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<b>Titul (v originále):</b>	Explainable Machine Learning for Intrusion Detection
<b>Rok publikace:</b>	2024
<b>Autor:</b>	Sameh Bellegdi (Prac.:)
<b>Autor:</b>	Ali Bin Selamat (Prac.: CZAV, DěkfIM)
<b>Autor:</b>	O. Olatunji (Prac.:)
<b>Autor:</b>	Hamido Fujita (Prac.:)
<b>Autor:</b>	Ondřej Krejcar (Prac.: KIT)
<b>Název zdroje:</b>	Lecture Notes in Artificial Intelligence, Theory and Applications
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<b>e-ISBN:</b>	
<b>Strany:</b>	122-134
<b>Abstrakt orig.:</b>	<p>Intrusion detection systems (IDS) are essential tools to maintain robust cybersecurity. Machine learning (ML)-based IDS provides promising results. However, such IDS are recognized as black-box and lack trust and transparency. There is a limited number of explainable IDS (X-IDS). Moreover, several X-IDS used outdated datasets. Some papers used deep neural network which is computationally expensive. This paper proposes lightweight tree-based X-IDS using a recent IDS dataset. We explore the effectiveness of explainable artificial intelligence (XAI) techniques in increasing ML-based IDS transparency. Four ML algorithms are employed; viz. LightGBM, random forests, AdaBoost, and XGBoost; to classify a given network flow as benign or malicious. Network flows extracted from the CSE-CIC-IDS2018 dataset are used to evaluate the IDS models. The best F1-score results of 0.979 and 0.978 are achieved with LightGBM and XGBoost, respectively. We use SHapley Additive exPlanations (SHAP) and Local Model-Agnostic Explanations (LIME) techniques to provide global and local explanations for predictions made by the LightGBM. The obtained explanations in the form of graphs provide measurable insights for cybersecurity experts regarding the most important features that impact the detection of intrusions.</p>
<b>Počet stran:</b>	13
<b>Médium:</b>	PO
<b>Odkazy:</b>	<a href="https://link.springer.com/book/10.1007/978-981-97-4677-4">https://link.springer.com/book/10.1007/978-981-97-4677-4</a>
<b>Hlavní klíč:</b>	intrusion detection; IDS; machine learning; explainable; achine learning; XAI; SHAP; LIME
<b>Jazyk (originál):</b>	angličtina (eng)
<b>Titul anglicky:</b>	Explainable Machine Learning for Intrusion Detection
<b>Datum konání:</b>	10.07.2024
<b>Datum vložení:</b>	17.07.2024
<b>Financování:</b>	S -

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<b>Titul (v originále):</b>	Fog-Based Ransomware Detection for Internet of Medical Things Using Lighweight Machine Learning Algorithms
<b>Rok publikace:</b>	2024
<b>Autor:</b>	Ras Elisa Harzie (Prac.:)
<b>Autor:</b>	Ali Bin Selamat (Prac.: CZAV, DěkfIM)
<b>Autor:</b>	Hamido Fujita (Prac.:)
<b>Autor:</b>	Ondřej Krejcar (Prac.: KIT)
<b>Autor:</b>	Shilan Hameed (Prac.:)
<b>Autor:</b>	Nguyet Quang Do (Prac.:)
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<b>Strany:</b>	200-211
<b>Abstrakt orig.:</b>	Instances of severe cyber threats such as aggressive attacks, malware, and ransomware have been causing significant harm to computer systems, servers, and various applications across diverse industries and enterprises. These security issues are of paramount importance and require immediate attention. To address these concerns, it is crucial to detect and classify ransomware effectively for prompt response and prevention. This research employs deep learning algorithms to achieve this goal by applying three methods which are DNN, LSTM and Bi-LSTM. The approach involves analyzing the behavior patterns of ransomware and identifying distinctive features that can differentiate between various types of ransomware families. The performance of the models is assessed using a dataset containing instances of ransomware attacks, demonstrating their capability to accurately detect and classify ransomware. Essentially, the study aims to enhance cybersecurity measures by leveraging advanced techniques in artificial intelligence to combat the growing threats posed by ransomware attacks.
