

ICPR-2020 Workshop
”Image Mining. Theory and Applications”
IMTA VII-2020

January 11, 2021 | Milan, Italy

<http://imta.isti.cnr.it/>

Organized in conjunction with the 25th International Conference on Pattern Recognition (ICPR 2020), Milan, Italy, January 10-15, 2021 (<https://www.micc.unifi.it/icpr2020/>)

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The IMTA-VII-2020 will be conducted by the Technical Committee No. 16 “Algebraic and Discrete Mathematical Techniques in Pattern Recognition and Image Analysis” of the International Association for Pattern Recognition and by the National Committee for Pattern Recognition and Image Analysis of the Russian Academy of Sciences.

The main purpose of the IMTA-VII-2020 is to provide the fusion of modern mathematical approaches and techniques for image analysis/pattern recognition with the requests of applications.

The IMTA-VII-2020 will continue the successful series of workshops devoted to modern mathematical techniques of image mining and to corresponding applications (2008, Funchal, Madeira, Portugal; 2009, Lisboa, Portugal; 2010, Angers, France; 2013, Barcelona, Spain; 2015, Berlin, Germany; 2018, Montreal, Canada).

The workshop will consist of invited talks, contributed talks, posters and informal discussions.

Scope

Automation of image mining is one of the most important strategic goals in image analysis, recognition and understanding both in scientific and technological aspects. The main subgoals are developing and applying of mathematical theory for constructing image models and representations allowable by efficient pattern recognition algorithms and for constructing standardized representations and selection of image analysis transforms. Automation of image mining is possible by combined application of mathematical theory of image analysis/understanding/recognition and mathematical theory of pattern recognition.

Automation of image processing, analysis, estimating and understanding is one of the crucial points of theoretical computer science having decisive importance for applications, in particular, for diversification of solvable problem types and for increasing the efficiency of problem solving.

The role of an image as an analysis and estimation object is defined by its specific and inalienable informational properties. Image is a mixture and a combination of initial (raw, “real”) data and its representation means of computational procedures and of the physical nature and of the models of objects, events and processes being represented via an image.

The specificity, complexity and difficulties of image analysis and estimation (IAE) problems stem from necessity to achieve some balance between such highly contradictory factors as goals and tasks of a problem solving, the nature of visual perception, ways and means of an image acquisition, formation, representation, reproduction and rendering, and mathematical, computational and technological means allowable for the IAE.

The mathematical theory of image analysis is not finished and is passing through a developing stage. It cleared not so long ago that only intensive creating a comprehensive mathematical theory of image analysis and recognition (in addition to the mathematical theory of pattern recognition) could bring a real opportunity to solve efficiently application problems via extracting from images the information necessary for intelligent decision-making. The transition to practical, reliable and efficient automation of image mining is directly dependent on introducing and developing mathematical means for IAE.

The participants will enjoy the opportunity to discuss a methodology, mathematical and computational techniques for automation of image mining on the base of mathematical theory for IAE. Another important task of the workshop is to discuss artificial intelligence techniques, in particular, linguistic and knowledge engineering tools for image mining – image knowledge bases and image science ontologies – and to estimate the prospects of the algebraic approaches in representation of image analysis knowledge in this environment. The interpretation of mathematical and linguistic techniques will be illustrated by

application problems, mainly from biology and medicine, automation of scientific research, industrial applications and of many other domains generating breakthrough and difficult application tasks.

Topics

The IMTA-VII-2020 is intended to cover, but it is not limited to, **the following topics**:

- Methodological advances in image analysis and pattern recognition with a special focus on:
 - Algebra
 - Discrete mathematics
 - Computational Topology
 - Machine Learning
- New Mathematical Techniques in Image Mining:
 - Algebraic Approaches
 - Image and Lattice Algebras
 - Lattice-based Deep Hierarchical Representations and Neural Networks
 - Discrete Mathematics Techniques
 - Descriptive Techniques and Ill-Structured Data Representation Problems
 - Structural and Syntactic Techniques
 - Multiple Classifiers and Fusion of Algorithms
 - Pattern Recognition Techniques in Image-Mining Environment
 - Other Mathematical Techniques
- Image Models, Representations and Features
- Automation of Image and Data Mining:
 - Image and Ill-Structured Data Analysis
 - Image Mining, Computer Vision and Knowledge-Based Systems
 - Image Databases
 - Image Mining Technologies
- Artificial Intelligence Techniques in Image Mining
 - Knowledge Representation, Processing, Extracting and Analysis
 - Image Knowledge Bases
 - Linguistic Tools for Image Mining (Image Science Ontologies; Image Science Thesauri)
- Applied problems:
 - Bioinformatics
 - Bioengineering
 - Medical applications
 - Industry and Economics
 - Cultural Heritage
 - Other Important, Difficult and Interesting Applied Problems

