

References

- [1] V. Cisco, “Cisco visual networking index: Forecast and trends, 2017–2022,” *White Paper*, 2018.
- [2] M. R. Robertson, “500 hours of video uploaded to youtube every minute [forecast],” *Tubular Insights: Video Marketing Insights*, 2015.
- [3] R. Fielding, *A Technological History of Motion Pictures and Television: an anthology from the pages of the Journal of the Society of Motion Picture and Television Engineers*. Univ of California Press, 1967.
- [4] S. Theodoridis and R. Chellappa, *Academic press library in signal processing: Image and Video Compression and Multimedia*. Academic Press, 2014, vol. 5.
- [5] R. Schafer and T. Sikora, “Digital video coding standards and their role in video communications,” *Proceedings of the IEEE*, vol. 83, no. 6, pp. 907–924, 1995.
- [6] “Draft revision of recommendation H.261: Video codec for audiovisual services at $p \times 64$ kbit/s,” *Signal Processing: Image Communication*, vol. 2, no. 2, pp. 221–239, aug 1990.
- [7] K. Jack, “MPEG-1, MPEG-2, MPEG-4, and H.264,” in *Digital Video and DSP*. Elsevier, 2008, pp. 165–199.

-
- [8] K. Rijkse, “H. 263: video coding for low-bit-rate communication,” *IEEE Communications Magazine*, vol. 34, no. 12, pp. 42–45, 1996.
- [9] S.-F. Chang, T. Sikora, and A. Purl, “Overview of the MPEG-7 standard,” *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 11, no. 6, pp. 688–695, 2001.
- [10] T. Wiegand, G. J. Sullivan, G. Bjontegaard, and A. Luthra, “Overview of the H. 264/AVC video coding standard,” *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 13, no. 7, pp. 560–576, 2003.
- [11] G. Sullivan, J. Ohm, W. J. Han, and T. Wiegand, “Overview of the high efficiency video coding (HEVC) standard,” *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 22, no. 12, pp. 1649–1668, Dec 2012.
- [12] J. Collaborative Team on Video Coding (JCT-VC), “HM reference software,” Available online at https://hevc.hhi.fraunhofer.de/svn/svn_HEVCSoftware/.
- [13] J.-R. Ohm, G. J. Sullivan, H. Schwarz, T. K. Tan, and T. Wiegand, “Comparison of the coding efficiency of video coding standards—including High Efficiency Video Coding (hevc),” *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 22, no. 12, pp. 1669–1684, 2012.
- [14] F. Bossen, B. Bross, K. Suhring, and D. Flynn, “HEVC complexity and implementation analysis,” *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 22, no. 12, pp. 1685–1696, 2012.
- [15] M. Viitanen, J. Vanne, T. D. Hämäläinen, M. Gabbouj, and J. Lainema, “Complexity analysis of next-generation HEVC decoder,” in *International Symposium on Circuits and Systems*. IEEE, 2012, pp. 882–885.

-
- [16] M. Harwit and N. Sloane, "Hadamard transform optics," *Academic press, London*, 1979.
- [17] P. Porwik and A. Lisowska, "The Haar-wavelet transform in digital image processing: its status and achievements," *Machine Graphics and Vision*, vol. 13, no. 1/2, pp. 79–98, 2004.
- [18] R. N. Bracewell and R. N. Bracewell, *The Fourier transform and its applications*. McGraw-Hill New York, 1986, vol. 31999.
- [19] N. Ahmed and K. R. Rao, *Orthogonal transforms for digital signal processing*. Springer Science & Business Media, 2012.
- [20] V. Britanak, P. C. Yip, and K. R. Rao, *Discrete cosine and sine transforms: general properties, fast algorithms and integer approximations*. Elsevier, 2010.
- [21] E. D. Kolaczyk, "Methods for analyzing certain signals and images in astronomy using Haar wavelets," in *Conference Record of the Thirty-First Asilomar Conference on Signals, Systems & Computers*, vol. 1. IEEE, 1997, pp. 80–84.
- [22] Y. Qiang, "Image denoising based on Haar wavelet transform," in *International Conference on Electronics and Optoelectronics (ICEOE)*, vol. 3. IEEE, 2011, pp. V3–129.
- [23] S. A. Martucci and R. M. Mersereau, "New approaches to block filtering of images using symmetric convolution and the DST or DCT," in *International Symposium on Circuits and Systems, ISCAS'93*. IEEE, 1993, pp. 259–262.
- [24] R. C. Gonzalez and R. E. Woods, "Digital image processing second edition," *Beijing: Publishing House of Electronics Industry*, vol. 455, 2002.
- [25] K. R. Rao and P. Yip, *Discrete cosine transform: algorithms, advantages, applications*. Academic press, 2014.

