

References

Chapter 1

Multimedia Communications

- [1.1] H.H. Moutafah, "Multimedia communications: an overview," *IEEE Comm. Magazine*, vol.30, pp:18-19, May 1992.
- [1.2] R.R.V. Cox et al., "On the applications of multimedia processing to communications," *Proc. of the IEEE*, vol.86, pp.755-824, May 1998.
- [1.3] J.R. Rosenberg et al., "Multimedia communications for users," *IEEE Comm. Magazine*, vol.30, pp:20-36, May 1992.
- [1.4] Z.Z.S. Bjokovic, "Multimedia communication system modeling, standardization, requirements," in *Proc. Int. Conference on Multimedia Technology and Digital Telecommunication Services*, (COMPT'96), pp.5-13, Budapest, (Hungary), Oct. 1996.
- [1.5] L.L. Wolf, C. Grwaldz and R. Steinmetz, "Multimedia communication," *Proc. of the IEEE*, vol.85, pp:1915-1933, Dec. 1997.
- [1.6] Z.Z.S. Bjokovic, "Image decomposition and compression in digital multimedia systems," in *Proc. IX Int. Conference on Signal Processing Applications and Technology, ICSPAT'95*, pp.940-944, Boston, MA, USA, Oct. 1995.
- [1.7] R.R. Steinmetz and K.K. Nahrstedt, *Multimedia Computing, Communications and Applications*, Englewood Cliffs, NJ: Prentice-Hall, July 1995.
- [1.8] A.A. Hoshi et al., "An integrated multimedia desktop communication and collaboration platform for broadband ISDN," *Proc. IEEE Multimedia'92*, pp.28-37, April 1992.
- [1.9] A.A. Watabe et al., "Distributed desktop conferencing system with multimedia interface," *IEEE J. Selected Areas in Comm.*, vol.9, pp.531-539, May 1991.
- [1.10] K.R.R. Rao and Z.S. Bjokovic, "Packet video communications over ATM networks," Upper Saddle River, NJ: Prentice-Hall PTR, 2000.
- [1.11] E.E. Fouques, "Switching and routing providing value with multimedia services," *Alcatel Telecomm. Review*, pp.198-204, 3rd quarter 1999.
- [1.12] A.A. Lazar et al., "MASONET: Columbia's integrated network testbed," *IEEE J. Selected Areas in Comm.*, vol.11, pp.859-871, Nov. 1993.
- [1.13] P.P. Goriet, "Fast packet approach to integrated broadband networks," *Networks*, vol.9, pp.292-298, Dec. 1986.
- [1.14] J. S. Sidron and J.S. Gopal, "PRISA: An approach to integrated high speed private networks," *Int. J. Digital Analog Cable Syst.*, vol.1, pp.77-85, 1988.
- [1.15] L.K. Chiang et al. and K. Oguzier, "System considerations for picture communication," in *Proc. ICC'84*, pp.245-249, Amsterdam, May 1984.

- [1.16] Z.S.Bojkovic, "Some issues in packet video: modeling, coding and compression," *2nd Int. Workshop on Image and Signal Processing: Theory, Methodology, Systems and Applications*, pp.2-23, Budapest, Hungary, Nov. 1995.
- [1.17] Z.S.Bojkovic, "Recent trends in packet video transmission on ATM networks," in *Proc. Basis of Electronics Workshop '94*, pp.17-105, Cluj, Romania, Oct. 1994.
- [1.18] G.Karlsson, *Asynchronous transfer of video*, Swedish Institute of Computer Science (SICS), Research report R95:14, Kist, Sweden, 1997.
- [1.19] G.Karlsson, "ATM adaptation for video," in *Proc. of 6th Int. Workshop on Packet Video*, pp.E.3.1-5, Portland, OR, 1994.
- [1.20] P.White and J.Growerof, "The integrated services in the Internet: State of the art," *Proc. of the IEEE*, vol.85, pp.1934-1946, Dec. 1997.
- [1.21] Z.S.Bojkovic, "Digital HDTV system compression," *J. on Comm.*, vol.45, pp.2-10, May-June 1994.
- [1.22] U.Black, *ATM: Foundation for broadband networks*, Englewood Cliffs, NJ: Prentice Hall, 1995.
- [1.23] J.Hecke, "Statistical multiplexing gain for variable bit rate video codecs in ATM networks," *Int. J. Digital Analog Comm. Systems*, vol.4, pp.261-268, 1991.
- [1.24] E.Binder and B.Schaffer, "Vision O.N.E.-optimized network evolution: an architecture for the evolution of public communication networks into the universal broadband ISDN," *Telecom. Rep. Int.* vol.14, pp.12-19, 1991.

Chapter 2

Audio-Visual Integration

- [2.1] T.Chen and R.R.Rao, "Audio-visual integration in multimodal communication," *Proc. IEEE*, vol.86, pp.837-852, May 1998.
- [2.2] L.R.Rabiner and B.H.Juang, *Fundamentals of speech recognition*, Englewood Cliffs, New Jersey: Prentice Hall, 1993.
- [2.3] L.R.Rabiner, B.H.Juang and C.H.Lee, "An overview of automatic speech recognition," *Automatic speech and speaker recognition, advanced topics*, C.H.Lee, F.K.Soong and K.K.Paliwal, Eds., Norwell, Massachusetts: Kluwer, pp.1-30, 1996.
- [2.4] E.Levin and R.Pieraccini, "CHRONUS, the next generation," in *Proc. ARPA Spoken Language Systems Technology Workshop*, pp.269-271, Austin, TX, 1995.
- [2.5] S.Morishima, K.Aizawa and H.Harashima, "An intelligent facial image coding driven by speech and phoneme," in *Proc. IEEE ICASSP'89*, pp.1795-1798, Glasgow, United Kingdom, 1989.
- [2.6] F.Lavagetto, "Converting speech into lip movements: A multimedia telephone for hard of hearing people," *IEEE Trans. Rehab. Eng.*, vol.3, pp.1-14, March 1995.
- [2.7] P.Griffin and H.Noot, "The FERSA project for lip-sync animation," *Lecture Notes Comput. Sci.*, vol.1024, pp.528-529, 1995.
- [2.8] S.Voran and S.Wolf, "Proposed framework for subjective audiovisual testing," *ANSI Working Group T1A1.5*, vol.T1A1.5, pp.93-151, Nov. 1993.
- [2.9] Bellcore, *Experimental combined audio/video subjective test method*, ITU-T Study Group 12, SGC/12-01, Feb.1994.
- [2.10] H.McGurk and J.MacDonald, "Hearing lips and seeing voices," *Nature*, pp.746-748, Dec. 1976.

- [2.11] R.D.Easton and M.Basala, "Perceptual dominance during lip reading," *Perception Psychophys.*, vol.32, pp.746-748, Dec. 1976.
- [2.12] D.Burnham and B.Dodd, "Auditory-visual speech perception as a direct process: The McGurk effect in infants and across languages," *Speechreading by humans and machines*, D.Stork and M.Hennecke, Eds., Berlin, Germany: Springer Verlag, pp.103-114, 1996.
- [2.13] K.Green, "The use of auditory and visual information in phonetic perception," *Speechreading by humans and machines*, D.Stork and M.Hennecke, Eds., Berlin, Germany: Springer Verlag, pp.55-77, 1996.
- [2.14] C.Fisher, "Confusions among visually perceived consonants," *J. Speech Hearing Res.*, vol.11, pp.796-804, 1968.
- [2.15] B.Dodd and R.Campbell, Eds., *Hearing by Eye: The psychology of lipreading*, London, England: Lawrence Erlbaum, 1987.
- [2.16] K.Neely, "Effect of visual factors on the intelligibility of speech," *J. Acoust. Soc. Amer.*, vol.28, pp.1275-1277, Nov. 1956.
- [2.17] B.Walden et al, "Effects of training on the visual recognition of consonants," *J. Speech Hearing Res.*, vol.20, pp.130-145, 1977.
- [2.18] K.Berger, *Speechreading: Principles and methods*, National Educational Press, Baltimore, Maryland, 1972.
- [2.19] A.P.Benguerel and M.Pichora-Fuller, "Coarticulation effects in lip reading," *J. Speech Hearing Res.*, vol.25, pp.600-607, 1982.
- [2.20] K.E.Finn and A.A.Montgomery, "Automatic optically-based recognition of speech," *Pattern Recognition Lett.*, vol.8, pp.159-164, March 1988.
- [2.21] B.P.Yuhas, M.H.Goldstein and T.J.Sejnowski, "Integration of acoustic and visual speech signals using neural networks," *IEEE Comm. Magazine*, vol.27, pp.65-71, Nov. 1989.
- [2.22] B.Carlson and M.Clements, "A projection-based likelihood measure for speech recognition in noise," *IEEE Trans. Speech and Audio Processing*, vol.2, pp.97-102, Jan. 1994.
- [2.23] K.Otani and T.Hasegawa, "The image input microphone - A new nonacoustic speech communication system by media conversion from oral motion images to speech," *IEEE J. Selected Areas in Comm.*, vol.13, pp.42-48, Jan. 1995.
- [2.24] P.Duchnowski et al., "Toward movement-invariant automatic lip reading and speech recognition," *Proc. IEEE ICASSP'95*, pp.109-122, 1995.
- [2.25] K.Waters and T.M.Levergood, *DECface: An automatic lip synchronization algorithm for synthetic faces*, DEC Cambridge Research Lab. Tech. Rep., Cambridge, MA, Sept. 1993.
- [2.26] G.Wolberg, *Digital image warping*, New York, New York: IEEE Press, 1990.
- [2.27] F.I.Parke, "Parameterized models for facial animation," *IEEE Comput. Graph. Application Magazine*, vol.12, pp.61-68, Nov. 1982.
- [2.28] M.Rudfalk, *CANDIDE: A parameterized face*, Linkoping Univ., Sweden, Rep. LITH-ISY-I-0866, Oct. 1987.
- [2.29] T.Chen, H.P.Graf and K.Wang, "Lip-synchronization using speech-assisted video processing," *IEEE Signal Processing Lett.*, vol.2, pp.57-59, Apr. 1995.
- [2.30] R.Rao and R.Mersereau, "On merging hidden Markov models with deformable templates," *Proc. IEEE ICIP'95*, pp.556-559, Washington, DC, Oct. 1995.

- [2.31]: ITU-T Draft Recommendation H.263, Version 2, H.263+ *Video coding for low bit rate communication*, Sept. 26, 1997.
- [2.32]: E. DiPietro, "Automatic lipreading to enhance speech recognition," in *Proc. IEEE (GLOBECOM)*, pp. 265-272, Atlanta, GA, Nov. 1984.
- [2.33]: K. Prasad, D. Stork and G. Wolf, *Preprocessing video images for neural learning of lipreading*, Ricoh California Research Center, Tech. Rep. CRC-TR-9326, Menlo Park, CA, Sept. 1993.
- [2.34]: C. Bregler and Y. K. Chou, "Eigenlips for robust speech recognition," *IEEE ICASSP94*, pp. 669-672, Adelaide, Australia, 1994.
- [2.35]: G. L. Chion and J. N. Hwang, "Lipreading from color video," *IEEE Trans. Image Processing*, vol. 6, pp. 1192-1195, Aug. 1997.
- [2.36]: E. Dubois and T. S. Huang, "Motion estimation," *IEEE Signal Processing Magazine*, vol. 5, pp. 35-40, March 1988.
- [2.37]: R. Chellappa and T. Chen, "Audio-visual integration in a multimodal communication," *IEEE Signal Processing Magazine*, vol. 14, pp. 37-38, July 1997.
- [2.38]: T. Chen and R. R. Rao, "Audio-visual interaction in multimedia communication," *IEEE ICASSP97*, vol. 1, pp. 179-182, Munich, Germany, April 1997.
- [2.39]: A. J. Viterbi and J. K. Omura, *Principles of digital communication and coding*, New York, New York: McGraw-Hill, 1979.
- [2.40]: P. L. Sibbe and A. C. Bovik, "Computer lipreading for improved accuracy in automatic speech recognition," *IEEE Trans. Speech and Audio Processing*, vol. 4, pp. 337-351, Sept. 1996.
- [2.41]: K. Maki and A. Pentland, "Automatic lipreading by optical flow analysis," *Systems Computer Japan*, vol. 22, pp. 67-76, Jan. 1991.
- [2.42]: M. Turk and A. Pentland, "Face recognition," *J. Cognitive Neurosci.*, vol. 3, pp. 71-86, Jan. 1991.
- [2.43]: L. D. Cohen and J. Cohen, "Finite element methods for active contour models and balloons for 2D and 3D images," *IEEE Trans. PAMI*, vol. 15, pp. 131-141, Nov. 1993.
- [2.44]: P. L. Sibbe, "Sensory integration in audiovisual automatic speech recognition," *Proc. 28th Asilomar Conf. Asilomar Conf.*, vol. 1, pp. 561-565, Pacific Grove, California, Nov. 1994.
- [2.45]: G. L. Chion and J. N. Hwang, "Image sequence classification using a neural network based active contour model and a hidden Markov model," *Proc. IEEE ICIP94*, vol. 3, pp. 926-930, Austin, Texas, Nov. 1994.
- [2.46]: S. Y. Kung and J. N. Hwang, "Neural networks for intelligent multimedia processing," *Proc. IEEE*, vol. 86, pp. 1244-1272, June 1998.
- [2.47]: B. P. Yeh et al., "Neural networks models for sensory integration for improved vowel integration," *Proc. IEEE*, vol. 78, pp. 658-668, Oct. 1990.
- [2.48]: P. Dutilleul, V. Meier and A. Waibel, "See me, hear me: Integrating automatic speech recognition and lipreading," *Proc. ICSP'95*, pp. 547-550, Yokohama, Japan, 1995.
- [2.49]: C. Bregler, S. M. Qutub and Y. Koenig, "A hybrid approach to bimodal speech recognition," *Proc. 28th Asilomar Conf. Signals, Systems and Computers*, pp. 572-577, Pacific Grove, California, Nov. 1994.
- [2.50]: H. Hermansky et al., "RASTA-RLP speech analysis technique," *Proc. IEEE ICASSP'92*, vol. 1, pp. 121-124, San Francisco, California, 1992.

- [2.51] M.R. Civanlar and T. Chén, "Password-free network security through joint use of audio and video," *Proc. SPIE Photonics East*, pp. 204-225, Nov. 1996.
- [2.52] J. Luetim, N.A. Thacker and S. Webb, "Speaker identification by lip reading," *Proc. Int. Conf. Spoken Language Processing*, pp. 62-65, Philadelphia, Pennsylvania, Oct. 1996.
- [2.53] P.E. Nikias, "Riding the new integrated media systems wave," *IEEE Signal Processing Magazine*, vol. 14, pp. 2-33, July 1997.
- [2.54] J. Niu and A. Hittawi, "Combined audio and visual streams analysis for video sequence segmentation," *Proc. IEEE ICASSP97*, vol. 4, pp. 2666-2668, Munich, Germany, April 1997.
- [2.55] Y. Wang et al., "Multimedia content classification using motion and audio information," *Proc. IEEE Int. Symp. Circuits and Systems*, pp. 488-491, Hsing Kong, Taiwan, 1997.
- [2.56] ISO/IEC Standard DIS 3818-4, "Generic coding of moving pictures and associated audio systems," April 1995.
- [2.57] C. Saracano and R.R. Tomandl, "Audio as a support to scene change detection and characterization of video sequences," *Proc. IEEE ICASSP97*, pp. 2587-2600, Munich, Germany, April 1997.
- [2.58] D.J. Delella, C.A. Fowler and M.G. Furler, "Audio-visual integration in perception of real words," *Perception Psychophys*, vol. 3, pp. 355-362, 1992.
- [2.59] S. Hekhti, *Multimedia and communication technology*, Stoneham, Massachusetts: Focal, 1996.
- [2.60] B. Shro et al., *Multimedia technology for multimedia applications: An introduction*, Prentice-Hall, New Jersey, IEEE Press, 1995.
- [2.61] L. Chiariglione, "The development of an integrated audio-visual coding standard: MPEG," *Proc. IEEE*, vol. 83, pp. 51-57, Feb. 1995.
- [2.62] K.R. Rao and P. Yip, *Discrete cosine transform: Algorithms, advantages, applications*, New York, New York: Academic Press, 1990.
- [2.63] K.R. Rao and J. Hwang, *Techniques and standards for image, video and audio coding*, Upper Saddle River, New Jersey: Prentice-Hall PTR, 1996.
- [2.64] B. Furth, "Multimedia systems: An overview," *IEEE Multimedia Magazine*, vol. 1, pp. 47-59, Spring 1994.
- [2.65] M. Balthar and R.D. Dretning, Eds., *Multimedia interface design*, Reading, Massachusetts: Addison-Wesley, 1991.
- [2.66] L.C. Wolf, *Resource management for distributed multimedia systems*, Boston, Massachusetts: Kluwer Academic, 1996.
- [2.67] L.C. Wolf and R. Steinmetz, "Concepts for resource reservation in advance," *J. Multimedia Tools & Applications*, vol. 4, pp. 255-278, May 1997.
- [2.68] P.N. Belhumeur and P. Heppanah and D.J. Kiegan, "Eigenfaces vs. Fisherfaces: Recognition using class-specific linear projection," *IEEE Trans. PAMI*, vol. 19, pp. 711-720, July 1997.
- [2.69] S.S. Muta and J. N. Hwang, "Robust speech recognition based on joint model and feature space optimization of hidden Markov models," *IEEE Trans. Neural Networks*, vol. 8, pp. 94-204, March 1997.
- [2.70] E.Y. Ht Seng, J. N. Hwang and F. S. Chan, "Three-dimensional object representation and invariant recognition using continuous distance transform neural network," *IEEE Trans. Neural Networks*, vol. 8, pp. 141-147, Jan. 1997.

- [2.71] E.Owens and B.Blazek, "Visemes observed by hearing-impaired and normal-hearing adult viewers," *J. Speech Hearing Res.*, vol.28, pp.381-393, Sept. 1985.

