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Communications Regulation Commission
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Union of Scientists in Bulgaria
Telecommunications Association (ASTEL)
27-th NATIONAL CONFERENCE
WITH INTERNATIONAL PARTICIPATION



TELECOM 2019

THE WAYS TO CONNECT THE FUTURE



PROGRAMME AND ABSTRACTS

30 - 31 October 2019

**National Science and Technical Centre,
108 Rakovsky St. – Sofia**

**TELECOM 2019 is technically Co-Sponsored by IEEE:
2019 27th National Conference with
International Participation - #48729**

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TELECOM 2019 SESSIONS TIMETABLE

<i>Date</i>	<i>Time</i>	<i>Sessions</i>
Wednesday 30.10.2019		Plenary Session 1, hall 3
	10.00 – 12.00	Conference Opening Chairman: Assoc. Prof. Plamen Vachkov, PhD Greetings Presentations: 1. MTITC, 2. SEGA, 3. CRC, 4. A1 Bulgaria
	13.00 - 15.30	Plenary Session 2, hall 3 Chairman: Assoc. Prof. Alexander Nenkov, PhD Presentations: 5. Nikola Durchev, 6. Dimitar Avresky, 7. Antoni Slavinski, 8. Kamen Rangelov, 9. Kiril Konov
	16.00 – 17.30	Section Session 1, hall 3 TELECOMMUNICATION NETWORKS. COMMUNICATION CIRCUITS, SIGNALS AND SYSTEMS. Chairman: Prof. Elena Shoikova PhD Presentations: Papers: 1.1, 1.2, 1.3,.1.4, 1.5, 1.6
	17.35 – 18.15	Session “Round Table”, hall 3 HENG TONG OpticElectric – Reliable supplier of optic cables Discussion: IoT – INTERNET OF THINGS MOBILE NETWORKS CLOUD COMPUTING Chairman: Assoc. Prof. Plamen Vachkov, PhD, Assoc. Prof. Kamen Rangelov, PhD
	19.00 – 20.30	Informal meeting forum - Cocktail – Hall 3

<i>Date</i>	<i>Time</i>	<i>Sessions</i>
Thursday 31.10.2019	08.30 – 10.00	Section Session 2, hall 3 INTERNET OF THINGS (IOT). CYBERSECURITY. Chairman: Prof. Seferin Mirtchev, DSc Papers: 2.1, 2.2, 2.3, 2.4, 2.5, 2.6
	10.15 – 11.15	Section Session 3, hall 3 Poster Sessions SOFTWARE DEFINED NETWORKS. IMAGE PROCESSING AND CODING. EDUCATION IN THE FIELD OF TELECOMMUNICATION. Chairman: Assoc. Prof. Dimitar Arnaudov, PhD Papers: 3.1, to 3.10
	11.30 – 12.30	Section Session 4, hall 3 Poster Sessions WIRELESS SYSTEMS. TELECOMMUNICATION NETWORKS. CLOUD COMPUTING COMMUNICATIONS. Chairman: Assoc. Prof. Georgi Petro, PhD Papers: 4.1 - 4.10
	12.45 - 13.30	Section Session 5, hall 3 ECONOMICS OF ELECTRONIC COMMUNICATIONS AND POSTAL DELIVERY SERVICES. Chairman: Prof. Boris Yovchev, PhD Papers: 5.1, 5.2, 5.3
	13.35	Closing of the Conference, hall 3
		Assoc. Prof. Plamen Vachkov, PhD

CONFERENCE PROGRAMME

**Wednesday,
30.10.2019 г.**

NATIONAL SCIENCE AND TECHNICAL CENTRE

09.00 – 12.00

Registration

10.00 – 12.00

Plenary Session 1, hall 3

Conference Opening, Greetings

Chairman: Assoc. Prof. Plamen Vachkov, PhD

1. "Directive of the European Parliament and of the Council to Establish an European Code for Electronic Communications and a Regulation of the European Parliament and of the Council to Establish a Body of European Regulators for Electronic Communications"

Dimitar Dimitrov - Director of Communications Directorate,

Ministry of Transport, Information Technology and Communications

2. "The New Network and Information Security Regulations - Challenges and Solutions"

Vasil Grancharov, Director of the Network and Information Security Directorate,

State e-Government Agency

3. "

Communications Regulation Commission

- 4.

A1 Bulgaria - provider of digital services and telecommunication solutions

12.00 – 13.00

Lunch Break

13.00 – 15.30

Plenary Session 2, hall 3

Chairman: Assoc. Prof. Alexander Nenkov, PhD

- 5.

Dimitar Avresky,

International Research Institute for Autonomic Network Computing (IRIANC) - Association,
Boston, MA, USA / Munich. Germany

6. "Notes on Telecommunications – 2019"

Kamen Rangelov – **CEEC**

- 7.

Antoni Slavinski - **ASTEL**

8. "EU Economic Development Strategy - Industrialization, Digitization and the Path of Bulgaria"

Nikola Durchev,

Balkantel Ltd.