<b>Počet stran:</b>	12
<b>Médium:</b>	PO
<b>Odkazy:</b>	<a href="https://link.springer.com/chapter/10.1007/978-981-97-4677-4_17">https://link.springer.com/chapter/10.1007/978-981-97-4677-4_17</a>
<b>Hlavní klíč:</b>	Fog Computing; Deep Learning; DNN; LSTM; Bi-LSTM; Ransomware Detection; Malware Detection
<b>Jazyk (originál):</b>	angličtina (eng)
<b>Titul anglicky:</b>	Fog-Based Ransomware Detection for Internet of Medical Things Using Lighweight Machine Learning Algorithms
<b>Datum konání:</b>	10.07.2024
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<b>Stav:</b>	Přijatý
<b>Literární forma:</b>	J_ČLÁNEK V ODBORNÉM PERIODIKU
<b>Rozšíření LiF:</b>	Jimp
<b>Titul (v originále):</b>	An integrated model based on deep learning classifiers and pre-trained transformer for phishing detection
<b>Rok publikace:</b>	2024
<b>Autor:</b>	N.Q. Do (Prac.:)
<b>Autor:</b>	Ali Bin Selamat (Prac.: CZAV)
<b>Autor:</b>	H. Fujita (Prac.:)
<b>Autor:</b>	Ondřej Krejcar (Prac.: CZAV)
<b>Název zdroje:</b>	Future Generation Computer Systems
<b>Místo publikace:</b>	Shannon
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<b>e-ISBN:</b>	
<b>Vydavatel:</b>	Elsevier
<b>Ročník:</b>	161
<b>Strany:</b>	269-285
<b>Abstrakt orig.:</b>	<p>The unique nature of website URLs has made phishing detection a challenging task. Unlike natural language, URLs have an unstructured nature with non-linear and sophisticated correlations. Therefore, they should be handled as both natural language and unstructured data sequences. However, the current solutions for phishing URL detection only focused on a single aspect of page URLs. In this concern, this paper proposes an integrated model based on DL classifiers and pre-trained transformer to examine both the unique nature and the natural language structure of URLs simultaneously. The proposed model consists of three modules: RasNet (Keras-ResNet), TCMA (TCN-MHSA), and MPNet (Masked and Permuted Pre-training for Language Understanding). Considering the unique nature of the input data, RasNet combines two Keras embedding techniques to obtain the feature representations of URLs and then fuses them using a Residual Network (ResNet) to balance the weight distribution among the character-level and word-level information. Additionally, TCMA integrates the Temporal Convolutional Network (TCN) and the Multi-Head Self-Attention (MHSA) mechanism to optimize feature extraction and improve classification accuracy. Concurrently, MPNet joins the advantages and eliminates the drawbacks of Masked Language Modelling and Permuted Language Modelling to examine the nature and structure of web page URLs. The proposed model was trained and tested on four different datasets including Ebbu2017, PhishCrawl, 420K-PD, and 1M-PD. The experimental results indicated that the proposed solution outperformed other models in classifying malicious URLs with the highest detection rate of 99.71% on the 1M-PD dataset, improving the performance accuracy of the state-of-the-art approaches by 1.37% to 2.01%. © 2024</p>
<b>Počet stran:</b>	17
<b>Odkazy:</b>	<a href="https://www.sciencedirect.com/science/article/pii/S0167739X24003315?via%3Dihub">https://www.sciencedirect.com/science/article/pii/S0167739X24003315?via%3Dihub</a>
<b>Hlavní klíč:</b>	Attention mechanism; Phishing detection; Residual network; Temporal convolutional network; Transformer model
<b>Jazyk (originál):</b>	angličtina (eng)
<b>Titul anglicky:</b>	An integrated model based on deep learning classifiers and pre-trained transformer for phishing detection
<b>Datum vložení:</b>	28.07.2024
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<b>Literární forma:</b>	J_ČLÁNEK V ODBORNÉM PERIODIKU
<b>Rozšíření LiF:</b>	Jimp
<b>Titul (v originále):</b>	Prediction Models for Type 2 Diabetes Progression: A Systematic Review
<b>Rok publikace:</b>	2024
<b>Autor:</b>	N.N.N. Nazirun (Prac.:)