Chapter 3

Multimedia Processing in Communications

- [3.1] D.McLeod et al, "Integrated media systems," *IEEE Signal Processing Magazine*, vol.16, pp.33-43, Jan. 1999.
- [3.2] A.N.Venetsanopoulos and A.Dumitras, "Multimedia signal processing applications and systems," Invited keynote paper at *World Multiconference on Circuits, Systems, Communications and Computers*, Athens, Greece, July 2000.
- [3.3] A.Krikelis, "Multimedia signal processing architectures," *IEEE Concurrency*, vol.53, pp.5-7, July-Sept. 1997.
- [3.4] K.C.Pohlmann, *Principles of digital audio*, New York, NY: McGraw-Hill, 1995.
- [3.5] A.N.Netravali and B.G.Haskell, *Digital pictures*, New York: Plenum Press, 1998.
- [3.6] Z.S.Bojkovic et al, *Advanced topics in digital image compression*, Timisoara, Romania: Editing Politehnica, 1997.
- [3.7] N.Jayant, "High quality networking of audio-visual information," *IEEE Comm. Magazine*, vol.31, pp.84-95, Sept. 1993.
- [3.8] A.K.Jain, *Fundamentals of digital image processing*, Englewood Cliffs, NJ: Prentice Hall, 1989.
- [3.9] A.J.Viterbi and J.V.Omura, *Principles of digital communications and coding*, New York, NY: McGraw-Hill, 1997.
- [3.10] J.L.Mitchell et al, *MPEG video compression standard*, New York, NY: Chapman and Hall, 1996.
- [3.11] W.B.Pennebaker and J.L.Mitchell, *JPEG still image compression standard*, New York, NY: Van Nostrand Rheinhold, 1993.
- [3.12] N.Jayant, "Signal compression: Technology targets and research directions," *IEEE J. Selected Areas in Communications*, vol.10, pp.796-818, May 1992.
- [3.13] Z.Bojkovic, "Some issues in packet video: modeling, coding, compression," *2nd Int. Workshop on Image and Signal Processing: Theory, Methodology, Systems and Applications*, pp.2-23, Budapest, Hungary, Nov. 1995.
- [3.14] A.G.Tescher, "Multimedia is the message," *IEEE Signal Processing Magazine*, vol.16, pp.44-54, January 1999.
- [3.15] N.K.Bose, *Applied multidimensional systems theory*, New York, NY: Van Nostrand Rheinhold, 1982.
- [3.16] D.E.Dudgeon and R.M.Mersereau, *Multidimensional digital signal processing*, Englewood Cliffs, NJ: Prentice-Hall, 1984.
- [3.17] Y.S.Lim, *Two-dimensional signal and image processing*, Englewood Cliffs, NJ: Prentice-Hall 1990.
- [3.18] R.M.Mersereau, "The processing of hexagonally sampled two-dimensional signals," *Proc. of the IEEE*, vol.67, pp.930-979, June 1979.
- [3.19] T.S.Huang, "Two dimensional windows," *IEEE Trans. Audio Electroacust.*, vol.20, pp.88-90, Jan. 1972.

- [3.20] G.K.Rivard, "Direct fast Fourier transform of bivariate functions," *IEEE Trans. ASSP*, vol.25, pp.250-252, March 1977.
- [3.21] P.P.Vaidyanathan, *Multirate systems and filter banks*, Englewood Cliffs, NJ: Prentice Hall, 1993.
- [3.22] G.Sharma and R.Chellappa, "A model-based approach for the estimation of 2D maximum entropy power spectra," *IEEE Trans. Info. Theory*, vol.31, pp.90-99, Jan. 1985.
- [3.23] Y.Cafon, "High-resolution frequency wave number spectrum analysis," *Proc. of the IEEE*, vol.57, pp.1,408-1,418, Sept. 1969.
- [3.24] A.Zakhor and A.V.Oppenheim, "Reconstruction of two-dimensional signals from threshold crossings," *Proc. of the IEEE*, vol.78, pp.31-55, Jan. 1990.
- [3.25] M.I.Sezan, M.K.Ozkan and S.V.Forgeh, "Temporally adaptive filtering of noisy image sequences using robust motion estimation algorithms," *Proc. IEEE ICASSP*, vol.IV, pp.2,429-2,432, May 1991.
- [3.26] Y.T.Tse and R.L.Beker, "Global zoom/pan estimation and compensation for video compression," *Proc. IEEE ICASSP*, vol.IV, pp.2725-2728, May 1991.
- [3.27] C.Horne, "Improving block based motion estimation by the use of global motion," *SPIE* vol.2,094, pp.576-587, 1993.
- [3.28] H.C.Reeve and Y.S.Lim, "Reduction of blocking effects in image coding," *Optical Eng.*, vol.23, pp.34-37, Jan. 1984.
- [3.29] B.Ramamurthi and A.Gersho, "Nonlinear space-variant post-processing of block coded images," *IEEE Trans. ASSP*, vol.34, pp.1,258-1,268, Oct. 1986.
- [3.30] R.L.Stevenson, "Reduction of coding artifacts in transform image coding," *Proc. IEEE ICASSP*, vol.V, pp.401-404, April 1993.
- [3.31] L.Yan, "A nonlinear algorithm for enhancing low bit-rate coded motion video sequence," *Proc. IEEE ICASSP*, vol.II, pp.923-927, Nov. 1994.
- [3.32] Y.Yang, N.P.Galatsanos and A.K.Katsaggelos, "Iterative projection algorithms for removing the blocking artifacts of block-DCT compressed images," *Proc. IEEE ICASSP*, vol.V, pp.401-408, April 1993.
- [3.33] B.Macq et al., "Image visual quality restoration by cancellation of the unmasked noise," *Proc. IEEE ICASSP*, vol.V, pp.53-56, Nov. 1994.
- [3.34] T.Chen, "Elimination of subband-coding artifacts using the dithering technique," *Proc. IEEE ICASSP*, vol.II, pp.874-877, Nov. 1994.
- [3.35] W.Li, O.Egger and M.Kunt, "Efficient quantization of noise reduction device for subband image coding schemes," *Proc. IEEE ICASSP*, vol. IV, pp.2,209-2,212, Detroit, MI, May 1995.
- [3.36] T.Ebrahimi and M.Kunt, "Visual data compression for multimedia applications," *Proc. IEEE*, vol.86, pp.1,109-1,125, June 1998.
- [3.37] I.D.Markel and A.H.Gray, *Linear prediction of speech*, Berlin, Germany: Springer-Verlag, 1976.
- [3.38] B.S.Atal and S.L.Hanaker, "Speech analysis and synthesis by linear prediction of the speech wave," *J. Acoust. Soc. Amer.*, vol.50, pp.637-655, April 1971.
- [3.39] R.Bracewell, *The Fourier transform and its applications*, New York, NY: McGraw-Hill, 1986.
- [3.40] A.Buzo et al., "Speech coding based upon vector quantization," *IEEE Trans. ASSP*, vol.28, pp.562-574, Oct. 1980.

- [3.41] D.Y. Wang, B.H. Juang, and A.H. Gray, "An 8000-Bits/s vector quantization LPC vocoder," *IEEE Trans. ASSP*, vol.30, pp.770-780, Oct. 1982.
- [3.42] H. Duddley, "Phonetic pattern recognition vocoder for narrowband speech transmission," *J. Acoust. Soc. Amer.*, vol.30, pp.733-739, Aug. 1958.
- [3.43] B. Atal and M. Schroeder, "Predictive coding of speech and subjective error criteria," *IEEE Trans. ASSP*, vol.27, pp.247-254, June 1979.
- [3.44] J. Chen et al., "A low-delay CELP coder for the CCITT 16 Kbits/speech coding standard," *IEEE J. Selected Areas in Comm.*, vol.10, pp.830-849, May 1992.
- [3.45] ITU-T Recommendation G729, "Coding of speech at 8 kb/s using conjugate-structure algebraic code-excited linear prediction (CS-ACELP)," March 1996.
- [3.46] I.A. Gerson and M.A. Jasinski, "Vector sum excited linear prediction (VSELP)," in *Advances in speech coding*, Cüppersman and Gershow (Eds.), pp.67-79, Higham, Massachusetts: Kluwer Academic Publishers, 1991.
- [3.47] T. Hänninen et al., "Enhanced full rate coder for IS-636 digital cellular system," *Proc. IEEE ICASSP*, pp.731-734, Munich, Germany, 1997.
- [3.48] P. Kron, E.F. Deprettere, and R.H. Schuyter, "Regular pulse excitation: A novel approach to effective and efficient multipulse coding of speech," *IEEE Trans. ASSP*, vol.34, pp.1054-1068, 1986.
- [3.49] J.P. Campbell, V.C. Welch, and T.E. Termini, "The new 4800 bps voice coding standard," *Proc. Military Speech Tech.*, pp.64-70, 1989.
- [3.50] M.M. Sondhi, "A hybrid time-frequency domain articulatory speech synthesizer," *IEEE Trans. ASSP*, vol.35, pp.955-967, July 1987.
- [3.51] R. Sproat and J. Odia, "An approach to text-to-speech synthesis," in *Speech coding and synthesis*, Kleijn and Palivala (Eds.), pp.613-633, Amsterdam, The Netherlands: Elsevier, 1995.
- [3.52] E. Moulines and M. Wörhelst, "Time-domain and frequency domain techniques for prosodic modification of speech," in *Speech Coding and Synthesis*, Kleijn and Palivala (Eds.), pp.619-655, Amsterdam, The Netherlands: Elsevier, 1995.
- [3.53] M.M. Sondhi, D.R. Morgan, and J.L. Hill, "Stereo-phonic acoustic echo cancellation: An overview of the fundamental problem," *IEEE Signal Processing Letters*, vol.2, pp.48-51, Aug. 1995.
- [3.54] G. Weikik et al., "Adjustable filter for differential microphones," U.S. Patent 5,303,307, April 1994.
- [3.55] J.L. Flanagan et al., "Autodirective microphone systems," *Acoustics*, vol.73, pp.58-71, 1991.
- [3.56] M.M. Sondhi, "An adaptive echo canceller," *The Bell Systems Technical J.*, vol.6, pp.497-510, March 1967.
- [3.57] B.G. Htskoki, A. Puri, and A. Ntravali, *Digital video: an introduction to MPEG2*, Norwell, Massachusetts: Chapman and Hall, 1997.
- [3.58] A.M. Tekalp, *Digital video processing*, Englewood Cliffs (NJ): Prentice Hall, 1995.
- [3.59] A.J. Patti, M.J. Sezcan, and M. Tekalp, "Robust methods for high-quality stills from video in the presence of dominant motion," *IEEE Trans. CSVT*, vol.7, pp.328-342, May 1997.
- [3.60] R.R. Schultze and R.L. Stevenson, "Extraction of high-resolution frames from video sequences," *IEEE Trans. Image Processing*, vol.5, pp.999-1011, July 1996.
- [3.61] A.J. Patti, M.J. Sezcan, and M. Tekalp, "Super-resolution video reconstruction with arbitrary sampling lattices and non-zero aperture time," *IEEE Trans. Image Processing*, vol.6, pp.1064-1076, Aug. 1997.

- [3.62] H.J. Zhang, A. Kankanhalli and S.W. Smoliar, "Automatic partitioning of full-motion video," *Multimedia Systems*, vol.1, pp.10-28, Jan. 1993.
- [3.63] I.Y.A. Wang and E.H. Adelsbay, "Representing moving images by layers," *IEEE Trans. Image Processing*, vol.3, pp.625-638, April 1994.
- [3.64] G. Ahanger and T.D.C. Little, "A survey of technologies for parsing and indexing digital video," *J. Visual Comm. and Image Representation*, vol.7, pp.28-43, Jan. 1996.
- [3.65] B.L. Yeo and B.L. Liu, "Rapid scene analysis of compressed video," *IEEE Trans. CSVT*, vol.5, pp.533-544, Nov. 1995.
- [3.66] A. Aklonis and V. Chioumna, "A video tomography: an efficient method for camera work extraction and motion analysis," *ACM Multimedia 94*, pp.349-356, Oct. 1994.
- [3.67] Y.D. County, "Automatic video indexing via object motion analysis," *Pattern Recognition*, vol.30, pp.607-626, Sept. 1997.
- [3.68] A.N. Venetsanopoulos and A. Dimitras, "Multimedia signal processing applications and systems," Invited keynote paper at World Multiconference on Circuits, Systems, Communications and Computers, Athens, Greece, July 2000.
- [3.69] M. Souk, V. Hlavac and R. Byle, *Image processing, analysis and machine vision*, Norwell, Massachusetts: Chapman and Hall, 1993.
- [3.70] P. Raghun and Y. Yegnanarayana, "Segmentation of Gabor-filtered textures using deterministic relaxation," *IEEE Trans. Image Processing*, vol.5, pp.1,625-1,636, Dec. 1996.
- [3.71] R.M. Haralick, K. Shanmugam and J. Dinstein, "Textural features for image classification," *IEEE Trans. SMC*, vol.3, pp.610-621, Nov. 1973.
- [3.72] A. K. Kala and K. Karu, "Learning texture discrimination masks," *IEEE Trans. PAMI*, vol.18, pp.195-205, Feb. 1996.
- [3.73] J.P. Eakins, J.M. Bhandalan and M.E. Graham, "Similarity retrieval of trademark images," *IEEE Multimedia*, vol.5, pp.53-63, April-June 1998.
- [3.74] F.D. Aequi and P. Gamba, "Simplified model analysis and search for reliable shape retrieval," *IEEE Trans. CSVT*, vol.5, pp.654-666, Sept. 1998.
- [3.75] P.E. Trihanias, D. Karakas and A.N. Venetsanopoulos, "Directional filtering of color images: theory and experimental results," *IEEE Trans. Image Processing*, vol.5, pp.868-880, July 1996.
- [3.76] K. Plataniotis et al., "Color image processing using adaptive multichannel filters," *IEEE Trans. Image Processing*, vol.6, pp.938-949, July 1997.
- [3.77] K.B. Funderburg, "OCF: A new coding algorithm for high quality sound signals," *Proc. IEEE ICASSP*, pp.5.1.1-5.1.4, May 1987.
- [3.78] J. Johnston, "Transform coding of audio signals using perceptual noise criteria," *IEEE J. Selected Areas in Comm.*, vol.6, pp.114-123, Feb. 1988.
- [3.79] W.Y. Chan and A. Gersho, "High fidelity audio transform coding with vector quantization," *Proc. IEEE ICASSP*, pp.1,109-1,112, May 1990.
- [3.80] Y.F. Doherty et al., "A MUSKAM source coder for digital audio broadcasting and storage," *Proc. IEEE ICASSP*, pp.3, 605-3, 608, May 1991.
- [3.81] M. Iwazawa et al., "A 128 Kbit/s HIFI audio coder based on adaptive transform coding with adaptive block size MDCT," *IEEE J. Selected Areas in Comm.*, vol. 10, pp.138-144, Jan. 1992.

- [3.82] T.Painter and A.Spanias, "A review of algorithms for perceptual coding of digital audio signals," *Int. Conference on Digital Signal Processing*, vol.1, pp.175-208, Santorini, Greece, July 1997.
- [3.83] J.Johnston, "Perceptual transform coding of wideband stereo signals," *Proc. IEEE ICASSP*, pp.1,993-1,996, May 1989.
- [3.84] J.Zwislocki, "Analysis of some auditory characteristics," in *Handbook of Mathematical Psychology*, R.Luce et al, (Eds.), New York, NY: John Wiley, 1965.
- [3.85] B.Scharf, "Critical bands," in *Foundations of modern auditory theory*, New York, NY: Academic Press, 1970.
- [3.86] E.Zwicker and H.Fastl, *Psychoacoustic facts and models*, Berlin: Springer-Verlag, 1990.
- [3.87] J.Johnston, "Estimation of perceptual entropy using noise masking criteria," *Proc. IEEE ICASSP*, pp.2,524-2,527, May 1988.
- [3.88] H.Fletcher, "Auditory patterns," *Rev. Mod. Phys.*, pp.47-65, Jan. 1940.
- [3.89] N.Jayant et al, "Signal compression based on model of human perception," *Proc. IEEE*, vol.81, pp.1,385-1,422, Oct. 1993.
- [3.90] P.Noll, "Wideband speech and audio coding," *IEEE Comm. Magazine*, vol.31, pp.34-44, Nov. 1993.
- [3.91] N.Jayant and P.Noll, *Digital coding of waveforms*, Englewood Cliffs, NJ: Prentice-Hall, 1984.
- [3.92] Y.Mahieux et al, "Transform coding of audio signals using correlation between successive transform blocks," *Proc. IEEE ICASSP*, pp.2021-2024, May 1989.
- [3.93] Y.Mahieux and J.Petit, "Transform coding of audio signals at 64 Kbits/s," *Proc. IEEE GLOBECOM*, pp.405.2.1-405.2.5, Nov. 1990.
- [3.94] ISO/IEC JTC1/SC29/WG11 MPEG IS13813-3, *Information technology-generic coding of moving pictures and associated audio, Part3: Audio, MPEG-2*, 1994.
- [3.95] K.Brandenburg and J.D.Johnston, "Second generation perceptual audio coding: the hybrid vocoder," *Proc. 88th Conv. Aud. Eng. Soc.*, reprint #2937, March 1990.
- [3.96] M.Paraskevas and J.Mourjopoulos, "A differential perceptual audio coding method with reduced bitrate requirements," *IEEE Trans. ASSP*, vol.43, pp.490-503, Nov. 1995.
- [3.97] D.Schulz, "Improving audio codecs by noise substitution," *J. Audio. Eng. Soc.*, pp.593-598, July/Aug. 1996.
- [3.98] W.Y.Chan and A.Gersho, "Constrained-storage vector quantization in high fidelity audio transform coding," *Proc. IEEE ICASSP*, pp.3,597-3,600, May 1991.
- [3.99] J.Princen and A.Bradley, "Analysis/synthesis filter bank design based on time domain aliasing cancellation," *IEEE Trans. ASSP*, vol.34, pp.1,153-1,161, October 1986.
- [3.100] N.Iwakani et al, "High-quality audio coding at less than 64 Kb/s by using transform-domain weighted interleave vector quantization (TWINVQ)," *Proc. IEEE ICASSP*, pp.3,095-3,098, May 1995.
- [3.101] T.Moriya et al, "Extension and complexity reduction of TWIN VQ audio coder," *Proc. IEEE ICASSP*, pp.1,029-1,032, May 1996.
- [3.102] P.Duhamel et al, "A fast algorithm for the implementation of filter banks based on time-domain aliasing cancellation," *Proc. IEEE ICASSP*, pp.2,209-2,212, May 1991.
- [3.103] J.W.Woods and S.D.O'Neil, "Subband coding of images," *IEEE Trans. ASSP*, vol.34, pp.1,278-1,288, Oct. 1986.

