

Dear TC15 members,

Welcome to the January 2017 edition of our newsletter. All the chairs of the TC15 wish readers a happy new year. This edition brings to you a very interesting report on contests dealing with Graph Edit Distance held during the ICPR 2016 conference. Some updated Calls for Papers are also included below. Information about recent books and Special issue of Journal are also included.

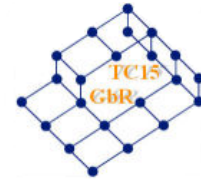
PhD, post-doctoral positions or young researcher's CV dealing with Graphs could also be included in future newsletters.

Do not hesitate to send us (ramel@univ-tours.fr) brief abstracts; we will be pleased to include them in the next TC15 newsletter. Remember that you can also find up-to-date information about our community on [our web site](#).

Best regards

Jean-Yves Ramel & Donatello Conte

TC15 newsletter editors



TC15

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Declaration of intent of Pasquale Foggia, new chair of the TC15

Dear TC15 members,



During the Technical Committee meeting that has been held at the last ICPR in Cancun, on December, the new chairs for the TCs have been formally appointed.

For our TC, I will serve as the chair for the next two years, assisted by the vice-chairs Luc Brun and Bin Luo. We want to start our first official message to our community with a heartfelt thank to our predecessors, the chair Xiaoyi Jiang and the vice-chairs Andrea Torsello and Luc Brun (who will continue to serve in this role also for the next term).

Under their guidance our community has grown, and we want just to recall that we have had (in 2015) the first edition of GbR outside of Europe.

We hope to be able, with the help from you all, to continue in this work. One of our commitments will be to try to further expand our community, especially considering that there are geographic areas that are greatly underrepresented, such as the Americas. One of the ways to pursue this objective will be to propose the introduction of special sessions on graph-related methods in pattern recognition conferences that will be held in those parts of the worlds, like CIARP.

With the help of Jean-Yves Ramel and Donatello Conte, that will continue to manage the TC15 newsletter, we will try to expand its scope as a space for discussion, by encouraging TC15 members to submit opinion articles and comments on research topics and trends that can be of interest to our community; this can be a way for starting joint research activities carried by several research members, and if there is a critical mass on a topic, it can lead to some editorial initiative (e.g. journal special issues, or books).

One of the things we have discussed at the ICPR TC meeting has been the renewal of the TC15 web site. We will try to "refresh" the look and feel of the site, as suggested at the meeting, also to make it more consistent with the design of the IAPR web site. We will also ask for a specific subdomain name under the iapr.org domain, so as to make the name of the site independent of where the site is actually hosted.

Among the suggestions we have received at the IAPR TC meeting, there was the hint to expand our education initiatives. Actually we have had several exchanges of students (both undergraduate and PhD)

between research groups affiliated to TC15, but we should try to give more publicity and visibility to these initiatives. Also, we can try to institute a prize for the best PhD thesis on a TC15-related subject, if we are able to get some funds from IAPR.

We conclude this message wishing you a happy 2017 full of graphs, and we look forward to meet you next may at GbR2017!

Bests,
Pasquale Foggia, Luc Brun and Bin Luo.

Report on contests and competitions dealing with Graphs during ICPR2016

ICPR 2016 - Graph Distance Contest - <https://gdc2016.greyc.fr/>

This contest has focused on the definition and the computation of general dissimilarity measures between graphs through two challenges:

* Challenge 1: computation of the exact or an approximate graph edit distance

* Challenge 2: computation of a dissimilarity measure for graph classification

Different datasets have been considered with symbolic or numerical attributes on both nodes and edges.

The goal of Challenge 1 was to compute the exact or an approximate GED, for several pairs of graphs of several datasets, under the following constraints: running time limited to 30 seconds edit costs imposed for each dataset. The submitted methods have been compared according to running time closeness to reference distances. The reference distance is the optimal edit distance (when available) or the minimal distance found by the methods under evaluation.

The participants were:

* An Exact Graph Edit Distance Computation using a Binary Linear Program (F24threads), Julien Lerouge, Zeina Abu-Aisheh, Romain Raveaux, Pierre Heroux, and Sebastien Adam, with 3 variants [URL](#)

* A Branch-and-bound algorithms (DF, PDFS): Zeina Abu-Aisheh, Romain Raveaux, Jean-Yves Ramel and Patrick Martineau with 3 variants, [URL](#)

* Assignment Problem based methods (QAPE): Benoit Gauzere, Sébastien Bougleux, Luc Brun, Vincenzo Carletti, Mario Vento, with 2 variants [URL](#)

The detailed results of this challenge show that F24threads was the method based on Binary Linear Program is the most precise between exact methods but fails to have a good deviation when matching graphs whose sizes are bigger than 60 vertices. QAPE beat F24threads on big graphs (graphs whose size is bigger than 60 vertices). Indeed, QAPE was the most precise approximate algorithm but since we don't have all the optimal solutions it's hard to tell how far are its solutions from the optimal ones and it is still not adapted to work with numeric attributes. DF and PDFS are highly dependent on the bipartite matching algorithm (used as a lower bound. One can notice that there is still no method that can match more than 40 nodes with really good deviation (compared to the optimal)

In future, more challenging datasets with all the optimal solutions, with bigger sizes of graphs, with denser graphs and with different types of attributes have to be used. The study the influence of costs on the methods has also to be studied more deeply.

