# Table of Contents

## Track 1: Embedded Architecture

Object-Orientation Is Evil to Mobile Game: Experience from Industrial Mobile RPGs .......................................................... 1  
*Weishan Zhang, Dong Han, and Thomas Kunz*

Device-Aware Cache Replacement Algorithm for Heterogeneous Mobile Storage Devices ........................................... 13  
*Young-Jin Kim and Jihong Kim*

The Lightweight Runtime Engine of the Wireless Internet Platform for Mobile Devices ................................................. 25  
*Yong-Duck You, Choong-Bum Park, and Hoon Choi*

Product Line Based Reuse Methodology for Developing Generic ECU ................................................................. 37  
*Si Won Choi, Jin Sun Her, Hyun Koo Kang, and Soo Dong Kim*

The Object-Oriented Protocol for Data Exchange and Control in Computational-Diverse Embedded Systems .......... 46  
*Bogusław Cyganek*

## Track 2: Embedded Hardware

A Link-Load Balanced Low Energy Mapping and Routing for NoC .... 59  
*Zhou Wenbiao, Zhang Yan, and Mao Zhigang*

Scheduling for Combining Traffic of On-Chip Trace Data in Embedded Multi-core Processor ............................ 67  
*Xiao Hu, Pengyong Ma, and Shuming Chen*

Memory Offset Assignment for DSPs ................................. 80  
*Jinpyo Hong and J. Ramanujam*

A Subsection Storage Policy in Intelligent RAID-Based Object Storage Device .................................................. 88  
*Dan Feng, Qiang Zou, Lei Tian, Ling-fang Zeng, and Ling-jun Qin*

Joint Source-Channel Decoding ASIP Architecture for Sensor Networks ......................................................... 98  
*Pablo Ituero, Gorka Landaburu, Javier Del Ser, Marisa López-Vallejo, Pedro M. Crespo, Vicente Atxa, and Jon Altuna*
# Table of Contents

**Track 3: Embedded Software**

- Function Inlining in Embedded Systems with Code Size Limitation .......................... 154  
  *Xinrong Zhou, Lu Yan, and Johan Lilius*

- Performance Characteristics of Flash Memory: Model and Implications .......................... 162  
  *Seungjae Baek, Jongmoo Choi, Donghee Lee, and Sam H. Noh*

- A New Type of Embedded File System Based on SPM .................................................. 174  
  *Tianzhou Chen, Feng Sha, Wei Hu, and Qingsong Shi*

- An Efficient Buffer Management Scheme for Implementing a B-Tree on NAND Flash Memory .................................................. 181  
  *Hyun-Seob Lee, Sangwon Park, Ha-Joo Song, and Dong-Ho Lee*

  *Gang Zhou, Man-Kit Leung, and Edward A. Lee*

- Power-Aware Software Prefetching ................................................................. 207  
  *Juan Chen, Yong Dong, Huizhan Yi, and Xuejun Yang*

- Fast Initialization and Memory Management Techniques for Log-Based Flash Memory File Systems .................................................. 219  
  *Junkil Ryu and Chanik Park*

**Track 4: HW-SW Co-design and SoC**

- An Efficient Implementation Method of Arbiter for the ML-AHB Busmatrix .................................................. 229  
  *Soo Yun Hwang, Hyeong Jun Park, and Kyoung Son Jhang*
### Table of Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modeling and Implementation of an Output-Queuing Router for Networks-on-Chips</td>
<td>241</td>
</tr>
<tr>
<td><em>Haytham Elmiligi, M. Watheq El-Kharashi, and Fayez Gebali</em></td>
<td></td>
</tr>
<tr>
<td>Handling Control Data Flow Graphs for a Tightly Coupled Reconfigurable Accelerator</td>
<td>249</td>
</tr>
<tr>
<td><em>Hamid Noori, Farhad Mehdipour, Morteza Saheb Zamani, Koji Inoue, and Kazuaki Murakami</em></td>
<td></td>
</tr>
<tr>
<td>Behavioral Synthesis of Double-Precision Floating-Point Adders with Function-Level Transformations: A Case Study</td>
<td>261</td>
</tr>
<tr>
<td><em>Yuko Hara, Hiroyuki Tomiyama, Shinya Honda, Hiroaki Takada, and Katsuya Ishii</em></td>
<td></td>
</tr>
<tr>
<td>NISD: A Framework for Automatic Narrow Instruction Set Design</td>
<td>271</td>
</tr>
<tr>
<td><em>Xianhua Liu, Jiyu Zhang, and Xu Cheng</em></td>
<td></td>
</tr>
<tr>
<td>A Hardware/Software Cosimulator with RTOS Supports for Multiprocessor Embedded Systems</td>
<td>283</td>
</tr>
<tr>
<td><em>Takashi Furukawa, Shinya Honda, Hiroyuki Tomiyama, and Hiroaki Takada</em></td>
<td></td>
</tr>
<tr>
<td>Face Detection on Embedded Systems</td>
<td>295</td>
</tr>
<tr>
<td><em>Abbas Bigdeli, Colin Sim, Morteza Biglari-Abhari, and Brian C. Lovell</em></td>
<td></td>
</tr>
</tbody>
</table>

