

**15th INTERNATIONAL MULTIDISCIPLINARY
SCIENTIFIC GEOCONFERENCE
S G E M 2 0 1 5**



**INFORMATICS, GEOINFORMATICS AND REMOTE SENSING
CONFERENCE PROCEEDINGS
VOLUME I**

INFORMATICS, GEOINFORMATICS

PHOTOGRAMMETRY AND REMOTE SENSING

**18-24, June, 2015
Albena, BULGARIA**

DISCLAIMER

This book contains abstracts and complete papers approved by the Conference Review Committee. Authors are responsible for the content and accuracy.

Opinions expressed may not necessarily reflect the position of the International Scientific Council of SGEM.

Information in the SGEM 2015 Conference Proceedings is subject to change without notice. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of the International Scientific Council of SGEM.

Copyright © SGEM2015

All Rights Reserved by the International Multidisciplinary Scientific GeoConferences SGEM

Published by STEF92 Technology Ltd., 51 “Alexander Malinov” Blvd., 1712 Sofia, Bulgaria

Total print: 5000

ISBN 978-619-7105-34-6

ISSN 1314-2704

DOI: 10.5593/sgem2015B21

**INTERNATIONAL MULTIDISCIPLINARY SCIENTIFIC GEOCONFERENCE SGEM
Secretariat Bureau**

Phone: +359 2 4051 841

Fax: +359 2 4051 865

E-mails: sgem@sgem.org | sgem@stef92.com

URL: www.sgem.org

ORGANIZERS

- BULGARIAN ACADEMY OF SCIENCES
- ACADEMY OF SCIENCES OF THE CZECH REPUBLIC
- LATVIAN ACADEMY OF SCIENCES
- POLISH ACADEMY OF SCIENCES
- RUSSIAN ACADEMY OF SCIENCES
- SERBIAN ACADEMY OF SCIENCES AND ARTS
- SLOVAK ACADEMY OF SCIENCES
- NATIONAL ACADEMY OF SCIENCES OF UKRAINE
- INSTITUTE OF WATER PROBLEM AND HYDROPOWER OF NAS KR
- NATIONAL ACADEMY OF SCIENCES OF ARMENIA
- SCIENCE COUNCIL OF JAPAN
- THE WORLD ACADEMY OF SCIENCES (TWAS)
- EUROPEAN ACADEMY OF SCIENCES, ARTS AND LETTERS
- ACADEMY OF SCIENCES OF MOLDOVA
- MONTENEGRIN ACADEMY OF SCIENCES AND ARTS
- CROATIAN ACADEMY OF SCIENCES AND ARTS, CROATIA
- GEORGIAN NATIONAL ACADEMY OF SCIENCES
- ACADEMY OF FINE ARTS AND DESIGN IN BRATISLAVA
- TURKISH ACADEMY OF SCIENCES
- BULGARIAN INDUSTRIAL ASSOCIATION
- BULGARIAN MINISTRY OF ENVIRONMENT AND WATER

HONORED ORGANIZER



BULGARIAN ACADEMY OF SCIENCES

EXCLUSIVE SUPPORTING PARTNER



INTERNATIONAL SCIENTIFIC COMMITTEE Informatics, Geoinformatics and Remote Sensing

- PROF. ING. ALEŠ ČEPEK, CSC., CZECH REPUBLIC
- PROF. G. BARTHA, HUNGARY
- PROF. DR. DAMIR MEDAK, CROATIA

- PROF. PETER REINARTZ, GERMANY
- PROF. DR. JÓZSEF ÁDAM, HUNGARY
- PROF. RUI MIGUEL MARQUES MOURA, PORTUGAL
- PROF. DR. ING. KAREL PAVELKA, CZECH REPUBLIC
- PROF. DR. MARCEL MOJZES, SLOVAKIA
- ASSOC. PROF. DR MILAN HOREMUZ, SWEDEN
- DR. TIBERIU RUS, ROMANIA
- DR. MARKO KREVS, SLOVENIA

CONFERENCE PROCEEDINGS CONTENTS
INFORMATICS

1. A NEW PHOTOGRAMMETRIC TOOL FOR THE AUTOMATIC DETECTION AND SEGMENTATION OF CIRCULAR OBJECTS IN LOW-QUALITY IMAGES , Assoc. Prof. Ing. Lacezar Lincev, Ing. Karolina Feberova, Ing. Jan Tomecek, Ing. Jakub Hendrych, VSB-Technical University of Ostrava, Czech Republic	3
2. A SIMULATION PLATFORM FOR ATMOSPHERIC PHENOMENA STUDY WITHIN COASTAL FLOODS IN BALTIC SEA AREA , Alexander A Visheratin, Denis Nasonov, Anna V Kalyuzhnaya, Sergey S Kosukhin, University ITMO, Russia..	11
3. ADVANCED COMMUNICATION APPROACH BETWEEN CROSS-PLATFORM MOBILE AND DESKTOP APPLICATIONS IN MEDICAL PURPOSES , M.Sc Dalibor Serafimovski, Full Prof. Vlado Gicev, M.Sc Boris Panajotov, University Goce Delcev, FYR of Macedonia	19
4. ANALYSIS OF STUDENT'S BEHAVIOR IN LMS ELOGIKA , MSc. Marek Mensik, PhD, MSc. Pavla Drazdilova, PhD, VSB-Technical University of Ostrava, Czech Republic	27
5. ANALYSIS OF THE IMPACT OF DATA FLOW TYPE ON THE QUALITY OF SERVICE OF INFORMATION SYSTEMS , E.V. Ireeva, I.V. Kalinin, L.A. Muravyeva-Vitkovskaya, University ITMO, Russia	35
6. APPLICATION FOR PROCESSING OF MASS DATA FOR ENVIRONMENTAL IMPACTS MONITORING FROM MUNICIPAL WASTE INCINERATION , Marcela Malindzakova, Andrea Rosova, Martin Straka, Nikoleta Husakova, Lubica Kozakova, Technical University of Kosice, Slovakia	41
7. APPLICATION OF DATA MINING TECHNIQUES TO DETECT FRAUD IN THE HOUSING SECTOR , Assoc. Prof. Dr. Marina Medvedeva, Evgeniy Komotskiy, Ural Federal University, Russia	49
8. BIG DATA PRIVACY CONCERNS AMIDST GLOBAL DEVELOPMENT , Dr. Emanuel Tundrea, Prof. Dr. Gerhard Steinke, Assoc. Prof. Dr. Ryan C. LaBrie, Emanuel University of Oradea, Romania.....	53
9. COMBINING LASER SCANNING AND IBM TECHNOLOGY IN CULTURAL HERITAGE , Ing. Jaroslav Sedina, Prof. Karel Pavelka, Ing. Martina Faltynova, Ing. Eva Matouskova, Ing. Jan Reznicek, CTU in Prague, Czech Republic..	61
10. COMPARATIVE ANALYSIS OF ONLINE PROMOTION METHODS. CASE STUDY: LIDL ROMANIA VERSUS KAUFLAND ROMANIA , Lecturer Dr. Sebastian Moisa, Banat University of Agronomical Sciences and Veterinary Medicine, Romania.....	69

11. COMPUTER MODELLING OF FLAMMABLE GAS DISPERSION THROUGH LEAKAGES OCCURRED IN TECHNOLOGICAL INSTALLATIONS, PhD. Eng. Vlad Mihai Pasculescu, PhD. Stud. Eng. Marius Cornel Suvar, PhD. Stud. Eng. Nicolae Vlasin, PhD., Eng. George A. Gaman, Stud. Daniel Florea, National Institute for Research and Development in Mine Safety and Protection to Explosion - INSEMEX, Romania	77
12. DESIGN OF AIRCRAFT WINDOWS AND SAFETY CONSIDERATIONS, Assoc. Prof. Ing. Jan Pila PhD., Ing. Peter Korba PhD., Ing. Jana Cibereova, Assoc. Prof. Ing. Jaroslav Kozuba PhD., Technical University of Kosice, Slovakia	85
13. DESIGNING A FEEDFORWARD NEURAL NETWORK FOR WELDING CONTROL IN OIL AND GAS INDUSTRY EQUIPMENT, Dr. Gabriela Bucur, Assoc. Prof. Dr. Adrian Moise, Assoc. Prof. Dr. Otilia Cangea, Dr. Cristina Popescu, Petroleum-Gas University of Ploiesti, Romania.....	93
14. DEVELOPMENT OF AUTOMATED INFORMATION SYSTEMS FOR MONITORING OF INTELLECTUAL ACTIVITY RESULTS, Prof. Dr. A.V. Ostroukh, Prof. Dr. M.N. Krasnyanskiy, A.D. Obukhov, S.V. Karpov, D.L. Dedov, Moscow Automobile and Road construction State Technical University, Russia.....	101
15. DOCUMENTATION, 3D MODELLING AND REPLICATION OF ARCHAEOLOGICAL ARTIFACTS, Prof. Karel Pavelka, Ing. Jaroslav Sedina, Ing. Martina Faltynova, Ing. Eva Matouskova, CTU in Prague, Czech Republic.....	109
16. ECOLOGICAL PLA PLASTIC USED FOR FDM RAPID PROTOTYPING TECHNOLOGY, Assoc. Prof. Juraj Beniak, Assoc. Prof. Peter Krizan, Milos Matus, Michal Svatek, Slovak University of Technology Bratislava, Slovakia	117
17. EVALUATION OPERATOR PILOT SKILL IN LEARNING PROCESS, Ing. Pavol Kurdel PhD., Prof. Ing. Frantisek Adamcik CSc., Assoc. Prof. Ing. Jan Labun PhD., Technical University of Kosice, Slovakia	125
18. INFORMATION AND COMMUNICATION TECHNOLOGIES IN TOURISM OF SLOVAKIA, Assist. Prof. Ing. Marcela Tausova, Assist. Prof. Ing. Beata Stehlikova, Assoc. Prof. Ing. Katarina Culkova, Assist. Prof. Ing. Eva Mihalikova, Technical University of Kosice, Slovakia.....	131
19. INFORMATION SYSTEM OF GROUNDWATER MONITORING, Zhanar Beldeubayeva, Saule Rakhmetullinab, Erken Turganbayev, Vladimir Krivykh, East Kazakhstan State Technical University named after D.Serikbayev, Kazakhstan... ..	139
20. INTEGRATED SAFETY MANAGEMENT SUPPORT SYSTEM FOR WARMIA AND MAZURY REGION, Eliza Sitnik, Assoc. Prof. Ryszard Myhan, Adam Korpusik, Karolina Szturo, Lukasz Tomeczyk, University of Warmia and Mazury, Poland	147