9. "State and Prospects of Digital TV Broadcasting"

Kiril Konov – **CEEC**

16.00 – 17.30

Section Session 1, hall 3

**TELECOMMUNICATION NETWORKS. COMMUNICATION CIRCUITS,
SIGNALS AND SYSTEMS.**

Chairman: Prof. Elena Shoikova PhD

- 1.1. Control of the Chaotic Processes in Chaos Shift Keying Communication System
Galina Cherneva
- 1.2. Application of Hausdorff Window for Array Antennas Design
Peter Apostolov, Alexey Stefanov and Snezhina Andonova
- 1.3. Software Platforms for Modeling of Telecommunication Networks
Ivan Nedyalkov, Alexey Stefanov and Georgi Georgiev
- 1.4. Use of Adaptive Antenna Arrays to Reduce Interference in the E-UTRA Network
D. Makoveenko, S. Siden, V. Pyliavskiy and R. Fokin
- 1.5. Wavelet Feature Family for Image Compression
Elena Osharovskaya
- 1.6. Adaptation of the image to spectral distribution of the light source
Pyliavskiy Volodymyr

17.35 – 18.15

Session “Round Table”, hall 3

HENG TONG OpticElectric – Reliable supplier of optic cables

Telco Trends and Transformation Priorities

Discussion:

**IoT – INTERNET OF THINGS,
MOBILE NETWORKS,
CLOUD COMPUTING**

Chairman: Assoc. Prof. Plamen Vachkov, Assoc. Prof. Kamen Rangelov

19.00 – 20.30

Informal meeting forum - Cocktail – Hall 3

**Thursday,
31.10.2019**

NATIONAL SCIENCE AND TECHNICAL CENTRE

08.30 – 10.00

Section Session 2, hall 3

INTERNET OF THINGS (IOT). CYBERSECURITY.

Chairman: Prof. Seferin Mirtchev, DSc

- 2.1. Indoor particulate matter (PM) monitoring and analysis
Rosen Miletiev, Emil Iontchev, Rumen Yordanov
- 2.2. Thermographic analysis of tyres during chassis dynamometer test
Kalin Dimitrov and Ilian Damyanov
- 2.3. Energy Efficient Routing Protocols in Resource Constrained IoT Networks
Ravinder Beniwal, Kamelia Nikolova, Georgi Iliev

- 2.4. Immersion in Virtual Reality Video Games for Improving Physical Performance measures: A review
Kiril Todorov , Agata Manolova, Georgi Chervendinev
- 2.5. One Method of Network Cyber-security, Based on Artificial Intelligence
Roumen Trifonov, Ognyan Nakov, Slavcho Manolov, Georgi Tsochev, Galya Pavlova
- 2.6. The Consequences from DNS Security Weaknesses
Willian Dimitrov

10.15 – 11.15 Section Session 3, hall 3

Poster Sessions

SOFTWARE DEFINED NETWORKS. IMAGE PROCESSING AND CODING. EDUCATION IN THE FIELD OF TELECOMMUNICATION.

Chairman: Assoc. Prof. Dimitar Arnaudov, PhD

- 3.1. Optimizing SDN Control Plane Scalability by Efficient Switch to Controller Migration
Jordan Raychev, Diyana Kinaneva, Georgi Hristov and Plamen Zahariev
- 3.2. Investigating the Possibilities of Integrating Cloud Weather Data into Existing Applications
Jordan Raychev, Diyana Kinaneva, Georgi Hristov, Plamen Zahariev and Gergana Staevska
- 3.3. Application of Artificial Intelligence in UAV platforms for Early Forest Fire Detection
Diyana Kinaneva, Georgi Hristov, Jordan Raychev and Plamen Zahariev
- 3.4. Methods for Forming and Transmitting Hypermedia Images by Using Modern Communication Technologies
Venko Kacarov, Aneliya Stanoeva, Anton Stoilov, Alexey Stefanov, Filip Batalov
- 3.5. Approach for MIMO Wireless Channel Modelling and System Characterization for an Indoor Environment
Stanimir Sadinov, Krasen Angelov, Panagiotis Kogias, Michail Malamatoudis
- 3.6. Investigation of the Reliability of Service Equipment in Communication Networks
Krasen Angelov and Stanimir Sadinov
- 3.7. C # Implementation of Maximum Network Flow Problem
Fatima Sapundzhi and Metodi Popstoilov
- 3.8. Standardization of Mobile Usability: Is The Mission Possible?
Radka Nacheva
- 3.9. Analysis of RF Measurements in the Receiver Unit and the Transmitter Unit Using a Training Kit
Ivanka Tsvetkova and Adriana Borodzhieva
- 3.10. Snippets Transformation and Digitalization of Business Processes in Telecommunication Companies of Kazakhstan
Arman Maralov, Mariana Petrova

11.30 – 12.30 Section Session 4, hall 3

WIRELESS SYSTEMS. TELECOMMUNICATION NETWORKS. CLOUD COMPUTING COMMUNICATIONS.

Chairman: Assoc. Prof. Georgi Petrov, PhD

- 4.1. Investigation of Pareto/M/1/k Teletraffic System by Simulation
Seferin Mirtchev
- 4.2. Development of a Programming Continuous Integration System
Vladimir Dimitrov and Kolio Kolev

- 4.3. Development of a Mobile Movie Recommendation Application
Vladimir Dimitrov and Kolio Kolev
- 4.4. Blockchain based decentralized approach for cloud computing
Anatoly Peshev
- 4.5. Research of Communication between STM32L475 and Private Cloud realized by using Amazon FreeRTOS and MQTT
Neven Nikolov and Ognyan Nakov
- 4.6. Comparative study Java vs Kotlin
Daniela Gotseva, Yavor Tomov and Petko Danov
- 4.7. Multi-lead ECG Compression Approach using Combination of Linear Transformations
Yuliy Velchev
- 4.8. Recursive algorithm for Discrete Fourier Transformation of second kind
Emil Frenski
- 4.9. Comparison of Computed Specific Absorption Rate Induced in a Homogeneous Human Body Phantom Using a Wearable Textile Antenna for Biomedical Applications
Gabriela Atanasova, Nikolay Atanasov, Aleksey Stefanov, Snezhina Andonova, Manol Avramov and Margarita Kateva
- 4.10. Challenges of blockchain technologies in the future
Yavor Tomov

12.45 – 13.30

Section Session 5, hall 3

ECONOMICS OF ELECTRONIC COMMUNICATIONS AND POSTAL DELIVERY SERVICES.

