Server Temperature Monitoring System Using Web Based Censor And SMS Gateway

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Abstract. Server is computer that act as servant in network. Server manage data traffic and provide resource for user in the network. Some roles of server are file server, database server, print server, directory server, and web server. Performance of the server must be monitor. Censor is a device that can transform a value from one form to another form. The data for Server temperature monitoring system collected using DS1621 censor. Steps in design of server temperature monitoring systems are using waterfall methods that is problem identification and data collection in the planning process, requirement analysis, hardware and software integration design, database design, menu design, STD, coding with flowchart, testing, summary and maintenance. Censor in the server temperature monitoring will send temperature data using sms gateway to the administrator. Administrator will be informed as soon as possible if the server having upper limit temperature and can act immediately to resolve the problems.

1. Introduction
Temperature is a concept to express relationship between hot and cold. It is expresses a hot, if something have a high temperature and it is express as a cold if it is have low temperature. We need device to measure temperature to know hot and cold something. Termometer is something that we use measure a temperature. Termometer must have speed, precision and sensitivity response. Some example of termometer mostly known are termokepel, resistance termometer, optic pirometer etc., [Sears, 1994].

2. Literature Review
Temperature Scale
Some of temperature standard are Kelvin, Celcius, Rankine and Fahrenheit. Tetapan skala Kelvin diperoleh dari titik tripel (balance phase from solid, liquid, and gasses phase) water are 273,16 K. whereas, Celcius temperature degree, its point degree same as Kelvin degree, but, the freezing point diverted in such way that temperature Celcius tripel point water is 0.010 C. therefore, If Tc refer to Celcius then TC = TK – 273,15 K.
Temperature Rankine (TR), equation with temperature Kelvin can be expressed, \( TR = \frac{9}{5} TK = \frac{9}{5} TC + 491.67 \). And temperature Fahrenheit (TF) with Celsius can be expressed, \( TF = \frac{9}{5} TC + 32 \). Therefore, freezing point in temperature Fahrenheit \( TC= 0 \) C same as 32 F and gasses point \( TC = 100 \) C same as 212 F. [Sears, 1994]

**Microcontroller**

Microcontroller is a computer system that is packed into the Integrated Circuit. IC contain computer component such as CPU, RAM, ROM, and I/O Port. In contrast to the PC which is design for general purpose, mikrokontroler used for special purpose that is control specific system. Mikrokontroler also known as Embedded Microcontroller that is part of bigger systems. Microcontroller control systems such as digital camera, cellular phone, laser printer, washing machine, motor vehicle machine, oven microwave, remote control, tv, stereo system, robot, etc.

**Censor**

Censor is a device which transform a value of physical signal or energy to the another physical value. Censor connecting real physical and electric industry and electronic device. Used in the industry for monitoring, controlling, and protection, also known as Transducer. Is not limited for measure physical value, but also in chemical, and biology. There are two kind of censor, first, Passive censor, convert physical or chemical signal to another signal without help from source of energy. Active Sensor, convert physical of chemical signal or another signal using source of energy. Active censor is primary choice if the signal is weak.

**Server**

Server is computer that work as servant is the network. Server managing traffic in the network and provide resource which can be access by another computer in the network. Server is a special device in the computer networks as place for all nodes in the network to do resource sharing. Server handling all nodes, if nodes need it. There are many kind of server: printer server, file server, disk server, mail server, VPN server, DHCP server, DNS server, FTP server, WINS server, proxy server, web server, database server, etc.

**Internet**

Internet technology is very common terms for someone who works in computers world. Even for novice, words of world wide web (www) has become part of today's human modern live. Web sites display all of information from the world with unlimited distance.

**PHP**

PHP is mostly known scripting programming language today. PHP widely use for programming dynamic web sites, but also can be use for another reason. PHP is a server side scripting language that is application core system. For backend storage, Relational Database Management Systems (RDBMS) engine used as storage data.

**HTML**

HyperText Markup Language (HTML) is a markup language used for create a web page, displaying many information in a Internet web browser and formatting simple hypertext written into ASCII file format in order create integrated display. In the other hand, files can be create by word processing software and saving to the ASCII normal format become homepage with HTML command.

**CSS**

CSS is a one of web programming language for controlling some component in a web in order to be structured and same. Same as styles in word processing application like Microsoft Word which can setting some styles such as, heading, bodytext, footer, images and other style using in many files. CSS
used for formatting display web page created using HTML and XHTML. CSS can set picture size, body text color, warna tabel, border size, border color, hyperlink color, mouse over color, space between paragraph, space between text, left margin, right margin, top margin, bottom margin and other parameter. CSS is a style sheet language using for setting document display. CSS can show a same page with different format.

jQuery
jQuery is opensource Javascript library and and we can use it javascript in HTML. This library released on Januari 2006 in BarCamp NYC by John Resig and licensed under MIT and GPL license. Information about jQuery can be found in http://jquery.com. User must donload javascript files from jQuery in order to use that library in their function.