- [3.104] P.P.Vaidyanathan, *Multirate systems and filter banks*, Englewood Cliffs, NJ: Prentice-Hall, 1993.
- [3.105] P.H.Westerink, Y.Biemond and D.E.Boeke, "Evaluation of image subband coding scheme," *EUSIPCO'88*, pp.1,149-1,152, Grenoble, France, Sep. 1988.
- [3.106] R.M.Gray and D.L.Neuhoﬀ, "Quantization," *IEEE Trans. Info. Theory.*, vol.44, pp.1-63, Oct. 1998.
- [3.107] P.Voros, "High-quality sound coding within 2x64 Kb/s using instantaneous dynamic bit allocation," *Proc. IEEE ICASSP*, pp.2,536-2,539, May 1988.
- [3.108] A.Charbonnier and J.P.Petit, "Subband ADPCM coding for high quality audio signals," *Proc. IEEE ICASSP*, pp. 2,540-2,543, May 1988.
- [3.109] R.N.J.Veldhuis, "Subband coding of digital audio signals without loss of quality," *Proc. IEEE ICASSP*, pp.2,009-2,012, May 1989.
- [3.110] D.Teh et al, "Subband coding of high-fidelity quality audio signals at 128 Kbps," *Proc. IEEE ICASSP*, pp.II.197-200, May 1990.
- [3.111] I.Daubechies, *Ten lectures on wavelets*, Philadelphia, Pennsylvania: Society for Industrial and Applied Mathematics, 1992.
- [3.112] D.Sinha and A.H.Tewfik, "Low bit rate transparent audio compression using a dynamic dictionary and optimized wavelets," *Proc. IEEE ICASSP*, pp.I-197-200, May 1993.
- [3.113] D.Sinha and A.H.Tewfik, "Low bit rate transparent audio compression using adapted wavelets," *IEEE Trans. Signal Proc.*, vol.41, pp.3,463-3,479, Dec. 1993.
- [3.114] A.H.Tewfik and M.Ali, "Enhanced wavelet based audio coder," *Conf. Rec. of the 27th Asilomar Conf. on Signals, Systems and Computers*, pp.896-900, Pacific Grove, California, Nov. 1993.
- [3.115] K.Hamdy et al, "Low bit rate high quality audio coding with combined harmonic and wavelet representations," *Proc. IEEE ICASSP*, pp.1,045-1,048, May 1996.
- [3.116] M.Black and M.Zeytinoglu, "Computationally efficient wavelet packet coding of wideband stereo audio signals," *Proc. IEEE ICASSP*, pp.3,075-3,078, May 1995.
- [3.117] P.Kudimakis and M.Sandler, "On the performance of wavelets for low bit rate coding of audio signals," *Proc. IEEE ICASSP*, pp.3,087-3,090, May 1995.
- [3.118] P.Kudumakis and M.Sandler, "On the compression obtainable with four-tap wavelets," *IEEE Signal Processing Let.*, vol.10, pp.231-233, Aug. 1996.
- [3.119] S.Boland and M.Derichle, "High quality audio coding using multipulse LPC and wavelet decomposition," *Proc. IEEE ICASSP*, pp.3067-3069, May 1995.
- [3.120] S.Boland and M.Derichle, "Audio coding using the wavelet packet transform and a combined scalar vector quantization," *Proc. IEEE ICASSP*, pp.1,041-1,044, May 1996.
- [3.121] R.V.Cox et al, "On the applications of multimedia processing to communications," *Proc. IEEE*, vol.86, pp.755-824, May 1998.
- [3.122] M.Markovic and Z.S.Bojkovic, "On speech compression standards in multimedia videoconferencing: implementation aspects," *Int. Workshop on Image and Signal Processing IWISP'96*, pp.541-544, Manchester, UK, Nov. 1996.
- [3.123] A.N.Netravali and B.G.Haskell, *Digital pictures-representation, compression and standards*, New York, NY: Plenum Press, 1995.
- [3.124] H.M.Hang and J.W.Woods, *Handbook of visual communications*, New York, NY: Academic Press, 1995.
- [3.125] ITU-T Recomm. H.261, *Video codec for audiovisual services at px64 Kb/s*, March 1993.

- [3.126] ITU-T Recomm. H.263, *Video coding for low bit rate communications*, March 1996.
- [3.127] K.R. Rikse, "H.263: Video coding for low-bit-rate communications," *IEEE Trans. Comm.*, vol. 34, pp. 42-45, Dec. 1996.
- [3.128] ISO/IEC IS11172 (MPEG-1), *Information technology-coding of moving pictures and associated audio for digital storage media up to about 1.5 Mb/s*, 1993.
- [3.129] V.A. Puri, "Video coding using the MPEG-2 compression standard," *SPIE/VOLIP*, Boston, MA, pp. 11701-11713, Nov. 1993.
- [3.130] T. Honna, *MPEG contribution: Report of the adhoc group on MPEG-2 applications for multi-view point pictures*, ISO/IEC SC29/WG11 Doc: 861, March 1995.
- [3.131] J. Nji, T. Mang and D.H.K. Tsang, "CBR transportation on VBR MPEG-2 video traffic for video-on-demand in ATM networks," *Proc. IEEE ICC*, pp. 1391-1395, Dallas, TX, June 1996.
- [3.132] B.L. Tseng and D. Anastassiou, "Multiview-point video coding with MPEG-2 compatibility," *IEEE Trans. CSVT*, vol. 6, pp. 414-419, Aug. 1996.
- [3.133] K.R. Rao and P. Yip, *Discrete cosine transform: algorithms, advantages, applications*, New York, NY: Academic Press, 1990.
- [3.134] B. Girod et al., "Image and video coding," *IEEE Signal Processing Magazine*, vol. 15, pp. 40-48, March 1998.
- [3.135] M. Shapiro, "Embedded image coding using zerotrees of wavelet coefficients," *IEEE Trans. Signal Processing*, vol. 41, pp. 3, 445-3,462, Dec. 1993.
- [3.136] A. Said and M.W. Pearlman, "Image compression using the spatial orientation tree," *Proc. IEEE ISCAS*, pp. 279-282, Chicago, IL, 1993.
- [3.137] K.R. Horn, T. Wiegand and B. Girod, "Bit allocation methods for closed-loop coding of oversampled pyramid decomposition," *Proc. IEEE ICIP*, pp. 17-20, Santa Barbara, CA, 1997.
- [3.138] ISO/IEC 13818, *Generic coding of moving pictures and associated audio information (Part 2: Video)*, Geneva 1996.
- [3.139] M. Orchard and G.J. Sullivan, "Overlapped block motion compensation: an estimation-theoretic approach," *IEEE Trans. Image Processing*, vol. 3, pp. 693-699, Sept. 1994.
- [3.140] B. Girod, "Motion-compensation prediction with fractional-pel accuracy," *IEEE Trans. Comm.*, vol. 41, pp. 604-612, May 1993.
- [3.141] B. Girod, "Rate-constrained motion estimation," in *Visual Comm. and Image Proc. VCIP'94*, A.A. Katsaggelos, (Ed.), Proc. SPIE 2308, pp. 1,026-1,034, 1994.
- [3.142] D.R. Stinson, *Cryptophysics: theory and practice*, Boca Raton, Florida: CRC Press, 1995.
- [3.143] L.T. Cox et al., *Secure spread spectrum watermarking for multimedia*, Tech Report, NEC Research Institute, no. 95-10, p. 11, 1995.
- [3.144] M.W. Bender et al., "Techniques for data hiding," *IBM Systems Journal*, vol. 35, pp. B13-336, 1996.
- [3.145] M. Swanson, B. Zhu and A.H. Tewfik, "Data hiding for video in video," *Proc. IEEE ICIP*, vol. III, pp. 676-679, Santa Barbara, California, Oct. 1997.
- [3.146] M. Swanson, M. Kobayashi and A.H. Tewfik, "Multimedia data-embedding and watermarking technologies," *Proc. IEEE*, vol. 86, pp. 1,064-1,087, June 1998.
- [3.147] N. Jayanti, J. Johnston and R. Safranek, "Signal compression based on models of human perception," *Proc. IEEE*, vol. 81, pp. F385-F,422, Oct. 1993.

- [3.148] A. Piva et al., "DCT-based watermark extraction without resorting to the uncorrupted original image," *Proc. IEEE ICIP*, vol. 1, pp. 520-523, Santa Barbara, CA, Oct. 1997.
- [3.149] J. C. Ruanaidh and T. Pun, "Rotation, scale and translation invariant digital image watermarking," *Proc. IEEE ICIP*, vol. 1, pp. 536-539, Santa Barbara, CA, Oct. 1997.
- [3.150] D. Kundan and D. Hatzinakos, "A robust digital image watermarking method using wavelet-based fusion," *Proc. IEEE ICIP*, vol. 1, pp. 544-547, Santa Barbara, CA, Oct. 1997.
- [3.151] X. G. Xia, C. G. Boudelle and G. R. Arce, "A multiresolution watermark for digital images," *Proc. IEEE ICIP*, vol. 1, pp. 548-551, Santa Barbara, CA, Oct. 1997.
- [3.152] J. C. Ruanaidh, W. Dowling and R. Boland, "Watermarking digital images for copyright protection," *IEEE Proc. Vision, Image and Signal Processing*, vol. 143, pp. 250-256, Aug. 1996.
- [3.153] L. T. Cox et al., "Secure spread spectrum watermarking for multimedia," *IEEE Trans. Image Processing*, vol. 6, pp. 1, 673-1, 687, Dec. 1997.
- [3.154] J. C. Ruanaidh, W. Dowling and R. Boland, "Phase watermarking of digital images," *Proc. IEEE ICIP*, vol. III, pp. 232-242, Sept. 1996.
- [3.155] C. P. Rodhechuk and E. D. Delo, "Digital watermarking: algorithms and applications," *IEEE Signal Processing Magazine*, vol. 18, pp. 33-46, July 2001.
- [3.156] C. T. Hsu and J. B. Wu, "Hidden signature in images," *Proc. IEEE ICIP*, vol. III, pp. 223-226, Sept. 1996.
- [3.157] ISO/IEC JTC1/SC29/WG11 Doc. N5804, "Application domains for watermarking standards," March 2000.
- [3.158] M. Sidi Ahmed, *Image processing*, Tokyo, Japan: McGraw-Hill, 1995.
- [3.159] A. Dumitras, "State-of-the-art and trends in content-based access and manipulation of visual data," Technical Report, National Research Council of Canada, Dec. 1998.
- [3.160] B. B. Erol, A. Dumitras and K. Kossentini, "Emerging MPEG standards: MPEG-4 and MPEG-7," *Handbook of Image and Video Processing*, (A. B. Bovik, Ed.), Orlando, Florida: Academic Press, 2000.
- [3.161] X. Lee, Y. Q. Zhang and A. Leon-Garcia, "Information loss recovery for block-based image coding techniques: a fuzzy logic approach," *IEEE Trans. Image Processing*, vol. 4, pp. 252-273, March 1995.
- [3.162] M. Ghanbari and G. J. Hughes, "Packing coded video signals into ATM cells," *Trans. Networking*, vol. 1, pp. 505-509, October 1993.
- [3.163] S. Y. Kung, *Digital neural networks*, Englewood Cliffs, NJ: Prentice-Hall, 1993.
- [3.164] M. Arbib, *The handbook of brain theory and neural networks*, Cambridge, Massachusetts: MIT Press, 1995.
- [3.165] B. Rodhechuk, V. R. Man and E. Kerchhoffs, "Analysis of facial expressions with artificial neural networks," *European Simulation Multiconference*, Prague, Czech Republic, pp. 790-794, June 1995.
- [3.166] V. S. Shostri, L. C. Rabelo and E. Ojeyave, "Device-independent color correction for multimedia applications using neural networks and inductive modeling approaches," *IEEE Int. Conference on Neural Networks*, pp. 2, 176-2, 181, Washington, DC, June 1996.
- [3.167] R. Rish et al., "Interactive information visualization for exploratory intelligence data analysis," *Proc. of IEEE 1996 Virtual Reality Annual Int. Symposium*, pp. 230-238, Santa Clara, CA, April 1996.

- [3.168] E.Andre, G.Herzog and T.Rist, "From visual data to multimedia presentations," *IEEE Colloquium Grounding Representations: Integration of Sensory Information in Natural Language Processing, Artificial Intelligence and Neural Networks*, pp.1:1-3, May 1995.
- [3.169] K.Langer and F.Bodendorf, "Flexible user-guidance in multimedia CBT-applications using artificial neural networks and fuzzy logic," *Proc. Int. ICSC Symposia on Intelligent Industrial Automation and Soft Computing*, pp.B9-13, March 1996.
- [3.170] T.Mandl and H.C.Womser, "Soft computing-vague query handling in object oriented information systems," *Proc. HIM'95 (Hypertext-Information Retrieval-Multimedia)*, pp.277-291, Konstanz, Germany, April 1995.
- [3.171] Y.H.Tseng, J.N.Hwang and F.Sheehau, "Three-dimensional object representation and invariant recognition using continuous distance transform neural networks," *IEEE Trans. Neural Networks, Special Issue on Pattern Recognition*, vol.8, pp.141-147, Jan. 1997.
- [3.172] G.I.Chiou and J.N.Hwang, "Image sequence classification using a neural network based active contour model and a hidden Markov model," *Proc. IEEE ICIP*, vol.II, pp.926-930, Austin, Texas, Nov. 1994.
- [3.173] Y.Matsuyama and M.Tan, "Multiple descent competitive learning as an end for multimedia image processing," *Proc. of Joint Int. Conference on Neural Networks*, pp.2,061-2,064, Oct. 1993.
- [3.174] T.Chen and R.R.Rao, "Audio-visual interaction in multimedia communication," *Proc. IEEE ICASSP*, vol.I, pp.179-182, Munich, Germany, April 1997.
- [3.175] A.Pedolti, G.Ferigno and M.Redolfi, "Neural networks in multimedia speech recognition," *Proc. of the Int. Conference on Neural Networks and Expert Systems in Medicine and Healthcare*, pp.167-173, Plymouth, UK, Aug. 1994.
- [3.176] Y.Nakagawa, E.Hirote and W.Pedrycz, "The concept of fuzzy multimedia intelligent communication system," *Proc. of the Fifth IEEE Int. Conference on Fuzzy Systems*, pp.1,476-1,480, New Orleans, LA, Sep. 1996.
- [3.177] C.Fan, N.Namazi and P.Penafiel, "New image motion estimation algorithm based on the EM technique," *IEEE Trans. PAMI*, vol.18, pp.348-352, March 1996.
- [3.178] Y.K.Chen, Y.Lin and S.Y.Kung, "A feature tracking algorithm using neighborhood relaxation with multi-candidate pre-screening," *Proc. IEEE ICIP*, vol.II, pp.513-516, Lausanne, Switzerland, Sept. 1996.
- [3.179] S.Y.Kung and J.N.Hwang, "Neural networks for intelligent multimedia processing," *Proc. of the IEEE*, vol.86, pp.1,244-1,272, June 1998.
- [3.180] I.J.Cox, J.Ghosh and P.Yianilos, *Feature-based face recognition using distance*, Tech. Report 95-09, NEC Research Institute, Princeton, NJ, 1995.
- [3.181] S.H.Lin, Y.Chan and S.Y.Kung, "A probabilistic decision-based neural network for location of deformable objects and its applications to surveillance system and video browsing," *Proc. IEEE ICASSP*, pp.3,554-3,557, Atlanta, GA, May 1996.
- [3.182] T.S.Huang et al, "A neuronet approach to information fusion," *Proc. IEEE First Workshop on Multimedia Signal Processing*, pp.45-50, Princeton, NJ, June 1997.
- [3.183] H.H.Yu and W.Wolf, "A hierachical, multi-resolution method for dictionary-driven content-based image retrieval," *Proc. IEEE ICIP*, pp.823-826, Santa Barbara, CA, Oct. 1997.
- [3.184] S.H.Lin, S.Y.Kung and L.J.Lin, "Face recognition/detection by probabilistic decision-based neural networks," *IEEE Trans. Neural Networks*, vol.8, pp.114-132, Jan. 1997.

- [3.185] Z.S.Bojkovic, D.A.Milovanovic and N.Mastorakis, "Neural networks applications for multimedia processing," *Proc. of 5th Seminar on Neural Network Applications in Electrical Engineering*, pp.87-91, Belgrade, Yugoslavia, Sep. 2000.
- [3.186] *The chromatic media processor*, <http://www.chromatic.com/>.
- [3.187] A.Peleg, S.Wilkic and V.Weiser, "Intel MMX for multimedia PCs," *Comm. of the ACM*, vol.40, pp.25-38, Jan. 1997.
- [3.188] P.Lapsley et al, *DSP processor fundamentals*, Piscataway, New Jersey: IEEE Press, 1997.
- [3.189] T.Chen, "The past, present and future of image and multi-dimensional signal processing," *IEEE Signal Processing Magazine*, vol.15, pp.21-58, March 1998.
- [3.190] A.Peleg and U.Weiser, "MMX technology extension to the Intel architecture," *IEEE Micro*, vol.16, pp.42-50, Jan. 1996.
- [3.191] S.Wolfram, *The mathematica book*, III edition, Port Chester, New York: Wolfram Media, Inc. and Cambridge University Press, 1996.
- [3.192] *MATLAB Image Processing Toolbox*, <http://www.mathworks.com/products/image/>.
- [3.193] *National Instruments LabView*, <http://www.natinst.com/>.
- [3.194] *NIH Image*, <http://rsb.info.nih.gov/nih-image/>.
- [3.195] I.Kuroda and T.Nishitani, "Multimedia processors," *Proc. of the IEEE*, vol.86, pp.1,203-1,221, June 1998.
- [3.196] ISO/IEC JTC1/SC29/WG11, Recomm. H.262, ISO/IEC 13818-2, *Information technology - Generic coding of moving pictures and acoustic audio information: Video*, Geneva, Switzerland, 1994.
- [3.197] M.Johnson, *Superscalar multiprocessor design*, Englewood Cliffs, NJ: Prentice Hall, 1991.
- [3.198] R.Bannon and Y.Saito, "The alpha 21164 PC microprocessor," *Proc. of Compcon*, pp.20-27, New York, NY: IEEE Computer Science Press, 1997.
- [3.199] R.B.Lee, "Subword parallelism with MAX-2," *IEEE Micro*, vol.16, pp.51-59, Aug. 1996.
- [3.200] M.Tremblay, D.Greenley and K.Normoyle, "The design of the microarchitecture of Ultra Sparc," *Proc. of the IEEE*, vol.83, pp.1,653-1,663, Dec. 1995.
- [3.201] C.Hansen, "Architecture of a broadband media processor," *Proc. of Compcon*, pp.334-340, New York, NY: IEEE Computer Science Press, 1996.
- [3.202] Y.Oshime, B.J.Shen and S.H.Jen, "High-speed memory architectures for multimedia applications," *IEEE Circuit Design Magazine*, vol.13, pp.8-13, Jan. 1997.
- [3.203] T.Robinson et al, "Multigigabyte/sec DRAMs with the MicroUnity mediachannel interface," *Proc. of Compcon*, pp.378-381, New York, NY: IEEE Computer Science Press, 1996.

