Ministry of Education and Science of Russia
State Research Center “Informatics and Control” of Russian Academy of Sciences
National Committee of the Presidium of RAS in Pattern Recognitions and Image Analysis
Center for Information Technologies in Designing of Russian Academy of Sciences
Institute of Information Technologies of National Academy of Sciences of Azerbaijan
Institute for Information Transmission Problems (Kharkevich Institute) of Russian Academy of Sciences
Publishing “Science and Technologies”
Moscow Scientific Research Institute of Television
Belarusian State University
National Research Tomsk State University
Southwest State University

OPTOELECTRONIC EQUIPMENT AND DEVICES IN SYSTEMS OF PATTERN RECOGNITION, IMAGE AND SYMBOL INFORMATION PROCESSING

"RECOGNITION — 2017"

XIII INTERNATIONAL SCIENTIFIC CONFERENCE

SELECTED PAPERS

May 16 — 19, 2017

Russia, Kursk

Program Chairs / Organizers / Editors:

Eduard Vatutin
Southwest State University, Kursk, Russia

Vitaly Titov
Southwest State University, Kursk, Russia

The main issues:

Mathematical theory of processing, analysis, recognition and understanding of images.

- Basics of design and calculation of machine (technical) vision systems.
- Algorithmic, program and technical means for information processing.
- HPC, special computing devices, parallel and distributed computing.
- Automation and control of production processing using optoelectronic systems (robotic systems).
- Bifurcations and chaos in electronics and information processing systems.
- Telecommunication networks and video information system services.
- Information technologies in education.

Program committee:

Dr. techn. sci., professor, academician of National academy of Sciences of Belarus **S. V. Ablameyko**, Belarusian State University, Minsk, Belarus

Dr. phys.-math. sci., professor **A. P. Afanasiev**, Institute for Information Transmission Problems (Kharkevich Institute) of Russian Academy of Sciences, Moscow, Russia

Dr. sci., professor **V. N. Afanasiev**, National Research University "Higher School of Economics", Moscow, Russia

Dr. techn. sci., professor, academician of National academy of Sciences of Azerbaijan **R. M. Alguliev**, Institute of Information Technologies of National academy of Sciences of Azerbaijan, Baku, Azerbaijan

Dr. PhD and Dr. rer. nat. Habilitation **V. Avrutin**, Institute for Systems Theory and Automatic Control, University of Stuttgart, Germany

Professor **S. Banerjee**, Indian Institute of Science Education & Research, Kolkata Mohanpur Campus, India

Dr. techn. sci., professor **Yu. S. Bekhtin**, Ryazan State Radiotechnical University, Moscow, Russia

Professor **V. Cavecchia**, Research Assistant at the Trento Section of the Institute of Materials for Electronics and Magnetism, National Research Council of Italy, Trento, Italy

Dr. techn. sci., professor **S. G. Emel'yanov**, Southwest State University, Moscow, Russia

Dr. techn. sci., professor **Ya. A. Furman**, Volga State University of Technology, Yoshkar-Ola, Russia

Dr. techn. sci., professor **I. M. Gostev**, National Research University "Higher School of Economics", Moscow, Russia

Dr. techn. sci., professor **V. N. Gridin**, Center for Information Technologies in Designing of Russian Academy of Sciences, Moscow, Russia

Dr. techn. sci., professor, academician of Russian Academy of Sciences **I. A. Kalyaev**, Southern Federal University, Taganrog, Russia

Dr. **S. Moller**, Institute for Biostatistics and Informatics in Medicine and Ageing Research, University of Rostock, Germany

Professor **G. Olivar Tost**, Department of Electrical and Electronic Engineering & Computer Sciences, Universidad Nacional de Colombia, Campus La Nubia, Manizales, Colombia

Dr. phis.-math. sci., docent **M. A. Posypkin**, Federal Research Center "Computer Science and Control" of Russian Academy of Sciences, Moscow, Russia