### Track 5: Multimedia and HCI

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>An Improved Fusion Design of Audio-Gesture for Multi-modal HCI Based on Web and WPS</td>
<td>309</td>
</tr>
<tr>
<td><em>Jung-Hyun Kim and Kwang-Seok Hong</em></td>
<td></td>
</tr>
<tr>
<td>User-Customized Interactive System Using Both Speech and Face Recognition</td>
<td>317</td>
</tr>
<tr>
<td><em>Sung-Ill Kim</em></td>
<td></td>
</tr>
<tr>
<td>Visualization of GML Map Using 3-Layer POI on Mobile Device</td>
<td>328</td>
</tr>
<tr>
<td><em>Eun-Ha Song, Laurence T. Yang, and Young-Sik Jeong</em></td>
<td></td>
</tr>
<tr>
<td>Speaker Recognition Using Temporal Decomposition of LSF for Mobile Environment</td>
<td>338</td>
</tr>
<tr>
<td><em>Sung-Joo Kim, Min-Seok Kim, and Ha-Jin Yu</em></td>
<td></td>
</tr>
<tr>
<td>Voice/Non-Voice Classification Using Reliable Fundamental Frequency Estimator for Voice Activated Powered Wheelchair Control</td>
<td>347</td>
</tr>
<tr>
<td><em>Soo-Young Suk, Hyun-Yeol Chung, and Hiroaki Kojima</em></td>
<td></td>
</tr>
<tr>
<td>MPEG-4 Scene Description Optimization for Interactive Terrestrial DMB Content</td>
<td>358</td>
</tr>
<tr>
<td><em>Kyung-Ae Cha and Kyungdeok Kim</em></td>
<td></td>
</tr>
</tbody>
</table>
### Track 6: Pervasive/Ubiquitous Computing and Sensor Network:

**Randomized Approach for Target Coverage Scheduling in Directional Sensor Network** ........................................... 379  
*Jian Wang, Changyong Niu, and Ruimin Shen*

**Efficient Time Triggered Query Processing in Wireless Sensor Networks** ......................................................... 391  
*Bernhard Scholz, Mohamed Medhat Gaber, Tim Dawborn, Raymes Khoury, and Edmund Tse*

**Dependable Geographical Routing on Wireless Sensor Networks** ................................................................. 403  
*Yue-Shan Chang, Ming-Tsung Hsu, Hsu-Hang Liu, and Tong-Ying Juang*

**Minimization of the Redundant Coverage for Dense Wireless Sensor Networks** ........................................... 415  
*Dingxing Zhang, Ming Xu, Shulin Wang, and Boyun Zhang*

### Track 7: Power-Aware Computing

**Improved Way Prediction Policy for Low-Energy Instruction Caches** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 425  
*Zhou Hongwei, Zhang Chengyi, and Zhang Mingxuan*

**Sleep Nodes Scheduling in Cluster-Based Heterogeneous Sensor Networks Using AHP** ......................................... 437  
*Xiaoling Wu, Jinsung Cho, Brian J. d'Auriol, and Sungyoung Lee*

**Energy-Efficient Medium Access Control for Wireless Sensor Networks** ........................................................ 445  
*Po-Jen Chuang and Chih-Shin Lin*

**Automatic Power Model Generation for Sensor Network Simulator** ............................................................... 453  
*Jaebok Park, Hyunwoo Joe, and Hyungshin Kim*

### Track 8: Real-Time Systems

**Situation-Aware Based Self-adaptive Architecture for Mission Critical Systems** ........................................... 464  
*Sangsoo Kim, Jiyong Park, Heeseo Chae, and Hoh Peter In*
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micromobility Management Enhancement for Fast Handover in HMIPv6-Based Real-Time Applications</td>
<td>Sungkuen Lee, Eallae Kim, Taehyung Lim, Seokjong Jeong, and Jinwoo Park</td>
<td>476</td>
</tr>
<tr>
<td>DVSMT: Dynamic Voltage Scaling for Scheduling Mixed Real-Time Tasks</td>
<td>Min-Sik Gong, Myoung-Jo Jung, Yong-Hee Kim, Moon-Haeng Cho, Joo-Man Kim, and Cheol-Hoon Lee</td>
<td>488</td>
</tr>
<tr>
<td>Real-Time Communications on an Integrated Fieldbus Network Based on a Switched Ethernet in Industrial Environment</td>
<td>Dao Manh Cuong and Myung Kyun Kim</td>
<td>498</td>
</tr>
<tr>
<td>Real-Time Traffic Packet Scheduling Algorithm in HSDPA System</td>
<td>Xiaodong Yu, Sung Won Kim, and Yong Wan Park</td>
<td>540</td>
</tr>
<tr>
<td>L4oprof: A System-Wide Profiler Using Hardware PMU in L4 Environment</td>
<td>Jugwan Eom, Dohun Kim, and Chanik Park</td>
<td>548</td>
</tr>
<tr>
<td>An Adaptive DVS Checkpointing Scheme for Fixed-Priority Tasks with Reliability Constraints in Dependable Real-Time Embedded Systems</td>
<td>Kyong Hoon Kim and Jong Kim</td>
<td>560</td>
</tr>
<tr>
<td>Energy-Efficient Fixed-Priority Scheduling for Periodic Real-Time Tasks with Multi-priority Subtasks</td>
<td>Zhigang Gao, Zhaohui Wu, and Man Lin</td>
<td>572</td>
</tr>
<tr>
<td>A C-Language Binding for PSL</td>
<td>Ping Hang Cheung and Alessandro Forin</td>
<td>584</td>
</tr>
</tbody>
</table>

