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## Research Profile

Reginald Lagendijk has been with Delft University of Technology since 1985. He is a full professor in the field of multimedia signal processing, and holds the chair of *Information and Communication Theory* since 1999. The fundamental question that he is interested in, is how multimedia information (images, video, audio) can be represented such that it is not only efficient in communication bandwidth or storage capacity, but that it is also easily identified when stored in large volumes (video libraries, internet) or transmitted over networks (e.g. P2P networks), that it is robust against errors when transmitted, that it can be protected against unauthorized usage, and that it has a good (audio-visual) quality.

Research projects he is currently involved in cover subjects such as multimedia content security (fingerprinting, watermarking, secure signal processing), multimedia information retrieval, and (wireless) multi-media communications. In the past he was involved in research on image sequence restoration and enhancement, and video compression. In the recent years he has been actively involved in shaping and exploring the field of privacy protected signal processing.

Professor Lagendijk is elected member of the *Royal Netherlands Academy of Arts and Sciences (KNAW)*, elected member of the *Royal Holland Society of Sciences and Humanities (KHMW)*, and he is a *Fellow of the IEEE* (for Contributions to Image Processing).

## Current Professional Assignments

Professor Lagendijk currently holds the following national and international professional assignments.

- Chair of the Department of Intelligent Systems at Delft University of Technology.
- Scientific director of the Delft Institute for Research on ICT (DIRECT).
- Scientific director of the Center for Dependable ICT (Cedict).
- Member of the board of the COMMIT research programme.
- Member of the management team of the Netherlands Institute on ICT (Nirict).
- Member of the board of the ICT Innovation Platform (IIP) Intelligent Communications.
- Member of the management team of the ASCI Research School.
- Project leader of the Sentinels project EU Kindred Spirits.

## Current and Past Projects

The following lists gives a concise overview of projects that prof. Lagendijk has been involved in since 2000.

- Trusted Healthcare Services (TheCS) (2012-2015). A COMMIT project that researches domain specific identity management techniques and validation techniques for the healthcare sector.
- Extreme Wireless Distributed Systems (EWiDS) (2011-2015). A COMMIT research project with the focus of protocols, data processing, and privacy in extremely large wireless distributed sensor networks.
- Open Access to Semantic Media (OpenSEM) (2010-2011). An EIT ICTLabs funded initiative to stimulate open access via a portal for open innovation in semantic media.
- Kindred Spirits (2010-2013). A national STW/Sentinels research project with the focus of improving privacy in online social networks.
- PetaMedia (2008-2011). Peer-to-peer tagged multimedia. A European network of excellence that brings together multimedia content analysis, user-based tagging, and peer-to-peer systems.

- Speed (2007-2009). Signal processing in the encrypted domain. The objective was to research signal processing and cryptographic techniques and algorithms that make possible the processing of signals in encrypted form.
- Freeband I-Share (2004-2008). Sharing resources in virtual communities. Our focus is on video compression (multiple description coding, distributed source coding) and content identification (fingerprinting, watermarking) in distributed systems such as peer-to-peer file sharing system and mobile networks.
- VcDemo. Image and Video Compression Learning Tool.

## Noteworthy Achievements

- Prof. Lagendijk gave the Academic Lecture during the 166th Dies Natalis ceremony (January 11, 2008), entitled: *Get Real!: Reflections on Trustworthy Virtuality*.
  - 40 peer-reviewed international journal publications, 140 peer-reviewed international conference publications, 10 book chapters and 5 books.
  - Based on the Scopus database, more than 2300 citations on 80 publications, Hirsch factor 16. Based on Google Scholar, more than 5600 citations on 250 cited publications, Hirsch factor 34.
  - Supervised around 30 (completed) Ph.D. theses.
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## Personal Data

Name	: Reginald Leendert Lagendijk (Inald).
Date and place of birth	: April 22, 1962, Leiden, The Netherlands.
Nationality	: Dutch.
Academic titles	: Prof. dr. ir.
Current position	: Full Professor, Faculty of Electrical Engineering, Mathematics, and Computer Science, Delft University of Technology, Mekelweg 4, 2628 CD Delft, The Netherlands.
E-mail	: R.L.Lagendijk@tudelft.nl.

