

Project acronym SIMBAD

Project full title Beyond Features: Similarity-Based

Pattern Analysis and Recognition

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Document title Final plan for the use and dissemination

of foreground

Deliverable n. D8.7

Document type Report

Dissemination level Public

Contractual date of delivery 36

Project reference number 213250

Status & version Final version

Work package WP8

Deliverable responsible (SHORT NAME) UNIVE

Contributing Partners (SHORT NAME)

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Additional contributor(s)

SIMBAD

Deliverable D8.7

FINAL PLAN FOR THE USE AND **DISSEMINATION OF FOREGROUND**

26 September 2011

Grant Agreement number: 213250

Project acronym: SIMBAD

Project title: Beyond Features: Similarity-Based Pattern Analysis and Recognition

Funding Scheme: Collaborative Project

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The consortium put a lot of effort to ensuring the highest diffusion of the research results, both inside and outside SIMBAD.

In order to strengthen the communication among the partners, we set up a blog on the project's site. We also made extensive use of the *SIMBAD Technical Report Series* as a tool to provide a timely access of information within the consortium, and increase interactions among the SIMBAD partners (overall, we produced 109 technical reports).

To strengthen internal collaborations, during the course of the project we had many exchange visits among partners which resulted in several joint publications. We run several project meetings (Venice, April 2008; York, November 2008; Zurich, June 2009; Verona, November 2009; Lisbon, May 2010; Delft, November 2010) and a one-week preparatory meeting focused on our biomedical applications (Zurich, February 2010). Also, in July 2010 we run a highly successful "hands-on" internal workshop in Castelbrando, Treviso, Italy.

The external dissemination of the project's results took place mainly through publications in the top-level conferences and journals in the fields of machine learning, pattern recognition and computer vision. We also disseminated the results related to the project's main applications to the medical and the chemometrics communities.

During the 42 months of the project the consortium has produced about 150 peer-reviewed scientific papers, of which 21 were published (or accepted for publication) in journals, and 6 are under review. The following table lists the most relevant ones for each work package (see the individual deliverables for a more comprehensive list).

Table A1
SELECTED SCIENTIFIC PUBLICATIONS

No.	Title	Authors	Venue	Issue	Pages	Year	WP
1	A hybrid generative/discriminative classification framework based on free-energy terms	A. Perina, M. Cristani, U. Castellani, V. Murino, N. Jojic	ICCV		2058-2065	2009	WP2
2	Pairwise probabilistic clustering using evidence accumulation	S. Rota Bulò, A. Lourenço, A. Fred, M. Pelillo	SSPR	SSPR 395-4		2010	WP2
3	2D shape recognition using information theoretic kernels	M. Bicego, A. Martins, V. Murino, P. Aguiar, M. Figueiredo	ICPR	CPR		2010	WP2
4	Free energy score space	A. Perina, M. Cristani, U. Castellani, V. Murino, N. Jojic	NIPS 2009	,		2009	WP2
5	Nonextensive information theoretic kernels on measures	A. Martins, M. Figueiredo, P. Aguiar, N. Smith, E. P. Xing	Journal of Machine Learning Research	10	935-975	2009	WP2
6	One-lead ECG-based personal identification using Ziv-Merhav cross parsing	D. Coutinho, A. Fred, M. Figueiredo	ICPR			2010	WP2
7	On the scalability of evidence accumulation clustering	A. Lourenço, A. Fred, A. K. Jain	ICPR			2010	WP2
8	Revisiting complex moments for 2-D shape representation and image normalization	J. Crespo and P. Aguiar	IEEE Transactions on Image Processing	20	2896-2911	2011	WP2
9	Online learning of structured predictors with multiple kernels	A. Martins, N. Smith, E. Xing, P. Aguiar, M. Figueiredo	AISTATS		507-515	2011	WP2
10	Nonextensive entropic kernels	A. Martins, M. Figueiredo, P. Aguiar, N. Smith, E. P. Xing	ICML		640-647	2008	WP2
11	Towards weakly supervised semantic segmentation by means of multiple instance and multitask learning	A. Vezhnevets, J. M. Buhmann	CVPR		3249-3256	2010	WP3
12	Image dissimilarity-based quantification of pathology	L. Sørensen, M. de Bruijne, R. Duin, M. Loog, P. Lo, A.	MICCAI		37-44	2010	WP3

