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Wireless Environment Monitoring System Using WiFi

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ABSTRACT: For last few years, challenges of monitoring and control of distant environmental parameters accurately has emerged as new field of research. The concept of Internet of Things (IOT) is also emerging very fast where everything around us comes with an internet connectivity for monitoring and control. Monitoring the environmental parameters and initiating a control action from internet is also part of this concept. In our proposed work, we design an environment monitoring system, capable of monitoring and control of environmental parameters like temperature, pressure and humidity. Also, we focus on design of a low cost system that is capable of not only remotely monitoring the environment variables like temperature, pressure and humidity but also initiates some control action like switching devices ON/OFF from the internet. This system uses Wireless sensor Networks for sensing the environment parameters in the area under supervision. Sensors Node has been designed to measure the temperature, pressure and humidity. The Control node has been designed to initiate the control action. The Central Monitoring is based on ARM11 raspberry pi board.

KEYWORDS:-RASPBERRY PI, Humidity Sensor, GSM.

I.INTRODUCTION

Environment monitoring system is a system that is capable of measuring several environmental parameters like temperature, humidity, pressure, illumination and quantity of gasses like LPG etc. These parameters are important in many applications like in industry, smart homes Greenhouse and weather forecasting. Advanced Environment monitoring systems offer many features like remote access to the measurement data and also can initiate some control action from distant location. These systems use Wireless sensor Networks for sensing the environment parameters. Wireless Sensor Network (WSN) has sensors to sense the physical parameters and they are interconnected wirelessly to exchange information. They have a central monitoring system that is connected to the internet to access the data remotely. Several sensors are equipped in each remote location to measure environmental parameters and these measurements are sent to the central office for storage and analysis purpose. In addition, the central office can give command to remote location for output control execution. These features offer a way to maintain condition and allow obtaining caution on occurrence of any abnormal conditions like parameters exceeding. A WSN allows deployment of number of sensor nodes which configure themselves depending upon the network topology and neighborhood situation. After sensing their physical environment and processing the obtained data locally, nodes communicate their data (or an extract) towards a network sink, where data is further processed and made available for readout. As transmitted data should find the best route towards its destination automatically, the network can be remotely controlled and therefore be handled as one large measurement instrument. Some systems also offer the remote logging facilities that are the parameters can be stored at regular intervals at the remote server so that they can be referred any time.
Environment monitoring system is a framework that is equipped for measuring a few ecological parameters like temperature, CO, SO2,NO2,PM2.5&PM10.These parameters are essential in numerous applications like in industry, savvy homes Greenhouse and climate guaging. Propelled Environment observing frameworks offer many elements like remote access to the estimation information and furthermore can start some control activity from removed area. These frameworks utilize Wireless sensor Networks for detecting nature parameters. Wireless Sensor Network (WSN) (WSN) has sensors to detect the physical parameters and they are interconnected remotely to trade data. They have a focal

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checking framework that is associated with the web to get to the information remotely. A few sensors are prepared in every remote area to quantify natural parameters and these estimations are sent to the focal office for capacity and examination reason. Moreover, the focal office can offer charge to remote area for yield control execution. These components offer an approach to keep up condition and permit acquiring alert on event of any irregular conditions like parameters surpassing. A WSN permits sending of number of sensor hubs which design themselves relying on the system topology and neighborhood circumstance. In the wake of detecting their physical condition and preparing the got information locally, hubs convey their data (or an extract) towards a system sink, where information is further handled and made accessible for readout. As transmitted information ought to locate the best course towards its goal naturally, the system can be remotely controlled and accordingly be taken care of as one expansive estimation instrument. A few frameworks likewise offer the remote logging offices that are the parameters can be put away at general interims at the remote server with the goal that they can be alluded at whatever time. The fast improvement and scaling down of sensor gadgets, and the current advances in remote correspondence and systems administration advances, are permitting researchers and architects to create systems of little sensors that can be utilized to persistently screen the wellbeing and solidness of nature we live in. Wireless Sensor Networks (WSNs) consist of a number of spatially distributed sensors with computing, processing and communication capabilities that can continuously sense and transmit data to a base station, where data can be processed and observed in real time. This project provides a detailed study and implementation of a WSN for real time and continuous environmental monitoring of greenhouse gases. A tree-topology WSN consisting of two sensor nodes and a base station was successfully built and tested using open source and inexpensive hardware to measure the concentration level of several greenhouse gases.