-
- [26] N. Ahmed, T. Natarajan, and K. R. Rao, "Discrete cosine transform," *IEEE Transactions on Computers*, vol. 100, no. 1, pp. 90–93, 1974.
- [27] A. K. Jain, "A fast Karhunen-Loeve transform for finite discrete images," in *Proc. Nat. Electronics Conf.*, vol. 29, 1974, pp. 323–328.
- [28] E. Feig and S. Winograd, "Fast algorithms for the discrete cosine transform," *IEEE Transactions on Signal Processing*, vol. 40, no. 9, pp. 2174–2193, 1992.
- [29] Y.-P. Lee, T.-H. Chen, L.-G. Chen, M.-J. Chen, and C.-W. Ku, "A cost-effective architecture for 8/spl times/8 two-dimensional DCT/IDCT using direct method," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 7, no. 3, pp. 459–467, 1997.
- [30] C.-T. Lin, Y.-C. Yu, and L.-D. Van, "Cost-effective triple-mode reconfigurable pipeline FFT/IFFT/2-D DCT processor," *IEEE Transactions on Very Large Scale Integration (VLSI) systems*, no. 8, pp. 1058–1071, 2008.
- [31] A. Madisetti and A. N. Willson, "A 100 mhz 2-D 8/spl times/8 DCT/IDCT processor for HDTV applications," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 5, no. 2, pp. 158–165, 1995.
- [32] T. Xanthopoulos and A. P. Chandrakasan, "A low-power DCT core using adaptive bitwidth and arithmetic activity exploiting signal correlations and quantization," *IEEE Journal of Solid-State Circuits*, vol. 35, no. 5, pp. 740–750, 2000.
- [33] M. Alam, W. Badawy, and G. Jullien, "A new time distributed DCT architecture for MPEG-4 hardware reference model," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 15, no. 5, pp. 726–730, 2005.

-
- [34] A. M. Shams, A. Chidanandan, W. Pan, and M. A. Bayoumi, “NEDA: A low-power high-performance DCT architecture,” *IEEE Transactions on Signal Processing*, vol. 54, no. 3, pp. 955–964, 2006.
- [35] M. Tikekar, C.-T. Huang, V. Sze, and A. Chandrakasan, “Energy and area-efficient hardware implementation of HEVC inverse transform and dequantization,” in *International Conference on Image Processing (ICIP)*. IEEE, 2014, pp. 2100–2104.
- [36] B. Lee, “A new algorithm to compute the discrete cosine transform,” *IEEE Transactions on Acoustics, Speech, and Signal Processing*, vol. 32, no. 6, pp. 1243–1245, December 1984.
- [37] Y. Arai, T. Agui, and M. Nakajima, “A fast DCT-SQ scheme for images,” *IEICE Transactions*, vol. E71, no. 11, p. 1095–1097, November 1988.
- [38] W.-H. Chen, C. Smith, and S. Fralick, “A fast computational algorithm for the discrete cosine transform,” *IEEE Transactions on Communications*, vol. 25, no. 9, pp. 1004–1009, Sep. 1977.
- [39] C. Loeffler, A. Ligtenberg, and G. S. Moschytz, “A practical fast 1-D DCT algorithms with 11 multiplications,” in *International Conference on Acoustics, Speech, and Signal Processing*, vol. 2, p. 988–991, May 1989.
- [40] L. Yu, S. Chen, and J. Wang, “Overview of AVS-video coding standards,” *Signal processing: Image communication*, vol. 24, no. 4, pp. 247–262, 2009.
- [41] J. E. Volder, “The CORDIC trigonometric computing technique,” *IRE Transactions on Electronic Computers*, vol. 8, no. 3, pp. 330–334, 1959.