		Dirksen					
13	The dissimilarity representation as a tool for three-way data classification using 2D measures	D. Porro-Muñoz, R. Duin, M. Orozco-Alzate, I. Talavera, J. Londono-Bonilla	Signal Processing	91	2520-2529	2011	WP3
14	A study on combining sets of differently measured dissimilarities	A. Ibba, R. Duin, W. J. Lee	ICPR		3360-3363	2010	WP3
15	Non-Euclidean dissimilarities: Causes and informativeness	R. Duin, E. Pekalska	S+SSPR		324-333	2010	WP3
16	Dissimilarity representation on functional spectral data for classification	D. Porro-Muñoz, I. Talavera, R. Duin, N. Hernandez, M. Orozco-Alzate	Journal of Chemometrics			2011	WP3
17	An empirical comparison of kernel-based and dissimilarity-based feature spaces	S.W. Kim, R. Duin	S+SSPR		559-568	2010	WP3
18	The dissimilarity space: Between structural and statistical pattern recognition	R. Duin, E. Pekalska	Pattern Recognition Letters			in press	WP3
19	The minimum transfer cost Principle for model-order selection	M. Frank, M. H. Chehreghani, J. M. Buhmann	ECML PKDD			2011	WP3
20	Information theoretic model validation for clustering	J. M. Buhmann	ISIT		1398-1402	2010	WP3
21	Selecting the rank of truncated SVD by maximum approximation capacity	M. Frank, J. M. Buhmann	ISIT			2011	WP4
22	Bayesian partitioning of large-scale distance data	D. Adametz, V. Roth	NIPS			2011	WP4
23	The translation-invariant Wishart-Dirichlet process for clustering distance data	J. E. Vogt, S. Prabhakaran, J. Fuchs, V. Roth	ICML		1111-1118	2010	WP4
24	Spherical embeddings for non-Euclidean dissimilarities	R. C. Wilson, E. R. Hancock, E. Pekalska, R. Duin	CVPR		1903-1910	2010	WP4
25	Bridging structure and feature representations in graph matching	W. Lee, V. Cheplygina, D. Tax, M. Loog, R. Duin	International Journal of Pattern Recognition and Artificial Intelligence			in press	WP4
26	Coupled prediction-classification for robust visual tracking	I. Patras, E. R. Hancock	IEEE Transactions on Pattern Analysis and Machine Intelligence	32	1537-1552	2010	WP4
27	Graph characterization via Ihara coefficients	P. Ren, R.C. Wilson, E.R. Hancock	IEEE Transactions of Neural Networks	22	233-245	2011	WP4
28	Geometric characterization and clustering of graphs using heat kernel embeddings	B. Xiao, R.C. Wilson, E.R. Hancock	Image and Vision Computing			2010	WP4
29	Manifold embedding for shape analysis	B. Xiao, H. Yu, E.R. Hancock	Neurocomputing	73	16061613	2010	WP4
30	A polynomial characterization of hypergraphs using the Ihara zeta function	P. Ren, T. Aleksic, R.C. Wilson, E. R. Hancock	Pattern Recognition	44	1941-1957	2011	WP4
31	Supervised relevance maps for increasing the distinctiveness of facial images	M. Kawulok, J. Wu, E. R. Hancock	Pattern Recognition	44	929-939	2011	WP4
32	Ihara zeta functions, quantum walks and cospectrality in strongly regular graphs	P. Ren, T. Aleksic, R.C. Wilson, E. R. Hancock	Quantum Information Processing	10	405417	2011	WP4
33	Efficient computation of Ihara coefficients using the Bell polynomial recursion	S Rota Bulò, E. R. Hancock, F. Aziz, M. Pelillo	Linear Algebra and Applications			in press	WP4
34	Graph matching through entropic manifold alignment	F. Escolano, E.R. Hancock, M. A. Lozano	CVPR		2417-242	2011	WP4
35	Imposing semi-local geometric constraints for accurate correspondence selection in structure from motion: A game- theoretic perspective.	A. Albarelli, E. Rodolà, A. Torsello	International Journal of Computer Vision			in press	WP5
36	Graph-based quadratic optimization: A fast evolutionary approach	S. Rota Bulò, M. Pelillo, I. M. Bomze	Computer Vision and Image Understanding	115	984-995	2011	WP5
37	A game theoretic approach to partial clique enumeration	S. Rota Bulò, A. Torsello, M. Pelillo	Image and Vision Computing	27	911-922	2009	WP5
38	Infection and immunization: A new class of evolutionary game dynamics	S. Rota Bulò, I. M. Bomze	Games and Economic Behaviour	71	193-211	2011	WP5

