



Project Report on  
**Online Temperature Monitoring  
and Alert System**

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**(OTMAS)**

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## **Introduction:**

At this moment ICT sector is growing at an enormous speed. In this sector server rooms, switch rooms and other sensitive infrastructure have very sensitive parts that have to be monitored every now and then. A important part of this monitoring is Temperature Monitoring. Each of these sensitive infrastructures must operate at a certain temperature and even a small change in temperature can leads to a significant failure of daily operation. Often dedicated manpower is needed to monitor the temperature of these infrastructures periodically. But it is not cost efficient and man monitoring cannot be errorless. So the best alternative is to implement a electronic device that can monitor the temperature continuously and also can notify the concern persons at any time. Hence, online temperature Monitoring and Alert System is created.

## **What is Online Temperature Monitoring and Alert System (OTMAS):**

Online Temperature Monitoring and Alert System is an embedded Internet of things (IoT) which is based on a programmable processor with temperature as input from a sensor and delivers the temperature as output to desired location via SMS or to a particular web portal.

The purpose of this embedded IOT system is to monitor temperature for server rooms, switch rooms and other temperature sensitive infrastructure with machinery producing a significant amount of heat. Normally, temperature is controlled by air conditioning. However, failure of air conditioning system may lead to swift rise in temperature, which in turn may lead to damage of the valuable machinery and may create fire hazards. Thus, as a cheap alternative, OTNAS monitors the temperature and alerts the concerned personnel, saves both times, money and sometimes avoids danger for damage and accidents.

## **Features of OTMAS:**

1. The system can monitor temperature automatically in a regular interval (every minute in this module)
2. The system can send the data to an online server for the purpose of storage and display
3. The system can have options for displaying the temperature using various visualization tools like graphs, widgets, meters etc online so that temperature can be monitored from anywhere.
4. The system can send periodic updates of temperature through SMS to concern personnel
5. The system can send critical temperature alert to concern personnel if a certain threshold for temperature is exceeded.

## **Components:**

The system is build with the following components:

1. Microcontroller
2. Temperature Sensor
3. Access to Internet
4. SMS Gateway or GSM SIM Module

**Operations and Block Diagram:**

1. The microcontroller reads temperature data every minute via temperature sensor.
2. The microcontroller sends the temperature data to an online IOT server for online monitoring using a write API key.
3. The microcontroller calculates average temperature of every 5 minutes and compares the average to a certain threshold.
4. If threshold is crossed, it send a critical alert SMS
5. The microcontroller waits for 30 minutes to see if temperature is below the threshold. If not, then it sends another alert and waits for another 30 minutes and soon.
6. The microcontroller sends a regular updates in a predefined time 4 times a day. (at any desired time of the user)