Dr. techn. sci., professor **S. S. Sadykov**, Murom Institute (branch) of Vladimir State University of A.G. Stoletov and N.G. Stoletov, Murom, Russia

Dr. techn. sci., professor **Yu. S. Sagdullaev**, Moscow Television Research Institute, Moscow, Russia

Dr. techn. sci., professor **I. N. Sinicyn**, Federal Research Center "Computer Science and Control" of Russian Academy of Sciences, Moscow, Russia

Dr. techn. sci., professor **V. I. Syryamkin**, National Research Tomsk State University, Tomsk, Russia

Dr. techn. sci., professor **Yu. G. Yakushenkov**, Moscow State University of Geodesy and Cartography, Moscow, Russia

Dr. PHD **B. A. Yahya**, Palestinian Russian Academic Society, Ramallah, Palestine

Dr. techn. sci. **Alkawasmi Ramzi**, Palestine Polytechnic University, Hebron, Palestine

Organising committee:

Rector of University, dr. techn. sci., professor **S. G. Emel'yanov** (chairman)

Vice-rector for Scientific Work, dr. techn. sci., professor **L. M. Chervyakov** (vice-chairman)

Head of Department of Computer Sciences, dr. techn. sci., professor **V. S. Titov** (vice-chairman)

Cand. techn. sci., professor **T. A. Shirabakina** (scientific secretary)

Dr. techn. sci., professor **S. I. Egorov**

Dr. techn. sci., professor **Zh. T. Zhusubaliev**

Dr. techn. sci., professor **I. E. Chernetskaya**

Dr. techn. sci. **M. H. Najajra**, Al-Istiqlal University, Jericho Palestine

Cand. techn. sci., docent **V. S. Panishev**

Cand. techn. sci., docent **E. I. Vatutin**

Head of the Laboratories **V. V. Savelova** (technical secretary)

Engineer **O. S. Petrukhina** (technical secretary)

Copyright © 2017 for the individual papers by the papers' authors. Copying permitted for private and academic purposes. Re-publication of material from this volume requires permission by the copyright owners. This volume is published and copyrighted by its editors.

Table of Contents

Preface

Regular Papers

Identication of Spatial Objects on Digital Maps *1*
Dmitry Andrianov, Sergey Eremeev, Kirill Kuptsov

Developing an Algorithm for Identifying Bovine Latent Mastitis Based on Data Complexing from Livestock Enterprise Sensors *8*
Lev Antonov, Alexey Orlov

Development of an Algorithm for Determining the Movement of Products Between Racks Based on Data from Their Radio Frequency Tags..... *17*
Alexandr Astafiev, Alexey Orlov, Dmitry Popov, Maxim Pshenichkin

A Soft Decoding for High Rate Reed-Solomon Codes *29*
Sergey Egorov

Trace-Analysis of Images of the Differential Chronogram of the Combustion Wave for Recognition of Transitional Modes of SHS..... *37*
Pavel Gulyaev, Vladimir Jordan

Synthesis of the General Structure and Algorithm of Controlling the Functions of a Mobile Photo-Ophthalmoscope *45*
Alexander Gushchin, Yuri Mukha

Mathematical Model of a "Tail" Computation in a Desktop Grid..... *54*
Evgeny Ivashko

Stochastic Modelling of Large-Scale Distributed Computer Systems Functioning with Group Restorations *60*
Valery Pavsky, Kirill Pavsky

Recognition of Flat Objects Based on Dimensionless Marks Based of Their Contours..... *68*
Sultan Sadykov, Yaroslav Kulkov

On Some Features of Symmetric Diagonal Latin Squares *74*
Eduard Vatutin, Stepan Kochemazov, Oleg Zaikin

The System for Determining the Human Head Position and Orientation for Vehicle Simulators *80*
Alexei Zakharov, Alexei Barinov, Arkady Zhiznyakov

Data Protection in the Organization of Numerical Experiments in Distributed Computing *89*
Ilya Kurochkin, Daniil Popov