II.REVIEW OF LITERATURE

In literature, the problem and the previous techniques of environmental system is described

1. A Cyber-Physical System forEnvironmental Monitoring

Author presents the development of a cyber physicalsystem that monitors the environmental conditions or the ambient conditions in indoor spaces at remote locations. The communication between the system's components is performed using the existent wireless infrastructure based on the IEEE 802.11 b/g standards. The resulted solution provides the possibility of logging measurements from locations all over the world and of visualizing and analyzing the gathered data from any device connected to the Internet. The communication protocol and the design of the nodes help in achieving low power consumption, offering battery lifetimes of several years. The system eliminates bulky solutions, provides the possibility of logging data where Wi-Fi network coverage exists, and can be used in a wide range of monitoring application.

2. ISSAQ: Integrated Sensing Systems for Real-Time Indoor Air Quality Monitoring

The system aims to detect the level of seven gases, ozone (O3), particulate matter, carbon monoxide (CO), nitrogen oxides (NO2), sulfur dioxide (SO2), volatile organic compound, and carbon dioxide (CO2), on a real-time basis and provides overall air quality alert timely. Health, Safety,productivity,comfort.Effect ofbad air, room size, people density, air flow, location, wind.

3. Automated Irrigation System Using a Wireless SensorNetwork and GPRS Module

The system has a distributedwireless network of soil-moisture and temperaturesensors placed in the root zone of the plants. In addition, a gateway unit handles sensor information, triggers actuators, and transmits data to a web application. Feasible and cost effective.

4. Sentinels: Smart Monitoring of Photovoltaic Systems at Panel level

The system is based on a Wireless Sensor Networks with sensing nodes. The monitoring of photovoltaic (PV) systems is important for the optimization of their efficiency. In this paper, a low-cost smart multisensory architecture equipped with voltage, current, irradiance, temperature, and inertial sensors, for the monitoring (at the panel level) of a PV system, is presented with the aim of detecting the causes of efficiency losses. Distributed monitoring and diagnosis of PV panels, to improve the reliability. To detect anomalous aging processes and accidental causes leading to efficiency loss in PV panels.

5. Low-Complex Synchronization Algorithms for Embedded Wireless Sensor Networks

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In industrial applications of wireless sensor networks (WSNs), synchronized sampling of data on each sensor node is often required. Thus, the wireless communication protocol needs to support accurate timing synchronization. If due to a high sampling rate also high data throughput is required, WSNbased on the IEEE 802.15.4 physical layer often do not provide sufficient data rate. High datathroughput, improving synchronization accuracy. At the expense of less accuracy

6. IMA: An Integrated Monitoring Architecture with Sensor Networks

The integrated monitoring has become an important approach for investigation, detection, and policy decision in many fields. Unfortunately, current monitoring systems are commonly developed by different organizations using specific technologies and platforms, bringing a lot of difficulties for the seamless integration and unified access. Efficiency is improved remarkably, architecture proved to be feasible. Necessaryto effective, security and privacy such as data encryption, decryption.

7. Quantification of Individual Gases/Odors Using Dynamic Responses of Gas Sensor Array With ASM Feature Technique

Utilizes the newly developed feature method in the first stage and the specially designed neural quantifiers in the next subsequent stages. The ability of the proposed method has been insured by applying it on the published dynamic responses of the thick film gas sensor array. Better separation among different clusters of test gases, 100% accurate as compared to the results obtained. Gases/odors is a critical requirement in industrial/home environment to avoid unhappy losses.