Chapter 4

Distributed Multimedia Systems

- [4.1] K.R.Rao and Z.S.Bojkovic, *Packet video communications over ATM networks*, Upper Saddle River, NJ: Prentice-Hall PTR, 2000.
- [4.2] V.O.K.Li and W.Liao, "Distributed multimedia systems," *Proc. of the IEEE*, vol.85, pp.1,063-1,108, July 1997.
- [4.3] B.Furth, "Multimedia systems: An overview," *IEEE Multimedia Magazine*, vol.1, pp.47-59, Spring 1994.

- [4.4] A.Campbell, G.Carlson and H.Hutchinson, "A quality of service architecture," *Comput. Comm. Review*, vol.24, pp.6-27, April 1994.
- [4.5] A.Vogel et al, "Distributed multimedia and QoS: A survey," *IEEE Multimedia Magazine*, vol. 2, pp.10-19, Summer 1995.
- [4.6] K.Nahrsted and R.Steinmetz, "Resource management in networked multimedia systems," *IEEE Comp. Mag.*, vol.28, pp.52-63, May 1995.
- [4.7] K.Nahrsted and J.M.Smith, "The QoS broker," *IEEE Multimedia Mag.*, vol. 2, pp.53-67, Spring 1995.
- [4.8] L.C.Wolf, C.Griwodz and R.Steinmetz, "Multimedia communication," *Proc. of the IEEE*, vol.85, pp.1,915-1,933, Dec. 1997.
- [4.9] H.Schulzrinne et al, "RTR: A transport protocol for real-time applications," Internet Engineering Task Force, RFC 1889, Jan. 1996.
- [4.10] A.Rayes and K.Sage, "Integrated management architecture for IP-based networks," *IEEE Communications Mag.*, vol.38, pp.48-53, April 2000.
- [4.11] H.Hegering, S.Abeck and B.Neumair, *Integrated management of networked systems*, San Francisco, CA: Morgan Kaufmann, 1998.
- [4.12] M.Guizani and A.Rayes, *Designing ATM switching networks*, New York, New York: McGraw-Hill, 1998.
- [4.13] S.Aidarous and T.Plevyak, *Telecommunications network management*, Piscataway, New Jersey: IEEE Press, 1998.
- [4.14] Ch.H.Wu and I.D.Irwin, "Multimedia and multimedia communication: A tutorial," *IEEE Trans. Industrial Electronics*, vol.45, pp.4-14, Feb. 1998.
- [4.15] X.Forum (1996). XTP: The Xpress Transport Protocol. <http://www.ca.saudia.gov/xtp/xtp.html>.
- [4.16] ATM Forum, *ATM Traffic Management Specification, Version 4.0*, Upper Saddle River, NJ: Prentice-Hall, 1996.
- [4.17] L.Zhang et al, "RSVP: a new resource reservation protocol," *IEEE Network Mag.*, vol.7, pp.8-18, Sept. 1993.
- [4.18] M.Decina and V.Trecordi, "Convergence of telecommunications and computing to networking models for integrated services and applications," *Proc. IEEE*, vol.85, pp.1,887-1,914, Dec. 1997.
- [4.19] P.Newman et al, "IP switching and gigabit routers," *IEEE Comm. Magazine*, vol.35, pp.64-69, Jan. 1997.
- [4.20] Y.Reuhter et al, RFC2105, Internet Engineering Task Force, Feb. 1997.
- [4.21] C.M.Pazos, M.R.Kotelba and A.G.Malis, "Real-time multimedia over ATM: RMOA," *IEEE Comm. Mag.*, vol.38, pp.82-87, April 2000.
- [4.22] G.Carlson, G.S.Blair and P.Robin, "Microkernel support for continuous media in distributed systems," *Comput. Networks ISDN Syst.*, vol.26, pp.1,323-1,341, 1994.
- [4.23] C.L.Lin and J.W.Layland, "Scheduling algorithms for multiprogramming in a hard real-time environment," *J. ACM*, vol.20, pp.46-61, Jan. 1973.
- [4.24] R.Steinmetz, "Analyzing the multimedia operating system," *IEEE Multimedia Mag.*, vol. 2, pp.68-84, Spring 1995.
- [4.25] H.Tokuda, "Operating system support for continuous media applications," in *Multimedia Systems*, Reading, MA: Addison-Wesley, pp.201-220, 1994.

- [4.26] A.Bouloutas and D.N.Serpanos, "A comparison of multimedia servers," IBM Research Division, T.J.Watson Research Center, Tech. Rep. RC19162, Sept. 1993.
- [4.27] D.J.Gemmell et al, "Multimedia storage servers: A tutorial," *Computer*, pp.40-49, May 1995.
- [4.28] A.Dan et al, "Buffering and catching in large scale video servers," IBM Research, Tech. Rep. RC19903, Jan.1995.
- [4.29] K.D.Huynh and T.M.Khoshgoftaar, "Performance analysis of advanced I/O architectures for PC-based video servers," *ACM/Springer Multimedia Syst.*, vol.2, pp.36-50, June 1994.
- [4.30] T.D.C.Little and D.Venkatesh, "Popularity-based assignment of movies to storage devices and video-on-demand system," *ACM/Springer Multimedia Syst.*, vol.2, pp.280-287, Jan 1995.
- [4.31] D.Meliksetian, F.F.Kuo Yu and C.Y.Ryer Chen, "Methodologies for designing video servers," *IEEE Trans. Multimedia*, vol.2, pp.62-69, March 2000.
- [4.32] D.N.Serpanos, L.Georgiadis and T.Bouloutas, "Multimedia packing: a load and storage balancing algorithm for distributed multimedia servers," *IEEE Trans. CSVT*, vol.8 pp.13-17, Feb. 1998.
- [4.33] B.G.Haskall, A.Puri and A.N.Netravali, *Digital video: An introduction to MPEG-2*, New York, NY: Chapman and Hall, 1997.
- [4.34] V.O.K.Li et al, "Performance model of interactive video-on-demand systems," *IEEE Journal Selected Areas Comm.*, vol.14, pp.1,099-1,109, Aug. 1996.
- [4.35] Y.H.Chang et al, "An open-systems approach to video on demand," *IEEE Commun. Mag.*, vol.32, pp.68-80, May 1994.
- [4.36] D.Delodere, W.Verbiest and H.Verhille, "Interactive video on demand," *IEEE Commun. Mag.*, vol.32, pp.82-88, May 1994.
- [4.37] W.J.Liao and V.O.K.Li, "The split-and-merge (SAM) protocol for interactive video-on-demand systems," *Proc. IEEE INFOCOM '97*, pp.1,351-1,358, Kobe, Japan, 1997.
- [4.38] L.Crutcher and J.Grinham, "The networked video jukebox," *IEEE Trans. CSVT*, vol.4, pp.105-120, April 1994.
- [4.39] C.L.Lin and S.V.Guan, "The design and architecture of a video library system," *IEEE Comm. Magazine*, vol.34, pp.84-91, Jan. 1996.
- [4.40] V.Leon and E.Miller, "Subscriber terminal units for video dial tone systems," *IEEE Network Mag.*, vol.9, pp.48-57, Sept/Oct. 1995.
- [4.41] G.H.Petit, D.Delodere and W.Verbiest, "Bandwidth resource optimization in video on demand network architectures," *Proc. Int. Workshop Community Networking Integrated Multimedia Services to the Home*, pp.91-97, New York, NY, 1994.
- [4.42] F.Schaffa and J.P.Nussbaumer, "On bandwidth and storage tradeoffs in multimedia distribution networks," *Proc. Int. Conf. Multimedia Computing Systems*, pp.1020-1026, Washington, D.C., 1995.
- [4.43] H.Ishii and N.Miyake, "Toward an open shared workspace: Computer and video fusion approach to team workstation," *Commun. ACM*, vol.34, pp.37-50, Dec. 1991.
- [4.44] R.Kling, "Cooperation, coordination and control in computer-supported work," *Comm. ACM*, vol.34, pp.83-88, Dec.1991.
- [4.45] C.A.Elias, S.J.Gibbs and G.L.Rein, "Groupware: Some issues and experiences," *Comm. ACM*, vol.34, pp.38-58, Jan. 1991.

- [4.46] K.Watabe et al, "Distributed desktop conferencing system with multiuser multimedia interface," *IEEE J. Selected Areas in Comm.*, vol.9, pp.531-539, May 1991.
- [4.47] W.Reinhard et al, "CSCW tools: Concepts and architectures," *IEEE Comput. Mag.*, vol.27, pp.28-36, May 1994.
- [4.48] R.Bently et al, "Architectural support for cooperative multiuser interface," *IEEE Comput. Mag.*, vol.27, pp.37-46, May 1994.
- [4.49] M.Stefik et al, "WYSIWIS revised: Early experiences with multiuser interfaces," *ACM Trans. Office Inform. Sys.*, vol.5, pp.147-167, Apr. 1987.
- [4.50] S.Sarin and I.Grief, "Computer-based real-time conferencing systems," *IEEE Comput. Mag.*, vol.18, pp.33-45, Oct. 1985.
- [4.51] R.Fish et al, "Quilt: A collaborative tool for cooperative writing," in *Proc. COIS'88*, pp.23-25, Palo Alto, CA, 1988.
- [4.52] I.Grief, R.Seliger and W.Weihl, "Atomic data abstractions in a distributed collaborative editing system," in *Proc. ACM CSCW'86*, pp.160-172, Seattle, WA, 1986.
- [4.53] K.L.Kreamer and I.L.King, "Computer-based systems for cooperative work and group decision making," *ACM Computing Surveys*, vol.20, pp.115-146, June 1988.
- [4.54] L.M.Applegate, B.R.Konsynski and J.F.Numamcker, "A group decision support system for idea generation and issue analysis in organization planning," in *Proc. ACM CSCW'86*, pp.16-34, Seattle, WA, 1986.
- [4.55] K.R.Rao and P.Yip, *Discrete cosine transform: algorithms, advantages, applications*, New York, NY: Academic Press, 1990.
- [4.56] I.C.Lauwers and K.A.Lantz, "Collaborative awareness in support of collaboration transparency: requirements for the next generation of shared window systems," *Proc. CHI'90*, pp.303-311, Seattle, WA, 1990.
- [4.57] B.Reljin and I.Reljin, "Multimedia: The impact on the teletraffic," *Advances in Physics, Electronics and Signal Processing Applications*, N.E.Mastorakis (Ed.), pp.366-373, World Scientific, 2000.
- [4.58] M.Strintzis and S.Mallasiotis, "Object-based coding of stereoscopic and 3D image sequence," *IEEE Signal Proc. Magazine*, vol.16, pp.14-28, May 1999.
- [4.59] J.B.Smith and S.F.Weiss, "Hypertext," *Commun. ACM*, vol.31, pp.816-819, July 1988.
- [4.60] J.Nielsen, "The art of navigation," *Commun. ACM*, vol.33, pp.296-310, March 1990.
- [4.61] R.M.Akscyn, D.L.McCracken and E.A.Yoder, "KMS: A distributed hypermedia system for managing knowledge in organizations," *Commun. ACM*, vol.31, pp.820-835, July 1988.
- [4.62] B.Campbell and J.M.Goodman, "HAM: A general purpose hypertext abstract machine," *Commun. ACM*, vol.32, pp.856-861, July 1988.
- [4.63] F.Garzotto, P.Paolini and D.Schwabe, "HDM - A model for the design of hypertext applications," *Proc. ACM Hypertext'91*, pp.313-328, San Antonio, TX, 1991.
- [4.64] F.Halasz and M.Schwartz, "The Dexter hypertext reference model," *NIST Hypertext Standardization Workshop*, pp.95-133, Gaithersburg, MD, 1990.

Chapter 5

Multimedia Communications Standards

- [5.1] R.Chellappa, T.Chen and A.Katsaggelos, "Audio-visual interaction in multimodal communication," *IEEE Signal Processing Magazine*, vol.14, pp.37-38, July 1997.

- [5.2] T.Sikora, "MPEG digital video-coding standards," *IEEE Signal Processing Mag.*, vol.14, pp.82-100, Sept. 1997.
- [5.3] ISO/IEC SC29/WG11, *MPEG Requirements Group, MPEG-7: Context and objectives*, Doc.N1678, MPEG Bristol Meeting, April 1997.
- [5.4] F.Pereira, *First proposal for MPEG-7 visual requirements*, ISO/IEC SC29/WG11 Doc.M1941, MPEG Bristol Meeting, April 1997.
- [5.5] S.F.Chang, "Content-based indexing and retrieval of visual information," *IEEE Signal Processing Magazine*, vol.14, pp.45-48, July 1997.
- [5.6] K.R.Rao and Z.S.Bojkovic, *Packet video communications over ATM networks*, Upper Saddle River, NJ: Prentice Hall PTR, 2000.
- [5.7] R.Koenen, "Profiles and levels in MPEG-4: Approach and overview," *Signal Processing: Image Comm.*, vol.15, pp.463-478, Jan. 2000.
- [5.8] F.Pereira, "MPEG-4: Why, what, how and when?," *Signal Processing: Image Comm.*, vol.15, pp.271-279, Jan. 2000.
- [5.9] L.Chiarglione, "MPEG and multimedia communications," *IEEE Trans. CSVT*, vol.7, pp.5-17, Feb. 1997.
- [5.10] L.Chiarglione, "Impact of MPEG standards on multimedia industry," *Proc. of the IEEE*, vol.86, pp.1,222-1,227, June 1998.
- [5.11] ISO/IEC IS11172 (MPEG-1), *Information Technology - Coding Of Moving Pictures and Associated Audio for Digital Storage Media up to About 1.5 Mb/s*, 1993.
- [5.12] ISO/IEC IS11172-2 (MPEG-1), *Information Technology - Coding of Moving Pictures and Associated Audio for Digital Storage Media up to About 1.5 Mb/s - Part 2: Video*, 1993.
- [5.13] ISO/IEC IS11172-3 (MPEG-1), *Information Technology - Coding of Moving Pictures and Associated Audio for Digital Storage Media up to About 1.5 Mb/s - Part 3: Audio*, 1993.
- [5.14] ISO/IEC IS11172-4 (MPEG-1), *Information Technology - Coding of Moving Pictures and Associated Audio for Digital Storage Media up to About 1.5 Mb/s - Part 4: Conformance*, 1993.
- [5.15] ISO/IEC IS11172-5 (MPEG-1), *Information Technology - Coding of Moving Pictures and Associated Audio for Digital Storage Media up to About 1.5 Mb/s, Part 5: Software Simulation*, 1993.
- [5.16] ISO/IEC IS13818-3 (MPEG-1), *Information Technology - Generic Coding of Moving Pictures and Associated Audio - Part 3: Audio*, 1995.
- [5.17] K.H.Brandenburg et al, "ISO MPEG-1 Audio: A generic standard for coding of light quality digital audio," *J. of Acoustic Engineering Society*, vol.42, pp.780-792, Oct. 1994.
- [5.18] B.L.Tceng and D.Anastassiou, "Multiview point video coding with MPEG-2 compatibility," *IEEE Trans. CSVT*, vol.6, pp.414-419, Aug. 1996.
- [5.19] T.Homma, "MPEG contribution: Report of the Ad Hoc Group on MPEG-2 applications for multi-view point pictures," ISO/IEC SC29/WG11 Doc.861, March 1995.
- [5.20] A.Puri, "A video coding using the MPEG-2 compression standard," *SPIE/VCIP*, vol.1,199, pp.1,701-1,713, Boston, MA, Nov. 1993.
- [5.21] J.Ni, T.Yang and D.H.K.Tsang, "CBR transmission on VBR MPEG-2 video traffic for video-on-demand in ATM networks," *International Conference on Communications*, Dallas, TX, pp.1,391-1,395, June 1996.

- [5.22] M.Orzessek and P.Sommer, *ATM and MPEG-2 Integration of Digital Video into Broadband Networks*, Upper Saddle River, NJ: Prentice Hall PTR, 1998.
- [5.23] ISO/IEC IS 13818-1, *Generic Coding of Moving Pictures and Associated Audio, Part 1: Systems*, 1995.
- [5.24] ISO/IEC IS 13818-2, *Generic Coding of Moving Pictures and Associated Audio, Part 2: Video*, 1995.
- [5.25] ISO/IEC IS 13818-6, *Generic Coding of Moving Pictures and Associated Audio, Part 6: DSM/CC*, 1995.
- [5.26] J.De Lameilieu and G.Schamel, "Hierarchical coding of TV/HDTV within the German HDTV project," *Proc. Int. Workshop on HDTV*, pp.8A.1.1-1.8, Ottawa, Canada, Oct. 1993.
- [5.27] ISO/IEC JTC1/SC29/WG11 N0702Rev, *Information Technology - Generic Coding of Moving Pictures and Associated Audio. Recommendation H.262, Draft International Standard*, Paris, France March 1994.
- [5.28] P.J.Burt and E.H.Adelson, "The Laplacian pyramid as a compact image code," *IEEE Trans. Comm.*, vol.COM-31, pp.532-540, April 1983.
- [5.29] C.Gonzales and E.Viscoto, "Flexibly scalable digital video coding," *Signal Processing: Image Comm.*, vol.5, pp.1-2, Feb. 1993.
- [5.30] T.Sikora, T.K.Tan and K.N.Ngan, "A performance comparison of frequency domain pyramid scalable coding schemes," *Proc. Picture Coding Symposium*, Lausanne, Switzerland, pp.16.1-16.2, March 1993.
- [5.31] A.W.Johnson et al, "Filters for drift reduction in frequency scalable video coding schemes," *Electronics Letters*, vol.30, pp.471-472, March 1994.
- [5.32] ITU-T Rec I.610, *OAM Principle of the BISDN Access*, 1995.
- [5.33] R.Orfali, D.Harkey and J.Edwards, *The essential client/server survival guide*, New York, NY: Wiley Computer Publishing, John Wiley, 1996.
- [5.34] F.Pereira, "Tutorial issue on the MPEG-4 standard," *Signal Processing: Image Comm.*, vol.15, pp.269-270, Jan. 2000.
- [5.35] Official MPEG Website, <http://www.cselt.it/mpeg>.
- [5.36] ISO/IEC JTC1/SC29/WG11, Doc.N4030, *MPEG-4 Overview v18.0*, Singapore, March 2001.
- [5.37] ISO/IEC Doc.N2724, *MPEG-4 Applications*, Seoul, Korea, March 1999.
- [5.38] ISO/IEC Doc.N2501, *Text of FDIS 14496-1: Systems*, Atlantic City, NJ, Oct. 1998.
- [5.39] ISO/IEC Doc.N2502, *Text of FDIS 14496-2: Visual*, Atlantic City, NJ, Oct. 1998.
- [5.40] ISO/IEC Doc.N2503, *Text of FDIS 14496-3: Audio*, Atlantic City, NJ, Oct. 1998.
- [5.41] ISO/IEC Doc.N2550, *Text of FDIS 14496-4: Conformance testing*, Rome, Italy, Dec. 1998.
- [5.42] ISO/IEC Doc.N2805, *Text of FDIS 14496-5: Reference software*, Vancouver, Canada, July 1999.
- [5.43] ISO/IEC Doc.N2506, *Text of FDIS 14496-6: DMIF*, Atlantic City, NJ, Oct. 1998.
- [5.44] MPEG Website on quality tests, <http://www.cselt.it/mpeg/qualitytests.htm>.
- [5.45] L.Chiarglione, "The development of an integrated audiovisual coding standard: MPEG," *Proc. of the IEEE*, vol.83, pp.151-157, Feb. 1995.
- [5.46] ISO/MPEG N1375, *Verification Model (VM) Development and Core Experiments*, Chicago, IL, Sept. 1996.