21. INTELLIGENT DECISION MAKING BASED ON QUERIES WITH PRESUPPOSITION IN MAS, MSc. Marek Mensik, PhD, PHDr. Martina Cihalova, PhD, VSB-Technical University of Ostrava, Czech Republic	155
22. INTELLIGENT TRANSPORTATION SYSTEMS. CASE STUDY, Assoc. Prof. Dr. Otilia Cangea, Assoc. Prof. Dr. Adrian Moise, Assoc. Prof. Dr. Gabriela Bucur, Assoc. Prof. Dr. Cristina Popescu, Petroleum-Gas University of Ploiesti, Romania.....	167
23. INTERACTIVE E-SCIENCE CYBERINFRASTRUCTURE FOR WORKFLOW MANAGEMENT COUPLED WITH BIG DATA TECHNOLOGY, Denis Nasonov, Alexander A Visheratin, Konstantin V. Knyazkov, Sergey V. Kovalchuk, University ITMO, Russia.....	175
24. LOGISTIC CHAIN DATA PROCESSING, Assoc. Prof. Oldrich Kodym, Dr. Libor Kavka, Dr. Michal Sedlacek, College of Logistics, Czech Republic	183
25. MATHEMATICAL SOFTWARE FOR E-LEARNING SYSTEMS IN MECHANICAL ENGINEERING, Prof. Dr. Vladimir Nemtinov, Prof. Dr. Mikhail Krasnyanskiy, Assoc. Prof. Andrey Borisenko, Assoc. Prof. Yulia Nemtinova, Prof. Dr. Sergey Karpushkin, Tambov State Technical University-Technological institute, Russia... ..	191
26. MESHFREE APPROXIMATION OF FUNCTIONS, Assoc. Prof. Victoria Elena Rosca, Prof. Elena Axinte, Assoc. Prof. Carmen Elena Teleman, Assist. Georgeta Baetu, Gheorghe Asachi Technical University of Iasi, Romania.....	199
27. MONITORING SYSTEM OF THE ANNEALING PROCESS WITH USING POWER PANEL PP 65, Milan Durdan, Jan Kacur, Assoc. Prof. Marek Laciak, Technical University of Kosice, Slovakia	207
28. NEW METHODS OF EVALUATION OF DEFORMATION STRUCTURE EXTRA-HIGH VOLTAGE PYLONS, Assoc. Prof. Ing. Lachezar Lichev, CSc., Ing. Jan Tomecek, Ing. Jakub Hendrych, Prof. Ing. Radim Chajka, CSc., Assoc. Prof. Ing. Martin Krejsa, Ph.D., VSB-Technical University of Ostrava, Czech Republic.....	215
29. ON DEVELOPMENT OF THE SPACECRAFT CONTROL SYSTEM'S STRUCTURE, Assoc. Prof. Roman Yu. Tsarev, Assoc. Prof. Alexander N. Pupkov, Assist. Prof. Alexander V. Prokopenko, Assoc. Prof. Alexey N. Knyazkov, Siberian Federal University, Russia.....	225
30. ON ENTROPY OF ALMOST ORTHOGONAL POLYNOMIALS OF LAGUERRE TYPE, Prof. Predrag Rajkovic, Vojkan Miljkovic, Kostadin Rajkovic, University of Nis, Faculty of Technology in Leskovac, Serbia	233
31. ONE RUNWAY AIRPORT SEPARATIONS, Ing. Matej Antosko PhD., Ing. Peter Korba PhD., Ing. Jozef Sabo PhD., Technical University of Kosice, Slovakia ...	241

32. POSSIBILITIES TO OPTIMIZE COMPUTER SIMULATION OF COMPARTMENT FIRES , PhD.Stud. Eng. Marius Cornel Suvar, PhD.Eng. Vlad Mihai Pasculescu, PhD.Stud. Eng. Nicolae Vlasin, PhD.Eng. Constantin Lupu, PhD.Eng. Emilian Ghicioi, National Institute for Research and Development in Mine Safety and Protection to Explosion - INSEMEX, Romania.....	249
33. POSSIBLE BUSINESS ASPECTS OF APPLICATION OF INTELLIGENT SYSTEMS IN SMALL AND MEDIUM ENTERPRISES IN SERBIA , Assoc. Prof. Dr. Nebojsa Denic, Vesna Stevanovic, Violeta Milicevic, Rasic Goran, Alfa University Belgrade Faculty of Information Technology, Serbia.....	257
34. REASONING WITH PLACE INFORMATION ON THE LINKED DATA WEB , Khalid Almuzaini, Alia Abdelmoty, Cardiff University, United Kingdom.....	265
35. RESEARCH OF GEOGRAPHIC INFORMATION SYSTEMS AT CREATION 3D MODELS , Kirgizbaeva Dinara M., Kurmanbayev Olzhas S., Nurpeisova Marzhan, Kazakh National Technical University Named After K. I. Satpayev, Kazakhstan.....	281
36. RESEARCH ON THE DEVELOPMENT OF AN EXPERT SYSTEM FOR SELECTING TECHNICAL EQUIPMENT INTENDED TO BE USED IN POTENTIALLY EXPLOSIVE ATMOSPHERES , PhD Eng. Vlad Mihai Pasculescu, Eng. Doru Gabriel Pricop, Eng. Marius Simion Morar, PhD Eng. Vlad Florea, University of Petrosani, Romania.....	291
37. SIMULATED OPERATION OF THE COMPUTER NETWORK , Prof. A. V. Ostroukh, Assist. Prof. K. N. Mezencev, Prof. M. N. Krasnyanskiy, Jha Punam, Assist. Prof. N. E. Surkova, Moscow Automobile and Road construction State Technical University, Russia.....	299
38. SOFTWARE ENGINEERING PRINCIPLES FOR CREATING A WEB-ORIENTED DATABASE OF GENES , Dr. Emanuel Tundrea, Emanuel University of Oradea, Romania	307
39. SPREADSHEET AS A MEANS TO SUPPORT A TIMETABLE SCHEDULING PROCESS WITH REFERENCE TO THE EXAMPLE OF A COURSE ENTITLED WITH REFERENCE TO THE EXAMPLE OF A COURSE ENTITLED “EDUCATION OF SPECIALISTS IN THE FIELD OF MANAGEMENT OF POST-MINING AREAS IN THE POLISH-CZECH BORDERLAND” , PhD Bartosz Szczesniak, PhD Krzysztof Michalski, Silesian University of Technology, Poland.....	315
40. STUDY OF TRANSIENT INDUCTIVE-CAPACITIVE CIRCUITS USING DATA ACQUISITION SYSTEMS , Lecturer PhD. Eng. Dragos Pasculescu, Assoc. Prof. PhD. Eng. Titu Niculescu, University of Petrosani, Romania.....	323