- 5.1. On the Subject of Resuming the Monopoly of the “Bulgarian Posts”
Zdravko Mihaylov and Valentin Tsenov
- 5.2. Potential Problems Related to EMC Caused by Low-Altitude Flying Powerful Electrical Rotorcrafts in Urban Environment
Georgi Petrov
- 5.3. The Old News in 2019 in the Infrastructure and Networks Legislation
Kamena Tsaneva, Darina Stoyanova

13.35

CLOSING OF THE CONFERENCE, hall 3.

CONTENTS

P1	Directive of the European Parliament and of the Council to Establish an European Code for Electronic Communications and a Regulation of the European Parliament and of the Council to Establish a Body of European Regulators for Electronic Communications (Presentation) Dimitar Dimitrov – Director of Communications Directorate, Ministry of Transport, Information Technology and Communications
P2	"The New Network and Information Security Regulations - Challenges and Solutions" Vasil Grancharov, Director of the Network and Information Security Directorate, State e-Government Agency (Presentation)
P3	Communications Regulation Commission (Presentation)
P4	A1 Bulgaria - provider of digital services and telecommunication solutions (Presentation)
P5	EU Economic Development Strategy - Industrialization, Digitization and the Path of Bulgaria (Presentation) Nikola Durchev – Balkantel
P6	Presentation Dimitar Avresky – International Research Institute for Autonomic Network Computing (IRIANC) - Association, Boston, MA, USA / Munich. Germany
P7	Notes on Telecommunications – 2019 (Presentation) Kamen Rangelov – CEEC
P8	Presentation Antoni Slavinski – ASTEL
P9	State and Prospects of Digital TV Broadcasting (Presentation) Kiril Konov – CEEC
1	USE OF ADAPTIVE ANTENNA ARRAYS TO REDUCE INTERFERENCE IN THE E-UTRA NETWORK D. Makoveenko, S. Siden, V. Pyliavskyi and R. Fokin 14
2	WAVELET FEATURE FAMILY FOR IMAGE COMPRESSION Mikola Patlayenko, Olena Osharovska, Volodymyr Pyliavskyi, Valentina Solodka 14
3	ADAPTATION OF THE IMAGE TO SPECTRAL DISTRIBUTION OF THE LIGHT SOURCE Pyliavskyi Volodymyr 14
4	ENERGY EFFICIENT ROUTING PROTOCOLS IN RESOURCE CONSTRAINED IOT NETWORKS Ravinder Beniwal, Kamelia Nikolova, Georgi Iliev 15
5	BLOCKCHAIN BASED DECENTRALIZED APPROACH FOR CLOUD COMPUTING Anatoly Todorov Peshev 15
6	RECURSIVE ALGORITHM FOR DISCRETE FOURIER TRANSFORMATION OF SECOND KIND Emil Frenski.....16

7	MULTI-LEAD ECG COMPRESSION APPROACH USING COMBINATION OF LINEAR TRANSFORMATIONS Yuliyana Slaveykov Velchev 16
8	DEVELOPMENT OF A PROGRAMMING CONTINUOUS INTEGRATION SYSTEM Vladimir Dimitrov Dimitrov, Kolio Nenchev Kolev 17
9	CONTROL OF THE CHAOTIC PROCESSES IN CHAOS SHIFT KEYING COMMUNICATION SYSTEM Galina Petkova Chernev 17
10	SOFTWARE PLATFORMS FOR MODELING OF TELECOMMUNICATION NETWORKS Ivan Nedyalkov, Alexey Stefanov, Georgi Georgiev 17
11	C # IMPLEMENTATION OF MAXIMUM NETWORK FLOW PROBLEM Fatima Sapundzhi and Metodi Popstoilov 18
12	THERMOGRAPHIC ANALYSIS OF TYRES DURING CHASSIS DYNAMOMETER TEST Kalin Dimitrov and Ilian Damyanov 18
13	APPLICATION OF HAUSDORFF WINDOW FOR ARRAY ANTENNAS DESIGN Peter Apostolov, Alexey Stefanov and Snezhina Andonova 19
14	THE CONSEQUENCES FROM DNS SECURITY WEAKNESSES Willian Dimitrov 19
15	SNIPPETS TRANSFORMATION AND DIGITALIZATION OF BUSINESS PROCESSES IN TELECOMMUNICATION COMPANIES OF KAZAKHSTAN Arman Maralov, Mariana Mateeva Petrova 19
16	INDOOR PARTICULATE MATTER (PM) MONITORING AND ANALYSIS Rosen Miletiev, Emil Iontchev 20
17	ANALYSIS OF RF MEASUREMENTS IN THE RECEIVER UNIT AND THE TRANSMITTER UNIT USING A TRAINING KIT Ivanka Dimitrova Tsvetkova and Adriana Naydenova Borodzhieva 20
18	RESEARCH OF COMMUNICATION BETWEEN STM32L475 AND PRIVATE CLOUD REALIZED BY USING AMAZON FREERTOS AND MQTT Neven Nikolov and Ognyan Nakov 21
19	COMPARISON OF COMPUTED SPECIFIC ABSORPTION RATE INDUCED IN A HOMOGENEOUS HUMAN BODY PHANTOM USING A WEARABLE TEXTILE ANTENNA FOR BIOMEDICAL APPLICATIONS Gabriela Atanasova, Nikolay Atanasov, Aleksey Stefanov, Snezhina Andonova, Manol Avramov, Margarita Kateva 21
20	COMPARATIVE STUDY JAVA VS KOTLIN Daniela Gotseva, Yavor Tomov and Petko Danov 21