- [5.47] ISO/MPEG N998, *Proposal Package Description (PPD) - Revision 3*, Tokyo, Japan, July 1995.
- [5.48] ISO/MPEG N3930, *MPEG-4 Requirements*, Pisa, Italy, Jan. 2001.
- [5.49] O.Avaro et al, "MPEG-4 Systems: Overview," *Signal Processing: Image Comm.*, vol.15, pp.281-298, Jan. 2000.
- [5.50] ISO/MPEG N2723, *MPEG-4 Requirements*, March 1999.
- [5.51] ISO/MPEG N2806 FDIS 14496-6, *Delivery multimedia integration framework, Part 6*, Vancouver, Canada, July 1999.
- [5.52] C.Herpel and A.Eleftheriadis, "MPEG-4 Systems: Elementary stream management," *Signal Processing: Image Comm.*, vol.15, pp.299-320, Jan. 2000.
- [5.53] ISO/MPEG N1713, *FAQ on MPEG-4 Video*, Bristol, England, April 1997.
- [5.54] G.Franceshini, "The delivery layer in MPEG-4," *Signal Processing: Image Comm.*, vol.15, pp.347-363, Jan. 2000.
- [5.55] E.D.Scheirer, R.Vaananen and J.Huopaniemi, "Audio BIFS: Describing audio scenes with the MPEG-4 multimedia standard," *IEEE Trans. Multimedia*, vol.1, pp.237-250, Sept. 1999.
- [5.56] ISO/IEC 14772-1, *The Virtual Reality Modeling Language*, 1997. <http://www.vrml.org/Specifications/VRML97>.
- [5.57] ISO/MPEG N1162, *Report on the Ad Hoc Group on Evaluation of Tools and Algorithms of Video Submissions for MPEG-4*, Munich, Germany, Jan. 1996.
- [5.58] Z.S.Bojkovic and D.A.Milovanovic, "Audiovisual integration in multimedia communications based on MPEG-4 facial animation," *Circuits, Systems and Signal Processing*, vol.20, pp.311-339, May-June 2001.
- [5.59] W.G.Gardner, "Reverberation algorithms," in *Applications of Digital Signal Processing to Audio and Acoustics*, M.Khars and K.Brandenburg (Eds.), New York, NY: Kluwer, 1998.
- [5.60] J.P.Jullien, "Structured model for the representation and the control of room acoustical quality," *Proc. 15th Int. Conf. Acoustic*, Trondheim, Norway, pp.517-520, 1995.
- [5.61] J.M.Jot, "Efficient models for reverberation and distance rendering in computer music and virtual audio reality," *Proc. Int. Computer Music Conf.*, Thessaloniki, Greece, pp.236-243, 1997.
- [5.62] ISO/MPEG N2502, *Text of FDIS 14496-2, Part 2: Video*, Nov. 1998.
- [5.63] ISO/MPEG N2503, *Text of FDIS 14496-3, Part 3: Audio*, Nov. 1998.
- [5.64] ISO/MPEG N2501, *Text of FDIS 14496-1, Part 1: Systems*, Nov. 1998.
- [5.65] T.Ebrahimi and C.Horne, "MPEG-4 natural video coding - an overview," *Signal Processing: Image Comm.*, vol.15, pp.365-385, Jan. 2000.
- [5.66] ITU-T experts group on very low bitrate visual telephony, *ITU-T Rec. H.263 Video Coding for Low Bitrate Communication*, Dec. 1995.
- [5.67] R.V.Cox et al, "On the applications of multimedia processing to communications," *Proc. of the IEEE*, vol.86, pp.755-824, May 1998.
- [5.68] T.Sikora, "The MPEG-4 video standard verification model," *IEEE Trans. CSVT*, vol.7, pp.19-31, Feb. 1997.
- [5.69] K.R.Rao and P.Yip, *Discrete Cosine Transform: Algorithms, Advantages and Applications*, New York, NY: Academic Press, 1990.

- [5.70] C.LeBuhan et al, "Shape representation and coding of visual objects in multimedia applications: an overview," *Ann. Telecomm.*, vol.53, pp.164-178, May 1998.
- [5.71] J.L.Mitchell et al, *MPEG Video Compression Standard*, New York, NY: Chapman and Hall, 1996.
- [5.72] ISO/MPEG N2552, *MPEG-4 Video Verification Model VM12.0*, Rome, Italy, Dec. 1998.
- [5.73] J.Hartman and J.Werneck, *The VRML Handbook*, Reading, MA: Addison-Wesley, 1996.
- [5.74] A.M.Tekalp et al, "Two-dimensional mesh-based visual-object representation for interactive synthetic/natural digital video," *Proc. of the IEEE*, vol.86, pp.1,029-1,051, June 1998.
- [5.75] J.Y.Wang and E.H.Adelson, "Representing moving images with layers," *IEEE Trans. Image Processing*, vol.3, pp.625-638, Sept. 1994.
- [5.76] G.Wolberg, *Digital image warping*, Los Alamitos, CA: Computer Society Press, 1990.
- [5.77] A.M.Tekalp and J.Osterman, "Face and 2D mesh animation in MPEG-4," *Signal Processing: Image Comm.*, vol.15, pp.387-421, Jan. 2000.
- [5.78] P.Klara et al, "Simulation of facial muscle actions based on rational free form deformations," *Proc. of Eurographics*, pp.59-69, 1992.
- [5.79] G.A.Abrantes and F.Pereira, "MPEG-4 facial animation technology: survey, implementation and results," *IEEE Trans. CSVT*, vol.9, pp.290-305, March 1999.
- [5.80] F.Lavagetto and R.Pockaj, "The facial animation engine: toward a high-level interface for the design of MPEG-4 compliant animated faces," *IEEE Trans. CSVT*, vol.9, pp.277-289, March 1999.
- [5.81] L.Chen, J.Ostermann and T.Huang, "Adaptation of a generic 3D human face model to 3D range data," *First Workshop on Multimedia Signal Processing*, pp.274-279, Princeton, NJ, June 1997.
- [5.82] J.Ostermann, "Animation of synthetic faces in MPEG-4," *Computer Animation*, pp.49-52, June 1998.
- [5.83] H.Tao et al, "Compression of facial animation parameters for transmission of talking heads," *IEEE Trans. CSVT*, vol.9, pp.264-276, April 1999.
- [5.84] S.Moushima and H.Harashima, "A media conversion from speech to facial image for intelligent man-machine interface," *IEEE J. Selected Areas in Comm.*, vol.9, pp.594-600, May 1991.
- [5.85] K.Waters and T.Levergood, "An automatic lip-synchronization algorithm for synthetic faces," *Proc. of the Multimedia Conference*, pp.149-156, San Francisco, CA, Sept. 1994.
- [5.86] R.Koenen, F.Pereira and L.Chiarglione, "MPEG-4: Context and objectives," *Image Comm. J.*, vol.9, pp.295-304, May 1997.
- [5.87] A.M.Tekalp, *Digital Video Processing*, Englewood Cliffs, NJ: Prentice-Hall, 1995.
- [5.88] M.deBerget et al, *Computational Geometry - Algorithms and Applications*, Berlin, Germany: Springer, 1997.
- [5.89] Y.Altunbasak and A.M.Tekalp, "Occlusion-adaptive, content-based mesh design and forward tracking," *IEEE Trans. Image Processing*, vol.6, pp.1,270-1,280, Sept. 1997.
- [5.90] Y.Nakaya and H.Harashima, "Motion compensation based on spatial transformations," *IEEE Trans. CSVT*, vol.4, pp.339-356, June 1994.
- [5.91] Y.Altunbasak and A.M.Tekalp, "Closed-form connectivity preserving solutions for motion compensation using 2D meshes," *IEEE Trans. Image Processing*, vol.6, pp.1,255-1,269, Sept. 1997.
- [5.92] Y.Wang and O.Lee, "Active mesh - a feature seeking and tracking image sequence representation scheme," *IEEE Trans. Image Processing*, vol.3, pp.610-624, Sept. 1994.

- [5.93] C.Toklu et al, "Tracking motion and intensity variations using hierarchical 2D mesh modeling," *Graphical Models Image Process*, vol.58, pp.553-573, Nov. 1996.
- [5.94] P.J.L.vanBeek et al, "Hierarchical 2D mesh representation, tracking and compression for object-based video," *IEEE Trans. CSVT*, vol.9, pp.353-369, March 1999.
- [5.95] P.Doenges et al, "MPEG-4 audio/video synthetic graphics/audio for mixed media," *Signal Processing: Image Comm.*, vol.9, pp.433-464, May 1997.
- [5.96] S.R.Quackenbush, "Coding of natural audio in MPEG-4," *Proc. IEEE ICASSP*, pp.3,797-3,800, Seattle, WA, 1997.
- [5.97] E.D.Sheirer, "The MPEG-4 structured audio standard," *Proc. IEEE ICASSP*, pp.3,801-3,804, Seattle, WA, 1998.
- [5.98] E.D.Sheirer, Y.Lee and J.W.Yang, "Synthetic audio and SNHC audio in MPEG-4," in *Advances in Multimedia: Systems, Standards and Networks*, A.Puri and T.Chen (Eds.), New York, NY: Marcel Dekker, 1999.
- [5.99] G.A.Soulodre et al, "Subjective evaluation of state of the art two-channel audio codecs," *J. Audio Eng. Soc.*, vol.46, pp.164-177, 1998.
- [5.100] N.Jayant, J.Johnston and R.Safranek, "Signal compression based on models of human perception," *Proc. of the IEEE*, vol.81, pp.1,385-1,422, Oct. 1993.
- [5.101] M.Bosi et al, "ISO/IEC MPEG-2 advanced audio coding," *J. Audio Eng. Soc.*, vol.45, pp.789-814, Oct. 1997.
- [5.102] B.S.Atal and M.R.Shroeder, "Predictive coding of speech signals and subjective error criteria," *IEEE Trans. ASSP*, vol.27, pp.247-254, March 1979.
- [5.103] A.Gersho, "Advances in speech and audio compression," *Proc. of the IEEE*, vol.32, pp.900-918, June 1994.
- [5.104] M.Nishiguchi and J.Matsumoto, "Harmonic and noise coding of LPC residuals with classified vector quantization," *Proc. of the IEEE ICASSP*, pp.484-487, Detroit, MI, 1995.
- [5.105] E.D.Sheirer and B.L.Vercoe, "SAOL: the MPEG-4 structured audio orchestra language," *Comp. Music J.*, vol.23, pp.35-51, Feb. 1999.
- [5.106] B.L.Vercoe, W.G.Gardner and E.D.Sheirer, "Structured audio: the creation, transmission and rendering of parametric sound representations," *Proc. of the IEEE*, vol.85, pp.922-940, May 1998.
- [5.107] E.D.Sheirer, "Structured audio and effects processing in the MPEG-4 multimedia standard," *Multimedia Syst.*, vol.7, pp.11-22, Jan. 1999.
- [5.108] ISO/IEC JTC1 SC29/WG11 N2725, *Overview of the MPEG-4 Standard*, Seoul, Korea, 1999.
- [5.109] K.Brandenburg et al, "MPEG-4 natural audio coding," *Signal Processing: Image Comm.*, vol.15, pp.423-443, Jan. 2000.
- [5.110] D.Schulz, "Improving audio codecs by noise substitution," *J. Audio Eng. Soc.*, vol.46, pp.593-598, July/Aug. 1996.
- [5.111] N.Iwakami and T.Moriya, "Transform domain weighted interleave vector quantization (Twin VQ)," presented at the 101st Convention of the Audio Engineering Society, preprint 4377.
- [5.112] N.Iwakami and T.Moriya, "The integrated filter bank based scalable MPEG-4 audio coder," presented at the 105th Convention of the Audio Engineering Society, preprint 4810.
- [5.113] ISO/IEC JTC1/SC29/WG11 Doc.N2424, *Report on the MPEG-4 speech codec verification test*, Oct. 1998.

- [5.114] P.Kroon et al, "Regular-pulse excitation - A novel approach to effective and efficient multiple coding of speech," *IEEE Trans. ASSP*, vol.31, pp.1,054-1,063, Oct. 1986.
- [5.115] K.Brandenburg, "Perceptual coding of high quality digital audio," *Applications of Digital Signal Processing to Audio and Acoustics*, M.Kahrs and K.Brandenburg (Eds.), pp.39-83, New York, NY: Kluwer Academic, 1998.
- [5.116] D.Johnston et al, "Current and experimental applications of speech technology for telecom services in Europe," *Speech Comm.*, vol.23, pp.5-16, Feb. 1997.
- [5.117] E.D.Sheirer, Y.Lee and J.W.Yang, "Synthetic and SNHC audio in MPEG-4," *Signal Processing: Image Comm.*, vol.15, pp.445-461, Jan. 2000.
- [5.118] M.Kitai et al, "ASR and TTS telecommunications applications in Japan," *Speech Comm.*, vol.23, pp.17-30, Feb. 1997.
- [5.119] E.D.Sheirer, "Structured audio and effects processing in the MPEG-4 multimedia standard," *Multimedia Systems*, vol.7, pp.11-22, Jan. 1999.
- [5.120] J.Signes, Y.Fisher and A.Eleftheriadis, "MPEG-4's binary format for scene description," *Signal Processing: Image Comm.*, vol.15, pp.321-345, Jan. 2000.
- [5.121] ISO/IEC WD 14469-8, Doc.3852, *Carriage of MPEG-4 Contents over IP Networks*, Pisa, Italy, Jan. 1999.
- [5.122] A.N.Skodras, C.Christopoulos and T.Ebrahimi, "JPEG2000: The upcoming still image compression standard," *Proc. of the 11th Portugese Conference on Pattern Recognition*, pp.359-366, Porto, Portugal, May 2000.
- [5.123] *IEEE Signal Processing Magazine*, vol.1, pp.36-58, Sept. 2001.
- [5.124] A.Zandi et al, "CREW: Compression with reversible embedded wavelets," *Proc. of IEEE Data Compression Conference*, pp.212-221, Snowbird, Utah, March 1995.
- [5.125] ISO/IEC JTC1/SC29/WG1 Doc.N505, *Call for contributions for JPEG2000: image coding systems*, March 1997.
- [5.126] M.W.Marcellin and T.R.Fischer, "Trellis coded quantization of memoryless and Gauss-Markov sources," *IEEE Trans. Commun.*, vol.38, pp.82-93, Jan. 1990.
- [5.127] J.H.Kasuer, M.W.Marcellin and B.R.Hunt, "Universal trellis coded quantization," *IEEE Trans. Image Processing*, vol.8, pp.1,677-1,687, Dec. 1999.
- [5.128] J.Shapiro, "Embedded image coding using zerotrees of wavelet coefficients," *IEEE Trans. Signal Processing*, vol.41, pp.3,445-3,462, Dec. 1993.
- [5.129] D.Taubman and A.Zakhor, "Multirate 3D subband coding of video," *IEEE Trans. Image Processing*, vol.3, pp.572-588, Sept. 1994.
- [5.130] A.Said and W.Pearlman, "A new fast and efficient image codec based on set partitioning in hierarchical trees," *IEEE Trans. CSVT*, vol.6, pp.243-250, June 1996.
- [5.131] J.Li, P.CIeng and C.C.J.Kuo, "On the improvements of embedded zerotree wavelet (EZW) coding," *Proc. SPIE, Visual Comm. and Image Processing*, vol.2,601, pp.1,490-1,501, Taipei, Taiwan, May 1995.
- [5.132] P.J.Sementilli et al, "Wavelet TCQ: submission to JPEG-2000," *Proc. of SPIE, Appl. of Digital Image Proc.*, pp.2-12, July 1998.
- [5.133] A.Said and W.A.Pearlman, "An image multiresolution representation for lossless and lossy compression," *IEEE Trans. Image Processing*, vol.5, pp.1,303-1,310, Sept. 1996.

- [5.134] ISO/IEC JTC1/SC29/WG1 N988, C.Christopoulos, *JPEG-2000 Verification Model 2.0 (Technical Description)*, Oct. 1998.
- [5.135] W.B.Pennebaker and J.L.Mitchell, "JPEG still image data compression standard," New York, NY: Van Nostrand Reinhold, 1993.
- [5.136] ISO/IEC JTC1/SC29/WG1 N482r, D.Speck, *New Options in Radix-255 Arithmetic Coder*, March 1997.
- [5.137] ISO/IEC JTC1/SC29/WG11 N1020r, D.Taubman, *Report on Coding Experiment EBCOT (Embedded Block Coding with Optimized Truncation)*, Oct. 1998.
- [5.138] ISO/IEC JTC1/SC29/WG11 N1577, *JPEG2000 Part II Working Draft Version 1.0 Pre-Release A*, Jan. 2000.
- [5.139] ISO/IEC CD15444-1, *JPEG2000 Committee Draft v1.0*, Dec. 1999.
- [5.140] M.W.Marcellin et al, "An overview of JPEG2000," *Proc. of IEEE Data Compression Conference*, pp.523-541, Snowbird, 2000.
- [5.141] ISO/IEC 14496-2, *Information technology - Coding of Audio Visual Object - Part 2: Visual*, Dec. 1999.
- [5.142] ISO/IEC 14495-1, *Information technology - Lossless and Near-Lossless Compression of Continuous-Tone Still Images: Baseline*, Dec. 1999.
- [5.143] W3C, *PNG (Portable Network Graphics) Specification*, Oct. 1996, <http://www.w3.org/TR/REC-png>.
- [5.144] ISO/IEC 11544-1, *Information technology, Coded Representation of Picture and Audio Information - Progressive Bi-Level Image Compression*, March 1993.
- [5.145] ISO/IEC FCD14492, *Information technology - Coded Representation of Picture and Audio Information - Lossy/Lossless Coding of Bi-Level Images*, July 1999.
- [5.146] D.Santa-Cruz and T.Ebrahimi, "An analytical study of JPEG2000 functionalities," *Proc. IEEE ICIP*, vol.2, pp.49-52, Vancouver, Canada, Sept. 2000.
- [5.147] D.Nister and C.Christopoulos, "Lossless region of interest with embedded wavelet image coding," *Signal Processing*, vol.78, pp.1-17, Jan. 1999.
- [5.148] D.LeGall and A.Tabatabai, "Subband coding of digital images using symmetric short kernel filters and arithmetic coding techniques," *Proc. IEEE ICASSP*, pp.761-765, New York, NY, April 1988.
- [5.149] ISO/IEC JTC1/SC29/WG1, Doc.N1595, *USNB Comments on JPEG2000 CD1.0*, Jan. 2000.
- [5.150] M.Antonini et al, "Image coding using the wavelet transform," *IEEE Trans. Image Processing*, vol.1, pp.205-220, April 1992.
- [5.151] N.S.Jayant and P.Noll, *Digital Coding of Waveforms: Principles and Applications to Speech and Video*, New Jersey: Prentice-Hall, 1984.
- [5.152] M.Rabbani and P.W.Jones, *Digital Image Compression Techniques*, Bellington, Washington, SPIE Optical Engineering Press, 1991.
- [5.153] D.Santa-Cruz and T.Ebrahimi, "A study of JPEG2000 still image coding versus other standards," *Proc. of the EUSIPCO*, vol.2, pp.673-676, Tampere, Finland, Sept. 2000.
- [5.154] C.Christopoulos and A.N.Skodras, "The JPEG2000 still image coding system: an overview," *IEEE Trans. Consumer Electronics*, vol.46, pp.1,103-1,127, November 2000.
- [5.155] R.Koenen and F.Pereira, "MPEG-7: A standardized description of audiovisual content," *Signal Processing: Image Comm.*, vol.16, pp.5-13, Sept. 2000.

