

Záznamy vložené do ASEP za UI (1.6. – 31. 7. 2021)

0544179 - ÚI 2022 US eng M - Část monografie knihy

Kalina, Jan

Mental Health Clinical Decision Support Exploiting Big Data.

Research Anthology on Decision Support Systems and Decision Management in Healthcare, Business, and Engineering. Hershey: IGI Global, 2021 - (Khosrow-Pour, M.), s. 983-1000. ISBN 9781799890232

Institucionální podpora: RVO:67985807

Klíčová slova: big data * decision support * machine learning * supervised learning * mental health

Kód oboru RIV: IN - Informatika

Obor OECD: Computer sciences, information science, bioinformatics (hardware development to be 2.2, social aspect to be 5.8)

<https://www.igi-global.com/chapter/mental-health-clinical-decision-support-exploiting-big-data/282627>

DOI: [10.4018/978-1-7998-9023-2.ch048](https://doi.org/10.4018/978-1-7998-9023-2.ch048)

The complexity of clinical decision-making is immensely increasing with the advent of big data with a clinical relevance. Clinical decision systems represent useful e-health tools applicable to various tasks within the clinical decision-making process. This chapter is devoted to basic principles of clinical decision support systems and their benefits for healthcare and patient safety. Big data is crucial input for clinical decision support systems and is helpful in the task to find the diagnosis, prognosis, and therapy. Statistical challenges of analyzing big data in psychiatry are overviewed, with a particular interest for psychiatry. Various barriers preventing telemedicine tools from expanding to the field of mental health are discussed. The development of decision support systems is claimed here to play a key role in the development of information-based medicine, particularly in psychiatry. Information technology will be ultimately able to combine various information sources including big data to present and enforce a holistic information-based approach to psychiatric care.

Trvalý link: <http://hdl.handle.net/11104/0321235>

0544178 - ÚI 2022 RIV CZ eng A - Abstrakt

Kalina, Jan - Vidnerová, Petra

On Robust Training of Regression Neural Networks.

IWFOS 2021. Book of Abstracts. Brno: MUNI Faculty of Science, 2021. s. 35-35.

[IWFOS 2020/2021: International Workshop on Functional and Operatorial Statistics /5./. 23.06.2021-25.06.2021, Online]

Grant CEP: GA ČR(CZ) GA19-05704S; GA ČR(CZ) GA18-23827S

Institucionální podpora: RVO:67985807

Klíčová slova: neural networks * robustness * nonlinear regression quantiles

Kód oboru RIV: IN - Informatika

Obor OECD: Computer sciences, information science, bioinformatics (hardware development to be 2.2, social aspect to be 5.8)

<https://iwfos2021.sci.muni.cz/media/3326670/iwfos2021-book-of-abstracts.pdf>

Estimation, prediction or smoothing of curves represents a fundamental task of functional data analysis. Nonlinear regression methods allow to search for the best-fit curves explaining the dependence of a response variable on available independent variables. Neural networks, commonly used for the task of nonlinear regression, are however highly vulnerable to the presence of outlying measurements in the data. New robust versions of common types of neural networks, namely multilayer perceptrons and radial basis function networks, are proposed here based on nonlinear regression quantiles or highly robust loss functions. Three datasets are analyzed to illustrate the performance of the novel robust approaches, which turn out to outperform standard neural networks or other competing regression tools over contaminated data.

Trvalý link: <http://hdl.handle.net/11104/0321234>

0544091 - ÚI 2022 US eng J - Článek v odborném periodiku

Cibula, D. - Rob, L. - Mallmann, P. - Knapp, P. - Klat, J. - Chovanec, J. - Minář, L. - Melichar, B. - Hein, A. - Kieszko, D. - Pluta, M. - Špaček, J. - Bartoš, P. - Wimberger, P. - Madry, R. - Markowska, J. - Streb, J. - Valha, P. - Bin Hassan, H. I. - Pecen, Ladislav - Galluzzi, L. - Fučíková, J. - Hrnčiarová, T. - Hraška, M. - Bartůňková, J. - Spíšek, R.

Dendritic Cell-based Immunotherapy (DCVAC/OvCa) Combined with Second-line Chemotherapy in Platinum-sensitive Ovarian Cancer (SOV02): A Randomized, Open-label, Phase 2 Trial.

Gynecologic Oncology. Online 20 July 2021 (2021). ISSN 0090-8258

Institucionální podpora: RVO:67985807

Klíčová slova: Ovarian cancer * Dendritic-cell based immunotherapy * Immunogenic cell death

Impakt faktor: 4.623, rok: 2019

[DOI: 10.1016/j.ygyno.2021.07.003](https://doi.org/10.1016/j.ygyno.2021.07.003)