-
- [42] H. C. Karathanasis, "On computing the 2-D discrete cosine transform using rotations," *Microprocessing and Microprogramming*, vol. 38, no. 1-5, pp. 359–365, 1993.
- [43] E. P. Mariatos, D. E. Metafas, J. A. Hallas, and C. E. Goutis, "A fast DCT processor, based on special purpose CORDIC rotators," in *IEEE International Symposium on Circuits and Systems, ISCAS 1994, London, England, UK, May 30 - June 2, 1994*, 1994, pp. 271–274.
- [44] F. Zhou and P. Kornerup, "High speed DCT/IDCT using a pipelined CORDIC algorithm," in *12th Symposium on Computer Arithmetic (ARITH-12 '95), July 19-21, 1995, Bath, England, UK*, 1995, pp. 180–187.
- [45] Y. H. Hu and Z. Wu, "An efficient CORDIC array structure for the implementation of discrete cosine transform," *IEEE Transactions on Signal Processing*, vol. 43, no. 1, pp. 331–336, 1995.
- [46] J. Hsiao, L. Chen, T. Chiueh, and C. Chen, "High throughput CORDIC-based systolic array design for the discrete cosine transform," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 5, no. 3, pp. 218–225, 1995.
- [47] T. I. Haweel, "A new square wave transform based on the DCT," *Signal Processing*, vol. 81, no. 11, pp. 2309–2319, nov 2001.
- [48] R. Cintra, F. Bayer, and C. Tablada, "Low-complexity 8-point DCT approximations based on integer functions," *Signal Processing*, vol. 99, pp. 201–214, jun 2014.
- [49] Y.-J. Chen, Oraintara, Tran, Amaratunga, and Nguyen, "Multiplierless approximation of transforms using lifting scheme and coordinate descent with

- adder constraint,” in *International Conference on Acoustics Speech and Signal Processing*. IEEE, 2002.
- [50] J. Liang and T. Tran, “Approximating the DCT with the lifting scheme: systematic design and applications,” in *Conference Record of the Thirty-Fourth Asilomar Conference on Signals, Systems and Computers (Cat. No.00CH37154)*. IEEE, 2000.
- [51] —, “Fast multiplierless approximations of the DCT with the lifting scheme,” *IEEE Transactions on Signal Processing*, vol. 49, no. 12, pp. 3032–3044, 2001.
- [52] H. Malvar, “Erratum: Fast computation of discrete cosine transform through fast Hartley transform,” *Electronics Letters*, vol. 23, no. 11, pp. 608–608, may 1987.
- [53] N. Kouadria, S. Harize, N. Doghmane, and D. Messadeg, “Low complexity DCT for image compression in wireless visual sensor networks,” *Electronics Letters*, vol. 49, no. 24, pp. 1531–1532, nov 2013.
- [54] R. J. Cintra and F. M. Bayer, “A DCT approximation for image compression,” *IEEE Signal Processing Letters*, vol. 18, no. 10, pp. 579–582, oct 2011.
- [55] S. Bouguezel, M. O. Ahmad, and M. N. S. Swamy, “Binary discrete cosine and Hartley transforms,” *IEEE Transactions on Circuits and Systems I: Regular Papers*, vol. 60, no. 4, pp. 989–1002, apr 2013.
- [56] S. Bouguezel, M. O. Ahmad, and M. Swamy, “A low-complexity parametric transform for image compression,” in *International Symposium of Circuits and Systems (ISCAS)*. IEEE, may 2011.

-
- [57] U. S. Potluri, A. Madanayake, R. J. Cintra, F. M. Bayer, and N. Rajapaksha, "Multiplier-free DCT approximations for RF multi-beam digital aperture-array space imaging and directional sensing," *Measurement Science and Technology*, vol. 23, no. 11, p. 114003, oct 2012.
- [58] S. Bouguezel, M. Ahmad, and M. Swamy, "Low-complexity 8×8 transform for image compression," *Electronics Letters*, vol. 44, no. 21, p. 1249, 2008.
- [59] S. Bouguezel, M. O. Ahmad, and M. Swamy, "A multiplication-free transform for image compression," in *2nd International Conference on Signals, Circuits and Systems*. IEEE, nov 2008.
- [60] S. Bouguezel, M. O. Ahmad, and M. N. S. Swamy, "A fast 8×8 transform for image compression," in *International Conference on Microelectronics - ICM*. IEEE, dec 2009.
- [61] S. Bouguezel, M. O. Ahmad, and M. Swamy, "A novel transform for image compression," in *53rd International Midwest Symposium on Circuits and Systems*. IEEE, aug 2010.
- [62] F. Bayer and R. Cintra, "DCT-like transform for image compression requires 14 additions only," *Electronics Letters*, vol. 48, no. 15, p. 919, 2012.
- [63] W.-K. Kuo and K.-W. Wu, "Traffic prediction and QoS transmission of real-time live VBR videos in WLANs," *ACM Transactions on Multimedia Computing, Communications, and Applications*, vol. 7, no. 4, pp. 1–21, nov 2011.
- [64] S. Saponara, "Real-time and low-power processing of 3D direct/inverse discrete cosine transform for low-complexity video codec," *Journal of Real-Time Image Processing*, vol. 7, no. 1, pp. 43–53, aug 2010.