- [5.156] ISO/IEC JTC1/SC29/WG11, Doc.N3752, *Overview of the MPEG-7 standard*, La Baule, France, Oct. 2000.
- [5.157] ISO/IEC JTC1/SC29/WG11, Doc.N3751, *Introduction to MPEG-7*, La Baule, France, Oct. 2000.
- [5.158] ISO/IEC JTC1/SC29/WG11, Doc.2727, *MPEG-7 Requirements*, Seoul, Korea, March 1999.
- [5.159] ISO/IEC JTC1/SC29/WG11, Doc.2460, *MPEG-7 Context and Objectives V.10*, Atlantic City, Oct. 1998.
- [5.160] ISO/IEC JTC1/SC29/WG11, Doc.2691, *Description of Core Experiments for MPEG-7 Color/Texture Descriptors*, Seoul, Korea, March 1999.
- [5.161] ISO/IEC JTC1/SC29/WG11, Doc.2690, *Description of Core Experiments for MPEG-7 Shape/Motion Descriptors*, Seoul, Korea, March 1999.
- [5.162] P.Salambier and F.Marques, "Image and video segmentation tools for new multimedia services," *IEEE Trans. CSVT*, vol.9, pp.1,147-1,169, Dec. 1999.
- [5.163] H.K.Kim and J.D.Kim, "Region-based shape descriptor invariant to rotation, scale and translation," *Signal Processing: Image Comm.*, vol.16, pp.87-93, Sept. 2000.
- [5.164] S.Jeannin et al, "Motion descriptors for content-based video representation," *Signal Processing: Image Comm.*, vol.16, pp.59-85, Sept. 2000.
- [5.165] W.Zhao et al, "A reliable descriptor for face objects in visual content," *Signal Processing: Image Comm.*, vol.16, pp.123-136, Sept. 2000.
- [5.166] ISO/IEC JTC1/SC29/WG11 Doc.2728, *Applications for MPEG-7*, Seoul, Korea, March 1999.
- [5.167] *Special Issue on MPEG-7*, *IEEE Trans. CSVT*, vol.11, June 2001.
- [5.168] ISO/IEC N4041, *MPEG-21 Overview*, Singapore, March 2001.
- [5.169] ISO/IEC M7490, *Relationship Between the MPEG-21 and Mediacom 2004 Projects*, Sydney, Australia, July 2001.
- [5.170] K.Asatani and S.Nogami, "Trends in the standardization of telecommunications on GII, multimedia and other network technologies and services," *IEEE Comm. Magazine*, vol.34, pp.32-46, June 1996.
- [5.171] S.Okubo et al, "ITU-T standardization of audiovisual communication systems in ATM and LAN environments," *IEEE J. Selected Areas in Comm.*, vol.15, pp.965-982, Aug. 1997.
- [5.172] ITU-T Recommendation H.261, *Video Codec for Audio-Visual Services at px64 Kb/s*, March 1993.
- [5.173] ITU-T Recommendation H.320, *Narrow-Band Visual Telephone Systems and Terminal Equipment*, March 1996.
- [5.174] ITU-T Recommendation H.263, *Video Coding for Low Bit Rate Communication*, March 1996.
- [5.175] K.Rijkse, "H.263: Video coding for low bit-rate communications," *IEEE Trans. Comm.*, vol.34, pp.42-45, Dec. 1996.
- [5.176] ITU-T Draft Recommendation H.263 Version 2, *H.263+ Video Coding for Low Bitrate Communication*, Sept. 1997.
- [5.177] ITU-LBC-97-094, *Draft 10 of H.263+*, H.263+ Video group. Nice, France, Feb. 1997.
- [5.178] B.Erol, M.Gallant and F.Kossentini, "The H.263+ video coding standard: complexity and performances," DCC, Snowbird, UT, March 1998.
- [5.179] M.Yamashita, N.D.Kenyon and S.Okubo, "Standardization of multipoint audiovisual systems in CCITT," *Proc. IMAGE COM*, pp.154-159, Bordeaux, France, March 1993.

- [5.180] ITU-T Recommendation H.324, *Terminal for low bit rate multimedia communications*, 1995.
- [5.181] Draft ITU-T Recommendation H.323, *Visual Telephone Systems and Equipment for Local Area Networks Which Provide a Non-Guaranteed Quality of Service*, May 1996.
- [5.182] ITU-T Recommendation H.310, *Broadband Audio-Visual Communications Systems and Terminal Equipment*, 1995.
- [5.183] ITU-T Recommendation G.723.1, *Dual Rate Speech Coder for Multimedia Communication Transmitting at 5.3 and 6.3 Kbit/s*, 1996.
- [5.184] ITU-T Recommendation H.223, *Multiplexing Protocol for Low Bitrate Multimedia Communication*, 1996.
- [5.185] M.H.Willebeek-Le Mair and Z.Y.Shae, "Videoconferencing over packet-based networks," *IEEE J. Selected Areas in Comm.*, vol.15, pp.1,101-1,114, Aug. 1997.
- [5.186] H.K.Phyffer, "ISDN with broadband capabilities," *Telecomm. J.*, vol.57, pp.45-50, Jan. 1990.
- [5.187] E.Bingioni, E.Cooper and R.Sansom, "Designing a practical ATM LAN," *IEEE Network Mag.*, vol.7, pp.32-39, March 1993.
- [5.188] ITU-T Recommendation G.114, *One-Way Transmission Time*, 1993.
- [5.189] ITU-T Recommendation H.321, *Adaptation of H.320 Visual Telephone Terminals to BISDN Environments*, 1996.
- [5.190] ITU-T Recommendation H.245, *Control Protocol for Multimedia Communication*, 1996.
- [5.191] *IEEE Standard for Local and Metropolitan Area Networks - Supplement to Integrated Services (IS) LAN Interface at the Medium Access Control (MAC) and Physical (PHY) Layers: Specification of ISLAN 16-T*, IEEE Standard 802.90-1995.
- [5.192] ITU-T Recommendation H.321, *Multipoint Control Units for Audiovisual Systems Using Digital Channels up to 2 Mbit/s*, 1996.
- [5.193] ITU-T Recommendation H.331, *Broadcasting Type Audio-Visual Multipoint Systems and Terminal Equipment*, 1993.
- [5.194] ISO/IEC 8802-5 (ANSI/IEEE Std.802.5-1992), *Information technology - local and metropolitan area networks - Part 5: Token ring access method and physical layer specifications*, 1992.
- [5.195] IEEE Standard 802.1i, *Local area network MAC bridges - fiber distributed data interface (FDDI)*, 1992.
- [5.196] ITU-T Recommendation V.70, *Procedures for the simultaneous transmission of data and digitally encoded voice signals over the general switched telephone network or over 2-wire leases point-to-point telephone type circuit*, 1996.
- [5.197] ITU-T Recommendation H.225.0, *Media system packetization and synchronization on non-guaranteed quality of service LANs*, 1996.
- [5.198] S.Wenger, et al., "Error resilience support in H.263+," *IEEE Trans. CSVT*, vol.8, pp.867-877, Nov. 1998.
- [5.199] ITU-T Recommendation H.261, *Video codec for audiovisual services at px64 Kbit/s*, Geneva, 1990, revised in Helsinki, March 1993.
- [5.200] K.R.Rao and P.Yip, *Discrete cosine transform*, New York, NY: Academic Press, 1990.
- [5.201] A.N.Netravali and J.D.Robbins, "Motion-compensated television coding: Part I," *Bell Systems Technical J.*, vol.58, pp.631-670, March 1979.

- [5.202] ITU-T Recommendation H.242, *System for establishing communication between audiovisual terminals using digital channels up to 2 Mbit/s*, 1993.
- [5.203] J.H.Witten, R.M.Neal and J.G.Cleary, "Arithmetic coding for data-compression," *Communications of the ACM*, vol.30, pp.520-540, June 1987.
- [5.204] M.T.Orchard and G.J.Sullivan, "Overlapped block motion compensation - an estimation theoretic approach," *IEEE Trans. Image Processing*, vol.3, pp.693-699, Sept. 1994.
- [5.205] M.Willebeek-Le Mair, Z.Y.Shae and Y.C.Chang, "Robust H.263 video coding for transmission over the Internet," IBM Res. Rep. RC20532, Poughkeepsie, New York, Aug. 1996.
- [5.206] T.Chen, C.T.Swain and B.G.Haskell, "Coding of sub-regions for content-based scalable video," *IEEE Trans. CSVT*, vol.7, pp.256-260, Feb. 1997.
- [5.207] ITU-T, Study Group 16, Video Coding Experts Group (Question 15), Doc.Q15F09, *Report of the Ad Hoc Committee H.263++ Development*, Seoul, Korea, Nov. 1998.
- [5.208] ITU-T, Study Group 16, Video Coding Experts Group (Question 15), Doc.Q15D62, *Recommended Simulation Conditions for H.263v3*, Tampere, Finland, April 1998.
- [5.209] ITU-T, Study Group 16, Video Coding Experts Group (Question 15), Doc.Q15D65, *Video Codec Test Model, Near-Term, Version 10 (TMN10)*, Draft 1, Tampere, Finland, April 1998.
- [5.210] ITU-T, Study Group 16, Video Coding Experts Group (Question 15), Doc.Q15F10, *Report of the Ad Hoc Committee H.26L development*, Seoul, Korea, Nov. 1998.
- [5.211] ITU-T, Study Group 16, Video Coding Experts Group (Question 15), Doc.Q15D62, *Call for Proposals for H.26L Video Coding*, Geneva, Switzerland, Jan. 1998.
- [5.212] ITU-T, Study Group 16, Video Coding Experts Group (Question 6), Doc.VCEG-L24, *Multihypothesis Motion Pictures for H.26L*, Erlangen, Germany, Jan. 2001.
- [5.213] R.V.Cox and P.Kroon, "Low bit-rate speech coders for multimedia communication," *IEEE Comm. Magazine*, vol.34, pp.34-41, Dec. 1996.
- [5.214] ITU-T Recommendation H.222.1, *Multimedia multiplex and synchronization for audiovisual communication in ATM environments*, 1996.
- [5.215] ITU-T Recommendation H.221, *Frame structure for a 64-1920 Kbit/s channel in audiovisual teleservices*, 1997.
- [5.216] ITU-T Recommendation H.223, *Multiplexing protocol for low bit rate multimedia communication*, 1997.
- [5.217] H.Schulzine et al, *RTP: A transport protocol for real-time applications*, RFC1889, Jan. 1996.
- [5.218] ITU-T Recommendation X.680, *Information Technology - Abstract Syntax Notation One (ASN.1) - Specification of Basic Notation*, 1994.
- [5.219] M.Ohta, "IETF and Internet standards," *IEEE Comm. Magazine*, vol.36, pp.126-129, Sept. 1998.
- [5.220] B.Carpenter, *Architectural principle of the Internet*, RFC1958, June 1996.
- [5.221] R.Hevey and S.Bradner, *The organization involved in the IETF standards process*, RFC2028, Oct. 1996.
- [5.222] C.Huitema, J.Postel and S.Crocker, "Not all RFCs are standards," RFC1796, April 1995.
- [5.223] J.Postel, T.Li and Y.Renhter, *Best current practices*, RFC1818, Aug. 1995.
- [5.224] S.Bradner Ed, *The Internet standards process - Revision 3*, RFC2026, Oct. 1996.

- [5.225] W.Stallings, "IPv6: the new Internet protocol," *IEEE Comm. Magazine*, vol.34, pp.96-108, July 1996.
- [5.226] M.Decina and V.Trecordi, "Convergence of telecommunications and computing to networking models for integrated services and applications," *Proc. of the IEEE*, vol.85, pp.1,887-1,914, Dec. 1997.
- [5.227] M.Handley and V.Jacobson, *SDP: Session description protocol*, IETF MMUSIC Group, Internet Draft, draft-ietf-mmusic-sdp-04.txt.
- [5.228] M.Handly, *SAP: Session enhancement protocol*, IETF MMUSIC Group Draft, draft-ietf-mmusic-sap-00.txt.
- [5.229] E.Schooler, H.Schulzinne, and M.Handley, *SIP: Session initiation protocol*, IETF MMUSIC Group, Internet Draft, draft-ietf-mmusic-sip-04.txt.
- [5.230] H.Schulzinne, A.Rao and R.Lanthier, *Real time streaming protocol (RTSP)*, IETF MMUSIC Group, Internet Draft, draft-ietf-mmusic-rtsp-05.txt.
- [5.231] M.Handley et al, *The Internet multimedia conferencing architecture*, IETF MMUSIC Group, Internet Draft, draft-ietf-mmusic-confarc-00.txt.
- [5.232] H.Schulzinne, *RTP: A transport protocol for real-time applications*, RFC1889, Jan. 1996.
- [5.233] H.Schulzinne, *RTP profile for audio and video conferences with minimal control*, RFC1890, Jan. 1996.
- [5.234] D.Clark and D.Tennenhouse, "Architecture considerations for a new generation of protocols," *Proc. of ACM SIGCOM'90*, pp.201-208, Sept. 1990.
- [5.235] D.Mills, *Network time protocol version 3*, IETF RFC1305, March 1992.
- [5.236] D.E.Commer, *Interworking with TCP/IP*, New Jersey: Prentice-Hall, 1991.
- [5.237] R.Civanlar, A.Basso and C.Herpel, *RTP payload format for MPEG-4 streams*, IETF Internet Draft, draft-ietf-avt-rtp-mpeg401.txt, Feb. 1999.
- [5.238] ISO/IEC JTC1/SC29/WG11 N4081, *Carriage of MPEG-4 contents over IP networks*, March 2001.
- [5.239] D.Milovanovic and Z.S.Bojkovic, "MPEG-4 video transmission over Internet," *Proc. TELSIS'99*, pp.309-312, Nis, Yugoslavia, Oct. 1999.
- [5.240] T.D.C.Little and A.Ghafoor, "Multimedia synchronization protocols for broadband integrated services," *IEEE J. Selected Areas in Comm.*, vol.9, pp.1,368-1,382, Dec.1991.

Chapter 6

Multimedia Communications Across Networks

- [6.1] N.Jayant, "High quality networking of audio-visual information," *IEEE Commun. Magazine*, vol.31, pp.84-95, Sept. 1993.
- [6.2] P.Gonet, "Fast packet approach to integrated broadband networks," *Networks*, vol.9, pp.292-298, Dec. 1986.
- [6.3] M.Devanlt et al, "The 'prelude' ATD experiment assessments and future prospects," *IEEE J. Selected Areas in Comm.*, vol.4, pp.1,528-1,532, Dec. 1986.
- [6.4] J.Sidron and J.S.Gotal, "PARIS: An approach to integrated highspeed private networks," *Int. J. Digital Analog Cable Syst.*, vol.1, pp.77-85, Jan.-March 1988.
- [6.5] P.Brady, "A model for generating on-off patterns in two-way communications," *Bell Syst. Tech. J.*, vol.48, pp.2,445-2,472, Sept. 1969.

- [6.6] M.Listanti and F.Villani, "An X.25 compatible protocol for packet voice communications," *Comput. Comm.*, vol.6, pp.23-31, Feb. 1983.
- [6.7] B.Gold, "Digital speech networks," *Proc. of the IEEE*, vol.65, pp.1,630-1,658, Dec. 1977.
- [6.8] D.Minoli, "Optimal packet length for packet voice communication," *IEEE Trans. Commun.*, vol.COM-27, pp.607-611, 1979.
- [6.9] T.Bially et al, "A technique for adaptive voice flow control in integrated packet networks," *IEEE Trans. Comm.*, vol.COM-28, pp.325-333, March 1980.
- [6.10] T.S.Chen, Y.Walrand and D.G.Messerchmitt, "Dynamic priority protocols for packet voice," *IEEE J. Selected Areas in Comm.*, vol.7, pp.632-643, June 1989.
- [6.11] W.Mounteomery, "Techniques for packet video synchronization," *IEEE J. Selected Areas in Comm.*, vol.1, pp.1,022-1,028, Dec. 1983.
- [6.12] G.Barbeis and D.Pazzaglia, "Analysis and optimal design of a packet voice receiver," *IEEE Trans. Comm.*, vol.COM-28, pp.217-227, Feb. 1980.
- [6.13] T.Suda et al, "Performance evaluation of a packetized voice system - simulation study," *IEEE Trans. Comm.*, vol. COM-32, pp.97-102, Jan. 1984.
- [6.14] D.W.Patr, L.A.DaSilva and V.S.Frost, "Priority discarding of speech in integrated packet networks," *IEEE J. Selected Areas in Commun.*, vol.7, pp.644-656, June 1989.
- [6.15] G.Karlsson, *Asynchronous Transfer of Video*, SICS Research Report R95:14, Sweden, 1997.
- [6.16] ATM Forum, *ATM User-Network Interface Specification, Version 3.0*, Mountain View, California.
- [6.17] A.R.Reibman and B.G.Haskell, "Constraints on variable bit rate video for ATM networks," *IEEE Trans. CSVT*, vol.2, pp.361-372, Dec. 1992.
- [6.18] B.G.Haskell, "Buffer and channel sharing by several interframe picturephone coders," *Bell Systems Tech. J.*, vol.51, pp.261-289, Jan. 1972.
- [6.19] Y.Zdepsky, D.Raychaudhuri and K.Joseph, "Statistically based buffer control policies for constant rate transmission of compressed digital video," *IEEE Trans. Comm.*, vol.39, pp.947-957, June 1991.
- [6.20] J.P.Leduc and S.D'Agostino, "Universal VBR video codecs for ATM networks in the Belgian broadband experiment," *Signal Processing: Image Comm.*, vol.3, pp.157-165, June 1991.
- [6.21] C.T.Chen and A.Wong, "A self-governing rate buffer control strategy for pseudoconstant bit rate video coding," *IEEE Trans. Image Proc.*, vol.2, pp.50-59, Jan. 1993.
- [6.22] K.H.Tzou, "An intrafield DCT-based HDTV coding for ATM networks," *IEEE Trans. CSVT*, vol.1, pp.184-196, June 1991.
- [6.23] A.Ortega, K.Ramchandran and M.Vetterli, "Optimal trellis-based buffered compression and fast approximations," *IEEE Trans. Image Proc.*, vol.3, pp.26-40, Jan. 1994.
- [6.24] A.Eleftheriadis, S.Petajan and D.Anastassiou, "Algorithms and performance evaluation of the Xphone multimedia communication system," *Proc. of the ACM Multimedia Conf.*, Anaheim, CA, pp.311-320, Aug. 1993.
- [6.25] Y.C.Bolot and T.Turletti, "A rate control mechanism for packet video in the Internet," *Proc. of Info-com '94*, Toronto, Canada, pp.1,216-1,223, June 1994.
- [6.26] M.Macedonia and D.Brutzman, "MBONE provides audio and video across the Internet," *Computer*, vol.27, pp.30-36, April 1994.
- [6.27] B.Maglaris et al, "Performance models of statistical multiplexing in packet video communications," *IEEE Trans. Commun.*, vol.30, pp.834-843, July 1988.