41. STUDY ON DEVELOPING A WEB APPLICATION FOR HOTEL BOOKING ON THE SHORE OF THE BLACK SEA , Sabin Mihai Simionescu, Cristian Vasile, University Of Craiova, Romania	331
42. TECHNOLOGY OF USING PROPERTIES AND MECHANISMS OF ACTIONS IN USER INTERFACE DESIGN , Assist. Prof. Svetlana Belousova, Prof. Dr. Yury Rogozov, Assoc. Prof. Dr. Alexander Sviridov, Southern Federal University, Russia	339
43. TECNOMATIX FOR SUCCESSFUL APPLICATION IN THE AREA OF SIMULATION MANUFACTURING AND ERGONOMICS , Ing. Michal Hovanec PhD., Ing. Peter Korba, PhD., Assoc. Prof. Marek Solc, PhD., Technical University of Kosice, Slovakia	347
44. THE APPROACH TO THE CONFIGURABLE SYSTEM CONSTRUCTION BASED ON A METHODOLOGICAL APPROACH , Prof. Yury Rogozov, Assoc. Prof. Alexander Sviridov, Southern Federal University, Russia	353
45. THE APPROACH TO THE INFORMATION SYSTEMS DESIGN BASED ON THE PROPERTIES OF THE DOMAIN , Assist. Prof. Alexander Belikov, Prof. Dr. Yury Rogozov, Assoc. Prof. Dr. Alexander Sviridov, Southern Federal University, Russia	361
46. THE INFLUENCE OF ONLINE ADVERTISING ON THE BEHAVIOR OF FOOD PRODUCTS CONSUMER ON THE MARKET OF TIMIS COUNTY , Lecturer Dr. Sebastian Moisa, Banat University of Agronomical Sciences and Veterinary Medicine, Romania.....	367
47. THE INVESTIGATION OF UCG CONTROL METHODS , Jan Kacur, Milan Durdan, Technical University of Kosice, Slovakia	375
48. THE UTILITY OF NEURO-FUZZY HYBRID SYSTEMS IN CONTROL , Assist. Prof. Cristina Popescu, Assoc. Prof. Otilia Cangea, Assist. Prof. Gabriela Bucur, Assoc. Prof. Adrian Moise, Petroleum-Gas University of Ploiesti, Romania.....	383
49. USE OF NUMERICAL SIMULATION TO STUDY CAPACITIVE LOADS WHICH IS CONNECTING TO AN AC POWER SOURCE , Assoc. Prof. PhD. Eng. Titu Niculescu, Lecturer PhD. Eng. Dragos Pasculescu, University of Petrosani, Romania.....	391
50. USING PARTICLE SWARM OPTIMIZATION ALGORITHM FOR PARAMETER ESTIMATION IN HYDROLOGICAL MODELLING , Ing. Michala Jakubcova, Czech University of Life Sciences - Prague, Czech Republic	399
51. USING SELECTIVE MEMORY PERFORMANCE EVALUATION FOR TIME-CRITICAL EMBEDDED SYSTEMS DESIGN , Assoc. Prof. Pavel Kustarev, Alexander Antonov, Vasiliy Pinkevich, Roman Yanalov, University ITMO, Russia..	407

52. WIRELESS APPLICATION FOR MECHANICAL TRANSMISSION STUDY , Assoc. Prof. Florin Grofu, Constantin Cercel, Gheorghe Dragut, Constantin Brancusi University of Targu-Jiu, Romania.....	415
--	-----

GEOINFORMATICS

53. 3D DENSITY MODELS CONSTRUCTION METHOD FOR LAYERED MEDIA , Prof. Martyshko P.S., Byzov D.D., Ladovskiy I.V., Tsidaev A.G., Institute of Geophysics UB RAS, Russia	425
---	-----

54. A TECHNIQUE OF SPATIO-TEMPORAL ANALYSIS OF DARKNEEDLE STANDS DESICCATION BASED ON LANDSAT REMOTE SENSING DATA , PhD Sergei Im, Institute of Forest SB RAS, Russia.....	433
---	-----

55. AGGREGATE INDICES METHOD FOR CHOICE OF DANGER PREVENTION STRATEGY IN GIS-BASED MONITORING SYSTEM , Yan Ivakin, Misha Tsvetkov, St. Petersburg Institute for Information and Automation, Russia	441
---	-----

56. ANALYSIS OF ATMOSPHERIC AIR POLLUTION DEPOSITION TO SOIL ENVIRONMENT: THE MASOVIAN VOIVODESHIP CASE STUDY , Assoc. Prof. PhD DSc eng. Jolanta Kwiatkowska-Malina, MSc. eng. Andrzej Szymon Borkowski, Warsaw University of Technology - Faculty of Geodesy and Cartography, Poland.....	451
--	-----

57. ANALYSIS OF CHEMICAL ENGINEERING OBJECTS WITH REMOTE ACCESS GEOGRAPHICAL INFORMATION SYSTEM , Prof. Dr. Vladimir Nemtinov, Assoc. Prof. Cand.Sci. Yulia Nemtinova, Assoc. Prof. Cand.Sci. Andrey Borisenko, M.Eng. Anton Manaenkov, Tambov state technical university-Technological institute, Russia.....	463
---	-----

58. ANFIS MODEL FOR LANDSLIDE RISK MANAGEMENT , Assist.Prof. Jasna Pleho, Prof. Zikrija Avdagic, Arch Design d.o.o., Bosnia and Herzegovina	471
--	-----

59. APPLICATION OF GEOBROWSERS TO 2D/3D-VISUALIZATION OF GEOMAGNETIC FIELD , Assoc. Prof. Dr. Andrei V. Vorobev, Assoc. Prof. Dr. Gulnara R. Shakirova, Ufa State Aviation Technical University - Computer Science and Robotics Department, Russia	479
---	-----

60. APPLIED SOFTWARE TOOLS AND SERVICES FOR RAPID WEB GIS DEVELOPMENT , Dr. Oleg Yakubailik, Dr. Alexey Kadochnikov, Dr. Alexey Tokarev, Institute of Computational Modelling SB RAS, Russia.....	487
--	-----

61. ARCHITECTURAL AND TOURISM POTENTIAL OF TIMISOARA, ROMANIA HIGHLIGHTED BY WEBGIS SOLUTIONS , PhD Oana Grecea, PhD Sorin Herban, PhD Adrian Alionescu, Politehnica University of Timisoara, Romania... ..	495
--	-----

62. ARTIFICIAL INTELLIGENCE IN MODELLING OF SURFACE SUBSIDENCE DUE TO WATER WITHDRAWAL IN UNDERGROUND MINING , Wojciech T. Witkowski, AGH University of Science and Technology, Poland	503
63. AUTOMATED COST ESTIMATING METHODOLOGY FOR MODERN METHODS OF CONSTRUCTION , Assoc. Prof. Peter Mesaros, Juraj Talian, Daniela Mackova, Tomas Mandicak, Technical University of Kosice, Slovakia	511
64. AUTOMATIC WATER BODY EXTRACTION FROM REMOTE SENSING IMAGES USING ENTROPY , Dr. Julia Aahlen, Prof. Stefan Seipel, University of Gävle Department of Industrial Development IT and Land Management, Sweden ...	517
65. CLOUD BASED GEOSPATIAL SUPPORT FOR ECOSYSTEM SERVICES EVALUATION IN SLOVAKIA - A STUDY CASE OF SDI4APPS PROJECT , Dr. Martin Tuchyna, Dr. Tomas Kliment, Peter Pastorek, Dr. Branislav Krsak, Zuzana Okanikova, University of Zagreb, Faculty of Geodesy, Croatia	525
66. COMMUNICATION DISTANCE OF JENNIC WIRELESS NODES IN THE SMALL AREA , Vendula Hejlova, Tomas Pohanka, Vilem Pechanec, Walter Buttazzo, Chukwudi Nwaogu, Palacky University in Olomouc, Czech Republic	533
67. COMPARISON OF THE FILTERING METHODS IN CLEANING DATA OBTAINED FROM LASER SCANNER , Dr Anna Pieta, MSc Krzysztof Kloczek, AGH University of Science and Technology, Poland	541
68. COMPLETE 3D LANDSCAPE RECONSTRUCTION BASED ON HISTORICAL DATA SOURCES , Dr. Jan Pacina, Dr. Jiri Cajthaml, Vladimir Bruna, J. E. Purkyne University in Usti nad Labem, Czech Republic	547
69. CONCEPT OF A MODEL DATABASE ENABLING DATA STORAGE FOR PURPOSES OF INVESTMENT ATTRACTIVENESS ASSESSMENT OF DEGRADED POST-MINING AREAS , PhD Krzysztof Michalski, PhD Bartosz Szczesniak, Silesian University of Technology, Poland	555
70. DEVELOPMENT OF METHODS FOR ESTIMATING PARAMETERS OF NATURAL EMERGENCY PHENOMENA USING SATELLITE REMOTE SENSING DATA AND GIS TECHNOLOGIES , Assoc. Prof. Alexander V. Ivanov, Prof. Yulia I. Troitskaya, Senior Resercher Daniil. A. Sergeev, Senior Lecturer Svetlana V. Rodioinova, Nizhny Novgorod State University of Architecture and Civil Engineering, Russia	563
71. DIGITALIZATION OF RAILWAY SYSTEM FOR MOBILE APPLICATIONS , Enis Berisha, Berat Sinani, University of Prishtina “Hasan Prishtina”, Kosovo	571