-
- [65] V. Lecuire, L. Makkaoui, and J.-M. Moureaux, "Fast zonal DCT for energy conservation in wireless image sensor networks," *Electronics Letters*, vol. 48, no. 2, p. 125, 2012.
- [66] M. Budagavi, A. Fuldseth, G. Bjontegaard, V. Sze, and M. Sadafale, "Core transform design in the high efficiency video coding (HEVC) standard," *IEEE Journal of Selected Topics in Signal Processing*, vol. 7, no. 6, pp. 1029–1041, Dec 2013.
- [67] H. S. Malvar, A. Hallapuro, M. Karczewicz, and L. Kerofsky, "Low-complexity transform and quantization in H. 264/AVC," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 13, no. 7, pp. 598–603, 2003.
- [68] P. Meher, S. Y. Park, B. Mohanty, K. S. Lim, and C. Yeo, "Efficient integer DCT architectures for HEVC," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 24, no. 1, pp. 168–178, Jan 2014.
- [69] Y. Voronenko and M. Püschel, "Multiplierless multiple constant multiplication," *ACM Transactions on Algorithms*, vol. 3, no. 2, 2007.
- [70] A. Ahmed, M. U. Shahid *et al.*, "N point DCT VLSI architecture for emerging HEVC standard," *VLSI Design*, vol. 2012, p. 1–13, 2012.
- [71] M. Masera, M. Martina, and G. Masera, "Adaptive approximated DCT architectures for HEVC," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 27, no. 12, pp. 2714–2725, 2017.
- [72] J. Vanne, M. Viitanen, T. D. Hamalainen, and A. Hallapuro, "Comparative rate-distortion-complexity analysis of HEVC and AVC video codecs," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 22, no. 12, pp. 1885–1898, 2012.

- [73] M. Jridi, A. Alfalou, and P. K. Meher, “A generalized algorithm and reconfigurable architecture for efficient and scalable orthogonal approximation of DCT,” *IEEE Transactions on Circuits and Systems I: Regular Papers*, vol. 62, no. 2, pp. 449–457, 2015.
- [74] M. Jridi and P. K. Meher, “Scalable approximate DCT architectures for efficient HEVC-compliant video coding,” *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 27, no. 8, pp. 1815–1825, 2017.
- [75] C.-W. Chang, H.-F. Hsu, C.-P. Fan, C.-B. Wu, and R. C.-H. Chang, “A fast algorithm-based cost-effective and hardware-efficient unified architecture design of 4×4 , 8×8 , 16×16 , and 32×32 inverse core transforms for HEVC,” *Journal of Signal Processing Systems*, vol. 82, no. 1, pp. 69–89, 2016.
- [76] P.-T. Chiang and T. S. Chang, “A reconfigurable inverse transform architecture design for HEVC decoder,” in *IEEE International Symposium on Circuits and Systems (ISCAS)*, 2013, pp. 1006–1009.
- [77] H. Sun, Z. Cheng, A. M. Gharehbaghi, S. Kimura, and M. Fujita, “Approximate DCT design for video encoding based on novel truncation scheme,” *IEEE Transactions on Circuits and Systems I: Regular Papers*, vol. 66, no. 4, pp. 1517–1530, 2018.
- [78] M. Jridi, A. Alfalou, and P. K. Meher, “Efficient approximate core transform and its reconfigurable architectures for HEVC,” *Journal of Real-Time Image Processing*, pp. 1–11, 2018.
- [79] S. Chatterjee and K. Sarawadekar, “An optimized architecture of HEVC core transform using real-valued DCT coefficients,” *IEEE Transactions on Circuits and Systems II: Express Briefs*, vol. 65, no. 12, pp. 2052–2056, Dec 2018.