OBJECTIVE: DCVAC/OvCa is an active cellular immunotherapy designed to stimulate an immune response against ovarian cancer. We explored the safety and efficacy of DCVAC/OvCa plus carboplatin and gemcitabine in platinum-sensitive ovarian cancer. **METHODS:** In this open-label, parallel-group, phase 2 trial (ClinicalTrials.gov number NCT02107950), patients with platinum-sensitive ovarian cancer relapsing after first-line chemotherapy were randomized to DCVAC/OvCa and chemotherapy or chemotherapy alone. DCVAC/OvCa was administered every 3–6 weeks (10 doses). Endpoints included safety, progression-free survival (PFS; primary efficacy endpoint) and overall survival (OS; secondary efficacy endpoint). **RESULTS:** Between November 2013 and May 2015, 71 patients were randomized to chemotherapy in combination with DCVAC/OvCa or to chemotherapy alone. Treatment-emergent adverse events related to DCVAC/OvCa, leukapheresis and chemotherapy occurred in six (16.2%), two (5.4%), and 35 (94.6%) patients in the DCVAC/OvCa group. Chemotherapy-related events occurred in all patients in the chemotherapy group. Seven patients in the DCVAC/OvCa group were excluded from primary efficacy analyses due to failure to receive ≥ 1 dose of DCVAC/OvCa. PFS was not improved (hazard ratio [HR] 0.73, 95% confidence interval [CI] 0.42–1.28, $P = 0.274$, data maturity 78.1%). Median OS was significantly prolonged (by 13.4 months) in the DCVAC/OvCa group (HR 0.38, 95% CI 0.20–0.74, $P = 0.003$; data maturity 56.3%). A signal for enhanced surrogate antigen-specific T-cell activity was seen with DCVAC/OvCa. **CONCLUSIONS:** DCVAC/OvCa combined with chemotherapy had a favorable safety profile in patients with platinum-sensitive ovarian cancer. DCVAC/OvCa did not improve PFS, but the exploratory analyses revealed OS prolongation and enhanced surrogate antigen-specific T-cell activity.

Trvalý link: <http://hdl.handle.net/11104/0321150>

0544081 - ÚI 2022 RIV CH eng J - Článek v odborném periodiku

Boriani, G. - De Caterina, R. - Manu, M. C. - Souza, J. - Pecun, Ladislav - Kirchhof, P.

Impact of Weight on Clinical Outcomes of Edoxaban Therapy in Atrial Fibrillation Patients Included in the ETNA-AF-Europe Registry.

Journal of Clinical Medicine. Roč. 10, č. 13 (2021), č. článku 2879. ISSN 2077-0383

Institucionální podpora: RVO:67985807

Klíčová slova: atrial fibrillation * edoxaban * weight * registry * effectiveness * safety * non-vitamin K antagonist oral anticoagulants * stroke

Impakt faktor: 3.303, rok: 2019

<http://dx.doi.org/10.3390/jcm10132879>

[DOI: 10.3390/jcm10132879](https://doi.org/10.3390/jcm10132879)

Background: Extremes of body weight may alter exposure to non-vitamin K antagonist oral anticoagulants and thereby impact clinical outcomes. This ETNA-AF-Europe sub-analysis assessed 1-year outcomes in routine care patients with atrial fibrillation across a range of body weight groups treated with edoxaban. **Methods:** ETNA-AF-Europe is a multinational, multicentre, observational study conducted in 825 sites in 10 European countries. Overall, 1310, 5565, 4346 and 1446 enrolled patients were categorised into ≤ 60 kg, >60 - ≤ 80 kg (reference weight group), >80 - ≤ 100 kg and >100 kg groups. **Results:** Patients weighing ≤ 60 kg were older, more frail and had a higher CHA(2)DS(2)-VASc score vs. the other weight groups. The rates of stroke/systemic embolism, major bleeding and ICH were low at 1 year (0.82, 1.05 and 0.24%/year), with no significant differences among weight groups. The annualised event rates of all-cause death were 3.50%/year in the overall population. After adjustment for eGFR and CHA(2)DS(2)-VASc score, the risk of all-cause death was significantly higher in extreme weight groups vs. the reference group. **Conclusions:** Low rates of stroke and bleeding were reported with edoxaban, independent of weight. The risk of all-cause death was higher in extremes of weight vs. the reference group after adjustment for important risk modifiers, thus no obesity paradox was observed.

Trvalý link: <http://hdl.handle.net/11104/0321140>

0544029 - ÚI 2022 CZ cze A - Abstrakt

Geletič, Jan - Resler, Jaroslav - Krč, Pavel

Modelování realistického městského mikroklimatu a potenciálních adaptačních opatření.

Workshop výzkumných projektů v oblasti adaptace na změnu klimatu v hl. m. Praze. Program workshopu. Praha: Odbor ochrany prostředí Magistrátu hl. m. Prahy, Výzkumný ústav

vodohospodářský TGM v Praze, 2021.

[Workshop výzkumných projektů v oblasti adaptace na změnu klimatu v hl. m. Praze 2021.

15.06.2021-15.06.2021, Praha]

Grant CEP: GA KHP(CZ) UH0383

Institucionální podpora: RVO:67985807

Kód oboru RIV: DG - Vědy o atmosféře, meteorologie

Obor OECD: Meteorology and atmospheric sciences

https://portalzp.praha.eu/file/3301976/Program_Workshopu_vyzkumnych_projektu_AS_156o21_.pdf

Trvalý link: <http://hdl.handle.net/11104/0321091>

0544027 - ÚI 2022 NL eng J - Článek v odborném periodiku

Lehnert, M. - Geletič, Jan - Kopp, J. - Brabec, Marek - Jurek, M. - Pánek, J.

Comparison between Mental Mapping and Land Surface Temperature in Two Czech Cities: A New Perspective on Indication of Locations Prone to Heat Stress.

Building and Environment. Roč. 203, October 2021 (2021), č. článku 108090. ISSN 0360-1323

Institucionální podpora: RVO:67985807

Klíčová slova: Heat stress * Thermal comfort * Urban climate * Citizen science * Mental map * Land surface temperature

Kód oboru RIV: DG - Vědy o atmosféře, meteorologie

Obor OECD: Meteorology and atmospheric sciences

Impakt faktor: 4.971, rok: 2019

<http://dx.doi.org/10.1016/j.buildenv.2021.108090>

[DOI: 10.1016/j.buildenv.2021.108090](https://doi.org/10.1016/j.buildenv.2021.108090)

Most studies addressing heat in urban environments focus on thermal conditions and neglect the mental component of thermal comfort. This study employs mental maps to analyse thermal (dis)comfort in the medium-sized Czech cities of Olomouc and Plzeň in summer. Locations of "mental hotspots" are identified particularly on busy streets, at transport hubs, and in the city centres. The results reveal mental hotspots as highly-frequented locations in which people experience inferior thermal and environmental conditions. Slight variations in the spatial patterns of thermal discomfort for particular groups of persons are described. Mental hotspots overlap with surface temperature hotspots by less than half of their area; differences are statistically significant and spatially modulated. Overlap areas of "mental" and "real" hotspots show a promising approach towards indication of locations prone to development of heat stress in urban areas. These findings may contribute to adaptation to climate change and to urban planning, which should address not only the physical but also the subjectively-perceived issues of thermal comfort.