72. ELIMINATING DUPLICATE AND INCONSISTENT INFORMATION IN OPENSTREETMAP GEOGRAPHIC DATA , Assoc. Prof. Alexander N. Pupkov, PhD student Dmitry N. Aldoshkin, Assoc. Prof. Roman Yu. Tsarev, Assoc. Prof. Alexey N. Knyazkov, Siberian Federal University, Russia	577
73. EYE-TRACKING TESTING OF GIS INTERFACES , Bc. Vaclav Kudelka, Ing. Zdena Dobesova Ph.D., Palacky University in Olomouc, Czech Republic	585
74. FREQUENCY ANALYSIS OF PUBLIC TRANSPORT BETWEEN CZECH MUNICIPALITIES , Eng. Jan Tesla, Doc. Dr. Eng. Jiri Horak, Eng. Igor Ivan, PhD, VSB-Technical University of Ostrava, Czech Republic	593
75. GEOINFORMATION DATABASE FOR SUBSIDENCE MODELING DUE TO WATER WITHDRAWAL , Wojciech T. Witkowski, AGH University of Science and Technology, Poland	601
76. GEOINFORMATION MANAGEMENT AS A MODERN APPROACH TO THE MANAGEMENT OF SPATIALLY-DISTRIBUTED SYSTEMS AND TERRITORIES , Prof. DSc. E. P. Istomin, Assoc. Prof DSc. A. G. Sokolov, Assoc. Prof. DSc. V. M. Abramov, Assoc. Prof. DSc. G. G. Gogoberidze, PhD N.N. Popov, Russian State Hydrometeorological University, Russia.....	607
77. GIS LAYER CREATION FOR AGRIENVIRONMENTAL SUB-MEASURE:BIODIVERSITY CONSERVATION WITHIN THE RURAL DEVELOPMENT PROGRAMME OF THE SLOVAK REPUBLIC 2007-2013 , PhD. Adriana Zverkova, PhD. Martina Zverkova, PhD. Jana Mitrikova, PhD. Daniela Matusikova, PhD. Anna Senkova, University of Presov in Presov, Slovakia.....	615
78. GIS TOOLS FOR FOREST PRODUCTION OPTIMIZATION IN MOUNTAINOUS AREAS: THE SLOPE PROJECT , Daniele Magliocchetti, Giulio Panizzoni, Federico Prandi, Raffaele De Amicis, GraphiTech, Italy.....	625
79. GML – DOES IT REALLY WORK IN PRACTICE? , PhD Agnieszka Chojka, University of Warmia and Mazury, Poland.....	633
80. GNSS L1 POSITIONING WITH SBAS , Maciej Wrona, Military University of Technolgy Applied Geomatics center, Poland	641
81. GPU IMPLEMENTATION OF DBSCAN ALGORITHM FOR SEARCHING MULTIPLE ACCIDENT BLACK SPOTS , Dr. Sandor Szenasi, Obuda University, Hungary	647
82. HAULIERR'S PORTAL: A WEB-BASED GIS SERVICE FOR FREIGHT CONNECTION SEARCH , Tomas Peltan, Czech University of Life Sciences - Prague, Czech Republic.....	653
83. HAZARD AND LAND MANAGEMENT METHODS , Rodney L. Stevens, University of Gothenburg, Sweden	661

84. HYBRID GEOPROCESSING WEB SERVICES , Evgeny Panidi, Eduard Kazakov, Evgeny Kapralov, Anton Terekhov, Saint-Petersburg State University, Russia...	669
85. IMPROVING OF TRANSMISSIVITY MAPS FOR HYDROGEOLOGICAL MODEL OF LATVIA , Dr.sc.ing. Aivars Spalvins, Dr.geol. Olgerts Aleksans, Inta Lace, Riga Technical University, Latvia	677
86. INFORMATION-ANALYTICAL SYSTEM OF ENVIRONMENTAL MONITORING , Dr Maxim Medvedev, Ural Federal University, Russia	685
87. INTELLECTUAL GIS TECHNOLOGIES IN HISTORICAL AND ETHNOGRAPHIC RESEARCH , Yan Ivakin, Misha Tsvetkov, Vladislav Ivakin, St. Petersburg Institute for Information and Automation, Russia.....	691
88. INTERACTIVE SYSTEM FOR ENVIRONMENTAL MONITORING OF TRAFFIC JAM , Assoc. Prof. Alexander. V. Ivanov, Assoc. Prof. Alexander Yu. Platov, Graduate student Marina S. Belyakova, Master student Ekaterina A. Kaminskas, Nizhny Novgorod State University of Architecture and Civil Engineering, Russia	699
89. MANAGING RURAL AREAS CONSIDERING CLIMATE CHANGES AND EXTRAORDINARY WEATHER PHENOMENA – A CONCEPT OF SOLUTIONS ON A LOCAL SCALE , Kocur-Bera Katarzyna, Dudzinska Malgorzata, University of Warmia and Mazury, Poland.....	707
90. MAPPING HEAVY METAL CONTAMINATION BY KRIGING IN VALEA SESEI TAILING POND, ROMANIA , Cornelia Melenti, PhD. Ioana Laura Magyar , Technical University of Cluj-Napoca, Romania	715
91. MERCURY CONTENT AS A PART OF A MULTI-CRITERIA ANALYSIS OF INVESTMENT POTENTIAL OF POST-MINING AREAS , PhD Anna Michalska, PhD Krzysztof Michalski, Central Mining Institute (GIG), Poland	723
92. METHODS FOR EXTERNAL FACTORS ASSESSING WITHIN GEOINFORMATION MANAGEMENT OF TERRITORIES , Prof. DSc. E. P. Istomin, Assoc. Prof DSc. A. G. Sokolov, Assoc. Prof. DSc. V. M. Abramov, Assoc. Prof. DSc. G. G. Gogoberidze, PhD A.A. Fokicheva, Russian State Hydrometeorological University, Russia	729
93. MINERAL AND ANTHROGHENE ACCESS DATABASES ORGANIZATION FOR ALSHAR POLYMETALLIC DEPOSIT AND WASTE DUMP, FYR OF MACEDONIA , M.Sc Dalibor Serafimovski, Prof. Vlado Gicev Prof. Kosta Mitreski , University Goce Delcev, FYR of Macedonia.....	737
94. MODELING OF DECISION SUPPORT SYSTEM FOR SPATIAL PLANNING BASED ON ANFIS MODEL , Assist. Prof. Jasna Pleho, Prof. Zikrija Avdagic, Arch Design d.o.o., Bosnia and Herzegovina	745

95. MULTI-GNSS REAL-TIME PRECISE POSITIONING FOR PEDESTRIAN LANE DETECTION, Dr. Octavian Andrei, BSc Dhasorn Chinworapanya, Chulalongkorn University - School of Engineering, Thailand.....	753
96. OBSERVATION AS A BASIC QUALITATIVE METHOD IN TOURISM RESEARCH. CASE STUDY OF TOURIST DESTINATION DONOVALY IN SLOVAKIA, Assoc. Prof. Peter Cuka, PhD., Assoc. Prof. Zygmund Kruczek, PhD., Assoc. Prof. Adam Szromek, PhD., College of Business and Hotel Management, Czech Republic.....	761
97. PLANAR SLIDING WINDOW TECHNIQUE FOR SEARCHING ACCIDENT HOT SPOTS, Dr. Sandor Szenasi, Dr. Peter Csiba, J. Selye University, Slovakia	767
98. PRACTIAL APPLICATION OF GIS IN KOSOVO, APPLICATION STRATEGY, Asocc. Prof. Dr. Florim Isufi, Asocc. Prof. Dr. Shpejtim Bulliqi, Ardian Isufi Msc candidate, University of Prishtina “Hasan Prishtina”, Kosovo	773
99. RAILWAY TRACKS 3D MAPPING WITH STRUCTURED LIGHT METHOD, Maciej Wrona, Military University of Technolgy Applied Geomatics center, Poland	779
100. ROAD NETWORK DEVELOPMENT ANALYSIS IN AREAS AFFECTED BY OPEN-PIT MINING, Dr. Jan Pacina, Dr. Jan Popelka, Petr Novak, J. E. Purkyne University in Usti nad Labem, Czech Republic	785
101. SMART HOUSING ESTATE: IMPLEMENTATION OF ICT USER FRIENDLY APPLICATION TO RAISE INHABITANT’S SUSTAINABILITY AWARENESS, Tomas Volarik, Robert Wawerka, Stanislava Dermekova, Brno University of Technology Faculty of Civil Engineering, Czech Republic.....	793
102. SPATIAL INFORMATION RECORDING PROCEDURE INVOLVING METHODS OF CLOSE RANGE PHOTOGRAMMETRY AS APPLIED TO ARCHAEOLOGICAL RESEARCHES, Assist. Prof. Alexander Starovoytov, Assoc. Prof. Guzel Saifutdinova, Kazan (Volga Region) Federal University, Russia.....	801
103. SPATIAL VIZUALIZATION OF ENVIRONMENTAL ISSUES, Medjon Hysenaj, University of Shkoder, Albania.....	807
104. SPATIO-TEMPORAL ACCESSIBILITY ANALYSIS OF SOCIAL SERVICES OF THE KARLOVY VARY REGION, Mgr. Pavla Dedkova, Palacky University in Olomouc, Czech Republic.....	815
105. STANDARDIZATION OF LAND CONSOLIDATION DATA IN THE CZECH REPUBLIC, Eng. Arnost Muller, CTU in Prague, Czech Republic	823