21	DEVELOPMENT OF A MOBILE MOVIE RECOMMENDATION APPLICATION Vladimir Dimitrov Dimitrov and Kolio Nanchev Kolev22
22	CHALLENGES OF BLOCKCHAIN TECHNOLOGIES IN THE FUTURE Yavor Krumov Tomov 22
23	STANDARDIZATION OF MOBILE USABILITY: IS THE MISSION POSSIBLE? Radka Valerieva Nachev 22
24	INVESTIGATION OF PARETO/M/1/K TELETRAFFIC SYSTEM BY SIMULATION Seferin Todorov Mirtchev 23
25	ONE METHOD OF NETWORK CYBER-SECURITY, BASED ON ARTIFICIAL INTELLIGENCE Roumen Trifonov, Ognyan Nakov, Slavcho Manolov, Georgi Tsochev, Galya Pavlova 23
26	IMMERSION IN VIRTUAL REALITY VIDEO GAMES FOR IMPROVING PHYSICAL PERFORMANCE MEASURES: A REVIEW Kiril Todorov, Agata Manolova, Georgi Chervendinev 24
27	APPLICATION OF ARTIFICIAL INTELLIGENCE IN UAV PLATFORMS FOR EARLY FOREST FIRE DETECTION Diyana Kinaneva, Georgi Hristov, Jordan Raychev, Plamen Zahariev 24
28	INVESTIGATING THE POSSIBILITIES OF INTEGRATING CLOUD WEATHER DATA INTO EXISTING APPLICATIONS Jordan Raychev, Diyana Kinaneva, Georgi Hristov, Plamen Zahariev , Gergana Staevska 25
29	OPTIMIZING SDN CONTROL PLANE SCALABILITY BY EFFICIENT SWITCH TO CONTROLLER MIGRATION Jordan Raychev, Diyana Kinaneva, Georgi Hristov, Plamen Zahariev, 25
30	METHODS FOR FORMING AND TRANSMITTING HYPERMEDIA IMAGES BY USING MODERN COMMUNICATION TECHNOLOGIES Venko Kacarov, Aneliya Stanoeva, Anton Stoilov, Alexey Stefanov, Filip Batalov 25
31	APPROACH FOR MIMO WIRELESS CHANNEL MODELLING AND SYSTEM CHARACTERIZATION FOR AN INDOOR ENVIRONMENT Stanimir Sadinov, Krasen Angelov, Panagiotis Gregorios Kogias, Michail Nikolaos Malamatoudis, 26
32	INVESTIGATION OF THE RELIABILITY OF SERVICE EQUIPMENT IN COMMUNICATION NETWORKS Krasen Kirov Angelov and Stanimir Mihailov Sadinov 26

1.

USE OF ADAPTIVE ANTENNA ARRAYS TO REDUCE INTERFERENCE IN THE E-UTRA NETWORK

D. Makoveenko State Enterprise “Ukrainian scientific-research institute of radio and television” Odesa, Ukraine, dikatama.dm@gmail.com,

S. Siden, V. Pyliavskiy and R. Fokin O.S. Popov Odessa national academy of telecommunications Odesa, Ukraine, ssiden1@live.com

A model for investigating the 4G LTE (E-UTRA) Obstacle situation has been made. The results of modulation of uplink (UL) noise over the use of sectorial antennas of base stations are presented. The technology of power control is used to reduce noise. Recommendations on the use of AAP technology to reduce interference in the E-UTRA network are provided.

Keywords – intra system noise; coverage area; adaptive antenna arrays

2.

WAVELET FEATURE FAMILY FOR IMAGE COMPRESSION

Mikola Patlayenko, Olena Osharovska, Volodymyr Pyliavskiy and Valentina Solodka, Department of Television and Sound Broadcasting, O.S. Popov Odessa National Academy of Telecommunications, 1 Kuznechna Street, 65029 Odessa, Ukraine, nick_msa@ukr.net, osharovskaya@gmail.com, v.pilyavskiy@ukr.net

The article contains the results of experimental studies on compression of high and ultra-high definition images by families of wavelet functions. The dependences of the compression coefficients for the Daubechi, Haar, Coiflet, Meyer and biorthogonal wavelets are obtained. It is shown that wavelet functions allow more flexible control of the bitstream compared to a discrete cosine transform taking into account the detail of the images.

Keywords – image compression; signal to noise ratio; wavelet function.

3.