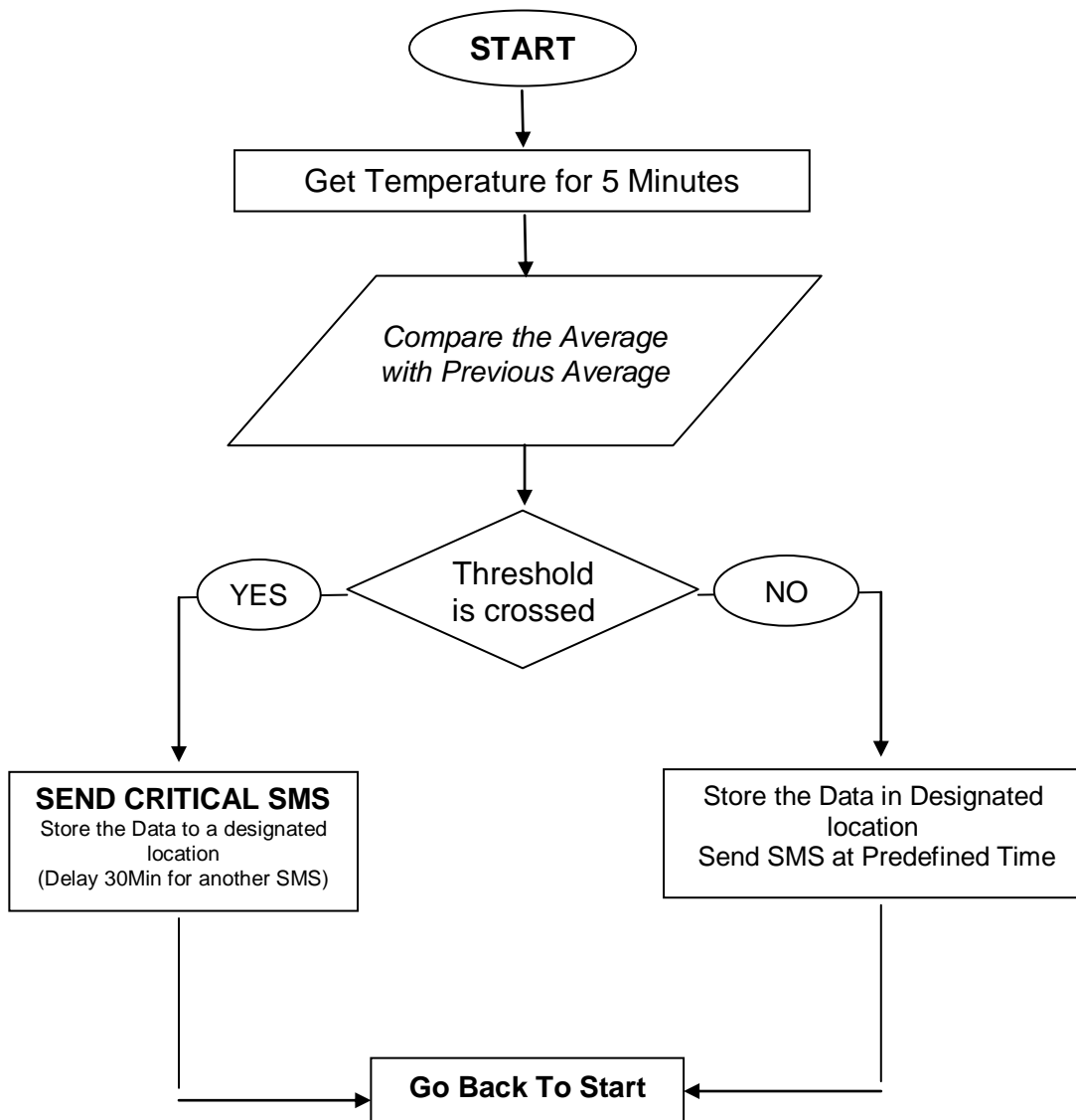


Figure: Block Diagram of the OTMAS

**OTMAS at Present:**

The system is already up and running in some very important switch rooms of Bangladesh Telecommunications Company Limited such as the IMS Core Switch room, the 171KL Core Switch Rooms, SBN-ZTE, SBN-HUAWEI and SBN-ALKATEL switch rooms. They are operating with no trouble after their installation since May 2019.



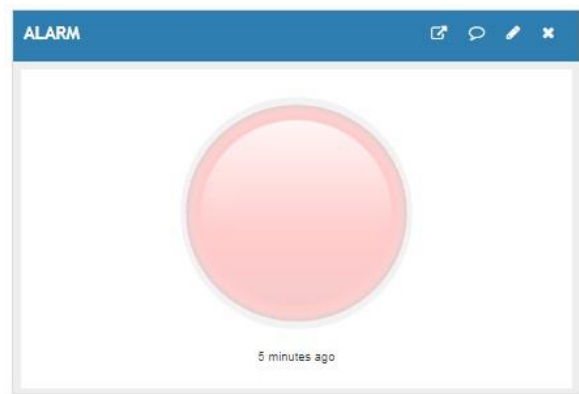
**a**



**b**

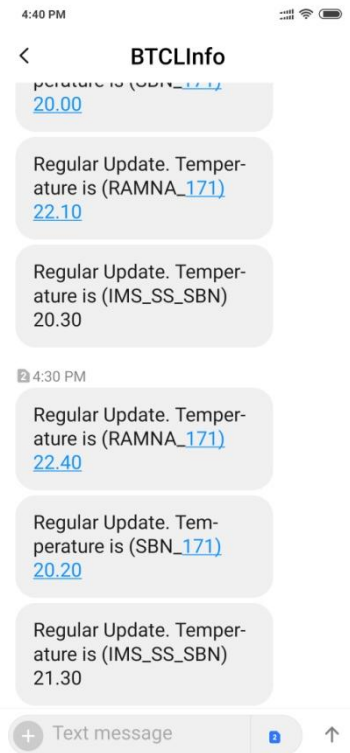


**c**



**d**

*Figure: OTMAS OVER INTERNET (a) Graphical Representation of Temperature with time in Ramna 171KL Switch Room over Internet; (b) Continuous Temperature Meter with Critical(Marked RED); (c) Numerical Display of Temperature; (d) Critical Temperature Alert Light;*



*Figure: Regular Temperature Notification of OTMAS via SMS*

**Upgradation Plan of OTMAS:**

There are some future upgradation plans for the OTMAS system. OTMAS can detect Humidity, so with the relation between humidity and temperature, this system can work as a fire alarm. Another idea is to control the power ON/OFF of individual unit of air conditioning system of the room. The final plan is to integrate all the OTMAS device to a particular server to centrally observe and monitor all the important infrastructure of an organization.

**Conclusion:**

OTMAS is a simple but very effective way of monitoring temperature. From the result of test implementation of OTMAS in some switch rooms, it can be concluded that, the device increases the security level of the rooms and reduces a lot of tension of air conditioning failure.