106. SUBSIDENCE TROUGHS DETECTION FOR SAR IMAGES - PRELIMINARY RESULTS , PhD Justyna Bala, PhD Stanisława Porzycka-Strzelczyk, MSc Jacek Strzelczyk, AGH University of Science and Technology, Poland.....	829
107. SYNCHRONIZATION AND REPLICATION OF GEODATA IN THE ESRI PLATFORM , MSc. Tomas Pohanka, Assoc. Prof. Vilem Pechanec, MSc. Marketa Solanska, Palacky University in Olomouc, Czech Republic.....	837
108. TECHNIQUE OF CREATION INTERACTIVE VISUALIZATION OF 3D MAPS WITHIN THE UNIVERSITY CAMPUS , Yerkin Kakimzhanov, Zhenis Kozhaev, Saule Bektemirova, al-Faraby Kazakh National University, Kazakhstan.....	845
109. TESTING ACCURACY OF POLISH NATIONAL WAAS RTK SERVICE , Maciej Wrona, Military University of Technology Applied Geomatics Center, Poland	851
110. THE CALCULATION OF THE ROAD ZONE EFFECT AND ITS IMPACT ON CARBON SEQUESTRATION IN THE LANDSCAPE , Assoc. Prof. Vilem Pechanec, Mgr. Jan Purkyt, Assoc. Prof. Pavel Cudlin, Palacky University in Olomouc, Czech Republic.....	859
111. THE KERNEL DENSITY ESTIMATION FOR THE VISUALIZATION OF SPATIAL PATTERNS IN URBAN STUDIES , Raul-T Mora-Garcia, M-Francisca Cespedes-Lopez, Juan-Carlos Perez-Sanchez, Raul Perez-Sanchez, University of Alicante, Spain	867
112. THE PRECISION OF THE GPS POSITIONING SYSTEM AND GPS PHASE OBSERVATIONS COMPENSATION BY LEAST SQUARES METHOD , Associate Ph. D. Popescu Cosmin, Associate Ph. D. Dragomir Lucian, Lecturer Ph. D. Filip Ofelia Larisa, Banat University of Agronomical Sciences and Veterinary Medicine, Romania.....	875
113. THE USE OF CITYGML STANDARD IN THE CONTEXT OF CREATING SMART CITIES , M.Sc.Eng. Katarzyna Gozdz, Prof. Dr Eng. Wojciech Pachelski, Military University of Technology Faculty of Civil Engineering and Geodesy, Poland	883
114. THE USE OF WEBGIS SERVICES IN PUBLIC ADMINISTRATION IN POLAND , Dr. Karol Szuniewicz, Dr. Iwona Cieslak, Mst. Szymon Czyza, University of Warmia and Mazury, Poland.....	891
115. USAGE OF HEURISTIC ALGORITHM FOR OPTIMIZATION OF PRECISE GNSS RTK MEASUREMENT , Assoc. Prof. Dalibor Bartonek, Ing. Jiri Bures, PhD., Brno University of Technology, Czech Republic	899
116. USING GNSS KINEMATIC PPP METHOD FOR VEHICLE POSITIONING , Maciej Wrona, Military University of Technolgy Applied Geomatics center, Poland	907

117. VISUALIZATION OF THE KARST DEVELOPMENT DYNAMICS BY SPATIAL-TEMPORAL MAPS, Assoc. Prof. Ruslan Sharapov, Murom Institute of Vladimir State University, Russia913

118. WORKFLOW FOR THE HOMOGENISATION OF CLIMATE DATA USING GEOSTATISTICAL SIMULATION, Julio Caineta, Sara Ribeiro, Amilcar Soares, Ana Cristina Costa, ISEGI Universidade Nova de Lisboa, Portugal.....921

PHOTOGRAMMETRY AND REMOTE SENSING

119. ACCURACY ASSESMENT OF DIGITAL ELEVATION MODELS DERIVED WITH CONTEMPORARY SATELLITE TECHNOLOGIES, MSc Piotr Janusz Koza, MSc Sebastian Rozycki, PhD Katarzyna Osinska-Skotak, Warsaw University of Technology - Faculty of Geodesy and Cartography, Poland933

120. AERIAL TOPOGRAPHIC SURVEY OF SMALL AREAS BY “LOW-COST” DIGITAL CAMERA CANON EOS 5D, Marcel Kliment, Michaela Bulikova, Tomas Kliment, Vlado Cetl, Jakub Kocica, Slovak Agriculture University in Nitra, Slovakia.....941

121. AIRBORNE LIDAR TOPOGRAPHICAL SURVEYING, Associate Ph. D. Popescu Cosmin, Associate Ph. D. Dragomir Lucian, Lecturer Ph. D. Filip Ofelia Larisa, Banat University of Agronomical Sciences and Veterinary Medicine, Romania.....949

122. AIRBORNE REMOTE SENSING ACTIVITIES IN ALBANIA FOR MULTITEMPORAL VEGETATION MONITORING, Carmine Gambardella, Nicola Pisacane, Alessandra Avella, Pasquale Argenziano, Carmine Maffei, Second University of Naples Department of Architecture and Industrial Design, Italy.....957

123. ANALYSIS OF FOG EVENTS AT MAGURELE – ROMANIA USING GROUND BASED EQUIPMENTS AND AIR CIRCULATION, PhD Toanca Florica, PhD Stefanie Horatiu, PhD Andrei Simona, PhD Barbu Nicu, PhD Nicolae Doina, National Institute for Research and Development in Optoelectronics, Romania965

124. ANALYSIS OF POSSIBILITIES AND CONSTRAINS OF USING ERS-1, ERS-2 AND ENVISAT RADAR DATA IN THE PROCESS OF URBAN AREAS GROWTH MONITORING., Piotr Opido, Andrzej Lesniak, AGH University of Science and Technology, Poland.....973

125. ANALYSIS OF THE ALGORITHMS FOR AUTOMATIC SPATIAL ORIENTATION OF THE CLOUDS OF POINTS OBTAINED WITH A TERRESTRIAL SCANNER, M.Sc. Eng. Jakub Stefan Markiewicz, M.Sc. Eng. Lukasz Marcin Markiewicz, Warsaw University of Technology, Poland981

126. ARCHAEOLOGICAL SURVEY BY COMBINATION RPAS AND GEOPHYSICAL METHODS, Ing. Jaroslav Sedina, Ing. Bc. Eliska Housarova, Ing. Zdenka Bila, CTU in Prague, Czech Republic	989
127. ARTIFICIAL MODEL IN THE ASSESSMENT OF THE ALGORITHM OF OBJECTS RECORDED BY LASER SCANNING SHAPE DETECTION (ALS/TLS), Artur Janowski, Piotr Nierebinski, Jakub Szulwic, Politechnika Gdanska Wydział Inżynierii Lądowej i Środowiska, Poland	995
128. CALIBRATING THE PHOTOGRAMMETRIC UNIT, Ing. Monika Mikovcaková, doc. Ing. Milan Mikolas, Ph.D., Ing. Andrea Polická, Ing. Lubomir Kovalcik, Ing. Tomas Pechar, VSB-Technical University of Ostrava, Czech Republic	1003
129. COHERENT AND NONCOHERENT ANALYSIS OF THE MULTI-TEMPORAL C-BAND SAR DATA FOR AGRICULTURAL CHANGE MONITORING, PhD Eng. Violeta Poenaru, Prof. Alexandru Badea, Prof. Sorin Mihai Cimpeanu, PhD. Stud. Cristian Moise, Romanian Space Agency, Romania	1011
130. DENSE POINT CLOUDS AS A DATA SOURCE OF ORTHOIMAGES, Wojciech Ostrowski, Warsaw University of Technology, Poland	1019
131. DEVELOPMENT OF SUBURBANIZATION IN THE HINTERLAND OF PRAGUE MONITORED BY REMOTE SENSING, Ph.D. Daniel Franke, Czech University of Life Sciences - Prague, Czech Republic	1027
132. DIGITAL AEROTRIANGULATION WITH SUPPORT OF GPS/IMU USING AERIAL PHOTOS FROM LARGE AND MEDIUM FORMAT DIGITAL CAMERAS., Ing. Miroslav Kardos, Assoc. prof. Frantisek Chudy, Ing. Julian Tomastik, Ing. Daniel Tunak, Technical University in Zvolen, Slovakia	1035
133. DIRECT GEOREFERENCING APPLICATION OF AERIAL PHOTOGRAMMETRY USING A GNSS/IMU/SENSOR SYSTEM, Assoc. Prof. Dr. Eng. Gabriel Popescu, Lecturer Dr. Eng. Octavian Laurentiu Balota, Lecturer Dr. Eng. Daniela Iordan, University of Agronomic Science and Veterinary Medicine - Bucharest, Romania	1043
134. EVALUATION OF THE DEVELOPMENT AGRICULTURAL PLANTS FOR PRECISION FARMING BASED ON REMOTE SENSING METHODS., Dr. Jakub Mirijovsky, dr. Jan Brus, MSc. Jitka Dolezalova, Svatopluk Mistecky, Palacky University in Olomouc, Czech Republic	1051
135. EXCLUSION OF NON-COHERENT AREAS FROM THE INTERFEROMETRIC SAR ANALYSIS USING COHERENCE MASKS., MSc. Huber Malik, Prof. Andrzej Lesniak, AGH - University of Science and Technology, Poland	1059

