Design for Real Temperature and Moisture Analysis on Battery Bank and Nobreak

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Abstract— Keeping track of the temperature and humidity of the nobreaks and battery bank locations helps to prevent loss of equipment life. Although equipment that makes measurements and controls on site is currently available, it is difficult to use techniques for temperature and humidity control in real time. This article implements and describes a temperature and humidity meter along with an automation system for real time verification of the nobreak and battery bank for industrial use. This design is used as an important tool in temperature monitoring with the purpose of avoiding the reduction of equipment life causing higher maintenance costs. Temperature and humidity meters were used to carry out the project, an arduino responsible for sending the data captured by the sensors to the database, and a web system that shows the data sent by the arduino in real time. The data obtained through the developed prototype were verified and compared in order to observe possible temperature changes in industrial environment. The measurements were compared to the temperatures indicated by the product manufacturer. With this it was attested that the prototype stored the temperature and humidity data and subsequently sent it to the web system correctly allowing thus a real time analysis of the temperature and humidity in which the equipment is submitted.

Keywords— Nobreaks; Automation; Battery Bank; Arduino.

I. INTRODUCTION

In today's globalized economy, organizations are increasingly looking for methods that can improve process speed or continuous improvement. As a result, companies are increasingly looking for new management and monitoring tools to provide them with better quality and productivity of their products, processes and services [1].

Developing effective ways to test and manage battery temperatures and operations so that energy loss incidents can be reduced to prevent businesses from running out of power has been the subject of much research in recent years. [2].

Nobreaks has application in various industrial areas, such as data centers, transportation, metallurgical, hospital, to the area that needs a UPS will have met their need. UPS is used when a power outage is not possible because power outages can lead to losses such as downtime, lost data, incomplete services and even lives being lost due to power outages in hospital devices, according to upsbr [3].

Some nobreaks already have the function of indicating the temperature on their panel, however, often this equipment is in reserved rooms where you cannot easily access. As a result, a problem that does not lead to a power outage may take time to resolve, thus causing a loss in the life of the company's assets or other equipment.

This article aims to provide a solution to the problems mentioned above, thus improving and speeding up the management of a company about its nobreaks and battery bank. Making Simple Problems. As a defect in air conditioning do not seriously affect expensive equipment such as nobreaks and batteries. Reducing your maintenance costs and possible loss of your asset.

II. METHODS AND MATERIALS

The methodology applied in this scientific article were based on bibliographic references. The main objective of the research is to solve immediate and concrete problems or needs in a company that contains nobreaks and battery banks.

All companies and organizations that use an IT system are directly or indirectly related to processing centers. Environmental factors such as fire protection, electricity, heat and excessive humidity, debris, dirt or dust should be monitored and controlled through contingency planning to minimize the risk and unnecessary disruption of services and business. [4] .

2.1 ARDUINO GSM SHIELD 2

Fig.1: Arduino GSM Shield 2
Source: Arduino store, (2018).

Arduino GSM Shield 2 allows an Arduino card to have internet access and to send text and make phone calls from an operator chip. [5] The GSM arduino uses a Quectel M10 radio modem. One of the communication methods and the AT commands. The GSM library has a large number of methods for communicating with arduino. The card requires the use of a network-registered operator chip to receive data or send commands over the network. [6]

Arduino GSM uses digital pins 2 and 3 for software serial communication with the M10. Pin 2 is connected to M10 TX pin and pin 3 to RX pin. PWRKEY pin is connected to Arduino pin 7. The M10 is a quadriband GSM / GPRS modem that uses the GSM850MHz, GSM900MHz, DCS1800MHz and PCS1900MHz frequencies. It uses TCP / UDP and HTTP protocols over a GPRS connection. The maximum downlink transfer speed and GPRS data transfer is 85.6 kbps.

2.2 DHT11 SENSOR

Fig.2: DHT11 Sensor
Source: Guangzhou Aosong Electronics, (2018).

The DHT11 Humidity and Temperature Sensor is a temperature and humidity sensor widely used in arduino projects for the most accurate reading for temperature ranges from 0 to 50 Celsius and humidity between 20 to 90%.