## Education and Professional Training

06/1980	: Atheneum B, Fioretti-college, Lisse, The Netherlands.
11/1985	: M.Sc.-degree (cum laude) in Electrical Engineering, Delft University of Technology, The Netherlands
04/1990	: Ph.D. in Electrical Engineering, Delft University of Technology, The Netherlands (cum laude). Title of thesis: "Iterative Identification and Restoration of Images". Advisor: prof. dr. ir. J. Biemond, Delft University of Technology.

## Employment

12/1985 – 04/1987	: Ph.D. researcher, Information Theory Group, Department of Electrical Engineering, Delft University of Technology, The Netherlands.
01/1986 – 12/1987	: Parttime researcher TNO-TPD/Dienst Getijdewateren, Rijkswaterstaat, The Hague, The Netherlands.
04/1987 – 12/1993	: Assistant Professor, Information Theory Group, Department of Electrical Engineering, Delft University of Technology, The Netherlands.

- 04/1991 – 11/1991 : Visiting scientist Eastman Kodak Research, Rochester NY, USA.
- 12/1993 – 04/1999 : Associate Professor, Information Theory Group, Department of Electrical Engineering, Delft University of Technology, The Netherlands.
- 04/1999 : Awarded: Antoni van Leeuwenhoek professorship, Delft University of Technology, The Netherlands.
- 04/1999 – current : Full Professor of Information and Communication Theory, Faculty of Electrical Engineering, Mathematics and Computer Science, Delft University of Technology, The Netherlands.
- 06-07/2000 and 03/2003 : Visiting professor, Microsoft Research Asia, Beijing, China, and Tsinghua University, Beijing, China.
- 01/2004 – 2007 : Consultant, Philips Research, Eindhoven, The Netherlands.
- 07/2005 : Visiting professor, Thomson Research Labs, Beijing, China.

### **Professional Activities**

- 01/2000 – 05/2012 : Chair of the Information and Communication Theory Group, Faculty of Electrical Engineering, Mathematics and Computer Science, Delft University of Technology, The Netherlands.
- 2002 – 2007 : Member of the Freeband/STW “National research program telecommunications” program board.
- 06/2004 – 06/2008 : Member (Chair) of the Advisory Committee on Professor Appointments to the Board of Delft University of Technology.
- 06/2005 – 12/2007 : Member of the program committee of the national BSIK program on “Freeband Communications”.
- 01/2008 – current : Member management team “Netherlands Institute for Research on Information and Communication Technology” (NIRICT).
- 01/2008 – 12/2011 : Chairman of the steering committee of the national BSIK program on “Freeband Communications”.
- 01/2008 – current : Chairman national ICT Innovation Platform (IIP) “Intelligent Communication”.
- 10/2008 – 12/2011 : Member of Advisory Council of Netherlands ICT Research and Innovation Authority.
- 01/2008 – current : Scientific director, Delft Research Center on Information and Communication Technology, Delft University of Technology, The Netherlands.
- 2011 – current : Co-director of the FES COMMIT national research program.
- 2011 – current : Chair of the Department of Intelligent Systems, Delft University of Technology.

### **Editorships and Chairs**

- 01/1994 – 12/1997 : Associate editor IEEE Transactions on Image Processing.
- 01/1995 – 12/2000 : Member of the IEEE Signal Processing Society Technical Committee on Image and Multidimensional Signal Processing.
- 01/1999 – 12/2006 : Area editor of EURASIP’s Journal Signal Processing: Image Communication.
- 11/2000 : General chair 2<sup>nd</sup> Int. Symposium on Mobile Multimedia Systems and Applications MMSA2000, Delft, The Netherlands.
- 05/2000 : Co-organizer of the IEEE Benelux Section Signal Processing Symposium, Eindhoven, The Netherlands.
- 06/2001 : General chair ASCI research school conference, Heijen, The Netherlands.
- 10/2001 : Tutorial chair of the IEEE Int. Conference on Image Processing, Thessaloniki, Greece.

