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Development of web monitoring radiation area monitor

Hoon Jin Jung, Jun Hee Lee, Phil NamKoong, Dong Hoon Lee, Su Hong Lee, Gun Bae Lee
Iljin Radiation Engineering Co.,Ltd Radiation Technology Laboratory
iljinrad@iljinrad.co.kr

1. Introduction

Recently the increasing number of radioisotope industry and nuclear facility have ever raised the possibility of radiation safety accident. As such a result, radioisotope companies and nuclear facility operators have become to be much interested in radiation area monitoring for efficient radiation protection.

At present, almost of the radiation area monitors which are imported products are outdated in aspect of their functions. Diversification of the monitoring work is urgently demanding additional functions to be added [1,2]. Thus we have developed new-type digital area monitor which enables remote web monitoring with image and radiation doserate value at distant places through using internet, the latest IT technology, and radiation measurement technology.

2. System configuration

Radiation area monitor is being widely used in monitoring radiation dose rate at areas such as x-ray room, rad-waste handling facility, radioisotope storage place, radiation equipment calibration room and so on.

As in the radiation accident, it is above all important to prevent workers from over-exposure as sooner as possible. Therefore the radiation area monitors have to provide workers with warning quickly and efficiently.

However most of these monitors have only siren or lamp for warning. If radiation safety administrator doesn't exist in the field, it is difficult that he is aware of warning signal. Without limitation of time and space, for rapid notification we designed network enabling web monitoring radiation area monitor which can network and have camera function.

This monitor have various function which have a role networking, CCTV, database and remote monitoring.

We developed the monitor divided circuit into three modules such as radiation detection part, image capture part and management software part.

In radiation detection module, we used Geiger-Mueller counter to detect radiation dose rate. For more accuracy measurement, we used correction methods such as instrumental correction, analytical correction and empirical correction [3,4].

In image capture module, we used CMOS(complementary metal-oxide semiconductor) image sensor for motion image capture. The CMOS sensor is cost effective and can be transfer easily captured image to personal computer. Digital captured image compressed using Image processor transferred to personal computer. Using this part, we expect that transfer motion image to administrator.

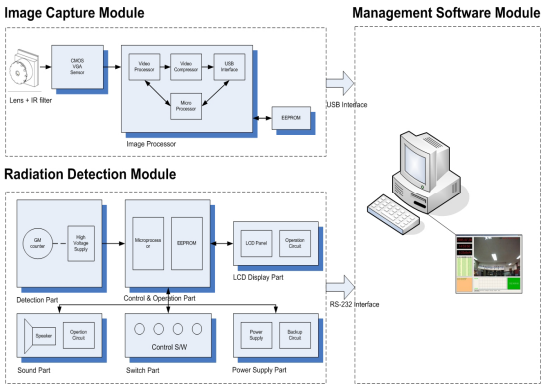

Figure 1. System Configuration

In management software module, this software gathers radiation dose rate transferred by RS-232 interface and captured motion image transferred by USB interface. This software processed them useful digital data and save them and convert database.

3. Software

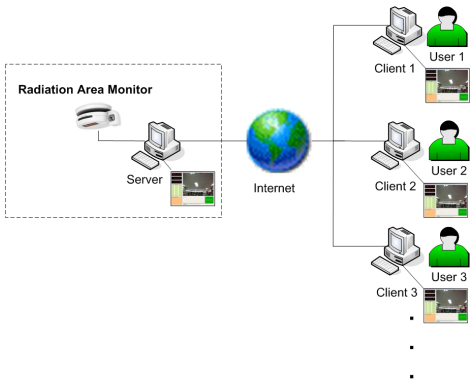

Figure 2. Client Server Program

Figure 2 shows the Client/Server Program. This program in management software module operates in a Client/Server model (2 tier). The Client/Server model

has become one of the central ideas of network computing. The client program forwards your request to the server program and the server program turn serves results back to the client program, which displays the information such as radiation dose rate and motion image for you. This client program operates like the server because of remote access through TCP/IP socket.

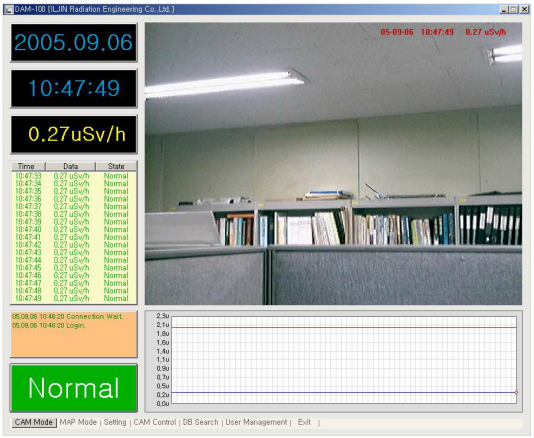

Figure 3. Monitoring program

Figure 3 presents monitoring program in management software. This program can show the motion image of monitoring area and radiation dose rate at real time.

Data, containing radiation levels and status, can be logged to a file at user-specified intervals. E-mail or short message service(SMS) can be sent out during alarm and/or failure conditions. Data can be displayed in a grid, a graph, or in a map view. Data is saved to a Microsoft Access database and to an Excel file if desired. Queries can be made, for example, to locate alarms over the past week.

4. Conclusion

We developed new-fashioned web monitoring radiation area monitor which is capable of measuring radiation dose rate and capturing motion image. Using this monitor, without limitation of time and space, the administrator can monitor in the field with various conveniences. And we expect the replacement of a foreign area monitor. As the image can be showed, we expect trespasser prevention and fire prevention. Additionally, technologies such as remote control, database and motion image capturing from our study can apply to another measurement systems.

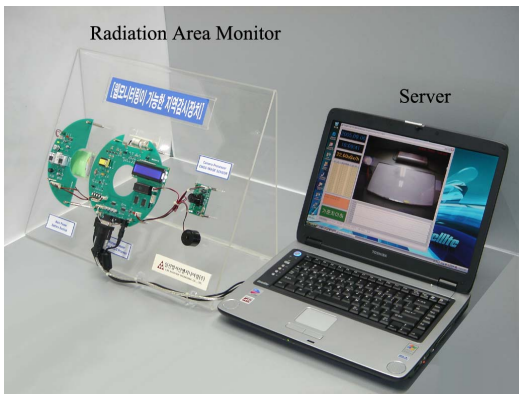

Figure 4. Developed web monitoring radiation area monitor

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Acknowledgement

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