



Distributed coding for video services

DISCOVER

Deliverable 17

Project dissemination – Final version

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TABLE OF CONTENTS

1. INTRODUCTION.....	4
2. DISCOVER WEB PAGE	4
3. DISCOVER PUBLICATIONS	5
4. OTHER DISSEMINATION ACTIVITIES	9
5. DISCOVER WORKSHOP.....	10
6. CONCLUSIONS	12

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1. INTRODUCTION

In addition to theoretical developments and practical demonstrations of Distributed Video Coding principles, one of the main objectives of DISCOVER is to disseminate the main findings of the consortium through adequate channels.

The objective of the present deliverable is to give a description of the main dissemination activities done during the DISCOVER project. For completeness purposes, first and second year activities are included.

The document is organized as follows: in Section 2, the DISCOVER web page is described. In Section 3, the publications of the DISCOVER partners are presented with adequate references. In Section 4, other dissemination activities are presented. In Section 5, the arrangements for the DISCOVER workshop to be held at the end of the project are presented. Concluding remarks are given in Section 6.

2. DISCOVER WEB PAGE

The DISCOVER web page was set up at the very beginning of the project and has been one of the main sources of public dissemination for the objectives, activities and publications of the consortium. The web page is <http://www.discoverdvc.org/>. The information presented in the DISCOVER web page is:

Home

- Project description

The main objectives and goals of the project as described in the DISCOVER technical annex are presented.

- Partners list

Affiliations of partners and links to their corresponding web pages are presented.

- DVC references

The project is making a great effort to keep track of all relevant publications on DVC made worldwide. The main related publications with adequate references are presented. Every three months a DISCOVER partner is responsible to search and update all DVC publications.

- Partner's publications on DVC

All the partner publications on DVC published before and during the life of the project are presented.

- Public deliverables

Public deliverables generated by the consortium are linked in this section for dissemination purposes.

- Workshop on Recent Advances in Distributed Video Coding

Information on the DISCOVER workshop is provided in this section.

- Contact us

The e-mail address of the project coordinator is given for contact purposes.

External links

- IST – FET

The FET information web page is provided.

Internal use only

- Document register

This section is for internal use of the consortium members and allows access to all relevant documents, test sequences and software updates.

3. DISCOVER PUBLICATIONS

DISCOVER is very much committed to publish all the new research results obtained in all technical aspects of the project. This section presents all the publications of the partners during the project. Publications from the partners on DVC whose associated research has been done before the start of the project and have had an important impact on DISCOVER developments are also presented at the end of the section for completeness purposes. Note that most of the publications are paper conferences due to the short life of the project. A very important dissemination paper has been accepted during the second year of the project and a second one is under review. A great emphasis has been put to publish in the major image and video processing conferences. To this end, papers are grouped by conference to remark the importance of the contributions. Although several papers have been sent to conferences during the second year of the project, only accepted papers have been listed.

Conference publications

International Conference on Image Processing (ICIP), San Antonio, USA, September 18-21, 2007 – Special session on Distributed Source Coding I: Low Complexity Video Coding.

- C. Brites, F. Pereira, “Encoder rate control for transform domain Wyner-Ziv video coding
- X. Artigas, S. Malinowski, C. Guillemot, L. Torres, "Overlapped quasi-arithmetic codes for distributed video coding.

- Y. Vatis, S. Klomp, J. Ostermann, “Inverse Bit Plane Decoding Order for Turbo Code based Distributed Video Coding”.

International Conference on Image Processing (ICIP), San Antonio, USA, September 18-21, 2007 – Special session on Distributed Source Coding II: Distributed Image and Video Coding and Their Applications.

- J. Ascenso, F. Pereira, “Adaptive hash-based side information exploitation for efficient wyner-ziv video coding”.
- M. Ouaret, F. Dufaux, T. Ebrahimi, “Codec-independent scalable video coding”

IEEE MultiMedia Signal Processing Workshop, Chania, Crete, October. 1-3, 2007.

- D. Kubasov, J. Nayak, C. Guillemot, “Optimal reconstruction in Wyner-Ziv video coding with multiple side information”
- D. Kubasov, K. Lajnef, C. Guillemot, “A hybrid encoder/decoder rate control for a Wyner-Ziv video codec with a feedback channel”

European Conference on Signal Processing, (EUSIPCO), Poznan, Poland, September 3-7 2007.

- C. Guillemot and A. Roumy, “Distributed Video Coding: Basics, Codecs and Applications”
- M. Ouaret, F. Dufaux, T. Ebrahimi, “Multiview distributed video coding with encoder fusion”

International conference on Multimed and Expo, (ICME) 2007, Beijing, China, July 2007.