- 10/2001 : Co-organizer 5th International Symposium on Wearable Computers, ETH Zurich, Switzerland.
- 07/2002 : Guest editor of the Special issue on Wireless Video, IEEE Transactions on Circuits and Systems for Video Technology.
- 09/2003 : Publicity chair and Awards chair of the IEEE Int. Conference on Image Processing, Barcelona, Spain.
- 09/2003 – 12/2005 : Associate editor IEEE Transactions on Signal Processing: Supplement on Secure Media.
- 09/2005 – 2010 : Associate editor IEEE Transactions on Information Forensics and Security.
- 01/2006 – current : Area editor EURASIP's Journal on Image and Video Processing.
- 09/2006 : European Liaison IEEE Int. Conference on Image Processing, Atlanta GA, USA.
- 09/2011 : Program co-chair IEEE Int. Conference on Image Processing, Brussels.

### Research Projects

- 1991 – 1994 : Project leader for Delft University of Technology in the EC RACE II project "DISTIMA" (stereoscopic imaging and compression).
- 1994 – 1998 : Project leader for Delft University of Technology in the EC ACTS project "SMASH" (video storage and protection for helical scan tape recorders).
- 1995 – 1998 : Project leader of the Philips Research/LEP project "POEM" (visual quality models for MPEG optimization).
- 1998 – 1999 : Project leader for Delft University of Technology in the EC ACTS project "STORit" (video retrieval from home archives).
- 1996 – 2000 : Vice-project leader of the STW "Mobile Multimedia Communications (MMC)" project (4<sup>th</sup> generation mobile communications technology and usage) (1 M€).
- 1997 – 1999 : Project leader and member of the Board of the Delft University of Technology's ARTD "Ubiquitous Communications" program (visual information processing in mobile and wireless terminals).
- 1999 – 2002 : Program leader Delft University of Technology's ARTD "Ubiquitous Communications" program (personal mobile communications with focus on low-power, adaptation, and system design) (3 M€).
- 2000 – 2002 : Project leader for Delft University of Technology of the EU project "CERTIMARK" (digital image and video watermark certification) (200 k€).
- 2000 – 2001 : Project leader of the Nokia project on Augmented Reality (60 k€)
- 2000 – 2003 : Project leader for TU-Delft of the GigaPort project "GigaMobile" and "Mobile and Wireless" (3<sup>rd</sup> generation mobile applications using personalization, location, and brokerage) (400 k€).
- 2000 – 2005 : Project leader of the STW project "DiwaMetrics" (digital image and video watermarks robust against geometric attacks) (300 k€).
- 2002 – 2006 : Project leader of the Freeband Impulse Project "CACTUS: Context-aware communications, terminal and user" (2.5 M€).
- 2004 – 2008 : Project leader of the Freeband Project "I-Share" (content and devices sharing technology) (7 M€).
- 2006 – 2009 : Project leader for TU-Delft EU FET project "SPEED" (secure signal processing in the encrypted domain) (450 k€).
- 2006 – 2008 : Scientific advisor and collaborator Spanish national project on "Distributed source coding".
- 2008 – 2011 : Coordinator of the EU Network of Excellence "PetaMedia: Peer-to-peer Tagged Media" (4 M€)
- 2010 – 2011 : Project leader Eltr ICTLabs Open Access to Semantic Media (OpenSEM) (400 k€)

2012 – 2013 : Project leader STW Sentinels project Kindred Spirits (1 M€).  
2012 – 2015 : Project leader for TU-Delft COMMIT project Trusted Healthcare Services (500 k€)