136. GENERATING ORTHOIMAGES OF MONUMENTAL OBJECTS BASING ON INTEGRATION OF TLS DATA AND DIGITAL IMAGES – RELATED ISSUES AND SOURCES OF ERRORS , M.Sc. Eng. Jakub Markiewicz, Prof. Dorota Zawieska, Warsaw University of Technology, Poland	1067
137. GROUND DEFORMATIONS MONITORING WITHIN RURAL AREAS USING SATELLITE RADAR INTERFEROMETRY METHOD , Assoc. Prof. Stanislaw Porzycka-Strzelczyk, Hubert Malik, Jacek Strzelczyk, AGH University of Science and Technology, Poland.....	1075
138. GROUND DISPLACEMENT DETECTION AND MONITORING USING SYNTHETIC APERTURE RADAR IMAGERY , Iulia Dana Negula, Violeta Poenaru, Romanian Space Agency, Romania	1083
139. IMAGE CORRELATION AS A TOLL FOR TRACKING FACIAL CHANGES CAUSING BY EXTERNAL STIMULI , Katarzyna Bobkowska, Artur Janowski, Marek Przyborski, Gdansk University of Technology, Poland.....	1089
140. IMPACT OF POINT IDENTIFICATION DURING STEREOPHOTOGRAMMETRIC EVALUATION OF FOREST ENVIRONMENT , Julian Tomastik, Frantisek Chudy, Miroslav Kardos, Daniel Tunak, Technical University in Zvolen, Slovakia	1097
141. LIGHTWEIGHT FISHEYE CAMERAS IN PHOTOGRAMMETRY , Wojciech Ostrowski, Warsaw University of Technology, Poland.....	1105
142. MODERN METHODS OF PHOTOGRAMMETRICAL DOCUMENTATION , Ing. Zdenka Bila, Ing. Jaroslav Sedina, Ing. Eliska Housarova, CTU in Prague, Czech Republic.....	1111
143. POMPEI: MULTI-SCALAR MULTI-SENSOR nD SURVEYING , Carmine Gambardella, Nicola Pisacane, Alessandra Avella, Pasquale Argenziano, Carmine Maffei, Second University of Naples Department of Architecture and Industrial Design, Italy	1119
144. SELECTION OF OPTIMAL STRATEGY FOR DSM GENERATION FROM MULTI-VIEW DENSE IMAGE MATCHING , Wojciech Dominik, Warsaw University of Technology - Faculty of Geodesy and Cartography, Poland	1127
145. TESTING RPAS FOR CADASTRE PURPOSES , Eliska Housarova, Prof. Dr. Ing. Karel Pavelka, Ing. Jaroslav Sedina, CTU in Prague, Czech Republic	1135
146. THE ANALYSIS OF FACTORS WHICH AFFECT ON THE TERRESTRIAL LASER SCANNING DATA REGISTRATION ACCURACY , M.Sc. Eng. Jakub Markiewicz, Ph. D. Michal Kowalczyk, Ass.Prof. Dorota Zawieska, Warsaw University of Technology, Poland.....	1143

147. POSSIBILITY OF USING REMOTE SENSING FOR OVERFLOW LAND DUE TO MINING ACTIVITIES IN UPPER SILESIA COAL BASIN, Msc Karol Kura, Central Mining Institute (GIG), Poland.....	1151
148. THE COMBINATION OF GEODETIC AND CLOSE-RANGE PHOTOGRAMMETRY METHODS IN TERRAIN MAPPING FOR THE PURPOSE OF HYDROLOGICAL ANALYSIS IN LAND EROSION PROTECTION, Marcel Kliment, Jakub Kocica, Tomas Kliment, Michaela Bulikova, Jozef Halva, Slovak Agriculture University in Nitra, Slovakia.....	1159
149. THE COMPARISON OF STANDARD METHODS FOR PAVEMENT TEXTURE EVALUATION WITH UNCONVENTIONAL APPROACH USING 3D SCANNING, Ing. Peter Kotek, Assoc. Prof. Matus Kovac, Prof. Martin Decky, University of Zilina - Faculty of Civil Engineering - Department of Highway engineering, Slovakia	1167
150. THE METHOD OF MEASURING THE MEMBRANE COVER GEOMETRY USING LASER SCANNING AND SYNCHRONOUS PHOTOGRAMMETRY, Artur Janowski, Waldemar Kaminski, Karolina Makowska, Jakub Szulwic, Krzysztof Wilde, Politechnika Gdanska Wydział Inżynierii Ładowej i Środowiska, Poland	1175
151. THE MONITORING OF THE ROMANIAN LITTORAL CLIFFS USING AUTOMATIC FLIGHT SYSTEMS, Eng. Dragos Niculescu, Eng. Elena Vlasceanu, Assoc. Prof. Dr. Eng. Ichinur Omer, Dr. Eng. Razvan Mateescu, N.I.M.R.D. Grigore Antipa, Romania.....	1187
152. THE USE OF MORPHOLOGICAL FILTERS AND GRANULOMETRIC METHOD TO ANALYZE THE MOVEMENT OF THE MOLECULES IN THE SEA WATER OF THE SOUTHERN BALTIC SEA, Jakub Szulwic, Marcin Serafin, Artur Janowski, Marek Przyborski, Gdansk University of Technology, Poland	1195
153. THE USE OF TERRESTRIAL LASER SCANNING FOR MEASUREMENTS IN SHALLOW-WATER: CORRECTION OF THE 3D COORDINATES OF THE POINT CLOUD, Prof. Greta Deruyter, Prof. Marc Vanhaelst, Dr .Cornelis Stal, MSc. Hanne Glas, Prof. Alain De Wulf, Ghent University, Belgium	1203
154. TOWARDS COST-EFFICIENT PROSPECTION AND 3D VISUALIZATION OF UNDERWATER STRUCTURES USING COMPACT ROVS, Dr. Cornelis Stal, Prof. dr. ing. Greta Deruyter, Dr. Mieke Paelinck, MSc. Annelies Vandenbulcke, Prof. dr. ir. Alain De Wulf, Ghent University, Belgium	1211
155. VERIFICATION OF REMOTE SENSING DATA FOR MEASURING BATHYMETRY ON SMALL WATER RESERVOIRS., Vaclav Hradilek, Petr Basta, Stepan Vizina, Petr Maca, Pavel Pech, Czech University of Life Sciences - Prague, Czech Republic.....	1219

International Multidisciplinary
Scientific GeoConference SGEM 2015
www.sgem.org

SECTION INFORMATICS

International Multidisciplinary
Scientific GeoConference SGEM 2015
www.sgem.org

ADVANCED COMMUNICATION APPROACH BETWEEN CROSS- PLATFORM MOBILE AND DESKTOP APPLICATIONS IN MEDICAL PURPOSES

M.Sc. Dalibor Serafimovski¹

Full Prof. Dr. Vlado Gicev¹

M.Sc. Boris Panajotov¹

¹ Faculty of Computer Science, University “Goce Delčev”-Štip, **R. Macedonia**

ABSTRACT

In the past few years, cross-platform programming technology gains importance. Great majority of companies use alternative and more accessible cross-platform technologies in order to gain access to different mobile platforms. This paper is focused on the channels of communication between cross-platform mobile and desktop applications created using Adobe Air technology. The main purpose of the article is to give clear guidance to improve the level of communication and security during data transmission between desktop and mobile applications on different platforms. The paper is divided in two parts. In the first part we are focused on analyzing the existing communications channels, modules and opportunities for their implementation. Nowadays as especially attractive are considered the technologies for transmission of medical data using mobile phones. According to this fact, in the second part of this paper we are focused on giving clear guidance for the process of creating safe and advanced modules and channels for communication between desktop and mobile applications. This second part of the paper also covers the opportunity of direct mobile communication and data transfer in medical purposes.

