

IAPR-TC18 - Discrete Geometry

Final Report

Period 2014-2016

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1 TC Background Information

1.1 Listing of TC Leadership Team

The TC18 Leadership team is composed of three members:

- Isabelle Sivignon (CNRS researcher, GIPSA-lab, Grenoble, France): chair, in charge of the relationship with DGCI ;
- Partha Bhowmick (associate professor, Indian Institute of Technology, Kharagpur India): vice-chair, in charge of code repository and databases management ;
- Rocio Gonzalez-Diaz (associate professor, School of Computer Engineering, University of Seville, Spain): vice-chair, in charge of educational material, tutorials, challenges (open problems).

1.2 TC website URL

The website URL is www.tc18.org

1.3 Number of members (people on mailing list)

The number of members in TC18 (mailing list) is **95** (+7 compared to 2015). The list has been updated recently to remove inactive email addresses, and active members of DG community who were not members yet were invited and accepted to participate in TC18.

1.4 Communication types used and frequency

Communication to the TC18 members is done thanks to a newsletter sent once or twice a year. The newsletters are archived on the TC18 website <http://www.tc18.org/events.php#newsletter>. Between two newsletters, shorter announcements are made to promote a conference, a workshop, open positions or sometimes new books.

1.5 Listing of key events usually organised by the TC

The TC does not usually organise events by itself, but takes part in the organization of the main TC conference “Discrete Geometry for Computer Imagery”. The TC18 General Chair is a member of DGCI Steering Committee, and as such participates in all important decisions concerning the conference (reviewing process, next location, special issues, etc). Also, a TC18 plenary session is organized during each DGCI conference (see Section 2.2.1). It generally consists in giving general information about the TC and the IAPR, novelties on the website and recall that the members are welcome to submit new material (images, educational, code). The slides presented during DGCI 2016 (and before) can be found on the TC18 website (<http://www.tc18.org/events.php#dgci>).

2 Activities in the last two years (since ICPR2014)

2.1 Website updates

2.1.1 Educational information & Tutorials

We already have nice material available in the Educational section of the website. Following ICPR 2014 where a tutorial on Discrete Geometry was given by TC18 members, the slides of the presentations were added on the TC18 website (http://www.tc18.org/subfields/distance_skeletons/index.php).

Moreover, since 2013, we list every year (updated twice a year) all the DG publications in the main international journals. This gives a quick and easy reference to check recent publications of and for TC18 members. The lists are available on <http://www.tc18.org/educational.php#materials>.

2.1.2 Description of application areas

2.1.3 Examples of successful projects

Just before ICPR 2014, the TC18 Gallery was launched on the website. The goal is to enhance the display of TC18 members work (<http://www.tc18.org/gallery.php>) and successful projects.

2.1.4 Demos & Code

In the last few years, a great effort has been made by the DG community to develop open-source libraries to spread DG tools and algorithms. The list of DG or DG-related softwares and libraries is available from the TC18 website http://www.tc18.org/code_data_set/code.php. Moreover, some demos have also been developed in the last two years. A specific webpage dedicated to demos has been added to the website http://www.tc18.org/code_data_set/demos.php, featuring at the moment demos from the Image Processing Online journal and two other demos.

2.1.5 Reference resources (datasets, evaluation tools)

The list of 3D volumes, already quite rich has been upgraded with a new set of volumes provided by David Coeurjolly <https://github.com/dcoeurjo/VolGallery>. Moreover, the open-source library DGtal www.dgtal.org also provides both test shapes and tools to generate 2D and 3D digital shapes.

2.2 Research Initiatives

2.2.1 Events organised

TC18 takes part every 18 months to the organization of DGCI conference. During DGCI 2016, TC18 chairs moreover organized a special session on Open Problems in DG. The idea was to bring researchers to briefly and informally share open problems. Two preliminary announcements of the event were made a few weeks before the conference so that researchers had time to think about problems to present. This plenary session was quite a success, and seven new problems were presented. Following the event, the Open Problems page on the TC18 website has been updated and 19 problems are now listed <http://www.tc18.org/OpenProblems.php>. When a problem is solved, or when new advances are made on a specific problem, the corresponding reference is added on the website.