- Y. Vatis, S. Klomp, J. Ostermann, “Enhanced Reconstruction of the Quantised Transform Coefficients for Wyner-Ziv Coding”.

International Workshop on Video Processing and Quality Metrics for Consumer Electronics (VPQM 2007), Scottsdale, Arizona, U.S.A, January 25-26, 2007.

- M. Ouaret, F. Dufaux, T. Ebrahimi, “On Comparing Image and Video Compression Algorithms”

SPIE Defense and Security Symposium (DSS 2007), Orlando, Florida, USA, April 9 – 13, 2007

- F. Dufaux, M. Ouaret, T. Ebrahimi, “Recent Advances in Multiview Distributed Video Coding”

ACM International Workshop on Video Surveillance and Sensor Networks, Santa Barbara, California, USA October 27, 2006.

- M. Ouaret, F. Dufaux, T. Ebrahimi, “Fusion-based multiview distributed video coding”.

International Conference on Image Processing (ICIP), Atlanta, USA, October 8-11, 2006.

- C. Brites, J. Ascenso, F. Pereira, “Studying temporal correlation noise modeling for pixel based Wyner-Ziv video coding”.
- J. Ascenso, C. Brites, F. Pereira, “Content adaptive Wyner-Ziv video coding driven by motion activity”.
- X. Artigas, L. Torres, “An approach to distributed video coding using 3D face models”.
- D. Kubasov, C. Guillemot, “Mesh-based motion-compensated interpolation for side information extraction in distributed video coding”.
- M. Maitre, C. Guillemot, Luce Morin, “3D scene modeling for distributed video coding”.

European Signal Processing Conference (EUSIPCO), Florence - Italy, September 2006.

- C. Brites, J. Ascenso, F. Pereira, “Feedback channel in pixel domain Wyner-Ziv video coding: myths and realities”.

International Society for Optical Engineering, SPIE Optics & Photonics, San Diego, California, USA, August 13-17, 2006.

- M. Ouaret, F. Dufaux, T. Ebrahimi, “On comparing JPEG2000 and intraframe AVC”.

International Conference on Signal Processing and Multimedia Applications (SIGMAP), Setúbal, Portugal, August 7–10, 2006.

- S. Klomp, Y. Vatis, J. Ostermann; “Side information interpolation with sub-pel motion compensation for Wyner-Ziv decoder”.

Nordic Signal Processing Symposium, (NORSIG), Reykjavik, Iceland, June 7-9, 2006.

- X. Artigas, E. Angeli, L. Torres, “Side information generation for multiview distributed video coding using a fusion approach”.

International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Toulouse, France, May 14-19, 2006.

- C. Brites, J. Ascenso, F. Pereira, “Improving transform domain Wyner-Ziv video coding performance”.
- M. Dalai, R. Leonardi, F. Pereira, “Improving turbo codec integration in pixel-domain distributed video coding”.
- X. Artigas, M. Tagliasacchi, L. Torres, S. Tubaro, “A proposal to suppress the training stage in a coset-based distributed video codec”.

Picture Coding Symposium (PCS), Beijing – China, April 24-26, 2006.

- C. Brites, J. Ascenso, F. Pereira, “Modeling correlation noise statistics at decoder for pixel based Wyner-Ziv video coding”.

Journal publications

Signal Processing Magazine

- C. Guillemot, F. Pereira, L. Torres, T. Ebrahimi, R. Leonardi, J. Ostermann, “Distributed Monoview and Multiview Video Coding: Basics, Problems and Recent Advances”, IEEE Signal Processing Magazine, Special Issue on Signal Processing for Multiterminal Communication Systems, September, 2007.

IEEE Transactions on Image Processing

- M. Maitre, C. Guillemot, Luce Morin, “3D model based frame interpolation for distributed video coding”, Vol. 12, No. 9, pp. 1246-1257 May 2007.

IEEE Transactions on Signal Processing

- M. Dalai, R. Leonardi, “Approximation of One-Dimensional Digital Signals under the L^∞ Norm”, Volume 54B, pages 3111-3124, August. 2006.

Partner publications whose associated research on DVC has been done before the start of the project and have had an important impact on DISCOVER developments are also presented here for completeness purposes.

International Symposium on Information Theory (ISIT), Adelaide, Australia, September 4-9, 2005.

- M. Dalai, R. Leonardi: “Non-Prefix Free Codes for Constrained Sequences.

IEEE International Conference on Image Processing (ICIP), Genoa, Italy, September 11-14, 2005.