Trvalý link: <http://hdl.handle.net/11104/0321090>

0544026 - ÚI 2022 eng C - Konferenční příspěvek (zahraniční konf.)

Kalina, Jan - Vidnerová, Petra - Tichavský, Jan

A Comparison of Trend Estimators under Heteroscedasticity.

ICAISC 2020 Proceedings (in print).

[ICAISC 2021: The International Conference on Artificial Intelligence and Soft Computing /20./.

Zakopane (PL), 20.06.2021-24.06.2021]

Grant CEP: GA ČR(CZ) GA19-05704S; GA ČR(CZ) GA18-23827S

Institucionální podpora: RVO:67985807

Klíčová slova: Nonlinear regression * Robust neural networks * Taut string * Outliers * Heteroscedasticity

Kód oboru RIV: IN - Informatika

Obor OECD: Computer sciences, information science, bioinformatics (hardware development to be 2.2, social aspect to be 5.8)

Trend estimation, i.e. estimating or smoothing a nonlinear function without any independent variables, belongs to important tasks in various applications within signal and image processing, engineering, biomedicine, analysis of economic time series, etc. We are interested in estimating trend under the presence of heteroscedastic errors in the model. So far, there seem no available studies of the performance of robust neural networks or the taut string (stretched string) algorithm under heteroscedasticity. We consider here the Aitken-type model, analogous to known models for linear regression, which take heteroscedasticity into account. Numerical studies with heteroscedastic data possibly contaminated by outliers yield improved results, if the Aitken model is used. The results of robust neural networks turn out to be especially favorable in our examples. On the other hand, the taut string (and especially its robust L1-version) inclines to over fitting and suffers from

heteroscedasticity.

Trvalý link: <http://hdl.handle.net/11104/0321087>

0544023 - ÚI 2022 CZ cze A - Abstrakt

Vidnerová, Petra

Simulace epidemiologických opatření v modelu M.

Poučení z pandemie COVID-19. Program konference. Praha: BISOP, 2021.

[Poučení z pandemie COVID-19. 16.06.2021-16.06.2021, Online]

Institucionální podpora: RVO:67985807

Klíčová slova: popularizace vědy * covid

<https://youtu.be/z8Fn9P3yAMk>

Trvalý link: <http://hdl.handle.net/11104/0321086>

0544022 - ÚI 2022 CZ cze A - Abstrakt

Neruda, Roman

Agentní modely.

Poučení z pandemie COVID-19. Program konference. Praha: BISOP, 2021.

[Poučení z pandemie COVID-19. 16.06.2021-16.06.2021, Online]

Institucionální podpora: RVO:67985807

Klíčová slova: popularizace vědy * covid

<https://youtu.be/z8Fn9P3yAMk>

Trvalý link: <http://hdl.handle.net/11104/0321085>

0544017 - ÚI 2022 RIV CH J - Článek v odborném periodiku

Balážiová, E. - Výmola, P. - Hrabal, P. - Mateu, R. - Zubal, M. - Tomáš, R. - Netuka, D. - Kramář, F. - Zemanová, Z. - Svobodová, K. - Brabec, Marek - Šedo, A. - Bušek, P.

Fibroblast Activation Protein Expressing Mesenchymal Cells Promote Glioblastoma Angiogenesis.

Cancers (Basel). Roč. 13, č. 13 (2021), č. článku 3304. ISSN 2072-6694

Institucionální podpora: RVO:67985807

Klíčová slova: glioblastoma * angiogenesis * microenvironment * fibroblast activation protein * seprase * angiopoietin * vessel destabilisation

Kód oboru RIV: BB - Aplikovaná statistika, operační výzkum

Obor OECD: Statistics and probability

Impakt faktor: 6.126, rok: 2019

<http://dx.doi.org/10.3390/cancers13133304>

DOI: [10.3390/cancers13133304](https://doi.org/10.3390/cancers13133304)

Fibroblast activation protein (FAP) is a membrane-bound protease that is upregulated in a wide range of tumours and viewed as a marker of tumour-promoting stroma. Previously, we demonstrated increased FAP expression in glioblastomas and described its localisation in cancer and stromal cells. In this study, we show that FAP+ stromal cells are mostly localised in the vicinity of activated CD105+ endothelial cells and their quantity positively correlates with glioblastoma vascularisation. FAP+ mesenchymal cells derived from human glioblastomas are non-tumorigenic and mostly lack the cytogenetic aberrations characteristic of glioblastomas. Conditioned media from these cells induce angiogenic sprouting and chemotaxis of endothelial cells and promote migration and growth of glioma cells. In a chorioallantoic membrane assay, co-application of FAP+ mesenchymal cells with glioma cells was associated with enhanced abnormal angiogenesis, as evidenced by an increased number of erythrocytes in vessel-like structures and higher occurrence of haemorrhages. FAP+ mesenchymal cells express proangiogenic factors, but in comparison to normal pericytes exhibit decreased levels of antiangiogenic molecules and an increased Angiopoietin 2/1 ratio. Our results show that FAP+ mesenchymal cells promote angiogenesis and glioma cell migration and growth by paracrine communication and in this manner, they may thus contribute to glioblastoma progression.

