

POWER HOUSE PARAMETRIC SURVEILLANCE SYSTEM

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Abstract- Internet of Things (IoT) plays a pivotal part in our daily life by controlling all electronic devices using network. By observing the important parameters and controlling of the power house system by generator controlling methods can be performed in which produces important pieces of information by keeping in mind the functioning of these e-devices. Instantaneously, the same information will be transmitted to these important statistics through the transmitting devices. It also saves the same information on the cloud as a supplementary and safety procedure to use them later. The outcomes of the environmental observations are associated with this scrutiny; for example, sensors are used in order to measurement of temperature and humidity. The collected data can be used to produce some actions such as heating devices, dominant cooling, or long-term statistic. By networking or any-other android application, the data can be uploaded to cloud storage. In present study, Arduino UNO, Wi- Fi module is used which helps in process and transfer of sensed data to cloud. Thus, the parameter received will be stored in the cloud platform. The changes in the environment are updated in the form of a database through cloud computing method. This project includes continuous automated process in industry.

I.INTRODUCTION

In this project Arduino Uno board is used in order to measure the conditions from respective sensors. These sensors include DHT-11 (which gives the data of humidity and temperature), MQ-6 (which gives the data of the gas status), and ESP8266 Wi-Fi module (It transfers the data from system to IoT related platform. In Arduino Uno, there is an inbuilt analog to digital converter. The weather parameters are calculated through Arduino. Then IoT related various method is used for transferring these parameters. After continuous time interval, the process is repeated again and again of transmitting data through Wi-Fi network. Then this weather data can be viewed by the user by visiting sites or application like Thing speaks etc. Web servers is used for storing the data and thus connecting the projects so that we can get live details of weather condition and certain required parameters. Internet connectivity or internet connection with wi-fi is necessary in this IoT-based reporting systems. Generators overheat in certain times in powerhouse environment so that in order to maintain stability and efficiency of

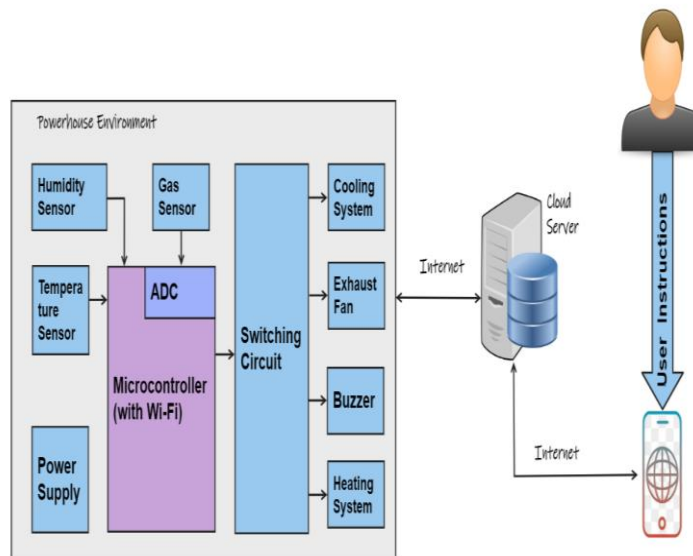
generator a new cooling system is implemented in this project, which includes a thermoelectric peltier module which works on seebeck effects by producing both heat and cooling on each sides of the module when certain voltage is applied.

IoT based temperature; humidity and gas monitoring system provides an efficient and definitive system for detecting conditional parameters. Right actions can be taken for the study as per the requirements. IoT- Based monitoring of conditions do not only allow user to reduce the human work and time, but also permits user to analyze changes in the environment for taking possible actions. It is cheaper in cost and consumes less power. on building this system we can conclude that it is very helpful in many aspects in our daily life in many ways. Since we are facing many problems during the past years due to gas leakage and fire accidents in industries as well as in our houses this project helps by monitoring the conditions and taking a safety measure before the accidents may occur. In future it can be implemented in a way that every home /industry consists of this system such that it prevents the flow of gas to prevent the accidents.

2.THEORY OF OPERATION

Using the Internet of Things in industrial safety is undeniably the smartest way to increase safety of process, But IoT promises more realistic ways for sustainable growth of safety. Nowadays IoT is grown in various aspects such as medical, industrial, schools, commercials etc due to its vast capabilities and necessity. The ultimate goal is to implement the automated concurrent monitoring of power house generator and its surrounding in case of safety basis.