The goal of the Challenge 2 was, given a dataset decomposed into a train set, a validation set and a test set, to determine the class of the graphs in the test set with a usual k-NN classifier (with k=3, decision at majority, reject if 3 different classes). The evaluation has been done on 4 different datasets

The 2 submitted methods have been analyzed and compared, for each dataset, according to recognition rate and confusion matrix. The first method was High Order Stochastic Graphlets for Graph-Based Pattern Classification, Anjan Dutta, Josep Lladós and the second one was the Upper Bound Depth-First Graph Edit Distance Algorithm proposed by Zeina Abu-Aisheh, Romain Raveaux, Jean-Yves Ramel and Patrick Martineau.

The results demonstrate that the both methods are interesting as the first method wins on 2 datasets (GREC, MAO) and the other one wins on Monoterp and Mutagenicity datasets.

IAPR Research Scholarships

IAPR Research Scholarships, awarded by the IAPR through its Education Committee (IAPR-EC), seek to make possible mobility across institutions and international boundaries for Early Career Researchers working in fields within the scope of the IAPR's interests. Through this program, the IAPR sees an opportunity to make a significant contribution to the development of Early Career Researchers as well as the wider Pattern Recognition community.

The candidate must be a full-time researcher: either a PhD research student who has completed at least one year's study at this level or someone already employed as a full-time researcher who has been active in the field for fewer than eight years and is working at a level equivalent to a post-doctoral researcher. The visits will be no longer than 12 months in duration. The scholarship will cover round trip travel to the chosen research institution and basic living expenses.

For further details on the application requirements, please visit <http://www.iapr.org/docs/IAPR-EC-RS-Call-2016>.

Open positions and CV

Open PhD position at GREYC Laboratory (Caen, France)

This Newsletter, is certainly not the place to insist on the relevance of graph based representation for pattern recognition. However, the irruption of Deep learning these last years has strongly modified the pattern recognition field. However, most of the convolutional neural networks (CNN) presented so far use as inputs either a vector or a grid of fixed dimension. Classical ways to use graphs as inputs for such networks consists in casting the graph into a vector or a regular grid hence losing an important part of the structural information.

The aim of this thesis, consists in designing a new type of CNN (mainly a new input layer) in order to predict the properties of graphs without any assumption on their structure. More details may be found at the following url: https://iapr-tc15.greyc.fr/download/PhdProposal_en.pdf

Please contact luc.brun@ensicaen.fr for additional information.

New books or PhD on Graphs

PhD of Maroua Hammami : Contributions à la localisation adaptative de zones informatives sur des images de documents. Advisor : Sébastien Adam, November 2016.

<https://hal.archives-ouvertes.fr/tel-01404896/document> (FR) - [Pat. Recognition Letters, Vol 71\(1\) 2016, p45-51](#) (EN)

PhD of Xavier Cortés: Active and Interactive Learning Strategies for Error-Tolerant Graph Matching, Advisor: Francesc Serratosa July 14th, 2016.

http://deim.urv.cat/~francesc.serratosa/Xavier_Cortes_Thesis.pdf

PhD of Carlos Moreno: Learning the Consensus of Multiple Correspondences for Data Structures, Advisor: Francesc Serratosa, July 12th, 2016.

http://deim.urv.cat/~francesc.serratosa/Carlos_Moreno_Thesis.pdf

PhD of Yusuf Osmanlioglu: On the Applications of Metric Trees and Metric Labeling to Hard Combinatorial Optimization Problems – Advisor: Ali Shokoufandeh, Ph.D. May 2016

<https://www.cbica.upenn.edu/sbia/Yusuf.Osmanlioglu/src/thesisOsmanlioglu.pdf>

Book: Graph-Based Social Media Analysis - Ioannis Pita

<https://www.crcpress.com/Graph-Based-Social-Media-Analysis/Pitas/p/book/9781498719049>

Upcoming conferences & Call for papers

GBR 2017

11th IAPR-TC15 Workshop on Graph-based Representations in Pattern Recognition
May 16-18, 2017 – Anacapri, of the island of Capri (Italy),

<p><i>Important dates</i></p> <ul style="list-style-type: none">• Paper submission January 22, 2017 (extended)• Notification of acceptance February 13, 2017• Camera ready March 6, 2017 <p><i>Topics</i></p> <ul style="list-style-type: none">• Graph matching• Graph-based image segmentation• Irregular (graph) pyramids• Graph representation of shapes	<ul style="list-style-type: none">• Graph distance and similarity measures• Graph-based learning and clustering• Data mining with graphs• Kernel methods for graphs• Graph embeddings• Belief-propagation methods• Graph-cuts methods• Graphs in computational topology and bioinformatics• Graphs in social network analysis
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Web site : <http://gbr2017.unisa.it>

GraphSM 2017

The Fourth International Workshop on Large-scale Graph Analysis, Management and Applications
May 21 - 25, 2017 - Barcelona, Spain

<p><i>Important dates</i></p> <ul style="list-style-type: none">• Paper submission: February 3, 2017 (extended)• Notification of acceptance March 3, 2017• Camera ready April 9, 2017 <p><i>Topics</i></p> <ul style="list-style-type: none">• Search in graph databases; Algebra and logic of graphs;• Expressive power of graph query languages;• Formalizations of graph databases	<ul style="list-style-type: none">• Graph data modelling• Indexing methods for graph processing• Storage systems for large-scale graph databases• Flexible query answering on graph-structured data• Graph pattern matching; Knowledge discovery• Algorithms for graph database processing• Biological and medical graph databases;• Graph processing for Social Networks• Visualizing
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Web site : <https://www.iaia.org/conferences2017/GraphSM.html#CallForPapers>