Trvalý link: <http://hdl.handle.net/11104/0321082>

0544003 - ÚI 2022 RIV US eng J - Článek v odborném periodiku

Billings, Jacob - Saggari, M. - Hlinka, Jaroslav - Keilholz, S. - Petri, G.

Simplicial and Topological Descriptions of Human Brain Dynamics.

Network Neuroscience. Roč. 5, č. 2 (2021), s. 549-568. ISSN 2472-1751

Institucionální podpora: RVO:67985807

Klíčová slova: Functional connectivity * Time-varying functional connectivity * Topological data analysis * Persistent homology

http://dx.doi.org/10.1162/netn_a_00190

[DOI: 10.1162/netn a 00190](https://doi.org/10.1162/netn.a.00190)

While brain imaging tools like functional magnetic resonance imaging (fMRI) afford measurements of whole-brain activity, it remains unclear how best to interpret patterns found amid the data's apparent self-organization. To clarify how patterns of brain activity support brain function, one might identify metric spaces that optimally distinguish brain states across experimentally defined conditions. Therefore, the present study considers the relative capacities of several metric spaces to disambiguate experimentally defined brain states. One fundamental metric space interprets fMRI data topographically, that is, as the vector of amplitudes of a multivariate signal, changing with time. Another perspective compares the brain's functional connectivity, that is, the similarity matrix computed between signals from different brain regions. More recently, metric spaces that consider the data's topology have become available. Such methods treat data as a sample drawn from an abstract geometric object. To recover the structure of that object, topological data analysis detects features that are invariant under continuous deformations (such as coordinate rotation and nodal misalignment). Moreover, the methods explicitly consider features that persist across multiple geometric scales. While, certainly, there are strengths and weaknesses of each brain dynamics metric space, we find that those that track topological features optimally distinguish experimentally defined brain states.

Trvalý link: <http://hdl.handle.net/11104/0321076>

0543657 - ÚT 2022 RIV US eng J - Článek v odborném periodiku

Maturkanič, Dušan - Procházk, Pavel - Hodboď, Robert - Tchawou Tchuisseu, Eder Batista - Brabec, Marek - Russhard, P.

Construction of the Signal Profile for Use in Blade Tip-Timing Analysis.

Journal of Engineering for Gas Turbines and Power. Roč. 143, č. 10 (2021), č. článku 4050857. ISSN 0742-4795

Grant ostatní:AV ČR(CZ) StrategieAV21/3

Program:StrategieAV

Institucionální podpora: RVO:61388998 ; RVO:67985807

Klíčová slova: data processing * signal processing * rotating speed instability * blade vibration * blade tip-timing

Kód oboru RIV: BI - Akustika a kmity; BB - Aplikovaná statistika, operační výzkum (UIVT-O)

Obor OECD: Applied mechanics; Statistics and probability (UIVT-O)

Impakt faktor: 1.804, rok: 2019

<https://asmedigitalcollection.asme.org/gasturbinespower/article-abstract/143/10/101001/1107085/Construction-of-the-Signal-Profile-for-Use-in?redirectedFrom=fulltext>

[DOI: 10.1115/1.4050857](https://doi.org/10.1115/1.4050857)

This paper illustrates a fundamentally different approach applied to blade tip-timing (BTT) analysis in the background of works performed through the long history of this method. New innovative approach is based on the precise separation of measured data that was published in previous works. In this respect, the construction of the signal profile is intended for fast and accurate definition of the regulation function served to expression of the complete speed fluctuation and its instabilities. Following, the presented signal profile is demonstrated on four variants of data processing in two significantly different operations, where it allows the application of a one-step approach. Finally, these results are also compared with a two-step method used in previous cases without the signal profile. The benefit of the suggested procedure of the signal profile calculation is evident in the possibility of processing more complex functions in deterministic methods without limiting the characteristic advantages of these methods.

Trvalý link: <http://hdl.handle.net/11104/0321115>

0543613 - ÚI 2022 RIV eng C - Konferenční příspěvek (zahraniční konf.)

Li, C. M. - Many, F. - Vidal, Amanda

Tableaux for Maximum Satisfiability in Lukasiewicz Logic.

2020 IEEE 50th International Symposium on Multiple-Valued Logic (ISMVL). Proceedings. Piscataway: IEEE, 2020, s. 243-248. ISBN 978-1-7281-5406-0. ISSN 2378-2226.

[ISMVL 2020: IEEE International Symposium on Multiple-Valued Logic /50./, Miyazaki (JP), 09.11.2020-11.11.2020]

Institucionální podpora: RVO:67985807

Klíčová slova: Lukasiewicz logic * MaxSAT * Tableaux

Kód oboru RIV: IN - Informatika

Obor OECD: Computer sciences, information science, bioinformatics (hardware development to be 2.2, social aspect to be 5.8)

DOI: [10.1109/ISMVL49045.2020.00007](https://doi.org/10.1109/ISMVL49045.2020.00007)

We define a tableau calculus for solving the MaxSAT problem of 3-valued Łukasiewicz logic, and prove its soundness and completeness. The calculus can be naturally extended to other finitely-valued logics. Our contributions establish the foundations of a generic problem solving paradigm for combinatorial optimization based on Łukasiewicz logic.

Trvalý link: <http://hdl.handle.net/11104/0320803>

0543570 - ÚI 2022 eng C - Konferenční příspěvek (zahraniční konf.)

Jančar, P. - Šíma, Jiří

The Simplest Non-Regular Deterministic Context-Free Language (to appear).

MFCS 2021. Proceedings.