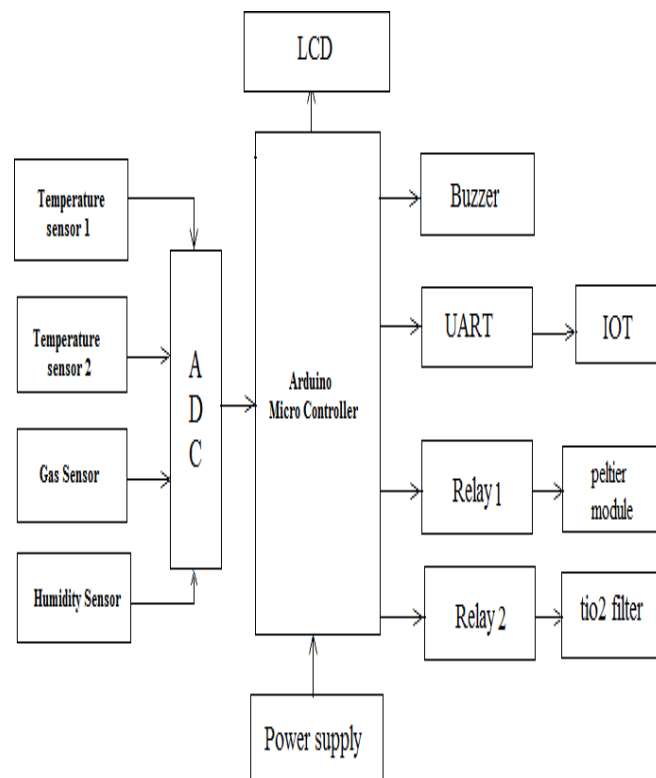
By implementing this idea we can reduce the accidents and automatically control the temperature of the generator for better efficiency and safety purposes, the most required component for this cooling system includes the thermoelectric peltier module which works on seebeck principle.



3.PROPOSED SYSTEM

The temperature controlling methods are used to maintain constant temperature of generator process . In such temperature controller systemthere is one reference temperature called set point or set temperature that is the desired temperature that must be maintained properly. The system is designed to meet the purpose and demand of society by using IoT to monitor and check temperature, humidity, and gas leakage in an industry. The system employs temperature, humidity, and gassensors to detect temperature and humidity changes with respect to time, as well as to monitor gas levels in industries and gas compounds such as methane, propane, butane, alcohol, noxious gases, carbon monoxide, and others. The sensors sense the temperature, humidity, and gas components and send the results to NodeMCU, which processes the data and then sends it to mobile application (IOT website). With this kind of system, not only the authorities, but also the people from another places can check the transmitted data via their mobile phone, laptop or pc and those temperature, humidity, and gasvalues will be displayed on the LCD display(one present inside the powerhouse) the system is advanced connection to two temperature sensor to measured normal roomtemperature¹(ambient monitoring only) and industry equipment temperature²(generator control)monitoring to above 40 degree(celsius) peltiermodule to cool down with help of relay¹. as well as to monitor gas levels in industries and gascompounds such as methane,propane, butane, alcohol, noxious gases, carbon monoxide, and others to detect and exiting a gas of tio2 filter my pure air to connected a relay. The all activity are uploaded every 10seconds to particular private web server by help ofIOT and wi-fi module.

Fig2-block diagram of proposed system



Advantages in proposed system includes

- Reduced Errors
- Predictive Maintenance
- Improved Safety
- fully automation to reduce humanerror

In these ways the advantages are useful in the upcoming generation and lots of upgradation are available for this project in upcoming years



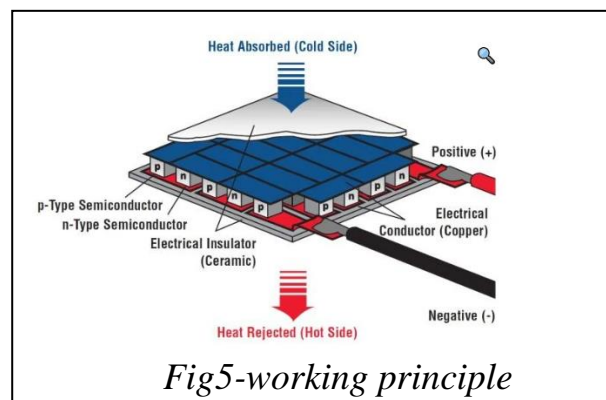
Fig3-arduino uno board

Arduino UNO is a microcontroller board based on the **ATmega328P**. It has 14-digital input/output pins (of which 6 can be used as PWM outputs), 6-analog inputs, a 16MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it.



Fig4 thermoelectric peltier module

A Peltier cooler is built up of semiconductor materials sandwiched between two parallel plates. Passing electrical current through the device activates the Peltier effect. This creates a temperature gradient between the two plates. This temperature gradient is what allows objects to be heated or cooled.



It works on seebeck effect, The Seebeck effect is when electricity is created between a thermocouple when the ends are subjected to a temperature difference between them. The Peltier-effect occurs when a temperature difference is created between the junctions by applying a voltage difference across the terminals. A hot surface in contact with the cold junction of TE will be cooled down and vice versa, a cold surface in contact with hot junction will be heated up. This effect can be used as a heat pump for heating (TEH) and cooling (TEC) applications.