8."Wi-Fi Enabled Sensors for Internet of Things: A Practical Approach

Internet of Things calls for connectivity not only to consumer electronics and home appliances, but also to small battery powered devices which cannot be recharged. Such small devices, often various types of sensors and actuators, are required to sustain reliable operation for years on batteries even in the presence of heavy interference.The IEEE 802.11 standard has established itself as one of the most popular wireless technologies offering connectivity. Operate at higher data rates; provide full coverage for all potential sensor locations.

9. Performance Study of Multilayer Perceptron's in a Low-Cost Electronic Nose

Nonselective gas sensor array has different sensitivitiesto different chemicals in which each gas sensor will also produce different voltage signals when exposed to an analyze with different concentrations. Estimationaccuracy and the time consumption of algorithm convergence.

III.SYSTEM ARCHITECTURE

The proposed system consists of the Wireless Sensor Network foracquiring climate data locally. In WSN various Environment monitoring sensors are placed inside the field, sensors include Gassensors (ie.So2, Co2, Co, No2), temperature sensor& humidity sensor. Using this information, Environment monitoring parameters calculated remotely at controlsystem and display on the remote station android mobilewirelessly.This Unit consists of a Wifi module, sensors, a microcontroller, and power sources. Several WSUs can be deployed in-field to monitor distributed sensor network for accurate Environment monitoring system. This setup can also be used to measure the temperature of atmosphere using temperature sensor, humidity level using humidity sensor, Gas related information using sensor& electrochemical sensor. Each unit is based on the microcontroller RASPBERRY PI thatcontrols the Wifi module and processes information came from the all sensors.

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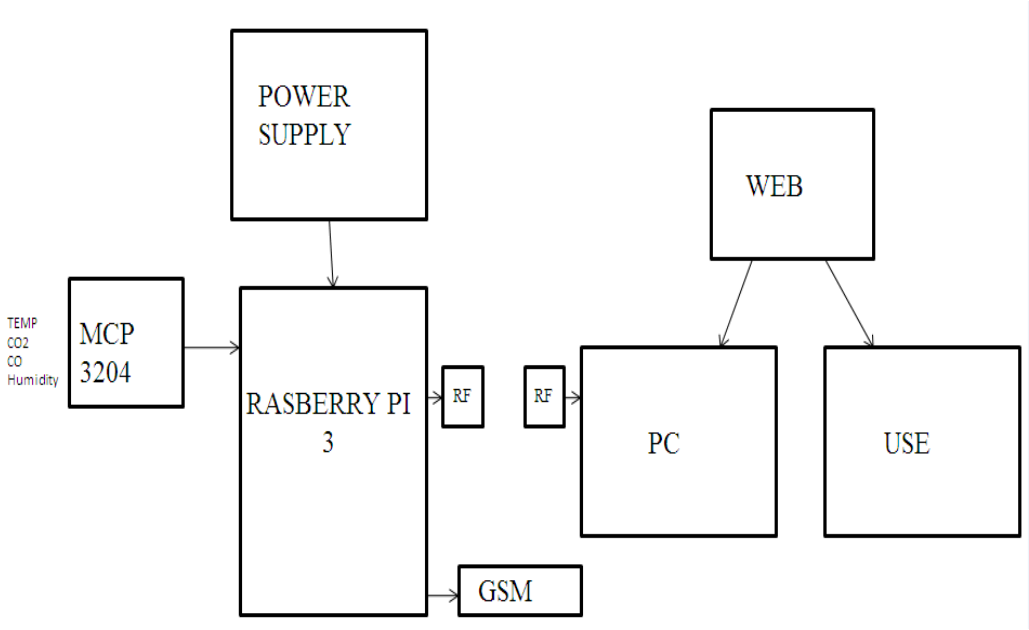

