

Proposal for Special Issue

Title of the proposed Thematic Issue:

[AIoT data management, analytics and decision making](#)

[\(Artificial Intelligence of Things data management, analytics and decision making\)](#)

Guest Editor Name:

[Dr. Ivan V. Izonin](#)

Guest Editor Affiliation:

[Lviv Polytechnic National University, Lviv, Ukraine](#)

Guest Editor's List of Publications (Last - 5 Years):

[Please, see an Appendix A](#)

Issue Description:

Nowadays, the fast development of hardware for IoT-based systems creates appropriate conditions for developing of services for application areas. As we known, the large number of multifunctional devices, which are connected to the Internet constantly increases. Today, most of the IoT devices just only collect and transmit data. The huge amount of data produced by these devices requires efficient and fast approaches to its analysis. This task can be solved by combining Artificial Intelligence and IoT tools. Essentially, AI accelerators can be used as a universal sensor in IoT systems, that is, we can create Artificial Intelligence of Things (AIoT). AIoT can be considered like a movement from data collection to the knowledge aggregation.

AIoT-based systems are being widely implemented in many high-tech industrial and infrastructure systems. Such systems are capable of providing not only the ability to collect but also analysis various aspects of data for identification, planning, diagnostics, evaluation, monitoring, optimization, etc., at the lower level in the entire system's hierarchy. That is, they are able to work more efficiency and effectiveness by generating the knowledge, that is needed for the real-time analytics and decision making in some applicable area.

This special issue will cover the up-to-date methodology for creating components of the AI-driven IoT systems to address a variety of information processing issues in different application systems.

Proposal Keywords:

[IoT data collection and verification](#)

[Aggregation and exploitation of sensor data](#)

Edge and fog computing architectures
QoS and intelligence traffic management
AI-driven IoT analytics
IoT platforms for smart home and smart city systems
AIoT technologies, applications and services

Thematic Issue Type:

Full-length thematic issue (research papers)

Total Articles:

10

Tentative date for submission of ALL manuscripts:

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Contact Information:

Dr. Ivan V. Izonin

Assistant Professor,

S. Bandera str., 12, Lviv, 79013, UKRAINE

ivanizonin@gmail.com

ivan.v.izonin@lpnu.ua

+38 098 888 96 87

Appendix A – Ivan V. Izonin's List of Publications (Last - 5 Years):