### Ph.D. Candidates Supervised

- [1] Dr.ir. R.A.F. Belfor, *Subsampling Methods for Image Sequence Coding*, June 1994. (Jointly with prof.dr.ir. J. Biemond, Delft University of Technology).
- [2] Dr.ir. R.P. Kleihorst, *Noise Filtering of Image Sequences*, October 1994. (Jointly with prof.dr.ir. J. Biemond, Delft University of Technology).
- [3] Dr.ir. E.D.L. Frimout, *Fast Playback of Helical-scan Recorded MPEG Video*, November 1995. (Jointly with prof.dr.ir. J. Biemond, Delft University of Technology).
- [4] Dr.ir. R.E.H. Franich, *Disparity Estimation in Stereoscopic Digital Images*, September 1996. (Jointly with prof.dr.ir. J. Biemond, Delft University of Technology).
- [5] Dr.ir. F. Bosveld. *Hierarchical Video Compression using SBC*, September 1996. (Jointly with prof.dr.ir. J. Biemond, Delft University of Technology).
- [6] Dr.ir. P.J. van der Meer, *Variable Bit-rate Compressed Video*, March 1997. (Jointly with prof.dr.ir. J. Biemond, Delft University of Technology).
- [7] Dr. M. Ziegler Dipl. Inf., *Region-based Analysis and Coding of Stereoscopic Video*, October 1997. (Jointly with prof.dr.ir. J. Biemond, Delft University of Technology).
- [8] Dr.ir. P.B.M. van Roosmalen, *Restoration of Archived Film and Video*, September 1999. (Jointly with prof.dr.ir. J. Biemond, Delft University of Technology).
- [9] Dr. Hanjalic, dipl.ing., *Browsing and Search Methods for Compressed Video*, December 1999. (Jointly with prof.dr.ir. J. Biemond, Delft University of Technology).
- [10] Dr.ir. G.C. Langelaar, *Real-time Watermarking Techniques for Compressed Video Data*, January 2000. (Jointly with prof.dr.ir. J. Biemond, Delft University of Technology).
- [11] Dr. F.J.P. Spaan, *Error Resilient Compression of Digital Video Data*, April 2000. (Jointly with prof.dr.ir. J. Biemond, Delft University of Technology).
- [12] Dr. I. Patras M.Sc., *Object-based Video Segmentation with Region Labeling*, December 2001. (Jointly with dr. E.A. Hendriks, Delft University of Technology).
- [13] Dr. S. Mietens M.Sc., *Scalable Video Compression*, February 2004. (Jointly with prof.dr.ir. P.H.N. de With, Eindhoven University of Technology).
- [14] Dr. I. Setyawan, M.Sc., *Geometric Distortion in Image and Video Watermarking: Robustness and Perceptual Quality Impact*, June 2004.
- [15] Dr.ir. H.W. van Dijk, *Democratic Processing: Mastering the Complexity of Communication Systems*, November 2004. (Jointly with prof.dr.ir. H.J. Sips, Delft University of Technology).
- [16] Dr.ir. K. Cartryse, *Private Computing and Mobile Code Systems*, November 2005. (Jointly with dr.ir. J.C.A. van der Lubbe, Delft University of Technology).

- [17] Dr. I. Haratcherev, M.Sc., *Application-Oriented Link Adaptation for IEEE 802.11*, March 2006. (Jointly with dr. K.G. Langendoen and prof.dr.ir. H.J. Sips, Delft University of Technology).
- [18] Dr. S. Persa, M.Sc., *Sensor Fusion in Head-Pose Tracking*, June 2006. (Jointly with dr.ir. P. Jonker and prof.dr. I.T. Young, Delft University of Technology).
- [19] Dr.ir. O.A. Niamut, *Rate-Distortion Optimal Time-Frequency Decompositions for MDCT-based Audio Coding*, November 2006. (Jointly with dr.ir. R. Heusdens, Delft University of Technology).
- [20] Dr.ir. R.J.M den Hollander, *Random Sampling Methods for Two-View Geometry Estimation*, May 2007. (Jointly with dr. A. Hanjalic, Delft University of Technology).
- [21] Dr. I Shterev, M.Sc., *Quantization-Based Watermarking: Methods for Amplitude Scale Estimation, Security, and Linear Filtering Invariance*, March 2007.
- [22] Dr. J. Ostergaard, M.Sc., *Multiple-description Lattice Vector Quantization*, June 2007. (Jointly with dr.ir. R. Heusdens, Delft University of Technology).
- [23] Dr.ir. J.R. Taal, *Video Compression for Wireless and Peer-to-Peer Networks*, October 2007.
- [24] Dr. Lie Lu, M.Sc.: *Content discovery from composite audio: An unsupervised approach*. December 2009. (Jointly supervised with dr.ir. A. Hanjalic, Delft University of Technology).
- [25] Dr. S. Borchert, M.Sc., *Motion Estimation and DCT Quantization in Low Complexity Video Compression*, June 2010.
- [26] Dr.ir. P.J. Doets, *Modeling Audio Fingerprints: Structure, Distortion, Capacity*, October 2010.
- [27] Dr. Z. Erkin, M.Sc., *Secure signal processing: Privacy preserving cryptographic protocols for multimedia* . June 2010.
- [28] Dr.ir. B. Gedrojc, *Private Computing with Untrustworthy Proxies*, October 2011. (Jointly supervised with dr.ir. J.C.A. van der Lubbe, Delft University of Technology).