Fig. System Architecture

In Existed display a Wi-Fi based framework that let clients screen ongoing data of the sensor gadgets through android applications. Our model uses Gas sensors to check for the Environment Monitoring level demonstrated in air, Gas sensors utilized as a part of framework are CO2 sensor, CO sensor, NO2 sensor, SO2 sensor to gauge the air level of various gasses in. Temperature sensor is screen the temperature in the atmosphere and additionally the dampness sensor is utilized to quantify the moistness in Environment. Likewise screen the constant esteem through android based versatile applications. The framework is associated with this application utilizing web. Figure.1 demonstrates the square representation of the proposed Environment observing and control framework. It has the accompanying parts.

1) Central Monitoring Unit
2) Sensor and Control Nodes

Central Monitoring Unit (CMU) is associated with the web. Through web it can speak with any web empowered work station or a portable terminal which can be an advanced cell. The sensor information is shown on remote work station and portable terminal. The control charge can likewise be started from the remote work station or portable terminal. The framework makes utilize quick and precise Google spreadsheet administration to log the information on the web. The control activity is started utilizing the Google frames benefit. As the reaction is gotten the focal checking unit identifies the reaction and gives the order to the control hub. Sensor hub consistently screens the temperature and dampness and sends the esteem to control unit which then stores values in the Google spreadsheet. This spreadsheet can hold the information for any measure of time and this information can be utilized for investigation reason. So Record of information is constantly accessible on the web.

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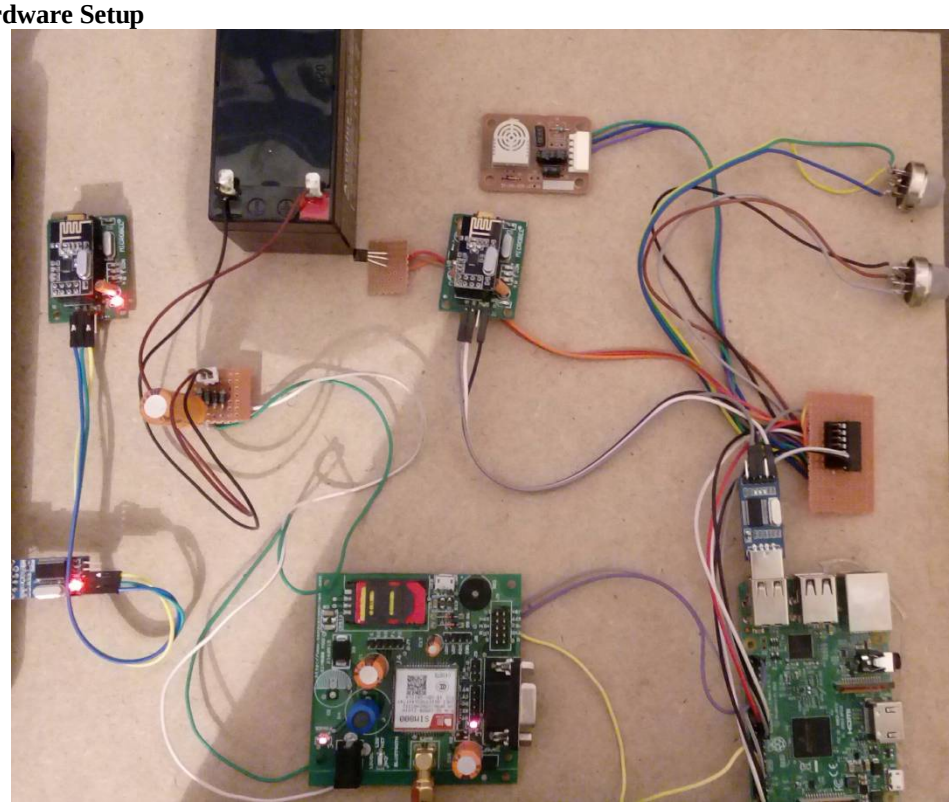
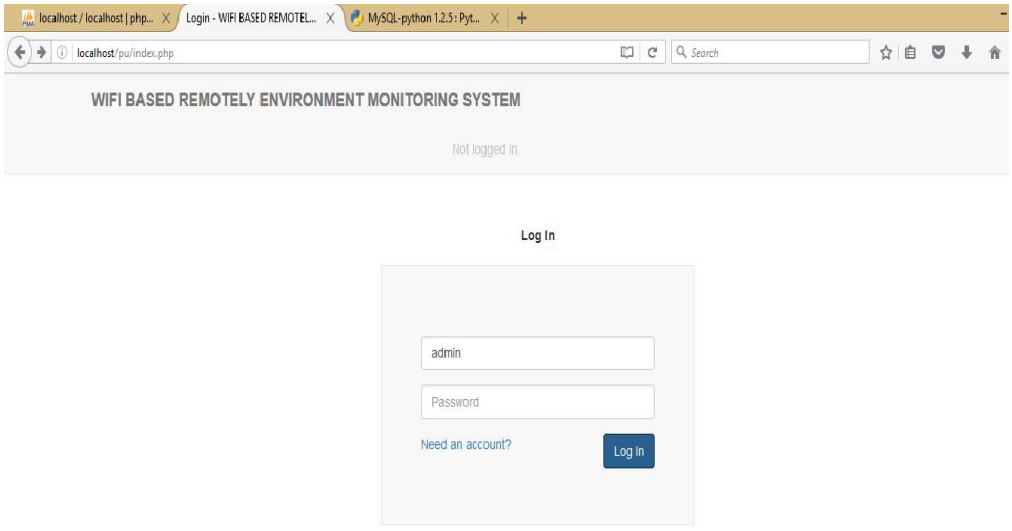
IV.RESULT