-
- [80] M. Abdelrasoul, M. S. Sayed, and V. Goulart, “Real-time unified architecture for forward/inverse discrete cosine transform in high efficiency video coding,” *IET Circuits, Devices & Systems*, vol. 11, no. 4, pp. 381–387, 2016.
- [81] T. Dias, N. Roma, and L. Sousa, “Unified transform architecture for AVC, AVS, VC-1 and HEVC high-performance codecs,” *EURASIP Journal on Advances in Signal Processing*, vol. 2014, no. 1, p. 1, 2014.
- [82] M. Chen, Y. Zhang, and C. Lu, “Efficient architecture of variable size HEVC 2D-DCT for FPGA platforms,” *AEU-International Journal of Electronics and Communications*, vol. 73, pp. 1–8, 2017.
- [83] R. Conceição, J. C. Souza, R. Jeske, M. Porto, J. Mattos, and L. Agostini, “Hardware design for the 32×32 IDCT of the HEVC video coding standards,” in *26th Symposium on Integrated Circuits and Systems Design (SBCCI)*, Sept 2013, pp. 1–6.
- [84] S. Shen, W. Shen, Y. Fan, and X. Zeng, “A unified 4/8/16/32-point integer IDCT architecture for multiple video coding standards,” in *IEEE International Conference on Multimedia and Expo*, July 2012, pp. 788–793.
- [85] H. Sun, D. Zhou, J. Zhu, S. Kimura, and S. Goto, “An area-efficient 4/8/16/32-point inverse DCT architecture for UHD TV HEVC decoder,” in *Visual Communications and Image Processing Conference*. IEEE, 2014, pp. 197–200.
- [86] M. Podpora, G. P. Korbas, and A. Kawala-Janik, “YUV vs RGB—choosing a color space for human-machine interaction.” *FedCSIS Position Papers*, vol. 18, pp. 29–34, 2014.

-
- [87] K. Seshadrinathan, R. Soundararajan, A. C. Bovik, and L. K. Cormack, “Study of subjective and objective quality assessment of video,” *IEEE Transactions on Image Processing*, vol. 19, no. 6, pp. 1427–1441, 2010.
- [88] G. Bjontegaard, “Calculation of average PSNR differences between RD-curves,” *Doc. VCEG-M33 ITU-T Q6/16, Austin, TX, USA, 2-4 April*, 2001.
- [89] —, “Improvements of the BD-PSNR model,” in *ITU-T SG16/Q6, 35th VCEG Meeting, Berlin, Germany, July*, 2008.
- [90] C. C. Cutler, “Differential quantization of communication signals,” Jul. 29 1952, US Patent 2,605,361.
- [91] V. Sze, M. Budagavi, and G. J. Sullivan, “High efficiency video coding (HEVC),” *Integrated Circuit and Systems, Algorithms and Architectures*, pp. 1–375, 2014.
- [92] M. Wien, “High efficiency video coding,” *Coding Tools and specification*, pp. 133–160, 2015.
- [93] J. Ohm, *Multimedia communication technology: Representation, transmission and identification of multimedia signals*. Springer Science & Business Media, 2012.
- [94] G. J. Sullivan, T. Wiegand *et al.*, “Rate-distortion optimization for video compression,” *IEEE Signal Processing Magazine*, vol. 15, no. 6, pp. 74–90, 1998.
- [95] S. H. ITU-T, “Audiovisual and multimedia systems, H. 265,” *High Efficiency video coding*, 2015.

-
- [96] J. Lainema, F. Bossen, W.-J. Han, J. Min, and K. Ugur, “Intra coding of the HEVC standard,” *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 22, no. 12, pp. 1792–1801, 2012.
- [97] A. Norkin, G. Bjontegaard, A. Fuldseth, M. Narroschke, M. Ikeda, K. Andersson, M. Zhou, and G. Van der Auwera, “HEVC deblocking filter,” *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 22, no. 12, pp. 1746–1754, 2012.
- [98] C.-M. Fu, E. Alshina, A. Alshin, Y.-W. Huang, C.-Y. Chen, C.-Y. Tsai, C.-W. Hsu, S.-M. Lei, J.-H. Park, and W.-J. Han, “Sample adaptive offset in the HEVC standard,” *IEEE Transactions on Circuits and Systems for Video technology*, vol. 22, no. 12, pp. 1755–1764, 2012.
- [99] M. Karczewicz and J. Ridge, “Context-based adaptive variable length coding for adaptive block transforms,” Sep. 21 2004, US Patent 6,795,584.
- [100] J. Au, “Context adaptive variable length decoding system and method,” Nov. 11 2003, US Patent 6,646,578.
- [101] V. Sze and M. Budagavi, “High throughput CABAC entropy coding in HEVC,” *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 22, no. 12, pp. 1778–1791, 2012.
- [102] K. R. Rao and P. C. Yip, *The transform and data compression handbook*. CRC press, 2000.
- [103] K. Sharman and K. Sühring, “Common test conditions,” *Joint Collaborative Team on Video Coding (JCT-VC), Document: JCTVC-X1100, Geneva, Switzerland*, 2016.