[MFCS 2021: International Symposium on Mathematical Foundations of Computer Science /46./

Tallinn (EE), 23.08.2021-27.08.2021]

Grant CEP: GA ČR(CZ) GA19-05704S

Institucionální podpora: RVO:67985807

Trvalý link: <http://hdl.handle.net/11104/0320756>

0543462 - ÚI 2022 RIV IE eng J - Článek v odborném periodiku

Janča, R. - Jahodová, A. - Hlinka, Jaroslav - Ježdík, P. - Svobodová, L. - Kudr, M. - Kalina, A. - Marusič, P. - Kršek, P. - Jiruška, Přemysl

Ictal Gamma-Band Interactions Localize Ictogenic Nodes of the Epileptic Network in Focal Cortical Dysplasia.

Clinical Neurophysiology. Roč. 132, č. 8 (2021), s. 1927-1936. ISSN 1388-2457

Grant CEP: GA MZd(CZ) NV17-28427A

Institucionální podpora: RVO:67985807 ; RVO:67985823

Klíčová slova: Epilepsy * Effective connectivity * Intracranial EEG * Networks * Seizure onset zone * Outcome

Kód oboru RIV: FH - Neurologie, neurochirurgie, neurovědy; FH - Neurologie, neurochirurgie, neurovědy (FGU-C)

Obor OECD: Neurosciences (including psychophysiology); Neurosciences (including psychophysiology (FGU-C)

Impakt faktor: 3.214, rok: 2019

<http://dx.doi.org/10.1016/j.clinph.2021.04.016>

DOI: [10.1016/j.clinph.2021.04.016](https://doi.org/10.1016/j.clinph.2021.04.016)

Objective: Epilepsy surgery fails in > 30% of patients with focal cortical dysplasia (FCD). The seizure persistence after surgery can be attributed to the inability to precisely localize the tissue with an endogenous potential to generate seizures. In this study, we aimed to identify the critical components of the epileptic network that were actively involved in seizure genesis. Methods: The directed transfer function was applied to intracranial EEG recordings and the effective connectivity was determined with a high temporal and frequency resolution. Pre-ictal network properties were compared with ictal epochs to identify regions actively generating ictal activity and discriminate them from the areas of propagation. Results: Analysis of 276 seizures from 30 patients revealed the existence of a seizure-related network reconfiguration in the gamma-band (25–170 Hz; $p < 0.005$) – ictogenic nodes. Unlike seizure onset zone, resecting the majority of ictogenic nodes correlated with favorable outcomes ($p < 0.012$). Conclusion: The prerequisite to successful epilepsy surgery is the accurate identification of brain areas from which seizures arise. We show that in FCD-related epilepsy, gamma-band network markers can reliably identify and distinguish ictogenic areas in macroelectrode recordings, improve intracranial EEG interpretation and better delineate the epileptogenic zone. Significance: Ictogenic nodes localize the critical parts of the epileptogenic tissue and increase the diagnostic yield of intracranial evaluation.

Trvalý link: <http://hdl.handle.net/11104/0320660>

0543460 - ÚI 2022 US eng J - Článek v odborném periodiku

Caputi, Luigi - Pidnebesna, Anna - Hlinka, Jaroslav

Promises and Pitfalls of Topological Data Analysis for Brain Connectivity Analysis.

Neuroimage. Roč. 238, September 2021 (2021), č. článku 118245. ISSN 1053-8119

Grant CEP: GA ČR(CZ) GA19-11753S; GA MZd(CZ) NV17-28427A

Institucionální podpora: RVO:67985807

Klíčová slova: Persistent homology * Connectivity * fMRI * Electrophysiology * Epilepsy * Schizophrenia

Kód oboru RIV: FH - Neurologie, neurochirurgie, neurovědy

Obor OECD: Neurosciences (including psychophysiology)

Impakt faktor: 5.902, rok: 2019

<http://dx.doi.org/10.1016/j.neuroimage.2021.118245>

[DOI: 10.1016/j.neuroimage.2021.118245](https://doi.org/10.1016/j.neuroimage.2021.118245)

Developing sensitive and reliable methods to distinguish normal and abnormal brain states is a key neuroscientific challenge. Topological Data Analysis, despite its relative novelty, already generated many promising applications, including in neuroscience. We conjecture its prominent tool of persistent homology may benefit from going beyond analysing structural and functional connectivity to effective connectivity graphs capturing the direct causal interactions or information flows. Therefore, we assess the potential of persistent homology to directed brain network analysis by testing its discriminatory power in two distinctive examples of disease-related brain connectivity alterations: epilepsy and schizophrenia. We estimate connectivity from functional magnetic resonance imaging and electrophysiology data, employ Persistent Homology and quantify its ability to distinguish healthy from diseased brain states by applying a support vector machine to features quantifying persistent homology structure. We show how this novel approach compares to classification using standard undirected approaches and original connectivity matrices. In the schizophrenia classification, topological data analysis generally performs close to random, while classifications from raw connectivity perform substantially better; potentially due to topographical, rather than topological, specificity of the differences. In the easier task of seizure discrimination from scalp electroencephalography data, classification based on persistent homology features generally reached comparable performance to using raw connectivity, albeit with typically smaller accuracies obtained for the directed (effective) connectivity compared to the undirected (functional) connectivity. Specific applications for topological data analysis may open when direct comparison of connectivity matrices is unsuitable - such as for intracranial electrophysiology with individual number and location of measurements. While standard homology performed overall better than directed homology, this could be due to notorious technical problems of accurate effective connectivity estimation.