1.Hardware Setup



2.Login



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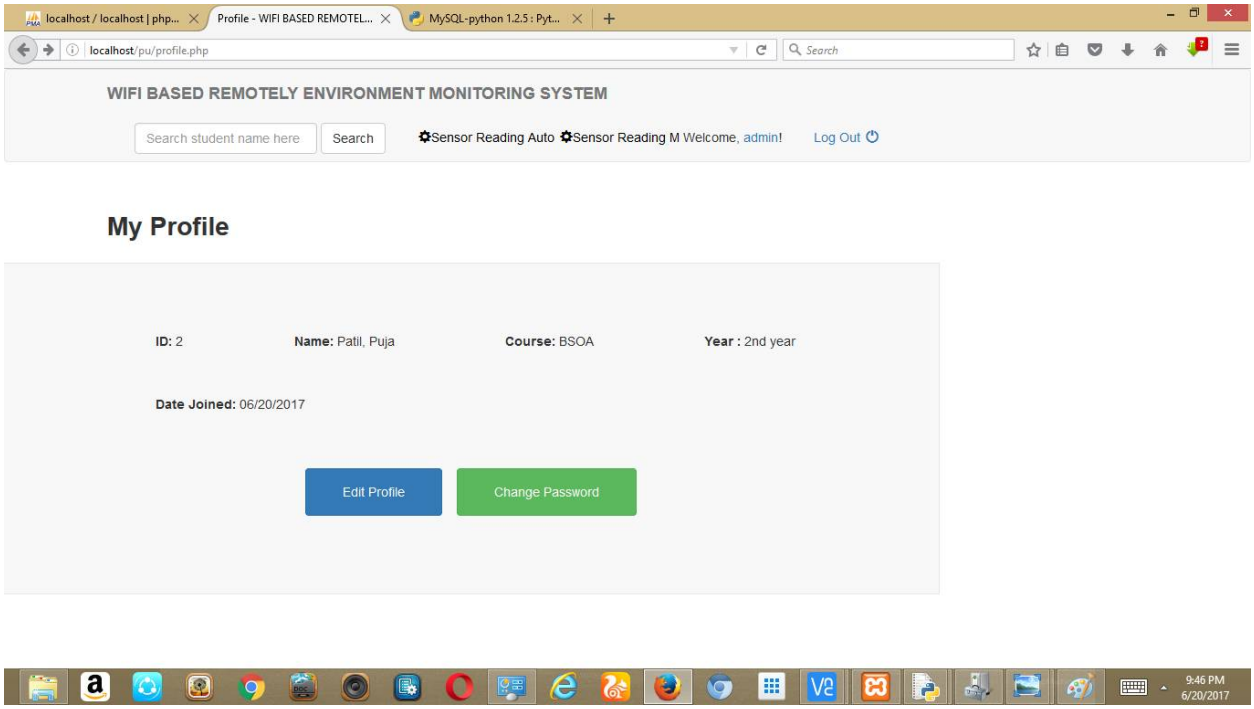
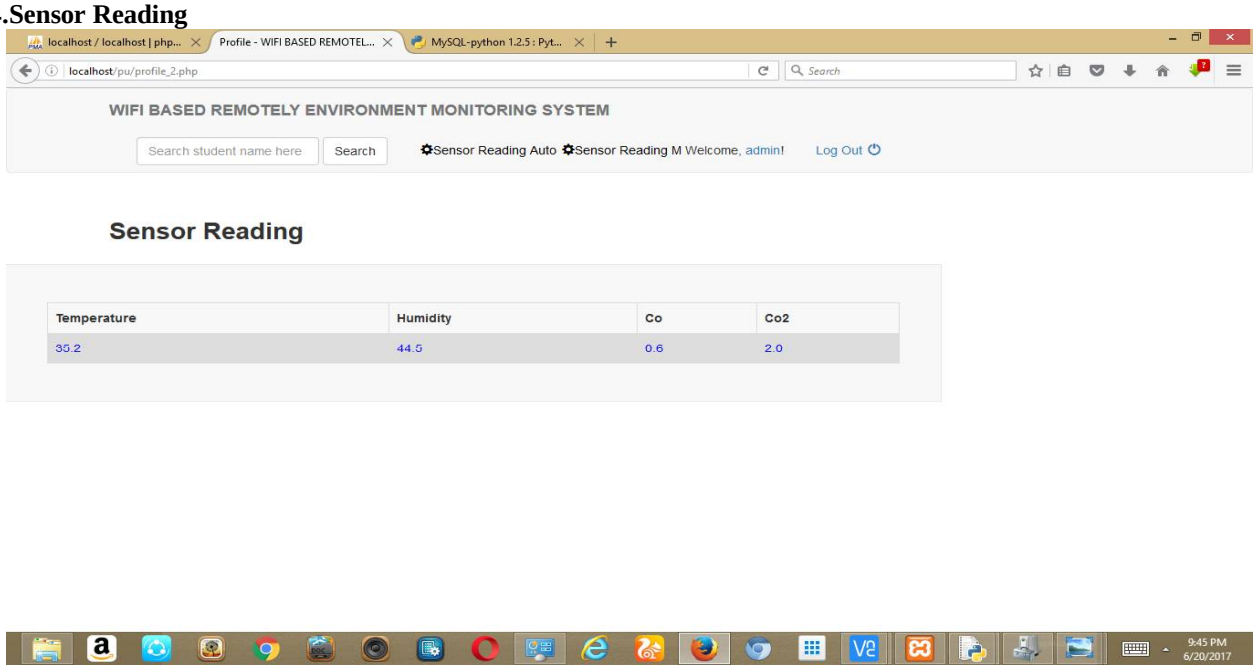
3..Profile



4.Sensor Reading



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V. CONCLUSION

Averting environmental pollution is one of the tedious tasks since the humans are responsible for this hazardous nature which poses threat to whole world. And we are responsible to eradicate pollution problems. Virtually all emissions vary from time to time. It is an excellent concept that will show a new dimension. Although the general and specific objective is very similar, theTechnological solutions employed are very different.

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