Book Chapters

1. Izonin, I., Tkachenko R., Kryvinska N., Tkachenko P., Greguš ml. M. "Multiple Linear Regression Based on Coefficients Identification Using Non-iterative SGTM Neural-like Structure", In: Rojas I., Joya G., Catala A. (eds), Advances in Computational Intelligence, 15th International Work-Conference on Artificial Neural Networks (IWANN 2019), Gran Canaria, Spain, June 12–14, 2019, Proceedings, Part I, Part of the Lecture Notes in Computer Science book series (LNCS, volume 11506), Springer Cham, pp. 467-479, 2019, ISBN 978-3-030-20520-1, DOI: 10.1007/978-3-030-20521-8_39, Pages 467-479.
2. Ivan Izonin, Natalia Kryvinska, Pavlo Vitynskyi, Roman Tkachenko, Khrystyna Zub "GRNN Approach Towards Missing Data Recovery between IoT Systems" In: Leonard Barolli, Hiroaki Nishino, Hiroyoshi Miwa (eds.) Advances in Intelligent Networking and Collaborative Systems, the 11th International Conference on Intelligent Networking and Collaborative Systems (INCoS-2019), Advances in Intelligent Systems and Computing book series, Springer, Cham, 2019, ISBN 978-3-030-29035-1
3. Roman Tkachenko, Pavlo Tkachenko, Ivan Izonin, Pavlo Vitynskyi, Natalia Kryvinska, Yurii Tsymbal "Committee of the Combined RBF-SGTM Neural-Like Structures for Prediction Tasks", In: Awan, I., Younas, M., Ünal, P., Aleksy, M. (eds.) Mobile Web and Intelligent Information Systems. 16th International Conference, MobiWIS 2019, Istanbul, Turkey, August 26–28, 2019. Lecture Notes in Computer Science book series, vol 11673, 2019, Springer, Cham,, 2019, ISBN 978-3-030-27192-3
4. Roman Tkachenko, Ivan Izonin, Michal Greguš ml., Pavlo Tkachenko, Natalia Kryvinska, Ivanna Dronyuk "Committee of the SGTM Neural-like Structures with Extended Inputs for Predictive Analytics in Insurance". In: Muhammad Younas, Irfan Awan, Salima Benbernou (eds) Big Data Innovations and Applications, 5th International Conference, Innovate-Data 2019, Istanbul, Turkey, August 26–28, 2019, Communications in Computer and Information Science book series (CCIS 1054) Springer, Cham, ISBN 978-3-030-27355-2
5. Ivan Izonin, Michal Greguš, Roman Tkachenko, Mykola Logoida, Oleksandra Mishchuk and Yurii Kynash "SGD-based Wiener Polynomial Approximation for Missing Data Recovery in Air Pollution Monitoring Dataset" In: Rojas I., Joya G., Catala A. (eds), Advances in Computational Intelligence, 15th International Work-Conference on Artificial Neural Networks (IWANN 2019), Gran Canaria, Spain, June 12–14, 2019, Proceedings, Part I, Part of the Lecture Notes in Computer Science book series (LNCS, volume 11506), Springer Cham, pp 781-793, 2019, ISBN 978-3-030-20520-1, DOI: 10.1007/978-3-030-20521-8_64
6. Oleksandra Mishchuk, Roman Tkachenko, Ivan Izonin "Missing Data Imputation through SGTM Neural-like Structure for Environmental Monitoring Tasks" In: Hu, Z.B., Petoukhov, S., (eds) Advances in Computer Science for Engineering and Education II. ICCSEEA2019. Advances in Intelligent Systems and Computing. Springer, Cham, pp. 142-151, 2019, ISBN 978-3-030-16620-5, DOI: 10.1007/978-3-030-16621-2_13
7. Tkachenko, R., Izonin, I. "Model and Principles for the Implementation of Neural-Like Structures based on Geometric Data Transformations". In: Hu, Z.B., Petoukhov, S., (eds) Advances in Computer Science for Engineering and Education. ICCSEEA2018. Advances in Intelligent Systems and Computing. Springer, Cham, vol.754, pp.578-587, 2018. ISBN Springer, Cham, DOI: 10.1007/978-3-319-91008-6_58

8. Tkachenko, R., Doroshenko, A., Izonin, I., Tsymbal Y., Havrysh, B. "Imbalance Data Classification via Neural-like Structures of Geometric Transformations Model: Local and Global Approaches" In: Hu, Z.B., Petoukhov, S., (eds) *Advances in Computer Science for Engineering and Education. ICCSEEA2018. Advances in Intelligent Systems and Computing.* Springer, Cham, vol.754, pp.112-122, 2018. ISBN Springer, Cham, DOI:10.1007/978-3-319-91008-6_12
9. Tkachenko, R., Tkachenko, P., Izonin, I., Tsymbal, Y. "Learning-based image scaling using neural-like structure of geometric transformations paradigm". In *Advances in Soft Computing and Machine Learning in Image Processing : Part of the Studies in Computational Intelligence book series / editors: Aboul Ella Hassanien, Diego Alberto Oliva, Springer International Publishing, n. 1, vol. 730, pp. 233-262, 2018. ISBN 978-3-319-63753-2, DOI 10.1007/978-3-319-63754-9.*