Trvalý link: <http://hdl.handle.net/11104/0320658>

0543376 - ÚI 2022 eng A - Abstrakt

Morrone, D. - Unverdorben, M. - Chen, C. - Dinshaw, L. - Jiang, W. - Kim, Y. H. - Kirchhof, P. - Koretsune, Y. - Pecun, Ladislav - Reimitz, P. E. - Wang, C. C. - Yamashita, T. - De Caterina, R.

Low bleeding and stroke rates with minor age-dependent increase confirm the safety and effectiveness of edoxaban in patients with atrial fibrillation across age groups: Two-year results from ETNA-AF.

Europace. Roč. 23, Suppl. 3 (2021), euab116.272. ISSN 1099-5129

Institucionální podpora: RVO:67985807

[DOI: 10.1093/europace/euab116.272](https://doi.org/10.1093/europace/euab116.272)

Funding Acknowledgements. Type of funding sources: Private company. Main funding source(s): Daiichi Sankyo. Background. Age is a risk factor for ischemic stroke and bleeding in patients with atrial fibrillation (AF). The large dataset from the global prospective, noninterventional ETNA-AF program allows for analysis of the impact of age on clinical events in AF patients treated with edoxaban. Purpose. Evaluate the safety and effectiveness of edoxaban by age subgroups and the impact of age on clinical events. Methods. Baseline patient characteristics, thromboembolic and bleeding events, and mortality data were collected from patients with 2-year follow-up in ETNA-AF program and analyzed in defined age subgroups. Cox regression analysis was conducted using age as a continuous variable and clinical events as outcome variables. Results. A total of 27,617 patients were categorized into four age subgroups: <65, 65-74, 75-84 and ≥85 years. Patient demographics and baseline characteristics are shown in the Table. Percentage of male, mean body weight, and mean creatinine clearance decreased with age, whereas percentages of patients with heart failure, patients on reduced dose edoxaban 30 mg, mean stroke and bleeding risk scores increased with age. The annualized rates of ischemic stroke and major bleeding increased with age, yet remained low. Importantly, the rate of intracranial hemorrhage was low across age groups, including the ≥85 years group. The hazard ratio (HR) for ischemic stroke was 1.041 (95%CI 1.028-1.053), ie. with a 1-year increase in age, the risk of ischemic stroke increased by 4.1%. The HRs for other clinical events were: major bleeding 1.044 (95%CI 1.033-1.055), intracranial hemorrhage 1.027 (95%CI 1.007-1.046), major gastrointestinal bleeding 1.065 (95%CI 1.048-1.081), all-cause mortality 1.086 (95%CI 1.079-1.093). Conclusion. Two-year

follow-up data from the global ETNA-AF program support the use of edoxaban as a safe and effective treatment for AF patients across all age groups, including the very elderly, in routine clinical care. The impact of age on the risk of ICH was smaller than that of ischemic stroke and major bleeding.

Trvalý link: <http://hdl.handle.net/11104/0320588>

0543375 - ÚI 2022 eng A - Abstrakt

Dinshaw, L. - Unverdorben, M. - Chen, C. - De Caterina, R. - Jiang, W. - Kim, Y. H. - Koretsune, Y. - Pecen, Ladislav - Morrone, D. - Reimitz, P. E. - Wang, C. C. - Yamashita, T. - Kirchhof, P.

Annualized clinical event rates during two-year follow-up are low in 27,617 atrial fibrillation patients on edoxaban: results from the global noninterventional ETNA-AF program.

Europace. Roč. 23, Suppl. 3 (2021), euab116.273. ISSN 1099-5129

Institucionální podpora: RVO:67985807

[DOI: 10.1093/europace/euab116.273](https://doi.org/10.1093/europace/euab116.273)

Funding Acknowledgements: Type of funding sources: Private company. Main funding source(s): Daiichi Sankyo. Background and Purpose: The large global Edoxaban Treatment in routine clinical practice (ETNA)-AF program was designed to assess the safety and effectiveness of edoxaban, complementing randomized clinical trials. Methods: ETNA collects data on patient characteristics and clinical events in unselected AF patients treated with edoxaban for stroke prevention, integrating data from prospective, noninterventional studies conducted in Europe, Japan, South Korea, and Taiwan. Results: The 2-year follow-up analysis included 27,617 patients, the majority of whom (82.6%) received the recommended dose according to the local label. At baseline, the mean age was 73.6 ± 9.8 years and 58.1% were male. Half of the patients (50.5%) were 75 years or older. The CHA2DS2-VASc score was 3.3 ± 1.5 , and the modified HAS-BLED score was 2.4 ± 1.1 . The rate of ischemic stroke was 0.74%/yr, major bleeding 1.02%/yr, intracranial hemorrhage 0.29%/yr, and major gastrointestinal (GI) bleeding 0.51%/yr. All-cause mortality was 3.13%/yr, and cardiovascular (CV) mortality 1.45%/yr (see Table). Conclusion: The rates of ischemic stroke and major bleeding events remained low globally and across regions during the two-year follow-up period in AF patients treated with edoxaban.

Trvalý link: <http://hdl.handle.net/11104/0320587>

0543363 - ÚI 2022 RIV US eng C - Konferenční příspěvek (zahraniční konf.)

Daniel, Milan - Dostál, R. - Kozhevnikov, S. - Matysková, A. - Moudrá, K. - Maia Pereira, A. - Příbyl, O.

City Simulation Software: Perspective of Mobility Modelling.

Smart City Symposium Prague 2021. IEEE Proceedings. Piscataway: IEEE, 2021 - (Růžička, J.), s. 1-7. ISBN 978-1-6654-1524-8.