## Publications

### Books

- [1] R.L. Lagendijk and J. Biemond, *Iterative Identification and Restoration of Images*, The International Series in Engineering and Computer Science, Kluwer Academic Publishers, Boston MA, USA, ISBN: 0792390970, 1991.
- [2] M.I. Sezan and R.L. Lagendijk (eds.), *Motion Analysis and Image Sequence Processing*, Kluwer Academic Publishers, Boston MA, USA, ISBN: 0792393295, 1993.
- [3] R.L. Lagendijk and J. Biemond, *Statistical Signal Processing* (in Dutch). Delftse Uitgevers Maatschappij, Delft, The Netherlands, ISBN: 9065621458, 1994.
- [4] A. Hanjalic, G.C. Langelaar, P.M.B. van Roosmalen, J. Biemond, and R.L. Lagendijk, *Image and Video Databases: Restoration, Watermarking and Retrieval*, Advances in Image Communication, Elsevier, Amsterdam, The Netherlands, ISBN: 0444505024, 2000.
- [5] R.L. Lagendijk, L.M.G.M. Tolhuizen, and P.H.N. de With (eds.), *Information Theory in the Benelux: An Overview of WIC Symposia 1980 – 2003*, Werkgemeenschap voor Informatie- en Communicatietheorie, Enschede, The Netherlands, ISBN: 9071048195, 2004.

## Public Domain Software

- [1] R.L. Lagendijk, A. Donadoni, *et al.*, *VcDemo: An Image and Video Compression Learning Tool*. Freeware windows software package based on 15 years of lecturing experience and image and video compression research. Download available from <http://ict.ewi.tudelft.nl/vcdemo>.

## Peer-reviewed Book Chapters

- [1] R.A.F. Belfor, R.L. Lagendijk, and J. Biemond, "Subsampling of Digital Image Sequences Using Motion Information". In: *Motion Analysis and Image Sequence Processing*, pp. 189-223, Kluwer Academic Publishers, Boston MA, USA, ISBN: 0792393295, 1993.
- [2] F. Bosveld, R.L. Lagendijk, and J. Biemond. "Hierarchical Coding". In: *Handbook of Visual Communications*, pp. 299-340, Academic Press, New York, USA, ISBN: 0123230500, 1995.
- [3] J. Biemond and R.L. Lagendijk, "Image Identification and Restoration". In: *Progress in Picture Processing*, pp. 188-232, Elsevier Science, Amsterdam, The Netherlands, ISBN: 0444824073, 1996.
- [4] R.L. Lagendijk, F. Bosveld, and J. Biemond, "Subband Video Coding", In: *Subband and Wavelet Transforms: Design and Applications*, pp. 251-285. Kluwer Academic Publishers, Dordrecht, The Netherlands, ISBN: 0792396456, 1996.
- [5] R.L. Lagendijk, R.E.H. Franich, and E.A. Hendriks, "Stereoscopic Image Processing". In: *The Digital Signal Processing Handbook*, pp. 57.1-57.10, Chapman and Hall/CRC Press, Salem MA, USA, ISBN: 0849385725, 1997.
- [6] R.L. Lagendijk and J. Biemond, "Basic Methods for Image Identification and Restoration", In: *Handbook of Image and Video Processing*, pp. 125-140, Academic Press, London, UK, ISBN: 0121197905, 2000.
- [7] R.L. Lagendijk, P.M.B. van Roosmalen, and J. Biemond, "Video Enhancement and Restoration". In: *Handbook of Image and Video Processing*, pp. 227-242, Academic Press, London, UK, ISBN: 0121197905, 2000.
- [8] S.M. Iacob, R.L. Lagendijk, and M.E. Iacob, "Asymmetric Similarity Measures for Video Summarisation". In: *State-of-the-Art in Content-Based Image and Video Retrieval*, pp. 255-278, Kluwer Academic Publishers, Boston MA, USA, ISBN: 1402001096, 2001.
- [9] P.H.N. de With and R.L. Lagendijk, "Image and Video Compression". In: *Information Theory in the Benelux: An Overview of WIC Symposia 1980 – 2003*, pp. 181-213, Werkgemeenschap voor Informatie- en Communicatietheorie, Enschede, The Netherlands, ISBN: 9071048195, 2004.
- [10] U. Rajashekar, A. Bovik, D. Sage, M. Unser, L.J. Karam, and R.L. Lagendijk, "Image Processing Education". In: *The Handbook of Image and Video Processing* (2<sup>nd</sup> edition), pp. 73-95, Academic Press, London, UK, ISBN: 0121197921, 2005.

