The First International Workshop on Similarity-Based Pattern Analysis and Recognition

Venice, 28-30 September 2011
The SIMBAD FP7 Project
Beyond Features:
Similarity-Based Pattern Analysis and Recognition

1. Università Ca' Foscari di Venezia (IT), coordinator
2. University of York (UK)
3. Technische Universität Delft (NL)
4. Instituto Superior Técnico, Lisbon (PL)
5. Università degli Studi di Verona (IT)
6. ETH Zürich (CH)

http://simbad-fp7.eu
Traditional pattern recognition techniques are centered on the notion of feature-vector, i.e. they derive similarities from vector representations.

But, there are various application domains where either it is not possible to find satisfactory features or they are inefficient for learning purposes.

This is typically the case, e.g.,

- when experts cannot define features in a straightforward way
- when data are high dimensional
- when features consist of both numerical and categorical variables,
- in the presence of missing or inhomogeneous data
- when objects are described in terms of structural properties, such as parts and relations between parts, as is the case in shape recognition
By departing from vector-space representations one is confronted with the challenging problem of dealing with (dis)similarities that do not necessarily possess the Euclidean behavior or not even obey the requirements of a metric.

The lack of the Euclidean and/or metric properties undermines the very foundations of traditional pattern recognition theories and algorithms!
SIMBAD aims at bringing to full maturation a paradigm shift that is currently just emerging within the pattern recognition and machine learning domains, where researchers are becoming increasingly aware of the importance of similarity information per se, as opposed to the classical feature-based approach.

The whole project will revolve around two main themes, which basically correspond to the two fundamental questions that arise when abandoning the realm of vectorial representations, namely:

- How can one obtain suitable similarity information from object representations that are more powerful than, or simply different from, the vectorial?

- How can one use similarity information in order to perform learning and classification tasks?
1. Deriving similarities for non-vectorial data
   - Structural (generative/compression) kernels
   - Learning and combining similarities

2. Learning and classification with non-(geo)metric similarities
   - Foundations of non (geo)metric similarities
   - Imposing geometricity on non-geometric similarities (embedding)
   - Learning with non-(geo)metric similarities (game theory)

3. Biomedical applications
   - Analysis of tissue micro-array (TMA) images of renal cell carcinoma
   - Analysis of brain magnetic resonance (MR) scans for the diagnosis of mental illness
For more information:

http://simbad-fp7.eu
The SIMBAD Book

M. Pelillo (Ed.)
Similarity-Based Pattern Analysis and Recognition

The book will be published in Springer’s Series Advances in Computer Vision and Pattern Recognition and is planned to appear in the spring of 2012.
The Venue
Ca’ Dolfin

- Built in XVI century, architect unknown
- Sold to Cardinal Dolfin on November 24, 1621 (for 12000 “scudi”)
- Purchased by milanese architect G. B. Brusa in 1876
- Then, Labia, Querini, etc.
- Purchased by Ca’ Foscari University in 1955
- It used to host the Applied Math Department
The Main Hall

Ceiling by Niccolò Bambini (1710-1715)

Ten paintings by Tiepolo (1726-1730)
Dictatorship Offered to Cincinnatus
Tiepolo, Giovanni Battista.
Oil on canvas. 387x227 cm
Italy. Circa 1730

Triumph of Manius Curius Dentatus
Tiepolo, Giovanni Battista.
Oil on canvas. 550x322 cm
Italy. Circa 1730
The Triumph of Marius, 1729
Giovanni Battista Tiepolo
Oil on canvas; Irregular painted surface, 220 x 128 5/8 in. (558.8 x 326.7 cm)

The Capture of Carthage, 1725–29
Giovanni Battista Tiepolo
Oil on canvas; Irregular painted surface, 162 x 148 3/8 in. (411.5 x 376.9 cm)
Kunsthistorisches Museum, Vienna

Giovanni Battista Tiepolo
(Venice 1696-1770 Madrid)
The Death of the Consul Lucius Junius Brutus
c. 1728/30
Canvas
Books on Ca’ Dolfin

