

# **Wireless Multimedia over IP: Technologies and Applications ( B3 )**

## **Summary**

With the fast development and natural convergence of Internet, wireless and multimedia technologies, wireless multimedia over IP providing a variety of applications and services has been an important trend for communication technologies with many technical challenges and very high potential. The huge volume of data and intensive computation requirements necessary for multimedia information processing integrated with such problems as the transmission fading, dynamically available bandwidth and power and high bit error rates and packet loss rates inevitable for wireless networks have created plenty of research issues to be investigated. This subproject includes four major subjects:

- (1) improved transmission technologies for wireless communications
- (2) video analysis, segmentation and processing
- (3) video streaming under wireless environment
- (4) content-based multimedia information retrieval under wireless environment

where some improved technologies for OFDM, a mainstream technology for wireless communications, is proposed in (1), and some fundamental technology for video processing useful for streaming and retrieval are developed in (2). (3) is focused on scalability and error correction/concealment/resilience for video transmission so as to take care of the dynamic bandwidth/power and high bit error rates of wireless networks, so as to achieve smooth and continuous multimedia communications in the wireless networks, (4) is to help the users to retrieve under wireless environment the desired multimedia information out of the huge volume of information over the networks.

In conclusion, the research effects in 2001 resulted in fruitful publications including 42 international journal papers (published: 26, accepted: 6, submitted: 10), and 71 international conference papers (published: 51 submitted, accepted: 4, submitted: 16). Below are the publication list for 2001 and the reprints of the published papers.

## Publication List ( 2001 )

### 1. International Journals

#### Published and Accepted

- [1] Y.P.Lin and S.M.Phoong, " ISI free FIR Filterbank Transceivers for Frequency-Selective Channels, " IEEE Trans. Signal Processing, pp. 2648-2658, Nov.2001.
- [2] Y.P.Lin and S.M.Phoong, "Optimal ISI-Free DMT Transceivers for Distorted Channels with Colored Noise, " IEEE Trans. Signal Processing, pp.2702-2712,Nov.2001.
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- [4] S.C.Pei and P.H.Wang, "Analytical Design of Maximally Flat FIR Fractional Hilbert Transformers, " Signal Processing, Vol.81, pp.643-661,2001.
- [5] S.C.Pei and C.C.Tseng, "A New Eigenfilter Based on Total Least Squares Error Criterion, " IEEE Trans. on Circuits and Systems, part I: Fundamental Theory and Applications, Vol.48, No.6, pp.699-709, June 2001.
- [6] S.C.Pei and P.H.Wang, "Closed-Form Design of Maximally Flat FIR Hilbert Transformers, Differentiators, and Fractional Delayers by Power Series Expansion, " to appear in IEEE Trans. on Circuits and Systems, Part I: Fundamental Theory and Applications, Vol.48, No.4, pp.389-398, April 2001.
- [7] S.C.Pei and J.J.Ding, "Two-Dimensional Affine Generalized Fractional Fourier Transform, " IEEE Trans. on Signal Processing, Vol.49, No.4, p.878-897, April 2001.
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- [12] J.F.Shen, T.C.Wang and L.G.Chen, " A Novel Low-Power Full-Search Block-Matching Motion-Estimation Design for H.263+, " IEEE Trans. on Circuits and Systems for Video Technology, Vol.11, No.7, pp.890-897, July 2001(SCI&EI).
- [13] P.C.Wu and L.G.Chen, "An efficient Architecture for Two-Dimensional Discrete Wavelet Transform, " IEEE Trans. on Circuits and Systems for Video Technology, Vol.11, No.4, pp.536-545, April 2001(SCI&EI).
- [14] Yi-Shin Tung, Ja-Ling Wu, His-Kang Tsao and Chi-Hui Huang, "A Highly Rate-Scalable System Based on MPEG-4 Spatial-Temporal-FGS Video Coding, " Advances in Automation, Multimedia and Video Systems, and Modern Computer Science, ISBN 960-8052-44-0, WSES Press, pp. 320-325.
- [15] Chien-Wu Tsai and Ja-Ling Wu, "Modified Symmetrical Reversible Variable-Length Code And Its Theoretical Bounds, " IEEE Transactions on Information Theory, Vol. 47, No. 6, pp. 2543-2548, Sept. 2001.
- [16] Chien-Wu Tsai and Ja-Ling Wu, "On Constructing the Huffman-Code-Based Reversible Variable-Length Codes, " IEEE Transactions on Communications, Vol. 49, No. 9, pp. 1506-1509, Sept. 2001.
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- [30] C.K.Chen, P.C.Tseng, Y.C.Chang and L.G.Chen, "A Digital Signal Processor with Programmable Correlator Array Architecture for 3rd Generation Wireless Communication System," *IEEE Trans. on Circuits and Systems II: Analog and Digital Signal Processing*, 2001(accepted).
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- [32] Fu-Chiang Chou, Chiu-Yu Tseng and Lin-shan Lee, "A Set of Corpus-based Text-to-speech Synthesis Technologies for Mandarin Chinese," to appear on *IEEE Transactions on Speech and Audio Processing*.