Intended audience

Professionals, researchers and engineers, PhD students and graduate students interested in Mathematical Theory of Image Analysis, in Problem-Solving via modern mathematical techniques, in intellectual decision-making, designers of automated image analysis systems.

Important Dates

Workshop submission deadline: **November 1, 2020**

Workshop author notification: **November 8, 2020**

Camera-ready submission: **November 15, 2020**

The deadlines are fixed and will not be extended.

Paper Submission

We invite submission of full and short papers describing work in the domains suggested above or in closely related areas. Short papers (6-8 pages) and full papers (12-15 pages) can be submitted through [EasyChair](https://easychair.org/conferences/?conf=imta7): <https://easychair.org/conferences/?conf=imta7>.

Accepted submissions will be presented either as oral or posters at the workshop, and published in the ICPR 2020 Workshops volume, edited by Springer.

Paper Templates

For detailed description on Word/Latex Templates, please directly refer to the following link (always up to date version):

<https://www.springer.com/gp/computer-science/lncs/conference-proceedings-guidelines>

Ethical Requirements

By submitting to IMTA-VII-2020, the authors acknowledge that the submitted paper has not previously and is not currently accepted for publication in its current form. This includes, but is not limited to, any conference, workshop, journal or collection of papers.

The paper will be presented in person by its author(s).

IMTA-VII-2020 may remove any papers violating these requirements.

Paper Reviewing Process

All papers will be peer-reviewed. The criteria for accepting the papers will be as follows:

- the paper is focused on the IMTA-VII-2020 topics and presents new methods in image mining;
- the paper increases the impact of image mining methods in applications, e.g. providing new technique for an old application problem, or a new application for a known technique;
- the paper increases the awareness and comprehension about the image mining theory providing novel research perspectives possibly merging with other domains.

Workshop Proceedings

Proceedings will be published before the meeting (all accepted IMTA-VII-2020 papers will be published in ICPR 2020 Workshop Volume, edited by Springer). After the meeting, the extended texts of the papers presented at the IMTA-VII-2020, selected and recommended by IMTA Committee will be published in 2021 in a Special Issue of the International Journal of the Russian Academy of Sciences “Pattern Recognition and Image Analysis. Advances in Mathematical Theory and Applications” (PRIA) (the Publisher - Pleiades Publishing, Ltd.: Tropic Isle Building, P.O. Box 3331, Road Town, Tortola, British Virgin Islands; c/o Springer Science + Business Media LLC, 223 Spring St., 6th Floor, New York, NY, 10013, USA; Pleiades House7 West 54 Street New York, NY 10019) ISSN PRINT: 1054-6618, ISSN ONLINE: 1555-6212).

PRIA is abstracted and/or indexed in SCOPUS, ACM Digital Library, CNKI, EBSCO Discovery Service, EI Compendex, Gale, Gale Academic OneFile, Google Scholar, INSPEC, OCLC WorldCat Discovery Service, ProQuest ABI/INFORM, ProQuest Advanced Technologies & Aerospace Database, ProQuest Business Premium Collection, ProQuest Central, ProQuest

Computer and Information Systems Abstracts, ProQuest Computing Database, ProQuest Materials Science & Engineering Database, ProQuest Science Database, ProQuest SciTech Premium Collection, ProQuest Technology Collection, ProQuest-ExLibris Primo, ProQuest-ExLibris Summon, Russian Science Citation Index on the Web of Science Platform.

Each paper in PRIA has DOI.

See PRIA – <http://pleiades.online> and <http://link.springer.com>

Registration Information

Please refer to the ICPR 2020 website at:

<https://www.micc.unifi.it/icpr2020/index.php/registration/>

Workshop Contact

All questions and requests for additional information should be sent to imta@isti.cnr.it.

Attention:

The workshop, like the ICPR conference, will be fully virtual!