- X. Artigas, L. Torres, “Iterative generation of motion-compensated side information for distributed video coding”.

International. Workshop on Very Low Bitrate Video Coding, Sardinia, Italy, September 15-16, 2005.

- Trapanese, M. Tagliasacchi, S. Tubaro, J. Ascenso, C. Brites, F. Pereira, “Improved correlation noise statistics modeling in frame-based pixel domain Wyner-Ziv video coding”.
- L. Natário, C. Brites, J. Ascenso, F. Pereira, “Extrapolating side information for low-delay pixel-domain distributed video coding”.
- Trapanese, M. Tagliasacchi, S. Tubaro, J. Ascenso, C. Brites, F. Pereira, “Embedding a block-based intra mode in frame-based pixel domain Wyner-Ziv video coding”.

IEEE International Conference on Advanced Video and Signal-Based Surveillance, Como, Italy, Setember 15-16, 2005.

- J.Ascenso, C.Brites, F.Pereira, “Motion compensated refinement for low complexity pixel based distributed video coding”.

4. OTHER DISSEMINATION ACTIVITIES

In addition to conference and journal papers, other dissemination activities have taken place in DISCOVER. Although Deliverable D7, *External Liaisons*, will explain in detail standardization activities and contributions within DISCOVER, let us mention that DISCOVER partners always attend MPEG (Moving Picture Experts Group) and JPEG (Joint Photographic Experts Group) meetings. During these meetings, dissemination activities have been carried out through formal presentations and conversations with MPEG and JPEG delegates. During the first year of DISCOVER, the following MPEG and JPEG meetings have been attended:

MPEG meetings attended:

- The 74th MPEG Meeting, Nice, France, 17–21, October 2005.
- The 75th MPEG Meeting, Bangkok, Thailand, 16–20, January 2006.
- The 76th MPEG Meeting, Montreux, Switzerland, 3–7, April 2006.
- The 77th MPEG Meeting, Klagenfurt, Germany, 17–21, July 2006.
- The 78th MPEG meeting, Hangzhou, China, 23-27, October 2007
- The 79th MPEG meeting, Marrakech, Morocco, 15-19, January 2007
- The 80th MPEG meeting, San Jose, USA, April 23-27, 2007
- The 81st MPEG meeting, Lausanne, Switzerland, July 2-6, 2007

JPEG meetings attended

- The 37th JPEG meeting, Singapore, November 14-18, 2005.
- The 38th JPEG meeting, Cupertino, March 13-17, 2006.
- The 39th JPEG meeting, Perugia, July 10-14, 2006.
- The 40th JPEG meeting, Jeju, Korea, Nov. 6-10, 2006
- The 41st JPEG meeting, San Jose, USA, April 23-27, 2007
- The 42nd JPEG meeting, Lausanne, Switzerland, July 2-6, 2007

Other dissemination activities have been carried out through invited talks, plenary speeches and conference panels given and participated by DISCOVER partners on Distributed Video Coding; in this context, the DISCOVER project has been introduced and objectives presented.

Invited talks:

L. Torres, “Distributed video coding, a new coding paradigm?”. Invited speaker. IEEE Signal Processing and Communications Application Conference, Eskisehir, Turkey, June 12, 2007.

L. Torres, “Distributed video coding, a new coding paradigm?”. IEEE Distinguished Lecturer Program, University of Texas at Dallas, Dallas, USA, April 10, 2007.

R. Leonardi, “Distributed video coding - Identifying Promising Application Scenarios”. Second Workshop on Mobile multimedia communication systems and networks, Liège-Belgium, November 26, 2006.

F. Pereira, “Distributed video coding: basics, developments and challenges”, Universidad Politécnica de Madrid, Spain, January 2007.

Riccardo Leonardi, “Video compression standards: Distributed coding and scalable codecs”, Invited lecture, 2006 IET Multimedia conference, London, United Kingdom, November 2006.

F. Pereira, “Distributed video coding: developments and challenges”, Umea University, Umea – Sweden, September 2006.

L. Torres, Codificación de imagen: pasado, presente y futuro. Universidad del País Vasco-Euskal Herriko Unibertsitatea. Bilbao. July 2006, (in Spanish).

L. Torres, “A tour to the past, present and future of video coding”. IEEE Distinguished Lecturer Program, Reykjavik, Iceland, June 6, 2006.

L. Torres “Sistemas de codificación de vídeo distribuidos”. Universidad de Granada. Granada. June 2006, (in Spanish).

L. Torres, “Distributed Video Coding: Applications and new technical proposals”. Purdue University, West Lafayette, USA, February 2006.