Cooling occurs when a current passes through one or more pairs of elements from n-type to p-type; there is a decrease in temperature at the junction (“cold side”), resulting in the absorption of heat from the environment. The heat is carried along the elements by electron transport and released on opposite (“hot”) side as electrons move from a high- to low-energy state.

The Peltier heat absorption is given by that

$$Q = P \text{ (Peltier Coefficient) } I \text{ (current)}$$

t(time). A single stage thermoelectric cooler can produce a maximum temperature difference of about 70 degrees Celsius.

The MQ-6 module is used in gas leakage detecting equipment in family and industry, This module has high sensitivity to LPG, iso-butane, propane and LNG. And TiO₂ filter is used as gas filter in this system.

The module gives out the concentration of the gases as a analog voltage equivalent to the concentration of the gases. The module also has an onboard comparator for comparing against an adjustable preset value and giving out a digital high or low. It can be easily interfaced with our Arduino.



Fig6-MQ6 gas sensor

The **DHT11** is a commonly used **Temperature and humidity sensor** that comes with dedicated NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as serial data.

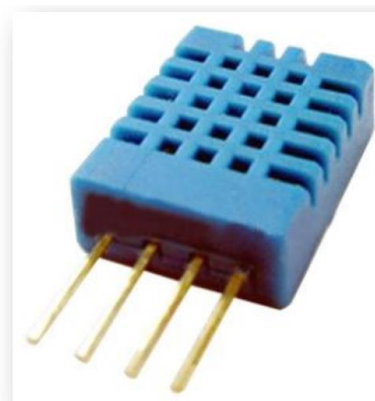


Fig7-DHT11 sensor

4.RESULT AND ANALYSIS

Powerhouse parametric surveillance system has enabled an advancement in monitoring iot platform and by automating the process results in increased safety and industrial applications.

The monitored parameters are displayed and stored in certain Iot platforms as a result shown in fig8.

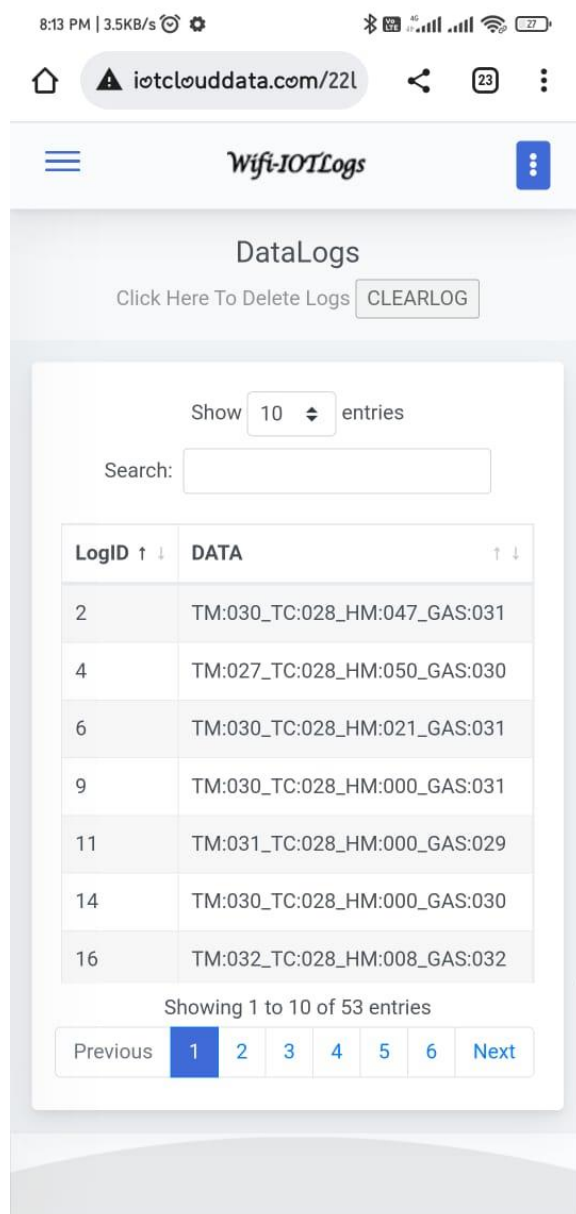


Fig8-Iot-result log

5.CONCLUSION

The system is working properly. The temperature rise and drop depends upon inter parameter embedded with Arduino based control. Thus, peltier module temperature and power is controlled automatically Arduino board according to the temperature sensed by the help of Temperature and Humidity Sensor (DHT22). The idea of the project is to change the generator temperature automatically. This technique is found to be the best technique for controlling the generator temperature using the thermoelectric peltier cooler module.

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