has digital as well as analogue output. Using the analogue output pin, this module analyses the humidity and gives a digital output when the moisture limit reaches too much. The lower voltage of the output is indicated by more water or less resistance. Whereas, higher resistance, i.e. high output voltage on the analogue pin, means less water. For instance, five volts of module output will result from a totally dry board. The analogue output of the module is connected to the A0 pin of the Nodemcu.

F. Working of the analog pin module: - The Nodemcu board only has 1 analogue pin, but in this project, two analogue output devices, namely the LDR and Raindrop module, are multiplexed to the A0 using two diodes. The multiplexing circuit appears in Figure 1 below. Here, the Raindrop Vcc sensor is connected to the D7 nodemc and the D8 nodemc is connected to the LDR input. D8 is low when D7 is high, rendering LDR off and raindrop module on [7].

III. CONCLUSION & DISCUSSION

By keeping the embedded devices in the environment for monitoring enables self-protection (i.e., smart environment) to the environment. 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 via the network, it can communicate with other objects. The data collected and the outcomes of the study would then be accessible via Wi-Fi to the end user. The smart way to track the environment and an effective, low-cost embedded system is provided in this paper with various models. It can also be changed so that all environmental parameters of the device along with its location will be sent to that phone or email id whenever a message or email is sent from a specific phone number or email id to the server.

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