## Peer-reviewed International Journal Papers

- [1] R.L. Lagendijk, J. Biemond, and D.E. Boeke, "Regularized Iterative Image Restoration with Ringing Reduction", *IEEE Transactions on Acoustics, Speech and Signal Processing*, vol. 36, no. 12, pp. 1874-1888, 1988.

- [2] J. Biemond, R.L. Lagendijk, and R.M. Mersereau, "Iterative Methods for Image Deblurring", *Proceedings of the IEEE*, vol. 8, no. 5, pp. 856-883, 1990.
- [3] R.L. Lagendijk, A.M. Tekalp, and J. Biemond, "Maximum Likelihood Image and Blur Identification: A Unifying Approach", *Optical Engineering*, vol. 29, no. 5, pp. 423-435, 1990.
- [4] R.L. Lagendijk, J. Biemond, and D.E. Boekee, "Identification and Restoration of Noisy Blurred Images Using the Expectation-Maximization Algorithm", *IEEE Transactions on Acoustics, Speech and Signal Processing*, vol. 38, no. 7, pp. 1180-1191, 1990.
- [5] R.L. Lagendijk, A.M. Tekalp, and J. Biemond, "Maximum Likelihood Image and Blur Identification: A Unifying Approach", *Selected Papers on Digital Image Restoration*, pp. 126-139, SPIE Optical Engineering Press, Bellingham WA, USA, 1992.
- [6] R.L. Lagendijk, J. Biemond, and D.E. Boekee, "Regularized Iterative Image Restoration with Ringing Reduction", *Selected Papers on Digital Image Restoration*, pp. 410-424, SPIE Optical Engineering Press, Bellingham WA, USA, 1992.
- [7] F. Bosveld, R.L. Lagendijk, and J. Biemond, "Compatible Spatio-Temporal Subband Encoding of HDTV", *Signal Processing*, vol. 28, pp. 271-289, 1992.
- [8] F. Bosveld, R.L. Lagendijk, and J. Biemond, "Hierarchical Coding of HDTV", *Signal Processing: Image Communication*, vol. 4, no. 3, pp. 195-225, 1992.
- [9] R.L. Lagendijk, A.M. Tekalp, and J. Biemond, "Maximum Likelihood Image and Blur Identification: A Unifying Approach", *Digital Image Processing*, pp. 349-362, IEEE Computer Society Press, Los Alamitos CA, USA, 1992.
- [10] R.A.F. Belfor, M.P.A. Hesp, R.L. Lagendijk, and J. Biemond, "Spatially Adaptive Subsampling of Image Sequences", *IEEE Transactions on Image Processing*, vol. 3, no. 5, pp. 492-500, 1994.
- [11] J.C. Brailean, R.P. Kleihorst, S. Efstratiadis, A.K. Katsaggelos, and R.L. Lagendijk, "Noise Reduction Filters for Dynamic Image Sequences: A Review", *Proceedings of the IEEE*, vol. 83, no. 9, pp. 1272-1292, 1995.
- [12] R.P. Kleihorst, R.L. Lagendijk, and J. Biemond, "Noise Reduction of Image Sequences Using Motion Compensation and Signal Decomposition", *IEEE Transactions on Image Processing*, vol. 4, no. 3, pp. 274-284, 1995.
- [13] T. Naveen, F.W. Bosveld, J.W. Woods, and R.L. Lagendijk, "Rate Constrained Multiresolution Transmission of Video", *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 5, no. 3, pp. 193-206, 1995.
- [14] R.P. Kleihorst, R.L. Lagendijk, and J. Biemond, "An Adaptive Order-Statistic Noise Filter for Gamma-Corrected Images Sequences", *IEEE Transactions on Image Processing*, vol. 6, no. 10, pp. 1442-1446, 1997.
- [15] G.C. Langelaar, R.L. Lagendijk, and J. Biemond, "Real-time Labeling of MPEG-2 Compressed Video", *Journal of Visual Communication and Image Representation*, vol. 9, no. 4, pp. 256-270, 1998.
- [16] A. Hanjalic, R.L. Lagendijk, and J. Biemond, "Automated High-Level Movie Segmentation", *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 9, no. 4, pp. 580-588, 1999.
- [17] R.L. Lagendijk, E.D. Frimout, and J. Biemond, "Low-Complexity Rate-Distortion Optimal Transcoding of MPEG I-Frames", *Signal Processing: Image Communication*, vol. 15, no. 6, pp. 531-544, 1999.



