

摘要

本研究主要整合編碼規則、資料安全與無線感測等技術，建構完整的環境監測資訊管理系統幫助國內實驗室完成流程管理自動化。環境監測資訊管理系統主要分為七個子系統，分別是，(1)報價子系統：根據客戶的要求開立檢測報價單。(2)委託子系統：依照客戶的要求將客戶委託的檢測項目或依照報價單上的項目開立委託單，委託實驗室工作。在委託子系統裡會將各層級的資料利用制定的編碼規則將資料有系統的分類。(3)採樣子系統：幫助採樣人員採樣及收集數據，減少採樣人員工作流程及單據填寫以提升工作效率，幫助採樣主管進行工作派工及檢視採樣資訊。在採樣子系統裡引進無線感測網路技術幫助採樣人員可以遠端且長期監測採樣地點。(4)收樣子系統：幫助收樣人員進行樣品接收，利用 Barcode 提升樣品接收效率也利用 Barcode 來確認刪除樣品。(5)分析子系統：幫助分析人員計算分析數據，並幫助分析主管進行工作派工及檢視分析結果。在分析子系統裡，制定了資料交換的格式及運作模式，讓實驗室可以自己制定公式。(6)品管子系統：幫助品管人員計算品管數據及判斷品管標準，並且繪製品管圖讓採樣人員在檢視歷史紀錄更為容易。(7)報告子系統：幫助實驗室人員進行報告位數取捨與報告列印，並且為了防止報告被更改，

利用浮水印加密演算法來驗證報告真偽。

為了驗證系統效能，本研究進行兩個實驗：(1)第一個實驗為了驗證在同一時間點檔案上傳及處理。經實驗得知檔案上傳數量為 50 時，系統的處理時間大約 1.5 分鐘，100 是 4 分鐘，150 是 5 分鐘，200 是 6 分以上，250 近 7.5 分。(2)第二個實驗驗證浮水印加密演算法的效率。經實驗後得知本研究所撰寫的浮水印加密程式在逐一執行檔案時最為穩定，每執行一筆的時間大約為 2 秒鐘，以 100 人同時上傳，最長的等待時間大約為 4 分鐘。

英文摘要

The research mainly integrates the technology of code rule, data security and wireless sensors, and builds up a completed environmental monitoring information management system to assist domestic laboratories in the automation of procedure management. The environmental monitoring information management system is primarily divided into seven subsystems, which are: 1. Quotation subsystem: It supplies detection quotation list according to customers' requirement. 2. Trusted sub systems: Based on the customers' requirement, it draws a commission list and commissions the laboratory to work on customers' detection project or the project on the quotation list. It can systematically classify data of all levels by the application made code rule in the trusted subsystem. 3. Sampling subsystems: It helps sampling personnel to take samples, collect data and reduce time on the work procedure and receipts filing so as to advance the efficiency of work. It also helps the sampling supervisor by dividing work and inspecting sampled information. Sampling personnel can monitor the sampling sites from remote locations and introduce wireless sensor network technology into sampling subsystems for the long term. 4. Sample collecting subsystem: It helps collecting samples personnel to receive the samples by the use of a barcode to promote the effectiveness of samples collecting and also to confirm and delete samples. 5. Analysis subsystems: It helps analysis personnel to calculate the analysis data and analysis supervisor to divide work and inspect analysis results. It has made a uniform data exchange format and operation pattern for the labo-

ratory, making a formula by itself in the analysis subsystem. 6 Quality control subsystem: It helps quality control personnel to compute quality control data and judge quality control standards and draw quality control chart in order to more easily inspect the historical records. 7 Reporting subsystems: It helps laboratory personnel to make decimals alternative and report printing and it uses watermark encryption algorithms to test identity of the report for preventing alterations to the report.

The research conducts two experiments for the purpose of testing the system efficiency: 1. the first experiment is to test files' uploading and disposing of files at the same time. We learn from the experiment result that the system needs 1.5 minutes for disposing of uploaded files whose quantities are 50, while 100 shares of files need 4 minutes, 150 shares of files need 5 minutes, 200 shares of files need more than 6 minutes and 250 shares of files need nearly 7.5 minutes. 2 The second experiment is to test the efficiency of watermark encryption algorithms. We learn from the experiment result that the watermark encryption procedure that was written by our research institution is in the most stable state when it is executed one by one. It needs about 2 seconds to execute once and the longest waiting time is about 4 minutes if 100 people are uploading files at the same time.