ADAPTATION OF THE IMAGE TO SPECTRAL DISTRIBUTION OF THE LIGHT SOURCE

Pyliavskiy Volodymyr, O.S. Popov Odessa National Academy of Telecommunications, Department radio and television broadcasting, Odessa, Kuznechna 1, Ukraine, v.pilyavskiy@ukr.net

The paper proposes an algorithm for determining the magnitude of the influence of a light source on image color. A method includes assessment influence based on using a color atlas. The simulation results are presented in two coordinate systems - the generally accepted xyz (which is not equal-contrast) and the equal-contrast CAM16 system. For the study, atlases of colors were chosen, the distance between the chromaticity coordinates of which is 5 units of MCO. For full adaptation, the adaptation system provides for the use of a sensor to determine the spectral distribution in real time. In the case when it is not possible to provide the system with this sensor, the image should be adapted to the color coordinates of the lighting source.

Analytical expressions for adapting to the color coordinates of the light source are presented in the work. This method allows you to increase the speed of adaptation and use when adapting video data.

Keywords – adaptation, light source, image processing, atlas of color, color appearance model.

4.

ENERGY EFFICIENT ROUTING PROTOCOLS IN RESOURCE CONSTRAINED IOT NETWORKS

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Georgi Iliev, Faculty of Telecommunications Technical University of Sofia, Sofia, Bulgaria, gli@tu-sofia.bg

Abstract— In this paper an approach for routing in MMSPEED protocol considering the residual energy has been proposed. Sensor nodes have limited energy due to that energy efficient routing has been an important issue in the sensor network. This approach finds energy efficient paths in delay constrained data in real time traffic. The MMSPEED protocol does not consider any energy metric in its routing. In this method routing decisions are made by considering remaining energy of the neighboring nodes of the sender node. Simulation results shows that energy efficiency of the sensor nodes are improved and overall lifetime of the wireless sensor network is also increased.

Keywords— MMSPEED, Wireless Sensor Network, Energy Efficiency.

5.

BLOCKCHAIN BASED DECENTRALIZED APPROACH FOR CLOUD COMPUTING

Anatoly Todorov Peshev, University of Library Studies and Information Technologies, 119 Tsarigradsko Shose blvd., 1784 Sofia, Bulgaria, peshev@outlook.com

Abstract – The Cloud computing concept provided solution for the always increasing demand of computing power, while keeping the costs at reasonable levels for organizations. Although, all the benefits of adopting cloud solution still there are privacy and vendor lock-ins concerns. Decentralized approach, based on the Blockchain and Edge Computing concepts can provide solution for those concerns.

Keywords – blockchain; cloud computing; decentralization; edge computing.

6.

RECURSIVE ALGORITHM FOR DISCRETE FOURIER TRANSFORMATION OF SECOND KIND

Emil Frenski, Department of Communication and Computer Engineering, Faculty of Engineering, South-West University "Neofit Rilski", 66 Ivan Michailov str., 2700 Blagoevgrad, Bulgaria, emil_f@swu.bg

Abstract – Many digital signal processing applications use frequency-domain algorithms. The standard method for spectrum analysis is the Discrete Fourier transform (DFT), typically implemented using a Fast Fourier transform (FFT) algorithm. The FFT calculates the frequency components in a window, on a block-by-block basis. If that window is move by one sample, it is obvious that most of the information will remain the same. An algorithm called recursive Sliding Discrete Fourier transform (rSDFT) is used for calculating the Fourier coefficients with a computational complexity proportional to the $O(M)$ for every input sample. This can be achieved by using a set of parallel recursive digital filters. This article shows the relation between the rSDFT of first and second kind.

Keywords – spectrum analysis; Discrete Fourier transform

7.

MULTI-LEAD ECG COMPRESSION APPROACH USING COMBINATION OF LINEAR TRANSFORMATIONS

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Abstract – An approach for lossy compression of multi-channel electrocardiogram (ECG) signals is presented. It is based on linear transformations. The approach combines Principal Component Analysis (PCA) for dimensionality reduction among channels and one dimensional Discrete Cosine Transform (DCT) applied on the resulting principal components. An iterative procedure is preferred for PCA calculation, thus avoiding eigendecomposition problem. A maximum of 4 principal components are needed for almost exact representation of an ECG signal with 9 channels. An analysis of the cumulative sum of the corresponding eigenvalues is used as criterion for principal components selection. The second part of the approach that causes information loss is zeroing of the lowest energy DCT coefficients. After appropriate packing the data are subject to arithmetic encoding.

The proposed approach is intended to be implemented in embedded systems with 32-bit floating point calculation capabilities, so the logical operations are minimized at the expense of arithmetic ones.

The approach is validated and tested with 50 files taken from a database consisting of multi-channel ECG signals. The tests were carried out by keeping the original sampling rate (1kHz) and the achieved compression ratio is in the range from 6 up to 20. Same tests were performed when the sampling rate is reduced down to 250Hz. In this case the compression ratio is lower and it varies from 3 to 7. The Percent Root-mean-square Difference Normalized (PRDN) criterion is from 2.2% to 31%, but the highest values are not common. Typical values for PRDN are below 10%. The comparative analysis shows the proposed approach outperforms

some older but approved methods for ECG compression while it is comparable to the performance of the new techniques with significant processing demands.

Considering the experimental results, replacing of DCT with wavelet transform will improve the efficiency. Using contextual probability models in the entropy encoding stage will increase the compression ratio additionally.