S. Klomp, “Distributed source and video coding”, Robert Bosch GmbH, Corporate Research, Hannover, November 2005.

F. Pereira, “Distributed Video Coding: Achievements and plans”. Purdue University, West Lafayette, USA, November 2005.

F. Pereira, “Distributed video coding - basics and trends”, Second MPEG Workshop on Future Directions in Video Compression, Nice – France, October 2005.

Conference panels:

Fernando Pereira and Joern Ostermann, Picture Coding: History and Future at Picture Coding Symposium, Beijing – China, April 24-26, 2006.

Fernando Pereira and Joern Ostermann, Picture Coding: Distributed Video Coding at Picture Coding Symposium, Beijing – China, April 24-26, 2006.

5. DISCOVER WORKSHOP

A very important dissemination activity is the DISCOVER workshop to be held at the end of the project. During the workshop, DISCOVER will present its main DVC research findings and other researchers active in similar or related fields will be also invited to attend and to present their work. The workshop will be held in Lisbon, November 6, in conjunction with the Picture Coding Symposium (PCS) which will be hosted by IST, a DISCOVER partner. PCS is

considered as one of the major image coding conferences in the world and this option is an excellent opportunity to widely widespread DISCOVER results.

After a careful search of possible speakers for the workshop, the following program has been set up:

DISCOVER WORKSHOP
“Recent Advances in Distributed Video Coding”
November 6, 2007

Workshop Programme

8:30 Welcome and Presentation of the DISCOVER Project
Luis Torres, UPC, Spain, on behalf of the DISCOVER project.

Session I: Distributed Source Coding
Session chair: Fernando Pereira, IST, Portugal.

8:50 Distributed Video Coding: An Overview
Speaker: Zixiang Xiong, Texas A&M University, USA.

9:30 Distributed Joint Source-Channel Coding
Speaker: Javier Garcia-Frias, University of Delaware, USA.

10:00 Distributed Source Coding with Unsupervised Statistical Learning
Speaker: David Varodayan, Stanford University, USA.

Coffee Break (10:30– 10:50)

10:50 On Source and Channel Codes for Distributed Source Coding
Speaker: Christine Guillemot, INRIA, France, on behalf of the DISCOVER project.

11:20 Distributed Source Coding for Secure Fingerprint Biometrics
Speaker: Anthony Vetro, Mitsubishi Electric Research Laboratories, MERL, USA.

Session II: Distributed Monoview Video Coding
Session chair: Joern Osterman, University of Hannover, Germany

11:50 Side Information and the Correlation Channel in DVC
Speaker: Inald Lagendijk, Technical University of Delft, The Netherlands.

12:20 DISCOVER Monoview Video Codec

Speaker: Fernando Pereira, IST, Portugal, on behalf of the DISCOVER project.

Lunch Break (12:50-14:30)

14:30 Error Resilience Assessment of the DISCOVER Codec

Speaker: Riccardo Leonardi, University of Brescia, Italy, on behalf of the DISCOVER project.

15:00 Distributed Video Coding Applications for Scalable and Flexible Decoding

Speaker: Ngai-Man Cheung, Antonio Ortega, University of Southern California, USA.

15:30 Distributed Video Coding: A Technique or a Toolbox?

Speaker: Edward Delp, Purdue University, USA.

Coffee Break (16:00– 16:20)

Session III: Distributed Multiview Video Coding

Session chair: Luis Torres, UPC, Spain

16:20 Distributed Visual Information Processing in Camera Sensor Networks

Speaker: Pier Luigi Dragotti, Imperial College, UK.

16:50 A Geometrical Framework for Distributed Coding of Multiview Images

Speaker: Ivana Tomic and Pascal Frossard, EPFL, Switzerland.

17:20 Fusion and DISCOVER Multiview Approach

Speaker: Touradj Ebrahimi, EPFL, Switzerland, on behalf of the DISCOVER project.

17.50 End of the workshop

6. CONCLUSIONS

Dissemination has been considered a very important activity in DISCOVER. The consortium has dedicated a strong effort to the set up of a project web site and to publish papers in very important conferences and journals related to the field of image and video coding. During the life span of DISCOVER activities, 26 conferences papers have been published which is believed to be quite remarkable due to the relatively short life of the project. A very important paper with a

very big dissemination impact has been also published along with two others in very important journals. Other journal and conference papers are under review at the time of submitting this deliverable. Other dissemination activities mainly related to invited speeches and conference panels have also been carried out. A DISCOVER workshop at the end of the project will be held to further spread DISCOVER activities and results.