
From the Editorial Board

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This special issue of *Pattern Recognition and Image Analysis* is the first of two issues devoted to publication of the complete texts of reports made by the participants of the 9th International Conference “Pattern Recognition and Image Analysis: New Information Technologies” (PRIA-9-2008) that took place September 14–20, 2008, in Nizhni Novgorod at the Lobachevskii Nizhni Novgorod State University and was organized by the Russian Academy of Sciences, the Department of Mathematical Sciences of the Russian Academy of Sciences, the National Committee of the Russian Academy of Sciences on Pattern Recognition and Image Analysis, the Dorodnitsyn Computing Centre of the Russian Academy of Sciences (Moscow), and the Russian Public Organization “Association of Pattern Recognition and Image Analysis.” PRIA-9-2008 was supported by the RF Ministry of Education and Science, the Federal Agency for Education, the Russian Foundation for Basic Research, the Foundation to Assist the Development of Small Enterprises in the Scientific–Technical Sphere, Information Research Ltd. (Study Analysis. Evaluation. Recognition) (Moscow), and the Scientific Research Institute of Applied Mathematics and Cybernetics of the Lobachevskii Nizhni Novgorod State University (Nizhni Novgorod).

PRIA-9-2008 continues the cycle of PRIA conferences—scientific, scientific–technical, information, and coordination arrangements devoted to new and challenging information technologies intended to solve the tasks of pattern recognition and image analysis and tasks from adjacent fields connected with the automation of decision-making according to heterogeneous incomplete, noisy, and contradictory information. The first PRIA conference was held in Minsk, in the Belarusian SSR (PRIA-1-91, 1991). All subsequent conferences have been held in the Russian Federation: Ul’yanovsk (PRIA-2-95, 1995), Nizhni Novgorod (PRIA-3-95, 1995), Novosibirsk (PRIA-4-98, 1998), Samara (PRIA-5-2000, 2000), Velikii Novgorod (PRIA-6-2002, 2002), St. Petersburg (PRIA-7-2004, 2004), and Yoshkar Ola (PRIA-8-2007).

The following scientific and scientific-organizational arrangements were included in the composition of PRIA-9-2008: the 9th International Conference “Pattern Recognition and Image Analysis: New Information Technologies,” the 9th All-Russia Conference with the participation of the CIS-countries “Methods and Instruments for Processing Complex Graphical Information,” brief lecture courses and review reports

of leading scientists and specialists called “The Modern State of Pattern Recognition and Image Analysis,” the exhibition “Software and Hardware Tools for Realizing and Supporting Information Technologies of Image Analysis and Pattern Recognition,” the session of Technical Committee TC16 of the International Association of Pattern Recognition “Algebraic Methods and Methods of Discrete Mathematics in Pattern Recognition and Image Analysis,” and the 8th congress of the Russian Public Organization “Association of Pattern Recognition and Image Analysis.”

The 9th International Conference “Pattern Recognition and Image Analysis: New Information Technologies” and the 9th All-Russia Conference with the participation of the CIS-countries “Methods and Instruments for Processing Complex Graphical Information” were accredited by the program “Participation of the Youth’s Scientific-Information Competition 2008” of the Foundation to Assist the Development of Small Enterprises in the Scientific–Technical Sphere.

The basis of themes of PRIA-9-2008 was constituted by the problems and research and development connected with the creation, fulfillment, and application of information technologies for pattern recognition and image analysis:

- posing, researching, and solving mathematical tasks arising owing to developing, researching, and realizing the methods for transforming, analyzing, and evaluating information in tasks of recognition, classification, and forecasting when representing initial data in the form of numeric and textual massifs, expert data, implementations of signals, images, time series, and random multidimensional fields or in the form of a mixture of the indicated data types;

- processing, analyzing, recognizing, understanding, and synthesizing images (including machine graphics, visualization, virtual reality);

- processing, analyzing, recognizing, understanding, and synthesizing speech;

- developing, researching, modifying, and systematizing mathematical and computational methods constituting the algorithmic base of information technologies;

- developing, researching, modifying, and systematizing the methods for information technology automation and testing;

- developing specialized information technologies (for classes of tasks and subject fields);

- developing and realizing instrument tools of many uses, databases, knowledge bases, and linguistic

instruments (including ontologies and thesauruses) to support information technologies for pattern recognition, image analysis, speech analysis and synthesis, and signal processing;

—developing, researching, adapting, and realizing the methods for solving nonstandard, particularly important and mass tasks of pattern recognition, image, speech, and signal analysis and understanding;

—analyzing, synthesizing, and processing complex graphic information and spatially distributed data, developing and completing mathematical models for describing graphic documents, developing knowledge bases, information-terminological, and software support of automated systems for processing complex graphical information;

—developing, researching, and applying GIS-technologies;

—developing multimedia technologies.