Keywords: communication, monitoring, adobe air, programing, data, analysis, server

INTRODUCTION

The main goal of this paper is to define clear guidelines and fully define the process of transfer of large and complex data between mobiles, desktop and server applications that communicate with each other within the Adobe Air executive environment. Mobile devices occupy a significant market share worldwide and in recent years we have seen a serious increase in the number of mobile Internet users who slowly but surely exceeds the number of standard internet users. From this point of view, there is a serious need for creating sophisticated systems for internal communication between mobile devices that are intended for quicker and easier transfer of large amounts of data in real time. The potential of mobile platforms is huge, some market research on mobile platforms have shown that in the near future, mobile devices will replace a number of machines in various industries. Particular importance is attached to the potential that mobile devices have for medical purposes, particularly for remote monitoring and rapid and automatic processing of medical data in real time, which allows shortening of total length for all processes, early prevention and improved diagnostics.

Mobile devices and more recently smart digital watches, allows transfer of data and monitoring the actual activities and specific movements of the human body and its limbs with built-in sensors that can detect the smallest movements and changes of position. These sophisticated and innovative technologies allows researchers to activate their creative potential and practically apply these technologies to increase the efficiency and quality of services in all areas. Downloading data such as weather data, current state of air pollution on specific geolocation where the mobile device or smart watch is located at that specific moment, then the uptake and transport of specific data from sensors attached to certain patients and related conditions, represent only a small part of the enormous base of opportunities which researchers worldwide use to create modern, advanced and innovative systems for remote monitoring and advanced transmission and processing of data to the distance [5],[6].

Our main goal in this paper was to try to create a small prototype model for the transmission of medical data and monitoring patients remotely, by which we will achieve advanced communication between devices that use different operating systems. The main intention was the system to be fully independent of the platform that is running on and to be multiplatform and functioning uniformly on all known mobile and desktop platforms. The practical models are made entirely using Adobe Air and Flex technologies.

DESCRIPTION OF THE MODEL

The basic concept of this model consists of module for input parameters embedded in the mobile application compatible with all existing mobile platforms that directly processes the input data and sends it to the server where it is processed and made available to the physician via the appropriate desktop application. The communication between the mobile application and desktop platform goes through ColdFusion server which makes the data transfer from the mobile device to the patient. This concept offers a fast and efficient transfer of data to the medical teams in real time. For data input from the patient side in order to get a more precise medical images, we choose to use the Adobe Forms Central service which is automatically processing data entered by the patient and directly generates reports. This concept allows the physician to receive accurate reports every day on his computer for a specific medical condition of his patient [7].

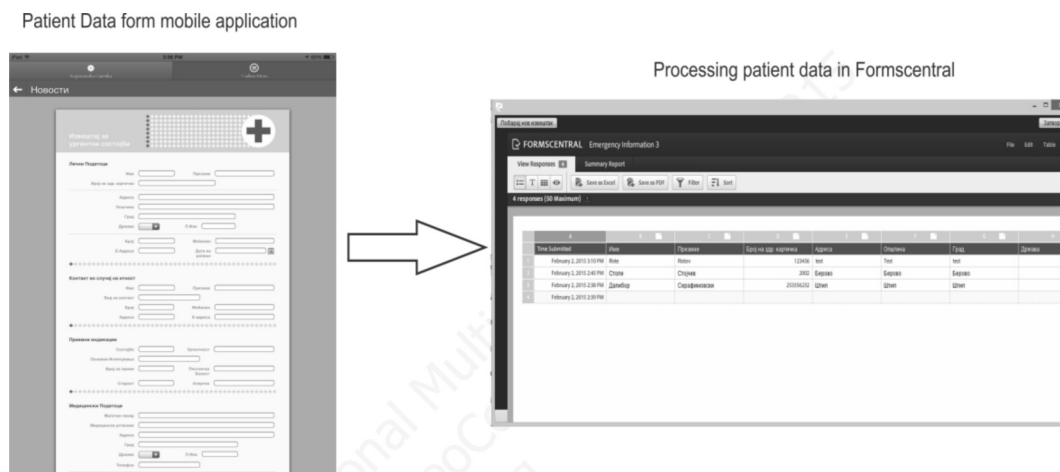


Figure 1. Processing of data entered into the mobile application and generated reports in real time using Adobe FormsCentral

Within the Patient Data Module that is embedded in the mobile application, patient enters daily parameters agreed with the doctor that are important for the respective disease. At the time when the application will connect to the Internet, the data in encrypted form is sent to the application server for processing. As can be seen in Figure 1, the data obtained from the mobile application is sorted for each patient individually using Adobe FormsCentral and later the doctor or other health worker who uses the software can directly create reports. If in any way the data on the server is lost or appears a disruption of communication between the mobile application and the server, in this case, for safety reasons, mobile application store a local copy in the form of SQLite database which contains data of all parameters entered in the last 48 hours within the mobile application [8],[9].

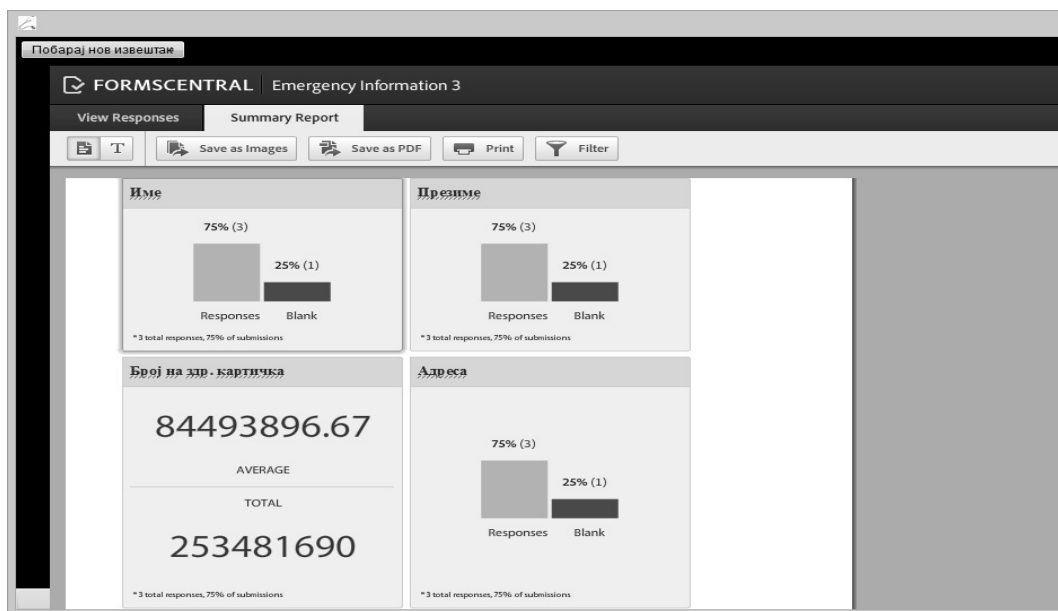


Figure 2. Automatic data processing and report generation

Once the data arrives safely on the server and become available for processing, the software sends a message back to the mobile application that relevant patient data are received and processed. One copy of the communication logs is stored within the application server and a copy of the logs also can be found locally in the mobile application. These databases are protected and not accessible to the ordinary user of the application. They can get this data with request that is sent from the server to the mobile application[3],[4]. With the help of FormsCentral module that is built into the software, the medical officer who uses the software can generate reports in Excel tables, in PDF format, to perform statistical calculations, filtering data, to record images of the generated reports and so on. We find that with this method significantly improves the primary communication distance between patient and doctor and increases accuracy in diagnosis.

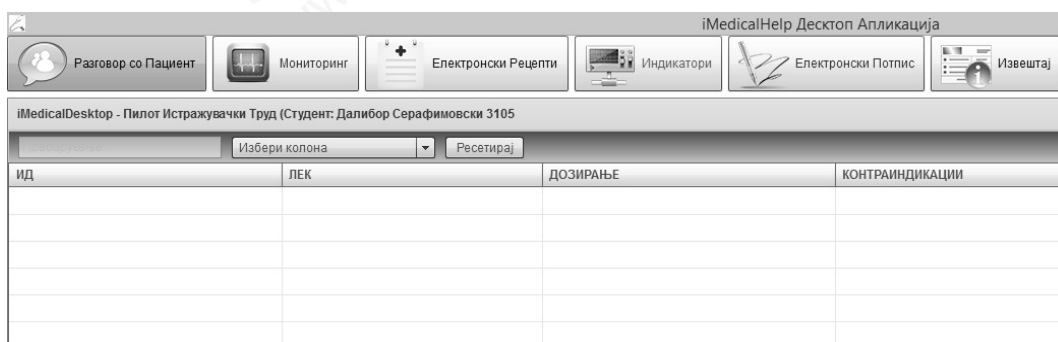


Figure 3. Multiplatform desktop application that processed the data received from patient's mobile devices

Our researches are leading us for a long time to develop models for remotely monitoring using mobile devices through direct communication, not only in medicine but also in many other areas. A huge number of researchers around the world are working in this field and offer different concepts and solutions which shows that the practical implementation of advanced technology and innovative solutions is the right path towards overall improvement and easing of the situation in all areas. As we already mentioned above, an object of the interests in this paper is the application of modern technologies for advanced communication and remote monitoring for medical purposes. In [2] the development and implementation of these technologies is described as an opportunity to eliminate the isolation that geographically is no longer an obstacle for providing of timely and quality medical care. Telemedicine that is further described in the literature or either defined as an opportunity for diagnosis, treatment, consultation, education and transfer of electronic medical records, images and videos in real time with high resolution.