-
- [104] R. Goldman, K. Bartleson, T. Wood, K. Kranen, C. Cao, V. Melikyan, and G. Markosyan, “Synopsys’ open educational design kit: Capabilities, deployment and future,” in *International Conference on Microelectronic Systems Education, MSE’09*. IEEE, 2009, pp. 20–24.
- [105] S.-h. Jung and H. W. Park, “A fast mode decision method in HEVC using adaptive ordering of modes,” *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 26, no. 10, pp. 1846–1858, 2016.
- [106] S. J. Park, “CU encoding depth prediction, early CU splitting termination and fast mode decision for fast HEVC intra-coding,” *Signal Processing: Image Communication*, vol. 42, pp. 79–89, 2016.
- [107] K. Goswami, J.-H. Lee, and B.-G. Kim, “Fast algorithm for the High Efficiency Video Coding (HEVC) encoder using texture analysis,” *Information Sciences*, vol. 364, pp. 72–90, 2016.
- [108] B. Lee, J. Jung, and M. Kim, “An all-zero block detection scheme for low-complexity HEVC encoders,” *IEEE Transactions on Multimedia*, vol. 18, no. 7, pp. 1257–1268, 2016.
- [109] K. Lee, H.-J. Lee, J. Kim, and Y. Choi, “A novel algorithm for zero block detection in high efficiency video coding,” *IEEE Journal of Selected Topics in Signal Processing*, vol. 7, no. 6, pp. 1124–1134, 2013.
- [110] H. Yin, H. Cai, E. Yang, Y. Zhou, and J. Wu, “An efficient all-zero block detection algorithm for high efficiency video coding with RDOQ,” *Signal Processing: Image Communication*, vol. 60, pp. 79–90, 2018.
- [111] W. K. Pratt, J. Kane, and H. C. Andrews, “Hadamard transform image coding,” *Proceedings of the IEEE*, vol. 57, no. 1, pp. 58–68, 1969.

-
- [112] D. Hein and N. Ahmed, "On a real-time Walsh-Hadamard/cosine transform image processor," *IEEE Transactions on Electromagnetic Compatibility*, no. 3, pp. 453–457, 1978.
- [113] USC-SIPI Image Database, University of Southern California, Signal and Image Processing Institute, <http://sipi.usc.edu/database/>.
- [114] K. Choi and E. S. Jang, "Early TU decision method for fast video encoding in high efficiency video coding," *Electronics letters*, vol. 48, no. 12, pp. 689–691, 2012.
- [115] M. Siekmann, H. Schwarz, B. Bross, D. Marpe, and T. Wiegand, "Fast encoder control for RQT," *Joint Collaborative Team on Video Coding (JCT-VC), Document JCTVC-E425, Geneva*, 2011.
- [116] L. Aksoy, E. Costa, P. Flores, and J. Monteiro, "Optimization of area and delay at gate-level in multiple constant multiplications," in *13th Euromicro Conference on Digital System Design: Architectures, Methods and Tools (DSD)*, Sept 2010, pp. 3–10.
- [117] Q. Shang, Y. Fan, W. Shen, S. Shen, and X. Zeng, "Single-port SRAM-based transpose memory with diagonal data mapping for large size 2-D DCT/IDCT," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, vol. 22, no. 11, pp. 2423–2427, Nov 2014.
- [118] U. S. Potluri, A. Madanayake, R. J. Cintra, F. M. Bayer, S. Kulasekera, and A. Edirisuriya, "Improved 8-point approximate DCT for image and video compression requiring only 14 additions," *IEEE Transactions on Circuits and Systems I: Regular Papers*, vol. 61, no. 6, pp. 1727–1740, 2014.

-
- [119] J. Zhu, Z. Liu, and D. Wang, “Fully pipelined DCT/IDCT/Hadamard unified transform architecture for HEVC codec,” in *IEEE International Symposium on Circuits and Systems (ISCAS)*, 2013, pp. 677–680.
- [120] D. Flynn, D. Marpe, M. Naccari, T. Nguyen, C. Rosewarne, K. Sharman, J. Sole, and J. Xu, “Overview of the range extensions for the HEVC standard: Tools, profiles, and performance,” *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 26, no. 1, pp. 4–19, 2015.