[SCSP 2021: Smart City Symposium Prague. Prague (CZ), 27.05.2021-28.05.2021]

Grant CEP: GA TA ČR(CZ) TN01000024

Institucionální podpora: RVO:67985807

Klíčová slova: Eclipse SUMO * Energy * Environment * Environmental modelling * Integrated Urban Development * Mobility * PALM modelling system * Urbanism * Smart City

Kód oboru RIV: IN - Informatika

Obor OECD: Computer sciences, information science, bioinformatics (hardware development to be 2.2, social aspect to be 5.8)

[DOI: 10.1109/SCSP52043.2021.9447384](https://doi.org/10.1109/SCSP52043.2021.9447384)

The field of smart cities and the latest problems in this area of expertise accent the need for interaction among different areas, such as transportation, energy management, education, buildings and others. New technologies and new methods allow for a fast development of each of the areas and of the city itself. At the same time, there is a need for further involvement of citizens and different stakeholders in the decision-making process within cities. In order to demonstrate the impact of a new policy (e.g., building a new shopping center) on certain city aspect (e.g., transportation), simulation models have been recognized as probably the best approach. Unfortunately, there is still no tool that would allow the stakeholders to evaluate the impact of such a policy on a city as a whole and from multiple perspectives. Dedicated simulation frameworks should be used in cooperation, one for transportation, one for energy grid management, another for its impact on the environment until all important aspects are covered. This paper describes a complex tool aiming on overcoming such complicated demands and giving the policy makers one tool to assess impact on different interconnected fields. It combines existing dedicated simulation frameworks into a complete software suite that can combine even contradictory results into one or more performance indicators. This can

be used as a decision support system and help in involving citizens into the city government and planning. This article focuses on the utilization of mobility modelling in such a software.

Trvalý link: <http://hdl.handle.net/11104/0320581>

0543241 - ÚI 2022 NL eng J - Článek v odborném periodiku

Klein, D. - Majer, Ondrej - Rad, S. R.

Probabilities with Gaps and Gluts.

Journal of Philosophical Logic. Online May 2021 (2021). ISSN 0022-3611

Grant CEP: GA ČR(CZ) GA18-00113S

Institucionální podpora: RVO:67985807

Klíčová slova: Belnap-Dunn logic * First Degree Entailment * Non-standard probability theory *

Probability theory * Bayes' updating * Jeffrey updating * Probability aggregation

<http://dx.doi.org/10.1007/s10992-021-09592-x>

[DOI: 10.1007/s10992-021-09592-x](https://doi.org/10.1007/s10992-021-09592-x)

Belnap-Dunn logic (BD), sometimes also known as First Degree Entailment, is a four-valued propositional logic that complements the classical truth values of True and False with two non-classical truth values Neither and Both. The latter two are to account for the possibility of the available information being incomplete or providing contradictory evidence. In this paper, we present a probabilistic extension of BD that permits agents to have probabilistic beliefs about the truth and falsity of a proposition. We provide a sound and complete axiomatization for the framework defined and also identify policies for conditionalization and aggregation. Concretely, we introduce four-valued equivalents of Bayes' and Jeffrey updating and also suggest mechanisms for aggregating information from different sources.

Trvalý link: <http://hdl.handle.net/11104/0320492>

0543168 - ÚI 2022 DE eng J - Článek v odborném periodiku

Kůrková, Věra - Sanguineti, M.

Correlations of Random Classifiers on Large Data Sets.

Soft Computing. Online First June 2021 (2021). ISSN 1432-7643

Klíčová slova: Random classifiers * Optimization of feedforward networks * Binary classification *

Concentration of measure * Method of bounded differences

Impakt faktor: 3.050, rok: 2019

[DOI: 10.1007/s00500-021-05938-4](https://doi.org/10.1007/s00500-021-05938-4)

Classification of large data sets by feedforward neural networks is investigated. To deal with unmanageably large sets of classification tasks, a probabilistic model of their relevance is considered. Optimization of networks computing randomly chosen classifiers is studied in terms of correlations of classifiers with network input-output functions. Effects of increasing sizes of sets of data to be classified are analyzed using geometrical properties of high-dimensional spaces. Their consequences on concentrations of values of sufficiently smooth functions of random variables around their mean values are applied. It is shown that the critical factor for suitability of a class of networks for computing randomly chosen classifiers is the maximum of sizes of the mean values of their correlations with network input-output functions. To include cases in which function values are not independent, the method of bounded differences is exploited.

Trvalý link: <http://hdl.handle.net/11104/0320443>

0543166 - ÚI 2022 BG eng A - Abstrakt

Matonoha, Ctirad - Moskovka, A. - Valdman, Jan

Minimization of Energy Functionals via the Finite Element Method in MATLAB.

Large-Scale Scientific Computations LSSC'21. Scientific Program, Abstracts, List of

Participants. Sozopol: Institute of Information and Communication Technologies, Bulgarian Academy of Sciences, 2021. s. 61-62.

[LSSC 2021: International Conference on Large-Scale Scientific Computations /13./ 07.06.2021-11.06.2021, Sozopol]

Institucionální podpora: RVO:67985807

<http://parallel.bas.bg/Conferences/SciCom21/lssc21.pdf>

Many problems in science and engineering have their mathematical formulation which leads to solving an operator equation $Au = f$, $u \in M$, $f \in H$, (1) where H is a Hilbert (or Banach) space, M is a subspace of H , u is a solution of (1) and A is an operator on M . In particular, we will focus on differential operators. There are a lot of methods for solving (1) and one of them is the so called

variational approach which is based on finding the minimum of corresponding energy functional. In our text we represent the variational principle for solving some particular problems using a finite elements method (FEM) for discretization of energy functionals. Minimization procedures of energy functionals require the knowledge of a gradient. If an exact gradient form is not available or difficult to compute, a numerical approximation can be assembled locally. The key feature is the sparsity of Hessian matrix which significantly affects the time and memory demands of evaluations

Trvalý link: <http://hdl.handle.net/11104/0320442>

0543163 - ÚI 2022 RIV GB eng J - Článek v odborném periodiku

Goldhaber, D. - Grout, C. - Wolff, M. - Martinková, Patrícia

Evidence on the Dimensionality and Reliability of Professional References' Ratings of Teacher Applicants.