Figure 4. Display of the main menu of the mobile application iMedicalHelp designed for patients

The researchers in the world are working hard to develop models for the transfer of medical data from multiple patients at the same time, and to be used for example in mass disasters and similar emergencies. Overall, the focus of most researchers is aimed at monitoring a single patient. In literature can be found proposed schemes for data transfer via 3G mobile networks from multiple patients simultaneously. Our model is based on the concept of sending data from multiple devices (many patients) to a central database that is associated with a corresponding software system on which side is directly performed filtering and sorting of data. The proposed model is not tested in emergency situations and is not suitable for use during emergency situations such as mass accidents as we already mentioned above. More authors propose sensor and ad - hoc networks as an alternative for the transmission of medical data during disasters, because these networks do not require special infrastructure.

DESCRIPTION OF SPECIFIC MODULES

Within our proposed practical design, we create and implement several additional modules that facilitate and speed up communication. For facilitate of communication and providing legal protection of involved users, we decided to include a module for digitally signing the data entered by the patient if it is necessary. Also if necessary, the doctor with the help of a software system can address a request to the mobile application that seeks approval for data processing to a third party using a digital signature by the patient. If the patient refuses the request, the mobile application creates the appropriate log in which is recorded the time at which the request is rejected and automatically stops the processing of data for the relevant application. Figure 5 shows the module that work with electronic signatures of patients.

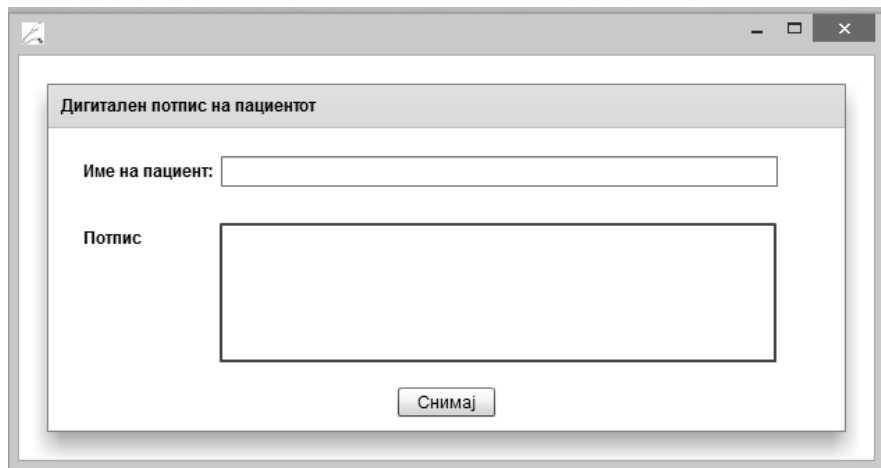


Figure 5. Module for working with electronic signatures

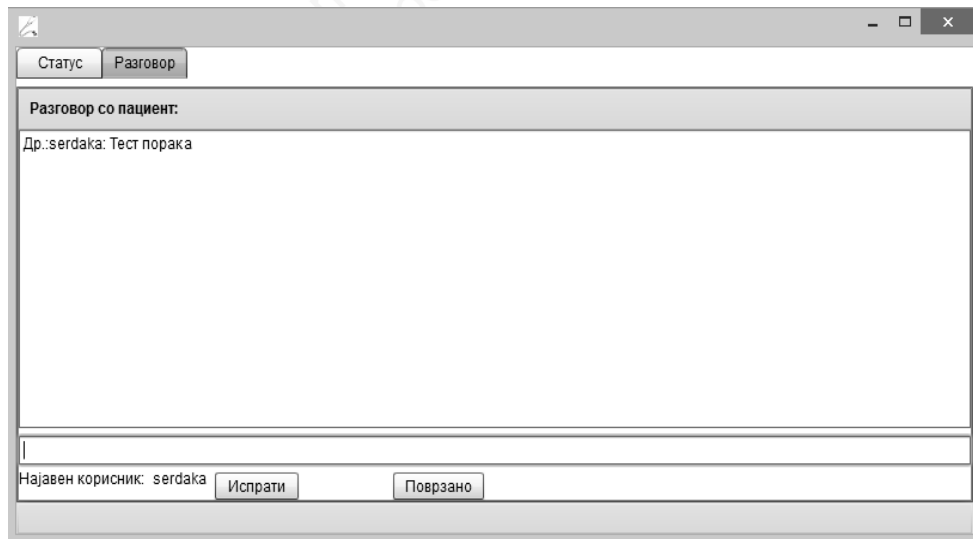


Figure 6. Module for Internet conversation between patients and doctors

In the process of remote monitoring we think that the essential role is in the immediate direct communication between the patient who uses the mobile application and the doctor who uses the software system. For this purpose, in our proposal model we implemented module for video - conference call which can involve more users of mobile and desktop application simultaneously. The module also includes a possibility for chat that we think would be suitable for short consultative talks between patients with similar problems and also between patients and physicians (Figure 6). Communication is deleted immediately after the conversation is finished and it is not possible to record the conversation [1].



Figure 7. The module for detecting geographical location

Studies are directed towards to discover innovative solutions that can help together with the modern technologies to save many lives. In practice, it often happens that older people with serious illnesses get lost somewhere outdoors and cannot be located while needing prompt medical intervention. Within our proposed model, we offer a solution that consumers can be located with the help of their mobile phones, with prior request for detection of geographical location sent through the server using the appropriate software system. When a request is sent to the mobile application, the application treats the request as urgent SOS and without approval sends to the server the geographical location of the patient. The application also sends a free SMS with the geographic location of the patient to the telephone number of a close person who has been previously recorded in the patient registration account. Within the mobile application are also kept all the important medical patient data such as blood group, illnesses who suffers from, any allergies, therapy that currently receives, prior hospital stay and so on. These important data can be directly downloaded by medical teams from the mobile phone of the patient with reference to only one request from the server to the mobile application during emergencies, the application will safely send data in electronic format to the medical team that is on the field.

CONCLUSION

Telemedicine and advanced communication between mobile devices and software systems represent the future of medicine. In this area there will be always room for innovation and implementation of new ideas. The application of sophisticated technology for monitoring and transferring data remotely can prevent many conditions, to save many lives and also to eliminate geographical barrier that occurs in some mountainous areas that are difficult to access. Economic impact respectively reducing costs by implementing these modern technologies is also of huge importance for every healthcare system and for every country. The model that we discussed in the framework of this paper is based on experiences from healthcare system of the Republic of Macedonia. We believe that this model is particularly suitable for countries that are in development. Within this paper, we have presented practical model of a system for remotely monitoring and processing of data, which can be used in medical purposes. The system consists of several separate modules that are unique by form and concept under they have been made. Studies have shown a need to continue the development of similar models in the future, that will be compatible with complex sensor networks and intelligent medical devices for monitoring human health that exist in the market today. Mobile and tablet devices, and intelligent watches in the future will be a bridge for communication between sensor networks and computer systems to monitor remotely.

REFERENCES

- [1] Matthew K. : Flash and PHP Bible, Wiley Publishing Inc. Indianapolis, Indiana, pp 64-80, 2008
- [2] K. Khoubati, Y. K. Dwivedi, A. Srivastava, B. Lal: Advances in Health Informatics and Electronic Healthcare Applications , IGI Global pp 24 – 67, 2010
- [3] Michael E.: Java SE 7 Programming Essentials, John Wiley and Sons Inc, Indianapolis Indiana, pp 64-72, 2013
- [4] Rodrigues, Joel J.P.C.: Mobile Networks and Cloud Computing Convergence for Progressive Services and Applications, IGI Global pp 41-47, 2013
- [5] P. Kostkova: Electronic Healthcare: Second International ICST Conference, EHealth, Istanbul, Turkey, Springer, pp 61-76, 2010
- [6] Al-Hakim, Latif: Web Mobile-Based Applications for Healthcare Management, pp 142-167, 2007
- [7] J.J. Berman: Methods in Medical Informatics, Fundamentals of Healthcare Programming in Perl, Python, and Ruby, CRC Press, Taylor and Francis Group, LLC, pp 54-68, 2011
- [8] R. Krohn, D.S. Mecalf: mHealth - From Smartphones to Smart Systems, HIMSS, pp 71-79, 2012
- [9] J. Donner, P. Mechael: mHealth in Practice: Mobile Technology for Health Promotion in the Developing World, Bloomsbury, pp 87-100, 2013