

The Design of Intelligent Surveillance System Based on Grid Structure

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ABSTRACT

A traditional residence surveillance system only can continuously capture monitoring images from image sensor that cannot actively perform the intelligent identification. Image sensors produce lots of continuous monitoring images so that the system spends a lot of time and storage space in processing these images, which is needlessly expensive. The system captures all images from image sensors in turn, so some monitoring blind spots exist among image sensors in the traditional surveillance system. This research proposed a design of intelligent residence surveillance system based on Grid structure to improve the shortcoming of traditional surveillance systems in real-time monitoring. The proposed image sensor could judge whether images are abnormal or normal by comparing the difference of the background image and captured images. Consequently, the intelligent image sensor, which is designed by embedded system development board, would send those abnormal images to the adaptive back-end server with Grid Middleware ; therefore, this could prevent from storing a large number of images that are normal. The proposed intelligent image sensor also provides a mechanism for multiple front-end image sensors to capture the monitoring images in real time and solve the problem of monitoring blind spots in the traditional surveillance system. In order to eliminate the congestion from images storing, this research proposed a distributed storing structure based on Grid technologies. The proposed system structure utilizes Ganglia Broker to integrate the backend-distributed computer resources and provide a real-time storage mechanism to solve congested problem caused by large images transmission. The proposed system also uses the RFT element of Globus tools for data replication to collect abnormal image files located at the back-end storing servers, and provides users to monitor and manage.

Keywords : Grid ; Intelligent Image Sensor ; Embedded System

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REFERENCES

- [1] 胡繼陽、李維仁、柯力群、張志龍, "嵌入式系統導論,3e", 學貫行銷股份有限公司, 2004年。
- [2] 新華電腦股份有限公司, "ARM內核嵌入式SOC原理以ARM7TDMI S3C4510B為例", 全華科技圖書股份有限公司, 2004年。
- [3] 紀志華, 『應用智慧型影像感測器之汽車保全系統設計』, 私立大葉大學碩士論文, 2007年。
- [4] 新華電腦股份有限公司, "ARM內核嵌入式SOC實作", 全華科技圖書股份有限公司, 2004年。
- [5] 劉家璋, 『智慧型居家保全系統之格網設計』, 私立大葉大學碩士論文, 2008年。
- [6] <http://www.uclinux.org/>。
- [7] Ian Foster, " What is the Grid? A Three Point Checklist " , Argonne National Laboratory & University of Chicago , 2002。
- [8] Ian Foster, Carl Kesselman and Steven Tuecke , " The Anatomy of the Grid Enabling Scalable Virtual Organizations " , Supercomputer Application , Page:2 – 6 , 2001。
- [9] The Globus Project , <http://www.globus.org/>。
- [10] <http://www.uclinux.org/>。
- [11] <http://www.busybox.net/>。
- [12] <http://www.uclibc.org/toolchains.html>。

- [13] Embedded uClinux在PreSOCes上實作，新華電腦股份有限公司，全華科技圖書股份有限公司，2004年。
- [14] Ian Foster, Carl Kesselman and Steven Tuecke, “ The Anatomy of the Grid Enabling Scalable Virtual Organizations ” Supercomputer Application, Page:6-14, 2001。
- [15] BORJA SOTOMAYOR, “ Globus Toolkit 4 PROGRAMMING JAVA Services ”, Page:7-10, 2005。
- [16] OpenSSL, <http://www.openssl.org/>。
- [17] Apache HTTP SERVER PROJECT, <http://httpd.apache.org/>。
- [18] <http://www.globus.org/toolkit/docs/4.0/security/simpleca/>。