Dear TC15 members,

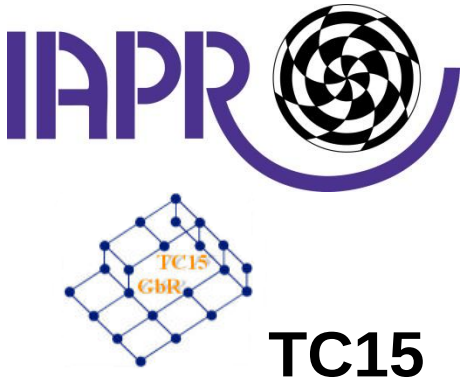
Welcome to the **September 2021 edition of the TC15 newsletter.** All the chairs of the TC15 hope this newsletter finds you in good health.

This edition provides a lot of interesting information about our community and proposes to organize some new events from now and until 2023.

Some updated Calls for positions, papers are also included below with information about recent datasets, books and Call for papers.

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

Best regards
Jean-Yves Ramel
TC15 newsletter editor



TC15

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Next events of the TC15

Because of the well-known pandemic situation, the whole organization of the TC15 events has been turned upside down, as well as many other activities of each of us. Thus, we have thought of organizing several events, from now until 2023, to replace our GbR conference of 2021, and to allow research groups to value their work.
Here you are the next event we are organizing.

2021

- ***First online TC15 seminar on October, the 22nd***: see the specific section in this Newsletter for details

2022

- ***Special Session*** on "Graphs for Pattern Recognition: Representations, Theory and Applications***" at ICPRAI 2022*** (Paris, June 2022): see the specific section in this Newsletter for details
- ***Special Session*** on "Graph-based Representation for Pattern Recognition" ***at SSPR 2022*** (probably in august 2022, organization in progress): we will organize a Special Session on Graphs; we had the agreement in principle from the organizers (Andrea Torsello), but the organization of the SSPR conference has not yet been established. Details will be given when more progress has been made

2023

- ***GbR 2023***: As you know this year it was not possible to organize our usual TC15 workshop. Nevertheless, we made a call to organize our GbR Workshop and the MIVIA Group from University of Salerno was the only one to submit its candidacy. Therefore, the next GbR will be in the 2023 and more details will be given in the coming months.
- As we said above, during the 2022 we are organizing some Special Sessions on Graphs within some bigger conferences because we are sure that the members of the TC15 have interesting research results to be presented and shared within these events

First online TC15 seminar on October, the 22nd (2021)

Dear TC15 members,

We are pleased to announce an online TC seminar on October, the 22nd of 2021. We propose 4th invited talks of the duration of about 40 minutes, **then we make a call for small presentation (about 10 minutes), to allow you to present your current research activities. Please contact us if you want to present you work**.

Here you are a tentative program (hours are in UTC+1 Rome, Berlin, Paris zone)

- 10:00 – Opening
- 10:10 – First Invited Talk: Ananda S. Chowdhury, "Graph based Video Processing"
- 10:50/11:30 – Presentations of research works (around 3)
- 11:30 – Second Invited Talk: Benoit Gaüzère, "Graphs and Pre-Image"
- 12:20 – Lunch Break
- 14:00 – Third Invited Talk: Romain Raveaux, "Differentiable Graph Matching"
- 14:40/15:20 – Presentations of research works (around 3)
- 15:20 – Fourth Invited Talk: Mario Vento, "Subgraph Isomorphism in Pattern Recognition"
- 16:00 – Closing

Upcoming conferences & Call for papers

GMLR Track, SAC 2022, Brno, Czech Republic (April 25-29, 2022)
Graph Models for Learning and Recognition (GMLR) Track at the 37th ACM Symposium on Applied Computing (SAC 2022)

The ACM Symposium on Applied Computing (SAC 2022) has been a primary gathering forum for applied computer scientists, computer engineers, software engineers, and application developers from around the world. SAC 2022 is sponsored by the ACM Special Interest Group on Applied Computing (SIGAPP), and will be held in Brno, Czech Republic. The technical track on Graph Models for Learning and Recognition (GMLR) is the first edition and is organized within SAC 2022. Typical examples of applications dealing with graph-based representation are: scene graph generation, point clouds classification, and action recognition in computer vision; text classification, inter-relations of documents or words to infer document labels in natural language processing; forecasting traffic speed, volume or the density of roads in traffic networks, whereas in chemistry researchers apply graph-based algorithms to study the graph structure of molecules/compounds.