Refereed Journals

10. Ivan Izonin, Natalia Kryvinska, Roman Tkachenko, Khrystyna Zub, Pavlo Vitynskyi. "An extended-input GRNN and its application", Elsevier Journal *Procedia Computer Science*, Special Issue on "10th International conference on emerging ubiquitous systems and pervasive networks (EUSPN-2019), 9th International conference on current and future trends of information and communication technologies in healthcare (ICTH-2019), affiliated workshops", Vol. 160, pp. 578–583, 2019. ISSN 1877-0509, DOI: 10.1016/j.procs.2019.11.044
11. Ivan Izonin, Roman Tkachenko, Natalia Kryvinska, Khrystyna Zub, Oleksandra Mishchuk, Taras Lisovych. "Recovery of incomplete IoT sensed data using high-performance extended-input neural-like structure", Elsevier Journal *Procedia Computer Science*, Special Issue on "10th International conference on emerging ubiquitous systems and pervasive networks (EUSPN-2019), 9th International conference on current and future trends of information and communication technologies in healthcare (ICTH-2019), affiliated workshops", Vol. 160, pp. 521–526, 2019. ISSN 1877-0509, DOI: 10.1016/j.procs.2019.11.054
12. Anatoliy Kovalchuk, Ivan Izonin, Natalya Kustra, Mihal Greguš ml.. "Information protection service using topological image coverage", Elsevier Journal *Procedia Computer Science*, Special Issue on "10th International conference on emerging ubiquitous systems and pervasive networks (EUSPN-2019), 9th International conference on current and future trends of information and communication technologies in healthcare (ICTH-2019), affiliated workshops", Vol. 160, pp. 503–508, 2019. ISSN 1877-0509, DOI: 10.1016/j.procs.2019.11.057
13. Anatoliy Kovalchuk, Ivan Izonin, Natalia Lotoshynska, Mihal Greguš ml.. "An approach towards image encryption and decryption using quaternary fractional-linear operations", Elsevier Journal *Procedia Computer Science*, Special Issue on "10th International conference on emerging ubiquitous systems and pervasive networks (EUSPN-2019), 9th International conference on current and future trends of information and communication technologies in healthcare (ICTH-2019), affiliated workshops", Vol. 160, pp. 491–496, 2019. ISSN 1877-0509, DOI: 10.1016/j.procs.2019.11.059
14. Anatoliy Kovalchuk, Ivan Izonin, Oleh Riznyk, Mihal Greguš ml.. "An efficient image encryption scheme using projective transformations", Elsevier Journal *Procedia Computer Science*, Special Issue on "10th International conference on emerging ubiquitous systems and pervasive networks (EUSPN-2019), 9th International conference on current and future trends of information and communication technologies in healthcare (ICTH-2019), affiliated workshops", Vol. 160, pp. 584–589, 2019. ISSN 1877-0509, DOI: 10.1016/j.procs.2019.11.043

15. Anatoliy Kovalchuk, Natalia Lotoshynska, Ivan Izonin, Leonid Berezko, Mihal Greguš ml.. "An approach towards an efficient encryption-decryption of grayscale and color images", Elsevier Journal Procedia Computer Science, Special Issue on "16th International conference on mobile systems and pervasive computing (MobiSPC 2019), 14th International conference on future networks and communications (FNC 2019), 9th International conference on sustainable energy information technology (SEIT 2019)", Vol. 155, pp. 630–635, 2019. ISSN 1877-0509, DOI: 10.1016/j.procs.2019.08.089
16. Tkachenko Roman, Mishchuk Oleksandra, Izonin Ivan, Kryvinska Natalia, Stolyarchuk Roksolyana. "A non-iterative neural-like framework for missing data imputation", Elsevier Journal Procedia Computer Science, Special Issue on "16th International conference on mobile systems and pervasive computing (MobiSPC 2019), 14th International conference on future networks and communications (FNC 2019), 9th International conference on sustainable energy information technology (SEIT 2019)", Vol. 155, pp. 319–326, 2019. ISSN 1877-0509, DOI: 10.1016/j.procs.2019.08.046.
17. Ivan Izonin, Natalia Kryvinska, Roman Tkachenko, Khrystyna Zub. "An approach towards missing data recovery within IoT smart system", Elsevier Journal Procedia Computer Science, Special Issue on Special Issue on "16th International conference on mobile systems and pervasive computing (MobiSPC 2019), 14th International conference on future networks and communications (FNC 2019), 9th International conference on sustainable energy information technology (SEIT 2019)", Vol. 155, pp. 11–18, 2019. ISSN 1877-0509, DOI: 10.1016/j.procs.2019.08.006.
18. R. Tkachenko, I. Izonin, P. Vitynskyi, N. Lotoshynska, and O. Pavlyuk. "Development of the Non-Iterative Supervised Learning Predictor Based on the Ito Decomposition and SGTm Neural-Like Structure for Managing Medical Insurance Costs", Data, vol. 3, no. 4, pp. 1-14, 2018. DOI:10.3390/data3040046
19. R. Tkachenko, Z. Duriagina, I. Lemishka, I. Izonin, A. Trostianchyn. "Development of machine learning method of titanium alloys properties identification in additive technologies", EasternEuropean Journal of Enterprise Technologies, vol. 3, iss. 12 (93), pp. 23-31, 2018 DOI: 10.15587/1729-4061.2018.134319.
20. Ivan Izonin, Andriy Trostianchyn, Zoia Duriagina, Roman Tkachenko, Tetiana Tepla, Natalia Lotoshynska, "The Combined Use of the Wiener Polynomial and SVM for Material Classification Task in Medical Implants Production", International Journal of Intelligent Systems and Applications (IJISA), vol.10, no.9, pp.40-47, 2018. DOI: 10.5815/ijisa.2018.09.05
21. T.L. Tepla, I.V. Izonin, Z.A. Duriagina, R.O. Tkachenko, A.M. Trostianchyn, I.A. Lemishka, V.V. Kulyk, T.M. Kovbasyuk. "Alloys selection based on the supervised learning technique for design of biocompatible medical materials", Archives of Materials Science and Engineering, vol.93, is.1, pp.32-40, 2018.
22. Dmytro Peleshko, Taras Rak, Ivan Izonin, "Image superresolution via divergence matrix and automatic detection of crossover", International Journal of Intelligent Systems and Applications (IJISA), vol.8, no.12, pp. 1-8, 2016. DOI: 10.5815/ijisa.2016.12.01