The main thematic fields of the conference were as follows:

(1) The mathematical theory of pattern recognition and forecasting;

(2) The mathematical theory of processing, analyzing, recognizing, and understanding images, spatially distributed data, and complex graphical information;

(3) The mathematical theory of speech processing, recognition, analysis, and understanding;

(4) The models, methods, and instruments for presenting initial information in tasks of pattern recognition, image analysis, and signal processing;

(5) Automating the development, testing, and adaptation of information technologies of pattern recognition, processing, analyzing, and understanding speech, signals, spatially distributed data, and complex graphical information;

(6) The algorithmic-program complexes, software tools, and information technologies for solving the tasks of recognizing patterns with standard information;

(7) The algorithmic-program complexes, software tools, and information technologies for analyzing and evaluating information presented in the form of images and signals;

(8) The databases and linguistic instruments for supporting information technologies of pattern recognition, processing, analyzing, and understanding speech, signals, spatially distributed data, and complex graphical information;

(9) The specialized architectures, instrumental and hardware tools for supporting the information technologies of pattern recognition, and image, speech, and signal processing, analysis, and recognition;

(10) The neuronal nets and neuronet methods of data processing, analysis, and interpretation;

(11) The algorithmic and software tools and information technologies for intelligent geographic and cartographic information systems and systems of ecological monitoring, GIS-technologies;

(12) The algorithms, software tools, and information technologies for intelligent biomedical and biotechnical systems;

(13) Algorithms, software tools, and information technologies in bioinformatics;

(14) Computer-vision systems;

(15) The algorithms, software tools, information technologies, and systems for processing and analyzing three-dimensional data;

(16) Video-information processing and analysis;

(17) Computer graphics, visualization, and virtual reality;

(18) Optical and optical-digital systems for analyzing and processing images and signals;

(20) Methods of artificial intelligence in pattern recognition and image analysis;

(21) Visual and aural perception in living organisms;

(22) Multimedia technologies.

More than 200 specialists and attendees representing academic and branch scientific-research institutes and higher educational institutions from more than 35 cities of the Russian Federation, CIS-countries, as well as 12 other countries (Algeria, Brazil, Germany, Greece, Iran, Spain, Italy, China, Morocco, Turkey, Finland, and France) took part in the work of the conference. Three full members and corresponding members of the Russian Academy of Sciences, Russian Academy of Natural Sciences, and Russian Academy of Medical Sciences, 47 doctors and 86 candidates of sciences, 115 young scientists, 7 postgraduates, and 3 students were among the participants of the conference. In sum, more than 204 reports approved by the Program Committee and published in the conference proceedings came to the address of the Organizational Committee. Four lectures, 16 plenary reports, 62 section reports, and 160 poster papers were given. The exhibition "Software and Hardware Tools for Realizing and Supporting Challenging Information Technologies of Image Analysis and Pattern Recognition" worked within the framework of the conference. Two exhibits were presented.

The conference involved the exchange of opinions on the problems of creating the mathematical theory of extracting information from images of different natures and its processing, development of software and hardware tools for effective storage and transmission of video-data, algorithms for compression and reconstruction of graphical information, automatic and automated systems for solving tasks of discrete geometry and pattern recognition, visualizing electronic maps, and preparing them for publication.

The problems of introducing the obtained results into different industries of the national economy and plans for developing and providing the corresponding teaching courses and laboratory works were discussed.

The best reports presented at PRIA-9-2008 by young scientists were awarded honorary diplomas by the Program Committee.

(1) Honorary diplomas of the first degree:

V.V. Yashina (Moscow), invited report "Image Representation Space in the Descriptive Approach Environment" (coauthor I.B. Gurevich).

(2) Honorary diplomas of the second degree:

E.S. Sorokin (Nizhni Novgorod) "Perfecting the Software for Updating Electronic Map Images" (coauthors Yu.G. Vasin and S.V. Zherzdev);

V.N. Koponenkov (Nizhni Novgorod) "Fast and Effective Algorithms of Local Discrete Wavelet Transform Research" (coauthor V.V. Myasnikov).

(3) Honorary diplomas of the third degree:

I.A. Golubev (Nizhni Novgorod) "A Storing Format for Heterogeneous Spatially Distributed Data" (coauthors Yu.G. Vasin and S.V. Zherzdev);

O.D. Yur'eva (St. Petersburg) "Choice of the Method for EGG QRS-Complex Reference Point Recognition for Heart-Rate Variability Spectral Analysis";

V.A. Kulikov (Novosibirsk) "Modeling and Analysis of Biological Object Velocity Using an Image Sequence from an Ethological Test on Motion Activity";

E.V. Myasnikov (Samara) "The Development of Regional Spatial Data and Metadata Geoportal" (coauthors E.V. Treshchova, N.S. Vorobyeva, and A.V. Chernov);

V. V. Dyubanov (Novosibirsk) "Attribute Selection through Description Rule Construction (algorithm

FriS-GRAD)" (coauthors N.G. Zagoruiko, I. Borisova, and O. Kutnenko).

Commendation certificates were obtained by A.A. Myagkov, L. Piovano, F. Makhdi, O.S. Ushmaev, E.V. Rusin, and A.A. Egorov.

The regularly scheduled 10th International Conference "Pattern Recognition and Image Analysis: New Information Technologies" (PRIA-10-2008) will be held by the National Committee of the Russian Academy of Sciences on Pattern Recognition and Image Analysis in 2010.

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