39	Graph transduction as a non-cooperative game	A. Erdem, M. Pelillo	Neural Computation			in press	WP5
40	A generalization of the Motzkin-Straus theorem to hypergraphs	S. Rota Bulò, M. Pelillo	Optimization Letters	3	287-295	2009	WP5
41	A game-theoretic approach to fine surface registration without initial motion estimation	A. Albarelli, E. Rodolà, A. Torsello	CVPR		430 -437	2010	WP5
42	Structured class-labels in random forests for semantic image labelling	P. Kontschieder, S. Rota Bulò, H. Bischof, M. Pelillo	ICCV			2011	WP5
43	Matching as a non-cooperative game	A. Albarelli, S Rota Bulò, A. Torsello, M. Pelillo	ICCV		1319-1326	2009	WP5
44	A game-theoretic approach to hypergraph clustering	S. Rota Bulò, M. Pelillo	NIPS	22	1571-1579	2009	WP5
45	Loosely distinctive features for robust surface alignment.	A. Albarelli, E. Rodolà, A. Torsello	ECCV		519-532	2010	WP5
46	Probabilistic clustering using the Baum- Eagon inequality	S. Rota Bulò, M. Pelillo	ICPR		1429 - 1432	2010	WP5
47	Computational pathology: Challenges and promises for tissue analysis	T. J. Fuchs, J. M. Buhmann	Computerized Medical Imaging and Graphics	35	515-530	2011	WP6
48	Renal cancer cell classification using generative embeddings and information theoretic kernels	M. Bicego, A. Ulas, P. Schüffler, U. Castellani, V. Murino, A. Martins, P. Aguiar, M. Figueiredo	IAPR-PRIB			2011	WP6
49	A multiple kernel Learning algorithm for cell nucleus classification of renal cell carcinoma	P. Schüffler, A. Ulas, U. Castellani, V. Murino	ICIAP			2011	WP6
50	Hybrid generative-discriminative nucleus classification of renal cell carcinoma	A. Ulas, P. Schüffler, M. Bicego, U. Castellani, V. Murino	SIMBAD		77-89	2011	WP6
51	Combining data sources nonlinearly for cell nucleus classification of renal cell carcinoma	M. Gönen, A. Ulas, P. Schüffler, U. Castellani, V. Murino	SIMBAD		250-260	2011	WP6
52	Brain morphometry by probabilistic latent semantic analysis	U. Castellani, A. Perina, V. Murino, M. Bellani, G. Rambaldelli, M. Tansella, P. Brambilla	MICCAI		177-184	2010	WP7
53	Dissimilarity-based detection of schizophrenia	A. Ulaş, R. Duin, U. Castellani, M. Loog, M. Bicego, V. Murino, M. Bellani, S. Cerruti, M. Tansella, P. Brambilla	International Journal of Imaging Systems and Technology	21	179-192	2011	WP7
54	A hybrid generative/discriminative method for classification of regions of interest in schizophrenia brain MRI	D. S. Cheng, M. Bicego, U. Castellani, M. Cristani, S. Cerruti, M. Bellani, G. Rambaldelli, M. Atzori, P. Brambilla, V. Murino	MICCAI Workshop		174-184	2009	WP7
55	Schizophrenia classification using regions of interest in brain MRI	D. S. Cheng, M. Bicego, U. Castellani, S. Cerruti, M. Bellani, G. Rambaldelli, M. Atzori, P. Brambilla, V. Murino	IDAMAP		47-52	2009	WP7
56	Heat diffusion based dissimilarity analysis for schizophrenia classification	A. Ulaş, U. Castellani, V. Murino, M. Bellani, M. Tansella, P. Brambilla	IAPR-PRIB		306-317	2011	WP7
57	Selecting scales by multiple kernel learning for shape diffusion analysis	U. Castellani, A. Ulaş, V. Murino, M. Bellani, M. Tansella, P. Brambilla	MICCAI Workshop		148-158	2011	WP7
58	A new shape diffusion descriptor for brain classification	U. Castellani, P. Mirtuono, V. Murino, M. Bellani, M. Tansella, P. Brambilla	MICCAI			2011	WP7