Refereed Conferences

23. Ivan Izonin, Michal Gregus, Roman Tkachenko, Pavlo Tkachenko, Natalia Kryvinska, Pavlo Vitynskyi, "Committee of SGTm Neural-Like Structures with RBF kernel for Insurance Cost Prediction Task", 2019 IEEE 2nd Ukraine Conference on Electrical and Computer Engineering (UKRCON 2019), Lviv, Ukraine, July 2-6, 2019, pp. 1037-1040.

24. Sergii Babichev, Artem Sharko, Bohdan Durnyak, Valeriy Zhydetskyi, Ivan Izonin "Application of Huang Transform and Wavelet Analysis for Acoustic Emission Signal Filtering", 2019 IEEE 2nd Ukraine Conference on Electrical and Computer Engineering (UKRCON 2019), Lviv, Ukraine, July 2-6, 2019, pp. 859-863.
25. Roman Tkachenko, Ivan Izonin, Natalia Kryvinska, Valentyna Chopyak, Nataliia Lotoshynska, Dmytro Danylyuk. "Piecewise-linear Approach for Medical Insurance Costs Prediction using SGTM Neural-Like Structure". In: Shakhovska N., Montenegro S., Estève Ya., Subbotin S., Kryvinska N., Izonin I.: (Eds.): Informatics & Data-Driven Medicine (IDDM 2018). Proceedings of the 1st International Workshop IDDM 2018. Lviv, Ukraine, November 28-30, pp.170-179, 2018, CEUR-WS.org.
26. Roman Tkachenko, Hakan Cutucu, Ivan Izonin, Anastasiya Doroshenko, Yurii Tsymbal "Non-iterative Neural-like Predictor for Solar Energy in Libya" In: Ermolayev, V., Suárez-Figueroa, M. C., Ławrynowicz, A., Palma, R., Yakovyna, V., Mayr, H. C., Nikitchenko, M., and Spivakovsky, A. (Eds.): ICT in Education, Research and Industrial Applications. Proc. 14-th Int. Conf. ICTERI 2018. Volume I: Main Conference. Kyiv, Ukraine, May 14-17, pp.35-45, 2018, CEUR-WS.org
27. Ihor Oleksiv, Ivan Izonin, Viktoriya Kharchuk, Roman Tkachenko, Anastasiya Doroshenko: "Identification of IT Sector Stakeholder's Requirements to Masters Program in Information System in Lviv Region" In: Ermolayev, V., Suárez-Figueroa, M. C., Ławrynowicz, A., Palma, R., Yakovyna, V., Mayr, H. C., Nikitchenko, M., and Spivakovsky, A. (Eds.): ICT in Education, Research and Industrial Applications. Proc. 14-th Int. Conf. ICTERI 2018. Volume I: Main Conference. Kyiv, Ukraine, May 14-17, pp.112-120, 2018, CEUR-WS.org.
28. Ye. Bodyanskiy, I. Perova, O. Vynokurova, I. Izonin "Adaptive Wavelet Diagnostic Neuro-Fuzzy System for Biomedical Tasks", In: Proc. of 14th International Conference on Advanced Trends in Radioelectronics, Telecommunications and Computer Engineering (TCSET), Lviv-Slavske, Ukraine, February 20 – 24, 2018, 711-715.
29. Tkachenko R., Doroshenko A., Izonin I., Vitynskyi P. "The Method of Neural Networks Committee in Problems of Recognition in Terms of Imbalanced Data" In: Proceedings of the Fourth International Conference on "Automatic Control and Information Technology" - Krakow, Poland : Cracow university of technology. – C. 115 – 121.
