Computer Engineering Group
Assistant Professor Chin-Hsien Wu

Ph.D., National Taiwan University
Field of study: Real-Time Systems, Embedded Systems, Ubiquitous Computing, Flash-Memory Storage Systems, File Systems, Hardware/Software Co-Design
Key words: Embedded Systems, Ubiquitous Computing, Hardware/Software Co-Design
URL: http://homepage.ntust.edu.tw/chwu/
Email: chwu@mail.ntust.edu.tw
Phone: 886-2-27303274(voice), 886-2-27376424(Fax)

1. The Subject and Aims of Research

   Recent research aims at designing an efficient management for flash-memory storage systems and embedded systems. Excellent research results and designs have been reported on performance enhancement, flash translation layer and system architecture designs. We are also interested in ubiquitous computing, hardware /software co-design and low-power design. Ubiquitous computing encompasses a wide range of technologies such as operating systems, wireless network, programming language and computer architecture. Hardware/software co-design is a promising research field by the cooperation between hardware and software to provide better system performance. Low-power design will focus on low-power system level and application level.

2. Recent and Future Research Topics

   (a) Management and design of flash-memory storage systems:

   I. Provide an efficient management for flash-memory storage systems, especially in resource-limited embedded systems.

   II. Take advantages of flash memory (read fast) and avoid its disadvantages (write slow) to provide efficient data access.

   (b) Database Design of embedded systems:

   I. Design an appropriate database system for embedded systems with huge-capacity flash memory.

   II. Integrate current database technologies with the latest flash-memory management into the embedded database systems.

   (c) Mobile and embedded hardware/software co-design platform:

   I. Adopt popular embedded operating systems such as Wince, Linux, and uc/OS2 as our platform and redesign the system in hardware/software co-design.

   II. Construct suitable file systems and storage systems for different applications and optimize the design.

   III. Practice various experimental platforms and devices such as 8051 chips, ARM, FPGA, RFID,…etc.

   (d) Ubiquitous computing:

   I. Cooperate with different devices such as PDA, PC, mobile phones, or other devices with wireless ability to provide human convenient services.

   II. Develop applications that can extract, analyze, and utilize context-aware

information from human or the environment.

(e) Low-power system design and applications

   I.   Design low-power systems.

   II.   Design low-power applications.

2. Selected publications, project, and honor

Publications:

- C. H. Wu, L. P. Chang, and T. W. Kuo, ``An Efficient B-Tree Layer for Flash-Memory Storage Systems,'' ACM Transactions on Embedded Computing Systems (ACM TECS), Volume 6, Issue 3 (July 2007).

- C. H. Wu, T. W. Kuo, and L. P. Chang, ``The Design of Efficient Initialization and Crash Recovery for Log-based File Systems over Flash Memory,'' ACM Transactions on Storage (ACM TOS) (EI), (4): 449-467 (2006).

- C. H. Wu and T. W. Kuo, 2006, "An Adaptive Two-Level Management for the Flash Translation Layer in Embedded Systems," IEEE/ACM 2006 International Conference on Computer-Aided Design (ICCAD), November 5-9, 2006

- C. H. Wu, T. W. Kuo, and C. L. Yang, 2004, ``Energy-Efficient Flash-Memory Storage Systems with Interrupt-Emulation Mechanism,'' accepted and to appear in the IEEE/ACM/IFIP International Conference on Hardware/Software Codesign and System Synthesis, Stockholm, Sweden, September, 2004 (IEEE/ACM/IFIP CODES 2004)

National Science Council Project:

A Flash Translation Layer for Huge-Capacity Flash Memory Storage Systems. 96.10 ~ 97.07

Honor:

Session Chair in IFIP International Conference on Embedded and Ubiquitous Computing