**Track 9: Security and Dependability**

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut Sequence Set Generation for Fault Tree Analysis</td>
<td>Dong Liu, Weiyan Xing, Chunyuan Zhang, Rui Li, and Haiyan Li</td>
<td>592</td>
</tr>
<tr>
<td>Multilevel Pattern Matching Architecture for Network Intrusion Detection and Prevention System</td>
<td>Tian Song, Zhizhong Tang, and Dongsheng Wang</td>
<td>604</td>
</tr>
</tbody>
</table>
XVIII Table of Contents

Smart Actuator-Based Fault-Tolerant Control for Networked Safety-Critical Embedded Systems .......................... 615
Inseok Yang, Donggil Kim, Kyungmin Kang, Dongik Lee, and Kyungsik Yoon

KCT-Based Group Key Management Scheme in Clustered Wireless Sensor Networks ........................... 627
Huifang Chen, Hiroshi Mineno, Yoshitsugu Obashi, Tomohiro Kokogawa, and Tadanori Mizuno

A Secure Packet Filtering Mechanism for Tunneling over Internet ...... 641
Wan-Jik Lee, Seok-Yeol Heo, Tae-Young Byun, Young-Ho Sohn, and Ki-Jun Han

Track 10: Wireless Communication

An End-to-End Packet Delay Optimization for QoS in a MANET ...... 653
Sang-Chul Kim

Power Efficient Relaying MAC Protocol for Rate Adaptive Wireless LANs ............................................. 664
Jaeeun Na, Yeonkwon Jeong, and Joongsoo Ma

PHY-MAC Cross-Layer Design of Reliable Wireless Multicast Protocol with a Case Study of MB-OFDM WPAN ....... 676
Jaeeun Na, Cheolgi Kim, and Joongsoo Ma

An Adaptive Multi-paths Algorithm for Wireless Sensor Networks ...... 686
Zhendong Wu and Shanping Li

Distributed Self-Pruning(DSP) Algorithm for Bridges in Clustered Ad Hoc Networks .................................. 699
Seok Yeoil Yun and Hoon Oh

Chaotic Communications in MIMO Systems .................................. 708
Karuna Thapaliya, Qinghai Yang, and Kyung Sup Kwak

A QoS Provisioning MAC Protocol for IEEE 802.11 WLANs .......... 718
Hu Zhengbing and Han Xiaomin

A Leader Election Algorithm Within Candidates on Ad Hoc Mobile Networks ....................................... 728
SungSoo Lee, Rahman M. Muhammad, and ChongGun Kim

An Improvement of TCP Downstream Between Heterogeneous Terminals in an Infrastructure Network ............ 739
Yong-Hyun Kim, Ji-Hong Kim, Youn-Sik Hong, and Ki-Young Lee
Intra Routing Protocol with Hierarchical and Distributed Caching in Nested Mobile Networks ............................................. 747
   Hyemee Park, Moonseong Kim, and Hyunseung Choo

Performance Analysis of 802.11e Burst Transmissions with FEC Codes over Wireless Sensor Networks ........................................ 757
   Jong-Suk Ahn, Jong-Hyuk Yoon, and Young-Im Cho

Efficient Location Management Scheme for Inter-MAP Movement Using M/G/1 Multi-class Queues in Hierarchical MIPv6 ...................... 765
   Jonghyoun Choi, Teail Shin, and Youngsong Mun

A Scheme to Enhance TEBU Scheme of Fast Handovers for Mobile IPv6 ............................................................ 773
   Seonggeun Ryu and Youngsong Mun

Network-Adaptive Selection of Transport Error Control (NASTE) for Video Streaming over Embedded Wireless System ...................... 783
   SungTae Moon and JongWon Kim

An Energy-Efficient and Traffic-Aware CSMA/CA Algorithm for LR-WPAN ............................................................... 791
   JunKeun Song, SangCheol Kim, HaeYong Kim, and PyeongSoo Mah

Packet Interference and Aggregated Throughput of Bluetooth Piconets in a Ubiquitous Network ............................................ 800

Jitter Distribution Evaluation and Suppression Method in UWB Systems .............................................................. 810
   Weihua Zhang, Hanbing Shen, Zhiquan Bai, and Kyung Sup Kwak

An Analyzer of the User Event for Interactive DMB .............................................................. 818
   Hlaing Su Khin and Sangwook Kim

Author Index ................................................................................................................. 827