The Ca’ Dolfin Tiepolos
K. Christiansen

Painting Then For Now.
Fragments of Tiepolo at the Ca’ Dolfin
S. Alpers, J.Hyde, and B. Kulok
The Workshop
<table>
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<th>Wednesday, 28 September</th>
<th>Thursday, 29 September</th>
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| 9.15 Welcome Address   | 9.30 Invited talk: Support Constraints Machines  
Marco Gori, University of Siena, Italy | 9.30 Invited talk: Limitations of Kernel and Multiple Kernel Learning  
John Shawe-Taylor, University College London, UK |
| 9.30 Invited talk: What Makes Things Similar?  
Ulrike Hahn, Cardiff University, UK | 10.30 Coffee break | 10.30 Coffee break |
| 10.30 Coffee break | 11.00 On the Usefulness of Similarity based Projection Spaces for Transfer Learning  
E. Morvant, A. Habrard, S. Ayouche | 11.00 Supervised Learning of Graph Structure  
A. Torsello, L. Rossi |
| 11.00 On the Usefulness of Similarity based Projection Spaces for Transfer Learning  
E. Morvant, A. Habrard, S. Ayouche | 11.30 Metric Anomaly Detection Via Asymmetric Risk Minimization  
A. Kontorovich, D. Hendler, E. Manahem | 11.30 An Information Theoretic Approach to Learning Generative Graph Prototypes  
L. Han, E.R. Hancock, R. Wilson |
| 11.30 Metric Anomaly Detection Via Asymmetric Risk Minimization  
A. Kontorovich, D. Hendler, E. Manahem | 12.00 One Shot Similarity Metric Learning for Action Recognition  
O. Kliper-Gross, T. Hassner, L. Wolf | 12.00 Graph Characterization via Backtrackless paths  
P. Aza, R. Wilson, E. R. Hancock |
| 12.00 Lunch | 12.30 Lunch | 12.00 Lunch |
| 13.30 Lunch | 14.00 Bag Dissimilarities for Multiple Instance Learning  
D. Tax, M. Loog, R. Duin, V. Chaplygina, W. Lee | 14.00 Lunch |
| 14.30 Poster Spotlights | | 14.30 Poster Spotlights |
| 14.30 Poster Spotlights | | |
| Session 1: Dissimilarity Characterization and Analysis | Session 4: Clustering and Dissimilarity Data | Session 5: Graphs and Relational Models |
| 14.00 Hybrid Generative-Discriminative Nucleus Classification of Renal Cell Carcinoma  
A. Ulas, P.J. Schüffler, M. Bicigo, U. Castellani, V. Murino | 14.00 Bag Dissimilarities for Multiple Instance Learning  
D. Tax, M. Loog, R. Duin, V. Chaplygina, W. Lee | 14.00 Poster Spotlights |
| 14.30 Multi-task Regularization of Generative Similarity Models  
L. Cazzantì, S. Feldman, M. Gupta, M. Gabbay | | 14.00 Poster Spotlights |
| 15.00 A Generative Dyadic Aspect Model for Evidence Accumulation Clustering  
A. Louranço, A. Fred, M. Figueiredo | | 14.00 Poster Spotlights |
| 15.30 Coffee break | | 14.30 Poster Spotlights |
| | | 14.30 Poster Spotlights |
| Session 2: Generative Models of Similarity Data | Session 3: Applications | |
| 16.00 Combining Data Sources Nonlinearly for Cell Nucleus Classification of Renal Cell Carcinoma  
M. Gönen, A. Ulas, P. J. Schüffler, U. Castellani, V. Murino | 16.00 Combined Data Sources Nonlinearly for Cell Nucleus Classification of Renal Cell Carcinoma  
M. Gönen, A. Ulas, P. J. Schüffler, U. Castellani, V. Murino | 16.00 Supervised Segmentation of Fiber Tracts  
E. Olivetti, P. Aivasani |
| 16.30 Supervised Segmentation of Fiber Tracts  
E. Olivetti, P. Aivasani | 17.00 Exploiting Dissimilarity Representations for Person Re-identification  
R. Sotta, G. Fumera, F. Roli | 17.00 Exploiting Dissimilarity Representations for Person Re-identification  
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R. Sotta, G. Fumera, F. Roli | | |
| | | |
| Poster Session: 15.00 - 17.30 | | |
| Mutual Information Criteria for Feature Selection  
Z. Zhang, E.R. Hancock | | |
| On a Non-Monotonicity Effect of Similarity Measures  
B. Moser, G. Stübi, J. Buchot | | |
| A Study of Embedding Methods under the Evidence Accumulation Framework  
H. Alido, A. Fred | | |
| Section-wise Similarities for Clustering and Outlier Detection of Subjective Sequential Data  
O. S. Siardia, I. Martín De Diago, C. Condó, E. Cabello | | |
| A Study of the Influence of Shape for Classifying Small Spectral Data Sets  
D. Porr-Muñoz, R. P.W. Duin, M. Orozo-Alzate, I. Talavera | | |
| Impact of the Initialization in Tree-Based Fast Similarity Search Techniques  
A. Serrano, L. Mico, J. Oncina | | |
| Feature Point Matching Using a Hermitian Property Matrix  
M. Hassab, E.R. Hancock | | |
| Learning Good Edit Similarities with Generalization Guarantees  
A. Ballet | | |
Videolectures Coverage

videolectures.net
exchange ideas & share knowledge
The Social Dinner
Thursday, 8:00 pm

Restaurant La Caravella
San Marco 2398, via XXII Marzo
Lunches
Wi-Fi?

Ask Samuel Rota Bulò
Thanks to the PC Members

Maria-Florina Balcan, Georgia Institute of Technology, USA
Manuele Bicego, University of Verona, Italy
Joachim Buhmann, ETH Zurich, Switzerland
Horst Bunke, University of Bern, Switzerland
Tiberio Caetano, NICTA, Australia
Umberto Castellani, University of Verona, Italy
Luca Cazzanti, University of Washington, Seattle, USA
Nicolò Cesa-Bianchi, University of Milan, Italy
Robert Duin, Delft University of Technology, The Netherlands
Francisco Escolano, University of Alicante, Spain
Mario Figueiredo, Technical University of Lisbon, Portugal
Ana Fred, Technical University of Lisbon, Portugal
Bernard Haasdonk, University of Stuttgart, Germany
Edwin Hancock, University of York, UK
Anil Jain, Michigan State University, USA
Robert Krauthgamer, Weizmann Institute of Science, Israel
Marco Loog, Delft University of Technology, The Netherlands
Vittorio Murino, University of Verona, Italy
Elzbieta Pekalska, University of Manchester, UK
Marcello Pelillo, University of Venice, Italy
Massimiliano Pontil, University College London, UK
Antonio Robles-Kelly, NICTA, Australia
Volker Roth, University of Basel, Switzerland
Amnon Shashua, The Hebrew University of Jerusalem, Israel
Andrea Torsello, University of Venice, Italy
Richard Wilson, University of York, UK
Thanks to the Invited Speakers

Marco Gori

Ulrike Hahn

John Shawe-Taylor
Thanks to the Local Organization Committee

Samuel

Nicola

Luca

Teresa
Thanks to Our Supporters

SEVENTH FRAMEWORK PROGRAMME

PASCAL2 Pattern Analysis, Statistical Modelling and Computational Learning

SIMBAD

IAPRO

Università Ca’ Foscari Venezia