Keywords – ECG; compression; PCA

8.

DEVELOPMENT OF A PROGRAMMING CONTINUOUS INTEGRATION SYSTEM

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Abstract – This paper describes the development of a Continuous Integration / Continuous Delivery system for programming code. The programmable languages and tools used for its development including Java, MySQL, Maven, Gradle, JPA, REST, etc. The application is build using the 3-Tier Software Architecture. Some of the benefits of this architecture are scalability, speed of development, performance, availability, etc.

Keywords – Continuous Delivery; Continuous Integration; Java; MySQL; Software Development.

9.

CONTROL OF THE CHAOTIC PROCESSES IN CHAOS SHIFT KEYING COMMUNICATION SYSTEM

Galina Petkova Cherneva, Department of Communication and Computer Engineering and Technologies, Faculty of Engineering, South-West University “Neofit Rilski”, 66 Ivan Mihailov str., 2700 Blagoevgrad, Bulgaria, gcherneva@swu.bg

Abstract – In this work is proposed an approach for the synthesis of impacts, which is increased the amplitude of the deviation of the phase trajectory of the points of balance until the chaotic mode. The idea to obtaining needed chaotic attractor is applied to the chaotic generators, described by the equations of Lorenz, in Chaos Shift Keying communication system. The described approach is simulated and numerical studied by Mathcad.

Keywords – chaotic processes, control, nonlinear dynamic system, Chaos Shift Keying.

10.

SOFTWARE PLATFORMS FOR MODELING OF TELECOMMUNICATION NETWORKS

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**Georgi Georgiev, Member of Union of Electronics, Electrical Engineering and Telecommunications (CEEC), 108 Rakovski St 1000 Sofia, Bulgaria
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Abstract – In the paperwork, a review of programs used to model communication networks has been made. The review is divided into three major groups: programs for modeling of IP-based networks, programs for modeling of any telecommunication networks and programs for modeling of cloud infrastructures. For each of the groups one program is proposed, indicating why it is selected. The chosen programs are: GNS3 (IP network simulator), Riverbed Modeler academic edition (Telecommunication network simulator) and GreenCloud. With each of the proposed programs, simulation models of communication networks have been developed. Some of the results and capabilities of each of the programs are shown.

Keywords – GNS3, Modeling, Riverbed Modeler, Telecommunication networks

11.

C # IMPLEMENTATION OF MAXIMUM NETWORK FLOW PROBLEM

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Abstract – The maximum network flow problem is a fundamental problem in network flow theory. The Ford-Fulkerson and Edmonds-Karp algorithm are widely used in optimization of flow networks and various computer applications. The current paper presents a C# implementation of Ford-Fulkerson and Edmonds-Karp algorithms for solving the maximum flow problem in networking.

Keywords – Edmonds-Karp algorithm; Ford-Fulkerson algorithm; Flow network; Maximum flow; optimization algorithms

12.

THERMOGRAPHIC ANALYSIS OF TYRES DURING CHASSIS DYNAMOMETER TEST

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Abstract – This paper is a thermographic study of the tyres of a passenger car with gasoline engine. Under controlled conditions, a series of images were obtained at a TU-Sofia laboratory. Image points are selected by analyzing the temperature field distribution. The possibilities of applying such an analysis in chassis dynamometer tests have been explored.

Keywords – thermographic, dynamometer test, gasoline

13.

APPLICATION OF HAUSDORFF WINDOW FOR ARRAY ANTENNAS DESIGN

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Abstract – In this article, a new window function for array antenna design is presented. The window function is obtained by approximation of Kronecker delta function with algebraic polynomial in Hausdorff metric. Equations defining the polynomial parameters are obtained. The definition range and analytical expressions for Hausdorff window are defined.

The change of Hausdorff window due to the Hausdorff distance and the power of the polynomial are graphically presented. The parameters of the array antenna are explored.

A comparison with array antenna with a Kaiser window is demonstrated.

Keywords – array antenna, approximation, Kaiser window, Chebyshev polynomial, Hausdorff distance.

14.

THE CONSEQUENCES FROM DNS SECURITY WEAKNESSES

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Abstract – Global DNS infrastructure is a major component for the web applications and a lot of a services exposed in the internet. Malicious actors do have wide arsenal exploiting DNS. The purpose of this study is to understand the cyber security status of DNS ecosystem. As part of the research, a statistical analysis based on CVE has been created to provide a view toward exposure to DNS security risks in general. It can help organizations to understand, assess and mitigate DNS risks. DNS data is basis to identify a compromised device. It's made short review of most used attacks against DNS and mitigation - amplification, reflection, floods, NXDOMAIN, DNS exploits, etc. and analysis for the DNS security incidents trend. The statistics implicitly reflect the degree of adoption of new DNS security standards and technologies. This article gives a roundup of security issues with DNS and possible countermeasures.

Keywords – attack, cyber, DNS, security, weakness

15.

SNIPPETS TRANSFORMATION AND DIGITALIZATION OF BUSINESS PROCESSES IN TELECOMMUNICATION COMPANIES OF KAZAKHSTAN

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Abstract – The telecommunications industry is an integral part of the modern global economy. However, its role is significantly different from the influence of other sectors of the economy on the general pace of development of human civilization. The article discusses the state and prospects of the development of telecommunication services in Kazakhstan in the context of digitalization. Kazakhstan's telecommunications industry consists of a set of telecommunications networks and services that transmit information and implement telecommunications services to consumers. The aim of the article is to study the structure and trend analysis of the telecommunication market in Kazakhstan in terms of digitalization.