Webserver Apache
Web server is a software installed on server which have minimal prerequisite and receive HTTP/HTTPS request from client by using web browser ( IE , Firefox , Chrome, dll) and send back result by using web page that have standar Hypertext Markup Language (.html).

SMS Gateway
Short messaging system (SMS) is a reliable communacation method today. SMS able to do transaction with database. Therefore SMS Gateway is needed. Pada prinsipnya, SMS Gateway software that using computer and cellular technologies that integrated for distributed messages that is generated by information system using SMS provided by cellular provider.

GAMMU
Gammu is a service provided for building SMS Gateway based application. When using Gammu, user could build application using SMS Gateway with any programming language or platform, web based using PHP or ASP or any other language and also desktop using Delphi, VB or others. Gammu are project which can manage many functions in the mobile phone or similar devices.

3. Methodology

System Design
System design is next step after system cycle analysis, define from functional requirements, engineering implementation preparation describe how a system is build. Build system can be illustration, description, and draft design or alignment from separate elements into integrating system, including configuration from hardware and software components of systems.

Figure 1. System Design
The above figure explain about system that is works to measure server temperature from beginning komputer server dibaca temperature panasnya oleh sensor DS1621 then data that has been aquire by that device sent by using cable serial port to the monitoring system which build on the web server then processing to the web application become web based monitoring system.
Hardware Design
Figure below shows hardware design for server temperature monitoring systems:

![Hardware Design Diagram](image)

**Figure 2. Hardware Design**

Below flowchart figure will explain how censor DS1621 works:

![DS1621 Flowchart](image)

**Figure 3. DS1621 How It Works**

From the above figure, censor DS1621 will active and activate driver. Then every 5 second server temperature will collect and sending it via serial port to the database and displaying it in the web server.
The above flowchart explain about monitoring system and sms gateway. SMS will be deliver if some criteria meet:

1. If the temperature is above the set limit 45 degree then the message will be deliver to the administrator as a warning message.

2. If the temperature above the limit set then message will be deliver every 5 minutes as a warning to the administrator and sms will not be sent if temperature back to normal below 45 degree celcius.

4. Result and Discussion
In this section we will explain scenario for using this server temperature monitoring application. The scenario as follows:

1. Administrator type URL temperature -server.com : temperature -server.com/gammutemperature /login.php in the web browser

2. Login page will be displayed for the first time, administrator must fullfil username and password
3. Main Page will be display after login succesful. There are five link in this page: Home, Monitor, SMS, Data Report, Data Log, Admin Area.

4. If we click Monitor then submenu Table Temperature, Grafik Temperature will be display. If “Table Temperature” click, then page as shown below will display. This page display server temperature data from censor device in table. If temperature normal then data will display in normal color. If temperature below or higher than maximum limit will be displayed with yellow or red color. When temperature reach below maksimum will display with yellow color and if temperature higher than maksimum limit will display with red color.

5. If we click submenu “Graph Temperature” then Page as shown in this below. This Page shown data temperature entering from censor device be have the shape of data line graph. If temperature entering graph normal indicate black line for temperature entering approach maximum limit temperature line will be change colour become yellow then If warm temperature exceed line maximum limit exceed line maximum limit then change become colour is red.

6. There are three submenu "Setting", "Data Outbox", "Data Sent Item" on SMS page. "Setting" page will display screen below. This page is for gammu configuration and sms gateway connection test.
7. “Data Outbox” page will display failed SMS delivery complete with its status. If delivery success the data will be displayed in the Data Sent Items page.

8. Data Sent Items will display SMS Status. When the SMS Sent and Destination number will be display in this page, Complete with is status

9. There are 3 sub menu on data report page : daily, weekly and monthly. Daily page will display highest temperature on that day. The data will display in the form of bar chart.
10. Weekly page will display temperature data in the respective week. The data will display in the table form.

![Figure 14. Page Weekly](image)

11. Monthly page will display temperature data in the respective month. Data will display in the form of bar chart.

![Figure 15. Grafik Bulanan](image)

12. Data log page display detail about user activity in this application. This page display when the user log on to the application and when the user log off. Data also display what the action that performed by user.

![Figure 16. Data Log](image)

13. Admin area page display permission for user application. Administrator also can add user and give permission for the application.
Integrating Sensor, Sms Gateway And Server Temperature Monitoring System Application

We need driver for integrating sensor device, sms gateway and monitoring system application. Driver need to be running before monitoring system application run, as displayed below.

As result from testing, the system can monitor server temperature from real time data gather from sensor, the data then send to the database to be processes as report. This system also can monitor computer on the network.

5. Conclusion

1. Driver for reading censor plugged into the computer serial port and grab data every 5 second, sending it to the database.
2. Administrator can get server temperature information from censor and monitoring system application.
3. Server temperature monitoring system can be accessed from local area network.

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