Economics of Education Review. Roč. 83, August 2021 (2021), č. článku 102130. ISSN 0272-7757

Grant CEP: GA ČR(CZ) GA21-03658S

Institucionální podpora: RVO:67985807

Klíčová slova: Educational economics * Human capital * Teacher hiring

Kód oboru RIV: BB - Aplikovaná statistika, operační výzkum

Obor OECD: Statistics and probability

Impakt faktor: 1.354, rok: 2019

<http://dx.doi.org/10.1016/j.econedurev.2021.102130>

[DOI: 10.1016/j.econedurev.2021.102130](https://doi.org/10.1016/j.econedurev.2021.102130)

There is growing interest in using measures of teacher applicant quality to improve hiring decisions, but the statistical properties of such measures are not well understood. We use unique data on structured ratings solicited from the references of teacher applicants to explore the dimensionality of measures of teacher applicant quality and the inter-rater reliability of the reference ratings. Despite questions about applicants designed to capture multiple dimensions of quality, factor analysis suggests that the reference ratings only capture one underlying dimension. Point estimates of inter-rater reliability range between 0.23 and 0.31 and are significantly lower for novice applicants. It is difficult to judge whether these levels of reliability are high or low in the current context given so little evidence on applicant assessment tools.

Trvalý link: <http://hdl.handle.net/11104/0320440>

0543145 - MÚ 2022 RIV US eng J - Článek v odborném periodiku

Hladký, Jan - Pelekis, Christos - Šileikis, Matas

A limit theorem for small cliques in inhomogeneous random graphs.

Journal of Graph Theory. Roč. 97, č. 4 (2021), s. 578-599. ISSN 0364-9024

Grant CEP: GA ČR(CZ) GJ18-01472Y; GA ČR GJ16-07822Y; GA ČR(CZ) GA19-08740S; GA ČR(CZ) GJ20-27757Y

Institucionální podpora: RVO:67985840 ; RVO:67985807

Klíčová slova: inhomogeneous random graphs * subgraphs * graph limits

Kód oboru RIV: BA - Obecná matematika; BA - Obecná matematika (UIVT-O)

Obor OECD: Pure mathematics; Pure mathematics (UIVT-O)

Impakt faktor: 0.922, rok: 2019

<https://doi.org/10.1002/jgt.22673>

[DOI: 10.1002/jgt.22673](https://doi.org/10.1002/jgt.22673)

The theory of graphons comes with a natural sampling procedure, which results in an inhomogeneous variant of the Erdős–Rényi random graph, called W -random graphs. We prove, via the method of moments, a limit theorem for the number of r -cliques in such random graphs. We show that, whereas in the case of dense Erdős–Rényi random graphs the fluctuations are normal of order $n^{\{r-1\}}$, the fluctuations in the setting of W -random graphs may be of order $0, n^{\{r-1\}}$, or $n^{\{r-0.5\}}$. Furthermore, when the fluctuations are of order $n^{\{r-0.5\}}$ they are normal, while when the fluctuations are of order $n^{\{r-1\}}$ they exhibit either normal or a particular type of chi-square behavior whose parameters relate to spectral properties of W . These results can also be deduced from a general setting, based on the projection method. In addition to providing alternative proofs, our approach makes direct links to the theory of graphons.

Trvalý link: <http://hdl.handle.net/11104/0320425>

0543069 - ÚI 2022 CZ cze E - Elektronický dokument

Katina, Stanislav - Krátká, Z.

Proč používat antigenní testy u lékaře, ale ne při plošném testování?

Praha: ProLekare.cz, 24. 3. 2021

Institucionální podpora: RVO:67985807

Klíčová slova: covid 19 * antigenní testy

<https://www.prolekare.cz/covid-19/proc-pouzivat-antigenni-testy-u-lekare-ale-ne-pri-plosnem-testovani-126420>

Proč antigenní test umožňuje poměrně úspěšně potvrdit infekci koronavirem u pacienta testovaného dobře zaškolenými zdravotníky a proč naopak odborníci nedoporučují využití antigenních testů v plošném měřítku, například ve školách. Z čeho mají obavy? Na celou problematiku se podíváme z pohledu matematických zákonitostí i klinické praxe a reality.

Trvalý link: <http://hdl.handle.net/11104/0320368>

0543068 - ÚI 2022 CZ cze E - Elektronický dokument

Katina, Stanislav - Krátká, Z.

Jsou děti významnými šířiteli koronavirové infekce, nebo se jedná o mýtus?

Praha: ProLekare.cz, 8. 4. 2021

Institucionální podpora: RVO:67985807

Klíčová slova: covid 19 * děti

<https://www.prolekare.cz/covid-19/jsou-deti-vyznamnymi-siriteli-koronavirove-infekce-nebo-se-jedna-o-mytus-126622>

Koronavirová epidemie omezila přístup ke vzdělání jednomu a čtvrt milionu dětí v Česku již ve dvou školních rocích. Smyslem zavedení distanční výuky bylo zamezit šíření infekce populací, ale při zavádění těchto opatření se nebere zřetel na publikované vědecké studie sledující infekčnost dětí. Cílem tohoto sdělení je upozornit jednak na první českou epidemiologickou studii provedenou u dětí a mladé populace, a zároveň na zahraniční práce, jež se této tématice věnují.

Trvalý link: <http://hdl.handle.net/11104/0320367>