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FEATURES:
- Dimensions: 23mm x 12mm x 5mm (including terminals)
- Power supply: 3.3 to 5.5 VDC
- Current: 200uA to 500mA, in standby from 100uA to 150 uA
- Humidity measurement range: 20 to 90% RH
- Temperature measurement range: 0° to 50°C
- Measurement humidity accuracy: ± 5.0% RH
- Temperature measurement accuracy: ±2.0 °C
- Response Time: <5s
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Fig.3: Sensor Features DHT11

Source: Authors, (2019).

The DHT11 sensor is an NTC thermistor and the Humidity sensor is HR202, the internal circuitry takes temperature readings through the sensors and communicates to a microcontroller via a one-way serial signal. [7]
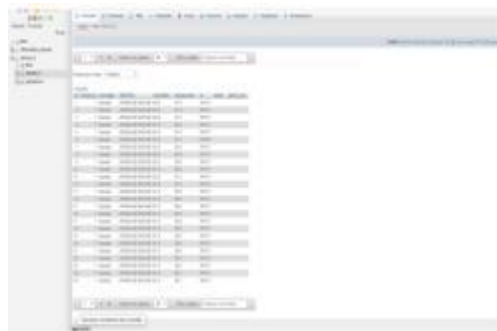

Fig.4: MySql database.
Source: Authors, (2019).

For storing information sent by the prototype we use the MySQL database which is a relational code database management system used most of the time for free. The service uses the Structure Query Language (SQL).
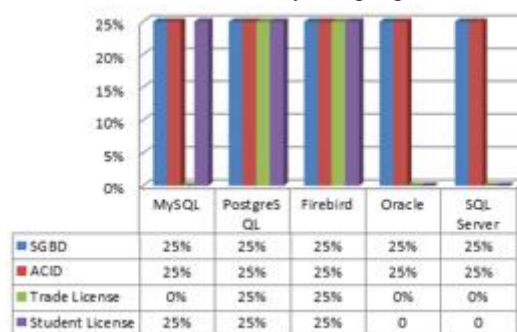

Fig.5: Top Databases
Source: Authors, (2019).

III. DEVELOPMENT

In many companies today, it is essential to use equipment that can ensure stability in the network or that may eventually replace the power grid due to the lack of utility power, thus avoiding that sectors of the company stop causing a large prejudice [8].

That's why nobreaks, stabilizers and battery banks are used to ensure the full operation of the company, but like all electronic equipment, the nobreaks and battery banks have working temperature limits, and exceeding their limits or working life is compromised. [9] For example battery banks, in which manufacturers warn that batteries should be kept between 24 ° C and 33 ° C on average, and every 10 ° C above the limit the battery life may be longer. It is on average 4 years reduced by up to 50%, considering

that battery banks have from 1 to 90 batteries depending on customer needs, the damage is quite high.

The project measurement equipment consists of an Arduino GSM Shield, chip, antenna, temperature and humidity meter and VGA input connector.

Fig.6: Reading prototype.
Source: Authors, (2019).

The data when captured by the temperature and humidity meter will be sent and read by the arduino that will send to the project database. A website has been developed in which it will be possible to identify in real time the ambient temperature and humidity in which each equipment is located, on the website itself contains notifications if any UPS is outside the ideal temperature range, the block containing its main data is left with a red band informing the incident.

Fig.7: Reading prototype.
Source: Authors, (2019).

When the temperature is below 25 degrees Celsius and above 35 degrees Celsius, the system identifies and sends an email to the company's UPS manager and identifies it on our site's operations screen as shown in Figure 3. A In php programming, project phpmail will help you have better control from both the responsible company and the project manager. This often helps in identifying faults in the responsible company's network that could in the future damage the UPS or battery bank and thus not causing damage by downtime or data loss for example.

Fig.8: phpmail image.
Source: Authors, (2019).

IV. CONCLUSION

This project aimed at the development of temperature control system in nobreaks and battery bank. The system will change the rudimentary view of the IT industry where this equipment is stored, the solution aims to monitor IT equipment such as UPS and batteries using hardware and software, making the actions of administrators more efficient in case of overheating avoiding industry downtime, as this technology supports critical sectors of an organization. The implementation of this project is important, as most companies do not use a computerized system to control the temperature of equipment in the Nobreaks room.

The results obtained through the project make the loss of information due to power outages due to problems with nobreaks and battery bank to be reduced dramatically. And with that, the organization and the critical parts that need it are always more connected to power.

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