- [6.28] D.P.Heyman, A.Tabatabai and T.Lakshman, "Statistical analysis and simulation study of video teleconferencing traffic in ATM networks," *IEEE Trans. CSVT*, vol.2, pp.49-59, March 1992.
- [6.29] A.Ortega, "Video transmission over ATM networks," *Microsystems Technology for Multimedia Applications*, (Shen et al, Eds.), Piscataway, New Jersey: IEEE Press, May 1995.
- [6.30] E.P.Rathgeb, "Modeling and performance comparison of policing mechanisms for ATM networks," *IEEE J. Selected Areas in Comm.*, vol.9, pp.325-334, April 1991.
- [6.31] M.Vetterli and K.M.Uz, "Multiresolution coding techniques for digital television: A review," Special issues on Multidimensional Processing of Video Signals, Multidimensional Systems and Signal Processing, pp.161-187, March 1992.
- [6.32] W.M.Garrett and M.Vetterli, "Joint source/channel coding of statistically multiplexed real time services on packet networks," *IEEE/ACM Trans. Networking*, vol.1, pp.71-80, Feb. 1993.
- [6.33] K.Ramchandran et al, "Multiresolution broadcast for digital HDTV using joint source-channel coding," *IEEE J. Selected Areas in Comm.*, vol.11, pp.6-23, Jan. 1993.
- [6.34] Q.F.Zhu, Y.Wang and L.Shaw, "Coding and cell-loss recovery in DCT-based packet video," *IEEE Trans. CSVT*, vol.3, pp.248-258, June 1993.
- [6.35] M.Ghanbari and V.Seferidis, "Cell-loss concealment in ATM video codecs," *IEEE Trans. CSVT*, vol.3, pp.238-247, June 1993.
- [6.36] S.R.McCanne, "Scalable compression and transmission of Internet multicast video," Ph.D. Thesis, University of California, Berkeley, 1996.
- [6.37] T.Chiang and D.Anastassiou, "Hierarchical coding of digital television," *IEEE Comm. Magazine*, vol.32, pp.38-45, May 1994.
- [6.38] W.Verbiest, "Video coding in an ATM environment," *Third Int. Conference on New Systems and Services in Telecommun.*, Liege, Belgium, Nov. 1986.
- [6.39] M.Dutoncheel and W.Verbiest, *Simulation results for a hybrid transform video coding algorithm*, RACE Project 2023, BTM-A 11-05-PR, 1986.
- [6.40] Y.Wang and Q.Zhu, "Error control and concealment for video communication: a overview," *Proc. of the IEEE*, vol.86, pp.974-997, May 1998.
- [6.41] Y.Wang et al, "Error resilient video coding techniques," *IEEE Signal Proc. Magazine*, vol.17, pp.61-82, July 2000.
- [6.42] G.Cote, S.Shirami and F.Kossentini, "Optimal mode selection and synchronization for robust video communications over error phone networks," *IEEE J. Selected Areas in Comm.*, vol.18, pp.952-965, June 2000.
- [6.43] S.Wenger et al, "Error resilience support in H.263+," *IEEE Trans. CSVT*, vol.8, pp.867-877, Nov. 1998.
- [6.44] I.Kondi, F.Ishtiaq and A.K.Katsaggelos, "Joint source-channel coding for scalable video," *Proc. 2000 SPIE Conf. Visual Communications and Image Processing*, pp.324-335, San Jose, CA, Jan. 2000.
- [6.45] Q.Zhu and Y.Wang, "Error concealment in visual communication," *Compressed Video Networks*, (A.R.Reibman and M.T.Sun, Eds.), New York, NY: Marcel Dekker, 2000.
- [6.46] S.Agni, "Error concealment for MPEG-2 video," *Signal Recovery Techniques for Image and Video Compression and Transmission*, A.K.Katsaggelos and N.P.Galatsanos, (Eds.), pp.235-268, Nowell, MA: Kluwer, 1998.
- [6.47] M.C.Hong et al, "Video error concealment techniques," *Signal Processing: Image Comm.*, vol.14, pp.437-492, May 1999.

- [6.48] D.W.Redmill and N.G.Kingsbury, "The EREC: an error-resilient technique for coding variable-length block of data," *IEEE Trans. Image Processing*, vol.5, pp.565-574, April 1996.
- [6.49] H.J.Lee, T.Chiang and Y.Q.Zhang, "Scalable rate control for MPEG-2 video," *IEEE Trans. CSVT*, vol.10, pp.878-894, Sept. 2000.
- [6.50] D.Ferrari and D.Verma, "A scheme for real-time channel establishment in wide-area networks," *IEEE J. Selected Areas in Comm.*, vol.8, pp.368-379, Apr. 1990.
- [6.51] M.R.Pickering and J.F.Arnold, "A perceptually efficient VBR rate control algorithm," *IEEE Trans. Image Proc.*, vol.3, pp.527-531, Sept. 1994.
- [6.52] A.Ortega et al, "Rate constraints for video transmission over ATM networks based on joint source/network criteria," *Annales des Telecommunications*, vol.50, pp.603-616, July-Aug. 1995.
- [6.53] Y.Shoham and A.Gersho, "Efficient bit allocation for an arbitrary set of quantizers," *IEEE Trans. ASSP*, vol.36, pp.1,445-1,453, Nov. 1988.
- [6.54] K.Ramchandran, A.Ortega and M.Vetterli, "Bit allocation for dependent quantization with applications to multiresolution and MPEG video coders," *IEEE Trans. Image Process.*, vol.3, pp.533-545, Sept. 1994.
- [6.55] J.Choi and D.Park, "A stable feedback control of the buffer state using the controlled Lagrange multiplier method," *IEEE Trans. Image Process.*, vol.3, pp.546-558, Sept. 1994.
- [6.56] Y.L.Liu and A.Ortega, "Bit rate control using piecewise approximated rate-distortion characteristics," *IEEE Trans. CSVT*, vol.8, pp.446-459, Aug. 1998.
- [6.57] W.Ding, "Rate control of MPEG video coding and recording by rate quantization modeling," *IEEE Trans. CSVT*, vol.6, pp.12-20, Feb. 1996.
- [6.58] B.Tao, H.A.Peterson and B.W.Dickinson, "A rate-quantization model for MPEG encoders," *Proc. IEEE ICIP*, vol.1, pp.338-341, Oct. 1997.
- [6.59] K.H.Yang, A.Jacquin and N.S.Jayant, "A normalized rate distortion model for H.263-compatible codecs and its application to quantizer selection," *Proc. IEEE ICIP*, vol.1, pp.41-44, Oct. 1997.
- [6.60] A.Vetro, H.F.Sun and Y.Wang, "MPEG-4 rate control for multiple video objects," *IEEE Trans. CSVT*, vol.9, pp.186-199, Feb. 1999.
- [6.61] J.Ribas-Corbera and S.M.Lei, "Contribution to rate control Q2 experiment: A quantization control tool for achieving target bitrate accurately," *Coding Moving Pictures and Associated Audio*, MPEG96/M1812 ISO/IEC JTC1/SC29/WG11, Sevilla, Spain, Feb. 1997.
- [6.62] H.J.Lee, T.Chiang and Y.Q.Zhang, "Scalable rate control for very low bit rate video," *Proc. IEEE ICIP*, vol.2, pp.768-771, Oct. 1997.
- [6.63] T.Chang and Y.Q.Zhang, "A new rate control scheme using a new rate-distortion model," *IEEE Trans. CSVT*, vol.7, pp.246-250, Feb. 1997.
- [6.64] A.Viterbi and J.Omura, "A new rate control scheme using a new rate distortion model," in *Principles of Digital Communication and Coding*, New York, NY: McGraw-Hill, 1979.
- [6.65] D.Wu et al, "Streaming video over the Internet: approaches and directions," *IEEE Trans. CSVT*, vol.11, pp.1-20, Feb. 2001.
- [6.66] S.McCanne, V.Jacobson and M.Vetterli, "Receiver-driven layered multicast," *Proc. ACM SIGCOMM'96*, pp.117-130, Aug. 1996.
- [6.67] D.Taubman and A.Zakhor, "A common framework for rate and distortion based scaling of highly scalable compressed video," *IEEE Trans. CSVT*, vol.6, pp.329-354, Aug. 1996.

- [6.68] B.J.Kim, Z.Xiong and W.A.Pearlman, "Low bit-rate scalable video coding with 3D set partitioning in hierarchical trees (3D SPIHT)," *IEEE Trans. CSVT*, vol.10, pp.1,374-1,387, Dec. 2000.
- [6.69] X.Wu, S.Cheng and Z.Xiong, "On packetization of embedded multimedia bitstreams," *IEEE Trans. Multimedia, Special Issue on Multimedia over IP*, vol.3, pp.132-140, March 2001.
- [6.70] S.Li, F.Wu and Y.Q.Zhang, "Study of a new approach to improve FGS video coding efficiency," ISO/IEC JTC1/SC29/WG11, MPEG99/M5583, Dec. 1999.
- [6.71] W.Li, "Bit-plane coding of DCT coefficients for fine granularity scalability," ISO/IEC JTC1/SC29/WG11 MPEG98/M3989, Oct. 1998.
- [6.72] W.Li, "Streaming video profile in MPEG-4," *IEEE Trans. CSVT*, vol.11, Feb. 2000. Special session on Media Streaming, International Conf. on Information Technology: Coding and Computing 2001, Las Vegas, Nevada, April 2001.
- [6.73] W.Tan and A.Zakhor, "Real-time Internet video using error resilient scalable compression and TCP-friendly transport protocol," *IEEE Trans. Multimedia*, vol.1, pp.172-186, June 1999.
- [6.74] F.Wu, S.Li and Y.Q.Zhang, "A framework for efficient progressive fine granularity scalable video coding," *IEEE Trans. CSVT*, vol.11, pp.332-344, March 2001.
- [6.75] G.J.Conklin et al, "Video coding for streaming media delivery on the Internet," *IEEE Trans CSVT*, vol.11, pp.269-281, March 2001.
- [6.76] C.W.Lin et al, "MPEG video streaming with VCR functionality," *IEEE Trans CSVT*, vol.11, pp.415-425, March 2001.
- [6.77] D.Wu, Y.T.Hou and Y.Q.Zhang, "Transporting real-time video over the Internet: challenges and approaches," *Proc. IEEE*, vol.88, pp.1,855-1,877, Dec. 2000.
- [6.78] D.Wu et al, "On end-to-end architecture for transporting MPEG-4 video over the Internet," *IEEE Trans. CSVT*, vol.10, pp.923-941, Sept. 2000.
- [6.79] J.C.Bolot, T.Turletti and J.Wakeman, "Scalable feedback control for multicast video distribution in the Internet," Proc. ACM SIGCOMM'94, London, UK, pp.58-67, Sept. 1994.
- [6.80] T.Turletti and C.Huitene, "Videoconferencing on the Internet," *IEEE/ACM Trans. Networking*, vol.4, pp.340-351, June 1996.
- [6.81] S.Floyd and K.Fall, "Promoting the use of end-to-end congestion control in the Internet," *IEEE/ACM Trans. Networking*, vol.7, pp.458-472, Aug. 1999.
- [6.82] S.Y.Cheng, M.Ammar and X.Li, "On the use of destination set grouping to improve fairness in multicast video distribution," *Proc. IEEE INFOCOM'96*, pp.553-560, March 1996.
- [6.83] L.Fan et al, "Summary cache: a scalable wide-area web cache sharing protocol," *IEEE/ACM Trans. Networking*, vol.8, pp.281-293, June 2000.
- [6.84] R.Steinmetz and K.Nahrstedt, *Multimedia: Computing, Communications and Applications*, Upper Saddle River, NJ: Prentice Hall, 1995.
- [6.85] G.Blakowski and R.Steinmetz, "A media synchronization survey: reference model, specification, and case studies," *IEEE J. Selected Areas in Comm.*, vol.14, pp.5-35, Jan. 1996.
- [6.86] H.Schulzrinne, A.Rao and R.Lanphier, *Real Time Streaming Protocol (RTSP)*, Internet Engineering Task Force, RFC2326, April 1998.
- [6.87] M.Handley et al, *SIP: Session Initiation Protocol*, Internet Engineering Task Force, RFC2543, March 1999.

- [6.88] H.Schulzrinne et al, *RTP: A Transport Protocol for Real-Time Applications*, Internet Engineering Task Force, RFC1889, Jan. 1996.
- [6.89] M.Orzessek and P.Sommer, *ATM and MPEG-2: Integrating Digital Video into Broadband Networks*, Upper Saddle River, NJ: Prentice Hall PTR, 1998.
- [6.90] K.R.Rao and Z.S.Bojkovic, *Packet Video Communications over ATM networks*, Upper Saddle River, NJ: Prentice Hall PTR, 2000.
- [6.91] Y.Feng, H.Mehrpour and R.T.Lo, "Statistical multiplexing schemes for MPEG video sources," *Proc. IEEE ICCS/ISPACS'96*, pp.1,501-1,505, Singapore, Nov. 1996.
- [6.92] D.Reininger et al, "Statistical multiplexing of VBR MPEG compressed video on ATM networks," *Proc. IEEE INFOCOM*, vol.3, pp.919-926, San Francisco, CA, March 1993.
- [6.93] M.Krunz, R.Sass and H.Hughes, "Statistical characteristics and multiplexing of MPEG streams," *Proc. IEEE INFOCOM*, pp.455-462, April 1995.
- [6.94] M.R.Ismail et al, "Modeling prioritized MPEG video using TES and a frame scheduling strategy for transmission in ATM networks," *Proc. INFOCOM*, pp.762-770, April 1995.
- [6.95] C.Gao and S.S.Meditch, "Two-layer video coding and priority statistical multiplexing over ATM networks," *Proc. IEEE ICC*, pp.127-136, Dallas, TX, June 1996.
- [6.96] N.Schroff and M.Schwartz, "Video modeling within networks using deterministic smoothing at the source," *Proc. IEEE INFOCOM*, vol.1, pp.342-349, June 1994.
- [6.97] D.L.Mils, "Improved algorithms for synchronizing computer network clocks," *IEEE/ACM Trans. Networking*, vol.3, pp.245-254, June 1995.
- [6.98] P.P.Singh et al, "Jitter and clock recovery for periodic traffic in broadband packet networks," *IEEE Trans. Commun.*, vol.42, pp.2,189-2,196, May 1994.
- [6.99] J.M.Simmons and R.G.Gallagher, "Design of error detection scheme for class C service in ATM," *IEEE/ACM Trans. Networking*, vol.2, pp.80-88, Feb. 1994.
- [6.100] ITU-T SG XVIII, *Performance evaluation results on cell loss in ATM networks*, Doc.1047, Nov. 1990.
- [6.101] M.Wada, "Selective recovery of video packet loss using error concealment," *IEEE J. Selected Areas in Comm.*, vol.7, pp.207-214, June 1989.
- [6.102] M.Ghanbari and V.Sferidis, "Cell-loss concealment in ATM networks," *IEEE Trans. CSVT*, vol.3, pp.238-247, June 1993.
- [6.103] M.Ghanbari and C.Hughes, "Packing coded video signals into ATM cells," *IEEE/ACM Trans. Networking*, vol.1, pp.505-508, Oct. 1993.
- [6.104] Q.Zhu, Y.Wang and L.Shaw, "Coding and cell loss recovery in DCT based packet video," *IEEE Trans. CSVT*, vol.3, pp.248-258, June 1993.
- [6.105] A.S.Tom, C.L.Yeh and F.Chu, "Packet video for cell loss protection using deinterleaving and scrambling," *Proc. IEEE ICASSP*, pp.2857-2860, Toronto, Canada, May 1991.
- [6.106] Y.Wang, Q.Zhu and L.Shaw, "Maximally smooth image recovery in transform coding," *IEEE Trans. Commun.*, vol.41, pp.1,544-1,551, Oct. 1993.
- [6.107] Y.Wang and Q.Zhu, "Signal loss recovery in DCT-based image and video coders," *Proc. SPIE Conf. on Visual Communications and Image Processing*, pp.667-678, Boston, MA, Nov. 1991.
- [6.108] H.Sun and J.Zdapski, "Adaptive error concealment algorithm for MPEG compressed video," *Proc. SPIE Conf. on Visual Communications and Image Processing*, pp.814-824, Boston, MA, Nov. 1992.