2.2.2 Publicity / dissemination activities

Apart from DGCI, the TC18 community participates very actively to other workshops and conferences: IWCIA 2015 (International Workshop on Combinatorial Image Analysis), CTIC 2016

(Combinatorial Topology in Image Context), ISMM 2015 (International Symposium on Mathematical Morphology), etc. Researchers from various countries are regular participants in these events for dissemination of their research work and further the progress of digital geometry in both theory and practice.

2.2.3 Other

3 Plans (timeline until ICPR2016 and beyond)

In the last mid-term report, we mentioned that an important goal for the near future would be to launch initiatives to bring the DG community closer to allied groups. Various actions are underway with the Mathematical Morphology community. During the last DGCI Steering Committee meeting, we discussed about a joint organization for the main TC18 conference (DGCI) and the main event in Mathematical Morphology (ISSM - International Symposium on Mathematical Morphology). The location of ISMM 2017 was already decided at the moment, and we thus decided to reconsider the matter for the next edition, bringing up the discussion well in advance. Gunilla Borgefors, who is an active member of both communities, has been appointed DGCI liaison for ISMM 2017.

In the meantime, a workshop of ACCV 2016 on DG and Mathematical Morphology (<http://www.dgcv.nii.ac.jp/DGMM4CV2016/>) is organized by TC18 members (Yukiko Kenmochi, Jean Cousty and Akihiro Sugimoto). Following this workshop, a special issue of DG in the open journal “Mathematical Morphology: Theory and Applications” is planned, with a TC18 chair as guest-editor (guest-editors: Jean Cousty, Yukiko Kenmochi, Isabelle Sivignon and Akihiro Sugimoto).

Last, we also plan to update the gallery of images on the website with images from the recent articles that were presented in DGCI 2016 or published in international journals in 2015/2016.

4 Recommendation to ExCo for TC leadership team for 2016-2018 term

For the next term, and following the IAPR rules, the TC18 chair has to change since Isabelle Sivignon already served two terms. Rocio Gonzalez-Diaz and Parth Bhowmick, who are vice-chairs, unfortunately do not wish to take over. Thus we had to look for new people to be on the TC18 leadership team. This was done by, first, launching an official call during DGCI 2016 TC18 meeting and in the June 2016 newsletter <http://www.tc18.org/newsletters/newsletterJune2016.html>, and second by contacting directly very active members of the DG community. Finally, we recommend the following TC18 leadership team for the 2016-2018 term:

- Bertrand Kerautret, Chair: since his PhD in 2004, Bertrand has been an assistant professor in LORIA (Nancy, France). He is the author of 11 articles in international journals, and 25 conference papers. In 2011, he co-organized the DGCI conference in Nancy, France. After the conference, he was the main instigator of the special issue in the IPOL (Image Processing Online) journal, which was a first for DGCI. Since then, he became very involved in the IPOL journal and in reproducibility in general. As a matter of fact, he is a co-organizer of the ICPR 2016 Workshop on Reproducible Research in Pattern Recognition. Last, he is one of the most active contributors of the open-source library DGtal, and manager of the DGtalTools project.
- Andrea Frosini, Vice-Chair: he obtained his PhD in 2001, and has been a researcher at Dept. of Sistemi and Informatica, Univ. of Florence (Italy) since then. His main research interests are discrete tomography, combinatorics and theory of words. He is the author of more than 25 articles in international journals, and 20 conference papers. In 2014, he was the main organizer of the DGCI Conference in Sienna, Italy.

- Arindam Biswas, Vice-Chair: he is an associate professor at the Department of Information Technology, Indian Institute of Engineering Science and Technology, Shibpur (India). He is a very regular contributor and participant to all the main DG events (DGCI, IWCI, CTIC), with 15 publications in international journals and more than 35 conference papers.

Apart from the involvement in the DG community these three researchers have shown over the years, they are from three countries which gather the most DG researchers (namely France, Italy and India).