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- [1] S.M.Phoong and Y.P.Lin, "Factorization of Unimodular Filter Banks and Its Applications, " submitted to IEEE Trans. Signal Processing,2001.
- [2] Y.P.Lin and S.M.Phoong, "BER minimized Transceivers with Channel Independent Transmitter, " submitted to IEEE Trans. Communications,2001.
- [3] Yumin Lee and Jyh-Hau Chen, "The Effect of Channel Estimator Memory Mismatch on the Performance of MLSE in Wireless Data Communications, " submitted to IEEE Journal on Selected Areas in Communications.
- [4] Hsiao-Yong Chen and Yumin Lee, "Space-Time Adaptive Interference-Canceling Equalizer for W-CDMA With Known and Unknown Interference, " submitted to IEICE Transactions on Communications.
- [5] Yumin Lee and Pinchieh Huang, "Channel Interpolation and MMSE MIMO Frequency Domain DFE for Wireless Data Communications Using OFDM, " submitted to IEEE Journal on Selected Areas in Communications.
- [6] Chien-Wu Tsai, To-Ju Huang, Kuo-Ling Fang and Ja-Ling Wu, "A Hybrid and Flexible H.263-based Error Resilient and Testing System, " submitted to IEEE Transactions on Circuits and Systems for Video Technology.
- [7] C.L.Liu, C.C.Chen, Y.H.Wang, C.T.Yen and J.H.Chen. (2001) , "Brain Activation by Global Form with Different Local Element Configuration: An fMRI Study, " submitted to Nature .
- [8] Ching-Po Lin, Van J.Wedeen, Ching Yao, Jyh-Horng Chen and Wen-Yih Isaac Tseng, "Validation of Diffusion Tensor MRI and Diffusion Spectrum MRI with Registered Manganese-enhanced Optic Tracts and Phantom, " submitted to PNAS.
- [9] Wen-Yih Isaac Tseng, Ching-Po Lin, Jyh-Horng Chen and Van J. Wedeen, "Diffusion Spectrum Imaging of Complex Cortical Cytoarchitecture in Adult Rats, " submitted to Science .
- [10] Ding-Yun Chen, Ming Ouhyoung, Ja-Ling Wu , "A Shift-Resisting Public Audio Watermarking System," submitted to IEEE Trans. on Circuit and Systems for Video Technology.

## 2. International Conferences

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- [1] Y.P.Lin, Wei-Luan Weng and S.M.Phoong, "Block Based DMT Systems with Reduced Redundancy, " in Proc. Int. Conf. Acoust. Speech, Signal Processing, Salt Lake City, Utah, May 2001.
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- [6] K.F.Chen, C.J.Lian, H.H.Chen and L.G.Chen, "Analysis and Architecture Design of EBCOT for JPEG-2000, " IEEE International Symposium on Circuits and Systems 2001 (ISCAS 2001), Sydney, Australia, May 2001.
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- [10] Y.C.Chang, C.C.Huang, H.C.Chang, H.C.Fang and L.G.Chen, "Error-Propagation Analysis and Concealment Strategy for MPEG-4 Video Bitstream with Data Partitioning, " IEEE International Conference on Multimedia and Expo 2001 (ICME 2001), Tokyo, Japan, Aug. 2001.
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- [13] C.L.Liu, C.C.Chen, Y.H.Wang, C.T.Yen and J.H.Chen(2001) , "Brain Activation by Global Form with Different Local Element Configuration: An fMRI Study, " Society For Neuroscience 31th Annual Meeting, 2001.
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## Submitted

- [1] Y.P.Lin and S.M.Phoong, "Block Based Time Division Multiplexers for Wireless Transmission, " submitted to Int. Conf. Acoust. Speech, Signal Processing, 2002.
- [2] S.M.Phoong and Y.P.Lin, "Optimal Transform for Colored Noise Suppression, " submitted to Int. Conf. Acoust. Speech, Signal Processing, 2002.
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