Important dates

- *Paper submission: October 15, 2021*
- *Notification of acceptance: Dec 10, 2021*
- *Camera-ready copies: December 21, 2021*
- *SAC Conference: April 25 - 29, 2022*

Topics of interest

- *Graph Neural Networks: theory and applications*
- *Deep learning on graphs*
- *Graph or knowledge representationa learning*
- *Graphs in pattern recognition*
- *Graph databases and linked data in AI*
- *Benchmarks for GNN*
- *Dynamic, spatial and temporal graphs*
- *Graph methods in computer vision*
- *Human behavior and scene understanding*
- *Social networks analysis*
- *Data fusion methods in GNN*
- *Efficient and parallel computation for graph learning algorithms*
- *Reasoning over knowledge-graphs*
- *Interactivity, explainability and trust in graph-based learning*
- *Probabilistic graphical models*
- *Biomedical data analytics on graphs*

Authors of selected top papers of this track will be asked to publish an extended version in a Special Issue of a Journal (the journal will be announced soon).

Web site: http://phuselab.di.unimi.it/GMLR2022

ICPRAI 2022, Paris (1-3 June 2022)

Special Session on "Graphs for Pattern Recognition: Representations, Theory and Applications"

Graphs have gained a lot of attention in the pattern recognition community thanks to their ability to encode both topological, geometrical, and semantic information. Despite their invaluable descriptive power and their invariance to diverse geometric deformations, their arbitrarily complex structured nature poses serious challenges when they are involved in Pattern Recognition and Artificial Intelligence. Some challenging problems are: a non-unique representation of data, heterogeneous attributes (symbolic, numeric, etc.), highly complex algorithms like (sub-) graph matching. This Special Session intends to focus on all aspects of graph-based representations in Pattern Recognition and Artificial Intelligence, from theoretical to applications concerns

Important dates • *To be confirmed soon (see web site)* • *Paper submission due: December 15, 2021* • *Conference: June 1-3, 2022 (Paris)* *Topics* • Dynamic, spatial and temporal graphs • Graph representations and methods in computer vision	• Geometry and Topology in Graphs • Graph Neural Networks Benchmarks for Graphs in Pattern Recognition • Graph Learning and Classification • Graph Matching • Social Networks Analysis • Graph Representation Learning • …

Web site: https://icprai2022.sciencesconf.org/

Open Positions

Ph.D. position in France - Learning Spatio-temporal data by graph representations

Supervisors

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Hosting Institution

Computer science laboratory of Tours / Laboratoire d'Informatique Fondamentale et Appliquées de Tours (LIFAT, lifat.univ-tours.fr), Tours, France

PhD Subject

In many application domains like action recognition or prediction, video segmentation, traffic forecasting or anomaly detection in brain activity signals, time-varying data are frequently represented by graphs. While there is a solid literature on graph-based data analysis, the domain has strongly evolved over the last 5 years with the advances in deep learning on Graph Neural Networks (GNN). Nevertheless, GNN have been less investigated for time-varying graphs. We can distinguish two main models:

- Recurrent Neural Network (RNN) combined with convolutions applied independently on each graph of a sequence [1, 2, 3].
- Graph Convolutional Networks alternating temporal and spatial convolutions on spatio-temporal graphs [4, 5, 6].

The aim of this thesis is to :

1. Study alternative representations for time-varying graphs.
2. Propose GNN models based on convolution, decimation and pooling operations, as well as RNN models, adapted to these alternative representations.
3. Program these models (in Python), and compare them to the state-of-the-art on standard datasets for different applications, in particular, skeleton-based gesture recognition.

Candidates profile

Master degree in Computer Science, Applied Mathematics, Data Science, or similar.

Skills (with experiences): neural networks, deep learning, Python programming, numerical analysis.

References

[1] A. Jain, A. R. Zamir, S. Savarese, and A. Saxena, "Structural-rnn: Deep learning on spatio-temporal graphs," CoRR, vol. abs/1511.05298, 2015

[2] C. Si, W. Chen, W. Wang, L. Wang, and T. Tan, "An attention enhanced graph convolutional lstm network for skeleton-based action recognition," in Proceedings of the IEEE conference on computer vision and pattern recognition, pp. 1227–1236, 2019

[3] Li, M., Chen, S., Zhao, Y., Zhang, Y., Wang, Y., & Tian, Q. (2020). Dynamic multiscale graph neural networks for 3d skeleton based human motion prediction. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (pp. 214-223).

[4] B. Yu, H. Yin, and Z. Zhu, "Spatio-temporal graph convolutional neural network: A deep learning framework for traffic forecasting," CoRR, vol. abs/1709.04875, 2017.

[5] L. Shi, Y. Zhang, J. Cheng, and H. Lu, "Skeleton-based action recognition with directed graph neural networks," in Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, pp. 7912–7921, 2019.

[6] Chen, T., Zhou, D., Wang, J., Wang, S., Guan, Y., He, X., & Ding, E. (2021). Learning Multi-Granular Spatio-Temporal Graph Network for Skeleton-based Action Recognition. arXiv preprint arXiv:2108.04536.