- [18] P.M.B. van Roosmalen, R.L. Lagendijk, and J. Biemond, "Correction of Intensity Flicker in Old Film Sequences", *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 9, no. 7, pp. 1013-1019, 1999.
- [19] W. Pasman, A. van der Schaaf, R.L. Lagendijk, and F.W. Jansen, "Accurate overlaying for mobile augmented reality", *Computers & Graphics*, no. 23, pp. 875-881, 1999.
- [20] G.C. Langelaar, I. Setyawan, and R.L. Lagendijk, "Watermarking Digital Image and Video Data: A State-of-the-Art Overview", *Signal Processing Magazine, Special Issue on Digital Watermarking*, vol. 17, no 5, pp.20-46, 2000.
- [21] A. Hanjalic, R.L. Lagendijk, and J. Biemond, "Recent Advances in Video Content Analysis: From Visual Features to Sematic Video Segments", *International Journal of Image and Graphics*, vol. 1, no. 1, pp. 63-81, 2001.
- [22] G.C. Langelaar and R.L. Lagendijk, "Optimal Differential Energy Watermarking of DCT Encoded Images and Video", *IEEE Transactions on Image Processing*, vol. 10, no. 1, pp. 148-158, 2001.
- [23] I. Patras, E.A. Hendriks, and R.L. Lagendijk, "Video Segmentation by MAP Labeling of Watershed Segments", *IEEE Transaction on Pattern Analysis and Machine Intelligence*, vol. 23, no. 3, pp. 326-332, 2001.
- [24] A. Hanjalic, G. Kakes, R.L. Lagendijk, and J. Biemond, "Indexing and Retrieval of Broadcast News Programs using DANCERS", *Journal of Electronic Imaging. Special Issue on Storage and Management of Digital Media*, vol. 10, no. 4, pp. 871-882, 2001.
- [25] P.M.B. van Roosmalen, R.L. Lagendijk, and J. Biemond, "Embedded Coring in MPEG Video Compressor", *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 12, no. 3, pp. 205-211, 2002.
- [26] C.W. Chen, R.L. Lagendijk, A. Reibman, and W. Zhu, "Introduction to the Special Issue on Wireless Communication", *IEEE Transactions on Circuit and Systems for Video Technology*, vol. 12, no. 6, pp. 357-359, 2002.
- [27] I. Patras, E.A. Hendriks, and R.L. Lagendijk, "Semi-automatic Object-based Video Segmentation with Labeling of Color Segments", *Signal Processing: Image Communications*, vol. 18, no. 1, pp. 51-65, 2003.
- [28] P.P. Jonker, S. Persa, J. Caarls, F. de Jong, and R.L. Lagendijk, "Philosophies and Technologies for Ambient Aware Devices in Wearable Computing Grids", *Elsevier Computer Communications*, vol. 26, no. 11, pp. 1145-1158, 2003.
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- [30] J.R. Taal, Z. Chen, Y. He, and R.L. Lagendijk, "Error Resilient Video Compression using Behavior Models", *EURASIP Journal on Applied Signal Processing*, vol. 2004, no. 2, pp. 290-303, 2004.
- [31] M.H. Chen, Y. He, and R.L. Lagendijk, "A Fragile Watermark Error Detection Scheme For Wireless Video Communications", *IEEE Transactions on Circuit and Systems for Video Technology*, vol. 7, no. 2, pp. 201-211, 2005.

- [32] E.T. Lin, A.M. Eskicioglu, R.L. Lagendijk, and E.J. Delp, "Advances in Digital Video Content Protection", *Proceedings IEEE, Special Issue on Multimedia Security for Digital Rights Management*, vol. 93, no. 1, pp. 171-183, 2005.
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