Keywords – digitalization, progress, business processes, transformation, virtual reality, unitization, responsibility, entrepreneurship, digital culture, outstanding decisions.

16.

INDOOR PARTICULATE MATTER (PM) MONITORING AND ANALYSIS

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Abstract – The current paper represent IoT indoor measurement system for real time monitoring of the particulate matter such as PM1.0, PM2.5 and PM10. Also the environment parameters such as temperature and humidity is accomplished. The operational stability and long term performance are measured and analyzed. The measurement system send the data to the remote server when the particulate matter levels are calculated on 24h base and compared to the national standards. The system also allows Bluetooth connectivity to nearby receivers such as mobile phones to show the real-time PM levels.

Keywords – particulate matter, temperature, humidity.

17.

ANALYSIS OF RF MEASUREMENTS IN THE RECEIVER UNIT AND THE TRANSMITTER UNIT USING A TRAINING KIT

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Abstract – The paper describes the main components of the transmitter unit and the receiver unit of a training kit, applied in the educational process of the students-bachelors in the course “Radio Communication Technologies” in the specialty “Internet and Mobile Communications” at the University of Ruse. The main steps in the processes of setting and measuring the units as well as the problems solved by the students are presented in the paper.

Keywords – radio frequencies; receiver unit; training kit; transmitter unit; wireless communications.

18.

RESEARCH OF COMMUNICATION BETWEEN STM32L475 AND PRIVATE CLOUD REALIZED BY USING AMAZON FREERTOS AND MQTT

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Abstract – This paper studies and describes communication between IoT cloud and IoT embedded system with STM32L475 microcontroller. Described are advantages and limitations of Private and Public IoT Cloud. It is used for experiments MQTT protocol, Private IoT Cloud and Amazon FreeRTOS. A JSON type data format is used between the cloud structure and IoT device. Architecture and software implementation of the experimental stage is also presented.

Keywords – Protocol, MQTT, Amazon freeRTOS, IoT, Embedded system, Private and Public Cloud

19.

COMPARISON OF COMPUTED SPECIFIC ABSORPTION RATE INDUCED IN A HOMOGENEOUS HUMAN BODY PHANTOM USING A WEARABLE TEXTILE ANTENNA FOR BIOMEDICAL APPLICATIONS

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Abstract – This paper gives a study and comparison of Specific Absorption Rate (SAR) induced in a homogeneous phantom using wearable textile antennas with and without body-antenna isolation. A planar monopole antenna intended to operate in industrial, scientific and medical 2.45 GHz band is taken as an example for the investigation. The 1- and 10-g averages SAR and SAR distributions of wearable antennas on the phantom in different observation planes are presented to study human safety.

Keywords – biomedical application, SAR; textile antenna; wearable antenna.

20.

COMPARATIVE STUDY JAVA VS KOTLIN

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Abstract – Among the great variety of programming languages, Java stands out vividly, becoming, for several decades, one of the most preferred languages for programmers.

Introduced only a few years ago, Kotlin is one of the many languages that use the Java Virtual Machine, but in this short period it has gained popularity. The purpose of this paper is to compare the two languages structurally and to identify the advantages and disadvantages of each.

Keywords – Kotlin; Java; Programming languages.

21.

DEVELOPMENT OF A MOBILE MOVIE RECOMMENDATION APPLICATION

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Abstract – This paper describes the development of a mobile application, which is an automated system for movie recommendations based on different categories. For its development the used technologies include – iOS operating system, iOS SDK and Swift programming language. The application is in a close integration with Facebook for which Facebook SDK is used, as well as the networking library AFNetworking which securely sends HTTP requests to the public API of themoviedb and then read the returned responses in JSON format.

Keywords – Facebook SDK; iOS; Mobile Application; Software Development; Swift programming language.

22.

CHALLENGES OF BLOCKCHAIN TECHNOLOGIES IN THE FUTURE

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Abstract – Nowadays, blockchain technologies based on peer-to-peer networks [1] are generating a new multi-billion dollar economy that presents new challenges for humanity. This paper aims to examine blockchain technology, comment on its problems, and propose a new algorithm that will help solve some of the problems associated with the regulation of this economy and the use of cryptocurrencies as a means of payment.

Keywords – peer-to-peer networks; blockchain technologies; Smart contract;

23.

STANDARDIZATION OF MOBILE USABILITY: IS THE MISSION POSSIBLE?

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Abstract – The benefits of maintaining standards can be summarized from different perspectives: consumers, businesses, governments, economically. They inform and shape the products we buy, ensuring quality and safety. Standardizing in dynamic activities such as the development of mobile applications and devices can be no easy task. In this regard, the aim of the current paper is to revise some international standard towards usability problems of mobile user interfaces and to analyze the possibility of standardization of mobile usability.

Keywords – mobile usability, international standards, interface design.

24.

INVESTIGATION OF PARETO/M/1/K TELETRAFFIC SYSTEM BY SIMULATION

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Abstract – The single-server Pareto/M/1/k teletraffic system is whit a peaked arrival process described by the generalized Pareto distribution, exponentially distributed service time and a final queue length. A real time trace simulation model for estimating the steady-state probabilities, losses and delays is developed for investigating this queueing system. The results is compared with the classical queueing system M/M/1/k. This simulation model allows studying the stochastic processes in modern telecommunications networks and system.