- [6.109] W.Kwok and H.Sun, "Multidirectional interpolation for spatial error concealment," *IEEE Trans. Consumer Electronics*, vol.3, pp.455-460, Aug. 1993.
- [6.110] H.Sun and W.Kwok, "Concealment of damaged block transform coded images using projections onto convex sets," *IEEE Trans. Image Process.*, vol.4, pp.470-477, April 1995.
- [6.111] P.Salama et al, "Error concealment techniques for encoded video streams," *Proc. IEEE ICIP*, vol.1, pp.9-12, Washington, DC, Oct. 1995.
- [6.112] J.Lee and B.W.Dickinson, "Temporally adaptive motion interpolation exploiting temporal masking in visual perception," *IEEE Trans. Image Process.*, vol.3, pp.513-526, Sept. 1994.
- [6.113] L.H.Kien and K.N.Ngan, "Cell-loss concealment techniques for layered video codecs in an ATM network," *IEEE Trans. Image Process.*, vol.3, pp.666-677, Sept. 1994.
- [6.114] J.Zhang et al, "MPEG-2 video services for wireless ATM networks," *IEEE J. Selected Areas in Comm.*, vol.15, pp.119-128, Jan. 1997.
- [6.115] E.Ayanoglu et al, "Performance improvement in the broadband networks using forward error correction for lost packets recovery," *J. of High-Speed Networks*, vol.1, pp.287-303, June 1993.
- [6.116] E.Ayanoglu et al, "Forward error control for MPEG-2 video transport in a wireless ATM LAN," *Proc. IEEE ICIP*, vol.2, pp.833-836, Lausanne, Switzerland, 1996.
- [6.117] M.Sudan and N.Shacham, "Gateway-based approach for managing multimedia sessions over heterogeneous signaling domains," *Proc. IEEE INFOCOM'97*, pp.702-711, IEEE Computer Soc. Press, Los Alamitos, CA, 1997.
- [6.118] S.D.Servetto and K.Nahrstedt, "Broadcast quality video over IP," *IEEE Trans. Multimedia*, vol.3, pp.162-173, March 2001.
- [6.119] A.Lombardo, G.Schembra and G.Morabito, "Traffic specifications for the transmission of stored MPEG video on the Internet," *IEEE Trans. Multimedia, Special Issue on Multimedia over IP*, vol.3, pp.5-17, March 2001.
- [6.120] O.Hashida, Y.Takahashi and S.Shimogawa, "Switched batch Bernoulli process (SBBP) and the discrete-time SBBP/G/1 queue with application to statistical multiplexer," *IEEE J. Selected Areas in Comm.*, vol.9, pp.394-401, April 1991.
- [6.121] M.Garnet and W.Willinger, "Analysis, modeling and generation of self-similar VBR video traffic," *Proc. ACM/SIGCOM*, pp.269-280, Aug. 1994.
- [6.122] M.Furini and D.F.Towsley, "Real-time traffic transmission over the Internet," *IEEE Trans. Multimedia*, vol.3, pp.33-40, March 2001.
- [6.123] W.C.Feng and S.Sechrest, "Critical bandwidth allocation for the delivery of compressed video," *Comp. Commun.*, vol.18, pp.709-717, Oct.1995.
- [6.124] J.D.Sclahi et al, "Supporting stored video: Reducing rate variability and end-to-end resource requirements through optimal smoothing," *IEEE/ACM Trans. Networking*, vol.6, pp.397-410, Aug. 1998.
- [6.125] M.Grossglanser, S.Keshow and D.Tse, "PCBR: A simple and efficient service for multiple time-scale traffic," *IEEE/ACM Trans. Networking*, vol.5, pp.741-755, Nov. 1997.
- [6.126] W.C.Feng and J.Rexford, "A comparison of bandwidth smoothing techniques for the transmission of prerecorded compressed video," *Proc. IEEE INFOCOM 1997*, pp.58-66, Kobe, Japan, Apr. 1997.
- [6.127] H.M.Radha et al, "Scalable internet video using MPEG-4," *Signal Processing: Image Comm.*, vol.15, pp.95-126, Sept. 1999.

- [6.128] H.M.Radha, M.Van der Schaar and Y.Chen, "The MPEG-4 fine-grained scalable video coding method for multimedia streaming over IP," *IEEE Trans. Multimedia*, vol.3, pp.53-68, March 2001.
- [6.129] S.J.Choi and J.W.Woods, "Motion-compensated 3D subband coding of video," *IEEE Trans. Image Processing*, vol.8, pp.155-167, Feb. 1999.
- [6.130] S.McCanne, M.Vetterli and V.Jacobson, "Low-complexity video coding for receiver-driven layered multicast," *IEEE J. Selected Areas in Comm.*, vol.16, pp.983-1001, Aug. 1997.
- [6.131] B.Girod et al, "Packet loss resilient Internet video streaming," VCIP'99, *Proc. SPIE*, vol.3,653, pp.833-844, Jan. 1999.
- [6.132] ISO/IEC 14496-2, "MPEG-4 video FGS v.4.0." Noordwijkerhout, Netherlands, Proposed Draft Amendment (PDAM), March 2000.
- [6.133] ISO/IEC 14496-2, "FGS Amendment WD v.10.0," Vancouver, BC, Canada, 48th MPEG Meeting, July 1999.
- [6.134] ISO/IEC 14496-2, "Information technology coding of audio-visual objects: Visual," March 2000.
- [6.135] M.van der Schaar, Y.Chen and H.M.Radha, "Embedded DCT and wavelet methods for fine granular scalable video: analysis and comparison," *IVCP2000, Proc. SPIE*, vol.2,974, pp.643-653, Jan. 2000.
- [6.136] M.Yong, "Study of voice packet reconstruction methods applied in CELP speech coding," *Proc. IEEE ICASSP*, vol.2, pp.125-128, San Francisco, CA, March 1992.
- [6.137] T.W.Leng, W.P.Blanc and S.A.Mahmoud, "Speech coding over frame relay network," *Proc. IEEE Int. Workshop on Speech Coding*, pp.75-76, Oct. 1993.
- [6.138] A.Husain and V.Cuperman, "Reconstruction of missing packets for CELP-based speech coders," *Proc. IEEE ICASSP*, vol.1, pp.245-248, 1995.
- [6.139] C.R.Watkins and J.H.Chen, "Improving 16kbps G.728 LD-CELP speech coder for frame erasure channels," *Proc. IEEE ICASSP*, vol.1, pp.241-245, 1995.
- [6.140] J.F.Wang et al, "A voice-driven packet loss recovery algorithm for analysis-by-synthesis predictive speech coders over Internet," *IEEE Trans. Multimedia*, vol.3, pp.98-107, March 2001.
- [6.141] W.B.Kleijn and K.K.Paliwal, *Speech Coding and Synthesis*, Amsterdam, Netherlands: Elsevier Science, 1995.
- [6.142] P.Merriman, "Video over DSL architecture," *Alcatel Telecommunications Review*, pp.250-257, 4th Quarter 2000.
- [6.143] M.Verhoeven, "Delivering voice services over DSL," *Alcatel Telecommunications Review*, pp.244-249, 4th Quarter 2000.
- [6.144] H.Zhang and K.J.R.Lin, "Robust image and video transmission over spectrally shaped channels using multicast modulation," *IEEE Trans. Multimedia*, vol.1, pp.88-103, March 1999.
- [6.145] H.Zhang and K.J.R.Lin, "Multimedia services over digital subscriber lines," *IEEE Signal Processing Magazine*, vol.17, pp.44-60, July 2000.
- [6.146] T.Starr, J.Cioffi and P.Silverman, *Understanding Digital Line Technologies*, Upper Saddle River, NJ: Prentice Hall PTR, 2000.
- [6.147] K.Maxwell, *Residential broadband, A User's Guide to the Battle for the Last Mile*, New York: John Wiley, 1999.
- [6.148] W.Goralski, *ADSL and DSL Technologies*, New York, NY: McGraw-Hill, 1998.
- [6.149] A.D.Roy, "Cable: it's not just for TV," *IEEE Spectrum*, vol.36, pp.53-59, May 1999.

- [6.150] A.D.Roy, "Ringing from the Internet," *IEEE Spectrum*, vol.36, pp.32-38, May 1999.
- [6.151] R.L.Freeman, *Telecommunications Transmission Handbook*, New York, NY: JohnWiley, 1998.
- [6.152] R.G.Winch, *Telecommunications Transmission Systems*, New York, NY: McGraw-Hill, 1998.
- [6.153] K.Feher, *Wireless Communications – Modulation and Spread Spectrum Applications*, Upper Saddle River, NJ: Prentice Hall, 1995.
- [6.154] V.O.Klee and X.X.Oui, "Personal communication systems (PCS)," *Proc. of the IEEE*, vol.83, pp.1,210-1,243, July 1995.
- [6.155] L.Hanzo, "Bandwidth efficient wireless multimedia communications," *Proc. of the IEEE*, vol.86, pp.1,342-1,382, July 1998.
- [6.156] J.Mikkonen et al, "Emerging wireless broadband networks," *IEEE Comm. Magazine*, vol.36, pp.112-117, Feb. 1998.
- [6.157] K.Palavan et al, "Wideband local access: wireless LAN and wireless ATM," *IEEE Commun. Magazine*, vol.35, pp.34-40, Nov.1997.
- [6.158] L.Correia and R.Prasad, "An overview of wireless broadband communications," *IEEE Commun. Magazine*, vol.35, pp.28-33, Jan. 1997.
- [6.159] D.J.Goodman and D.Raychaudhuri, (Eds.), *Mobile Multimedia Communications*, New York: Plenum Press, 1997.
- [6.160] Y.Waugand and Q.F.Hu, "Error control and concealment for video communication: a review," *Proc. of the IEEE*, vol.86, pp.974-977, May 1998.
- [6.161] M.Chelouche et al, "Digital wireless broadband corporate and private networks: RNET concepts and applications," *IEEE Comm. Magazine*, vol.35, pp.42-51, Jan. 1997.
- [6.162] M.Naghshinehand and M.W.LeMair, "End-to-end QoS provisioning multimedia wireless mobile networks using an adaptive framework," *IEEE Comm. Magazine*, vol.35, pp.72-81, Nov. 1997.
- [6.163] G.Wen and J.Villansenor, "A class of reversible variable length codes for robust image and video coding," *Proc. IEEE ICIP'97*, pp.65-68, Oct. 1997.
- [6.164] G.Reyes et al, "Video transcoding for resilience in wireless channels," *Proc. IEEE ICIP*, pp.338-342, Oct. 1998.
- [6.165] G.Cheung and A.Zakhor, "Joint source/channel coding for scalable video over noisy channels," *Proc. IEEE ICIP'96*, pp.767-770, Sept. 1996.
- [6.166] A.A.Alatan and J.W.Woods, "Joint utilization of fixed and variable-length codes for improving synchronization immunity for image transmission," *Proc. IEEE ICIP*, pp.319-323, Oct. 1998.
- [6.167] H.Li and C.W.Chen, "Joint source and channel optimized block TCQ with layered transmission and RCPC," *Proc. IEEE ICIP*, pp.644-648, Oct. 1998.
- [6.168] P.G.Sherwood and K.Zeger, "Progressive image coding for noisy channels," *IEEE Signal Processing Letters*, vol.4, pp.189-191, July 1997.
- [6.169] P.G.Sherwood and K.Zeger, "Error protection for progressive image transmission over memoryless and fading channels," *Proc. IEEE ICIP'98*, pp.324-328, Oct. 1998.
- [6.170] H.Man, F.Kossentini and J.T.Smith, "Robust EZW image coding for noisy channels," *IEEE Signal Processing Letters*, vol.4, pp.227-229, Aug. 1997.
- [6.171] Z.Xiong, B.J.Kim and W.A.Pearlman, "Progressive video coding for noisy channels," *Proc. IEEE ICIP'98*, pp.334-337, Oct. 1998.

- [6.172] D.W.Rednull and N.G.Kingsbury, "The EREC: an error-resilient technique for coding variable length blocks of data," *IEEE Trans. Image Process.*, vol.5, pp.565-574, April 1996.
- [6.173] R.Chandramouli, N.Ranganathan and S.J.Ramadoss, "Joint optimization of quantization and on-line channel estimation for low bit-rate video transmission," *Proc. IEEE ICIP'98*, pp.649-653, Oct. 1998.
- [6.174] J.M.Shapiro, "Embedded image coding using zerotrees of wavelet coefficients," *IEEE Trans. Signal Processing*, vol.41, pp.3,445-3,462, Dec. 1993.
- [6.175] A.Said and W.Pearlman, "A new fast and efficient image codec based on set partitioning in hierarchical trees," *IEEE Trans. CSVT*, vol.6, pp.243-250, June 1996.
- [6.176] A.Gersho and R.M.Gray, *Vector Quantization and Signal Compression*, Boston, MA, Kluwer, 1992.
- [6.177] M.W.Marcellin and T.R.Fischer, "Trellis coded quantization of memoryless and Gauss-Markov sources," *IEEE Trans. Comm.*, vol.38, pp.82-93, Jan. 1990.
- [6.178] J.Hagenamer, "Rate compatible punctured convolutional codes (RCPC) and their applications," *IEEE Trans. Comm.*, vol.36, pp.389-400, April 1988.
- [6.179] L.H.C.Lee, "New rate-compatible punctured convolutional codes for Viterbi decoding," *IEEE Trans. Comm.*, vol.42, pp.3,037-3,079, Dec. 1994.
- [6.180] D.Milovanovic and Z.Bojkovic, "Audio/video transmission in mobile communications," *Proc. ETAI*, pp.43-46, Ohrid, Republic of Macedonia, Sept. 2000.
- [6.181] GSM 06.55, *Digital Cellular Telecommunication System, Performance Characterization of the GSM Enhanced Full Rate EFR Speech Codec*, ETSI Tech. Rep., ETR305, Aug. 1996.
- [6.182] ETSI STC SMG11, Version1, *Adaptive Multirate AMR*, Study Phase Rep., Oct. 1997.
- [6.183] GSM03.34, *Digital Cellular Telecommunication System (Phase2+): High Speed Circuit Switched Data (HSCSD)-Stage2*, ETSI Tech. Specification, TS101138, April 1997.
- [6.184] M.Karcewicz, J.Nieglowski and P.Haavisto, "Video coding using motion compensation with polynomial motion vector fields," *Signal Processing: Image Comm.*, vol.10, pp.63-91, July 1997.
- [6.185] D.Raychaudhury and N.Wilson, "ATM based transport architecture for multiservices wireless personal communication networks," *IEEE J. Selected Areas in Comm.*, vol.12, pp.1,401-1,414, Oct. 1994.
- [6.186] K.Duantl, *Location Management for Mobile Networks*, ATM Forum/97-0322, 97-0087, Mountain View, California, Feb. 1997.
- [6.187] G.Bautz, *Addressing in Wireless ATM Networks*, ATM Forum/97-0322, Mountain View, California, April 1997.
- [6.188] C.Perkins, (Ed.), *Mobility Support*, IETF RFC2002, Reston, Virginia, Oct. 1996.
- [6.189] CDPD Consortium, *Cellular Digital Packet Data Specification*, POB809320, Chicago, IL, July 1993.
- [6.190] Ch.E.Perkins, "Mobile networking through mobile IP," *IEEE Internet Computing*, vol.2, pp.58-69, Jan.-Feb. 1998.
- [6.191] S.E.Deering, Ed., *ICMP Router Discovery Messages*, IETF RFC1256, Reston, Virginia, Sept. 1991.
- [6.192] C.Perkins, *IP Encapsulation Within IP*, IETF RFC2003, Reston, Virginia, May 1996.

- [6.193] L.Veltri, "IP mobility support in private access networks: an interworking scenario between mobile IP and NAPT," *Proc. IEEE ICT*, vol.1, pp.1,215-1,230, Bucharest, Romania, June 2001.
- [6.194] M.Holdrege and P.Srisuresh, *IP Network Address Translator (NAT) Terminology and Considerations*, IETF RFC2663, Reston, Virginia, Aug. 1999.
- [6.195] M.Holdrege and P.Srisuresh, *Protocol Complications with the IP Network Address Translator*, IETF RFC3027, Reston, Virginia, Jan. 2001.
- [6.196] Wireless Multimedia Forum, *Delivering Streaming Media to the Mobile Masses*, Los Gatos, California, Feb. 2001.
- [6.197] D.Sisalem, "SIP and mobile communication," *IEEE ICT, Proc. Special Sessions*, pp.447-450, Bucharest, Romania, June 2001.
- [6.198] A.Ballardie, *Core Based Trees (CBT) Multicast Routing Architecture*, IETF RFC2201, Reston, Virginia, 1997.
- [6.199] K.L.Calvert, E.Zegura and M.J.Donohoo, *Core Selection Methods for Multicast Routing*, GIT-CC-95/15 *Proc., IC3N'95*, Atlanta, GA, 1995.
- [6.200] K.Brown and S.Singh, "A network architecture for mobile computing," *Proc. IEEE INFOCOM'96*, pp.1,388-1,396, March 1996.
- [6.201] W.W.Lu, "Compact multidimensional broadband wireless: the convergence of wireless mobile and access," *IEEE Comm. Magazine*, vol.38, pp.119-123, Nov. 2000.
- [6.202] R.Rebhan et al, "Multimedia goes mobile in broadcast networks," *IEEE Multimedia*, Vol. 4, pp.14-21, April-June 1997.
- [6.203] D.Pan, "A tutorial on MPEG Audio compression," *IEEE Multimedia*, vol.2, pp.60-74, Summer 1995.
- [6.204] European Telecommunications Standards Institute, Sophia Antipolis Cedex, France, ETS300421 *DVB-Satellite (1999)*, ETS300429 *DVB-Cable (1998)*, ETS300744 *DVB-Terrestrial (1999)*.
- [6.205] S.Pekowsky and A.Andorfer, "Multimedia data broadcasting strategies," *IEEE Comm. Magazine*, vol.39, pp.138-145, April 2001.
- [6.206] G.Luettene, "The DVB multimedia home platform," *MUST'98*, May 1998.
- [6.207] J.van der Meer and C.M.Huizer, *Interoperability Between Different Interactive Engines for Digital Television, Problems and Solutions*, Eindhoven, The Netherlands, Philips, June 1997.
- [6.208] E.Stare et al, *The Multimedia Car Platform*, European Commission Project, Jan., 2000.
- [6.209] M.Milenkovic, "Delivering interactive services via a digital TV infrastructure," *IEEE Multimedia*, pp.34-43, Oct.-Dec. 1998.
- [6.210] A.Acharya, M.Franklin and S.Zdomi, "Prefetching from a broadcast disk," *Proc. 12th Int. Conf. Data Engineering*, IEEE CS Press, pp.276-285, Los Alamitos, CA, 1996.
- [6.211] T.E.Browen et al, "The data cycle architecture," *Comm. ACM*, vol.30, pp.71-81, Dec. 1992.
- [6.212] T.Imielinski, S.Viswanathan and B.R.Badrinath, "Data on air: organization and access," *IEEE Trans. Knowledge Data Eng.*, vol.9, pp.353-372, March 1997.
- [6.213] D.Minoli, *Video Dialtone Technology*, New York, NY: McGraw-Hill, New York, 1995.
- [6.214] J.Nielsen, *Usability Engineering*, Chestnut Hill, MA: Academic Press, 1993.

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