30. Pavlo Vitynskyi, Roman Tkachenko, Ivan Izonin, Hakan Kutucu "Hybridization of the SGTM Neural-like Structure through Inputs Polynomial Extension" Proceedings of the 2018 IEEE Second International Conference on Data Stream Mining & Processing (DSMP), 21–25 August 2018, Lviv, Ukraine, Lviv: Lviv Polytechnic Publishing House, 2018 pp. 386-391.
31. Yurii Rashkevych, Dmytro Peleshko, Olena Vynokurova, Ivan Izonin, Natalia Lotoshynska "Single-frame image super-resolution based on singular square matrix operator" In: ELECTRICAL AND COMPUTER ENGINEERING (UKRCON): proc. of the IEEE First Ukraine conf., May 29 – June 2 2017, Kyiv, Ukraine, IEEE, 2017, pp. 944–948.
32. Dmytro Peleshko, Olena Vynokurova, Ivan Izonin, Marta Peleshko, Sergii Mykhailiuk "Methodology for accelerated searching a crossover coefficient in images synthesis tasks" In: Proceedings of the 2017 14 International Conference The experience of designing and application of CAD systems in microelectronics (CADSM 2015), 21–25 February 2017, Polyana, Ukraine, Lviv : PP Vesha & co, 2017, pp. 143–147.
33. Dmytro Peleshko, Yuriy Ivanov, Boris Sharov, Ivan Izonin, Yuriy Borzov "Design and implementation of visitors queue density analysis and registration method for retail videosurveillance purposes" In: Data stream Mining & Processing: proc. of the 1st international scien. and techn. conf., 23–27 August 2016, Lviv, Ukraine, Lviv: Lviv Polytechnic Publishing House, 2016, pp.159–162.
34. Dmytro Peleshko, Taras Rak, Marta Peleshko, Ivan Izonin, Danylo Batyuk "Two-frames image superresolution based on the aggregate divergence matrix" In: Data stream Mining & Processing: proc. of the 1st international scien. and techn. conf., 23–27 August 2016, Lviv, Ukraine, Lviv: Lviv Polytechnic Publishing House, 2016, pp. 235–238.

35. Ivan Izonin, Roman Tkachenko, Dmytro Peleshko, Taras Rak, Danylo Batyuk "Learning-based image super-resolution using weight coefficients of synaptic connections" In: Computer science and information technologies: proc. of X intern. scien. and techn. conf., 14–17 Sep. 2015 y., Lviv, Ukraine., Lviv: Lviv Polytechnic Publishing House, 2015, pp. 25–29.
36. Yuriy Ivanov, Dmytro Peleshko, Oleksandr Makoveychuk, Ivan Izonin, Igor Malets, Natalia Lotoshunska, Danylo Batyuk "Adaptive moving object segmentation algorithms in cluttered environments" In: The experience of designing and application of CAD systems in microelectronics: proc.of the 13 intern. conf., Polyana, Ukraine, 24–27 February 2015, Lviv: Lviv Polytechnic Publishing House, 2015, pp. 97–99.