Besided the scientific publications, the consortium has put a lot of effort towards disseminating its achievements in a variety of ways. The following table summarizes the main activities carried out during the 42 months of the project.

Table A2: LIST OF MAIN DISSEMINATION ACTIVITIES

No.	Type of activity	of activity Main leader Title		Date	Place	
1	Book	UNIVE	Similarity-Based Pattern Analysis and Recognition Springer's Series "Advances in Computer Vision and Pattern Recognition"	mid-2012 (to appear)		
2	Workshop	UNIVE	SIMBAD 2011 First International Workshop on Similarity-Based Pattern Analysis and Recognition (Springer's LNCS proceedings; videolectures coverage; sponsored by PASCAL 2 and IAPR)	September 2011	Venice, Italy	
3	Workshop	UNIYORK	SIMBAD 2013 Second International Workshop on Similarity-Based Pattern Analysis and Recognition	Summer 2013	York, UK	
4	Workshop	UNIVE	ICML 2010 Workshop on "Learning in non- (geo)metric spaces" (sponsored by PASCAL 2; videolectures coverage)	June 2010	Haifa, Israel	
5	Special Session	UNIVE UNIYORK	Similarity-Based Pattern Analysis and Recognition Special session at S+SSPR 2010 (videolectures coverage)	August 2010	Cesme, Izmir, Turkey	
6	Special Session	UNIVE	"Learning and Intelligent OptimizatioN in Structured domains" Special session at LION 2010	January 2010	Venice, Italy	
7	Tutorial	UNIVE	"Game theory in computer vision and pattern recognition" CVPR 2011 Tutorial	June 2011	Colorado Springs, CO	
8	Tutorial	UNIVE UNIYORK UNIVR	"Beyond features: Similarity-based pattern analysis and recognition" ICIAP 2011 Tutorial	September 2011	Ravenna, Italy	
9	Tutorial	UNIVE	"Game theory in pattern recognition and machine learning" ICPR 2010 Tutorial	August 2010	Istanbul, Turkey	
10	Tutorial	UNIVE	"Game theory in pattern recognition" PRIA 2010 Tutorial	December 2010	St. Petersburg, Russia	
11	Tutorial	TUD	"Issue of non-Euclidean data" CIARP 2011 Tutorial	November 2011	Pucon, Chile	
12	Summer School Course	UNIVE TUD	Summer School on "Graphs in computer graphics, image and signal analysis"	August 2011	Bornholm, Denmark	
13	Summer School Course	UNIYORK	CVPR Summer School 2010	January 2010	Kioloa, Australia	
14	Summer School Course	UNIVE	Summer School VISMAC 2010	November 2010	Catania, Italy	
15	Magazine Article	UNIVE	"Artificial intelligence on a learning curve" In <i>Projects: Science, Technology and Innovation</i> , Insight Publisher	December 2010		
16	Newsletter Article	UNIVE	"Extending the frontiers of artificial intelligence" Cordis News	November 2008		
17	Newsletter Entry	UNIVE	FET Through the Keyhole: Future and Emerging Technologies in Europe	January 2011		

18	Talk	UNIVE	Project Exhibition at ECML PKDD 2009	September 2009	Bled, Slovenia	
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Other activities include: invited/keynote talks by all PI's at several international conferences as well as seminars given in various research labs all over the world. Further, the activities related to the project have been advertised via several interviews which are available at the project's website.