Keywords – Pareto distribution, simulation model, queueing system, peaked traffic

25.

ONE METHOD OF NETWORK CYBER-SECURITY, BASED ON ARTIFICIAL INTELLIGENCE

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Abstract – The Faculty of Computer Systems and Technologies at the Technical University - Sofia conducts research in the field of application of the artificial intelligence methods in cybersecurity within the framework of a project funded by the National Science Fund at the Ministry of Education and Science. The expected result is: after modeling and experimenting with different methods in different applications, to produce a "Report on the recommended use of intelligent methods for enhancing network and information security". The results of experiments with one such method aimed at cyber-protection of telecommunication networks are considered in this paper. The successfully tested Network Protection module of so-called Network Gateway Monitoring System could be defined as a network server to protect the network from attacks such as foot-printing, network scanning, SYN flood, ping sweep, port scanning, session hijacking and more.

Keywords – cyber defense, artificial intelligence, multi-agent systems

26.

IMMERSION IN VIRTUAL REALITY VIDEO GAMES FOR IMPROVING PHYSICAL PERFORMANCE MEASURES: A REVIEW

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Abstract — Virtual reality (VR) active video gaming, also called "exergaming" has become an emerging trend in entertainment but also fitness, education and health sectors.

It requires bodily movements to play and function as a form of physical activity (PA). Since this type of gaming is becoming more and more popular and accessible and the trends suggest that it may become a mainstream media, the scientific community is discussing on its usefulness. There are number of claims about its ability to improve health via an increase in PA but researchers also argue that it is still a form of time spent in front of monitor which comes with many negative sides. The aim of this paper is to overview the scientific research and outline the strengths, weaknesses and opportunities of immersive VR gaming to promote PA. The available evidence indicates that active video games can replace sedentary time spent in front of a computer or TV with physical activity and make a measurable contribution to the improvement of health. However whether it is a sustainable way to motivate gamers in PA is questionable.

Keywords – active video gaming; virtual reality; physical activity; sedentary behavior; obesity

27.

APPLICATION OF ARTIFICIAL INTELLIGENCE IN UAV PLATFORMS FOR EARLY FOREST FIRE DETECTION

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Abstract – In this paper we propose a platform for early forest fire detection that uses unmanned aerial vehicle for observing given territory. The UAV platforms are equipped with specialized cameras that are either optical or thermal. The focus of the paper falls on a method for using optical camera for fire detection. We pay attention to the powerful machine learning technique that is used for the implementation of object detection in images. We have trained an object detector that can recognize smoke and fire in the images and at the end we have evaluated the performance and accuracy of the model.

Keywords – AUC, Object detection, ROC, Tensorflow, UAVs.

28.

INVESTIGATING THE POSSIBILITIES OF INTEGRATING CLOUD WEATHER DATA INTO EXISTING APPLICATIONS

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Abstract – The article aims to investigate and present the possibilities of integrating cloud weather data into existing web-based applications by utilizing a publicly exposed APIs by manufactures. Besides the obvious visualization, the collected data from multiple location could be further analyzed and used to synthesize new weather prediction algorithms and models.

Keywords – API, Applications, Cloud, Weather data

29.

OPTIMIZING SDN CONTROL PLANE SCALABILITY BY EFFICIENT SWITCH TO CONTROLLER MIGRATION

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Abstract – The focus of the current paper is to present a new approach of optimizing the scalability of the control plane of software defined networks by efficient switch to controller migration.

Keywords – Control Plane, Optimization, SDN, Scalability

30.

METHODS FOR FORMING AND TRANSMITTING HYPERMEDIA IMAGES BY USING MODERN COMMUNICATION TECHNOLOGIES

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Abstract – Of particular interest is the development of an aromatic image synthesizer that can reproduce a given variety of aromas in the surrounding environment, leading to indirect changes in psychophysiological indicators and behavioral responses of the human body.

Keywords – biotechnical, aromatic image; synthesizer; psychophysiological indicators; aromas.

31.

APPROACH FOR MIMO WIRELESS CHANNEL MODELLING AND SYSTEM CHARACTERIZATION FOR AN INDOOR ENVIRONMENT

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Abstract – While coding and signal processing are key elements to successful implementation of a MIMO system, the communication channel represents a major component that determines system performance. There are a variety of different approaches used for modelling the MIMO wireless channel. This paper is focus on modelling aimed at characterizing the MIMO channel spatial-temporal properties for an indoor environment as an example. The approach discussed in this paper is defined to include the electromagnetic propagation and antennas.

Keywords – channel model, Indoor environment, MIMO, wireless coverage.

32.

INVESTIGATION OF THE RELIABILITY OF SERVICE EQUIPMENT IN COMMUNICATION NETWORKS

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Abstract – The security of a communication system is the system's ability to resist the external destabilizing factors and impacts, as well as the internal changes that can lead to emergency operation. The security according to the European Committee for Electrotechnical Standardization (CENELEC) is normally integrated under the conditions of reliability. The main objective of this study is the modeling of reliability of the communication service equipment, which is system with capability for performance recovery after failure. For this purpose, the method of Markov chains is used.

Keywords – communication equipment, Markov processes, reliability, probability of states.

Information

for the participants and guests of Telecom 2019

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