<b>Autor:</b>	A.A. Wahab (Prac.:)
<b>Autor:</b>	Ali Bin Selamat (Prac.: CZAV)
<b>Autor:</b>	H. Fujita (Prac.:)
<b>Autor:</b>	Ondřej Krejcar (Prac.: KIT, CZAV)
<b>Autor:</b>	Kamil Kuča (Prac.: CZAV, DěKFIM)
<b>Autor:</b>	G.H. Seng (Prac.:)
<b>Název zdroje:</b>	IEEE Access
<b>Místo publikace:</b>	Piscataway
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<b>ISSN:</b>	2169-3536
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<b>Vydavatel:</b>	IEEE
<b>Ročník:</b>	12
<b>Strany:</b>	161595-161619
<b>Abstrakt orig.:</b>	<p>Diabetes, especially type 2 diabetes (T2D), is a chronic disease affecting millions of people worldwide. The increasing prevalence of T2D, coupled with the complex interplay between genetic, environmental, and lifestyle factors, presents a major challenge for effective disease management. The traditional methods for predicting T2D progression and determining appropriate treatment strategies are often subjective and less accurate, resulting in treatment delays. Therefore, artificial intelligence (AI) based prediction models become crucial, as they offer a more objective and data-driven approach to T2D management. By leveraging advanced statistical techniques and machine learning algorithms, AI-based prediction models can better identify patients at high risk for T2D progression and predict responses to different treatment options. This can ultimately lead to improved outcomes for patients suffering from T2D. Therefore, this paper aims to review the existing research articles published from 2018 to 2022 using a systematic literature review (SLR) approach. From 40 selected articles, a taxonomy of the most common techniques for developing a prediction model in diabetes progression is drawn in three approaches: mathematical, machine learning (ML), and deep learning (DL). In addition, the best practices of dataset characteristics, pre-processors, and evaluation metrics of the existing algorithms are also provided, focusing on the context of diabetes progression prediction. The findings found that the majority of the selected papers employed ML, specifically the RF model, proven to have superiority in performance. This review also discusses current challenges faced in building prediction models for diabetes progression and proposes future research directions to overcome these challenges. The promising directions drawn include 1) incorporating feature reduction or importance tools to explore the relationship between variables, 2) developing an interpretable predictive model to provide analytical results that are understandable to clinicians, and 3) validating the model with multiple large-sample size datasets and seeking clinical advice from experts. Authors</p>
<b>Počet stran:</b>	25
<b>Odkazy:</b>	<a href="https://ieeexplore.ieee.org/document/10606225/">https://ieeexplore.ieee.org/document/10606225/</a>
<b>Hlavní klíč:</b>	Artificial intelligence; artificial intelligence; Computational modeling; Diabetes; diabetes progression; Diseases; Medical diagnosis; Prediction model; Predictive models; Reviews; systematic review; Taxonomy; type 2 diabetes
<b>Jazyk (originál):</b>	angličtina (eng)
<b>Titul anglicky:</b>	Prediction Models for Type 2 Diabetes Progression: A Systematic Review
<b>Datum vložení:</b>	01.08.2024
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<b>Literární forma:</b>		J_ ČLÁNEK V ODBORNÉM PERIODIKU
<b>Rozšíření LiF:</b>		Jimp
<b>Titul (v originále):</b>		MD-DCNN: Multi-Scale Dilation-Based Deep Convolution Neural Network for epilepsy de using electroencephalogram signals
<b>Rok publikace:</b>		2024
<b>Autor:</b>		M. Karnati (Prac.:)
<b>Autor:</b>		G. Sahu (Prac.:)
<b>Autor:</b>		A. Yadav (Prac.:)
<b>Autor:</b>		Ayan Seal (Prac.: CZAV)
<b>Autor:</b>		J. Jaworek-Korjakowska (Prac.:)
<b>Autor:</b>		Marek Penhaker (Prac.:)
<b>Autor:</b>		Ondřej Krejcar (Prac.: CZAV)
<b>Název zdroje:</b>		Knowledge-based systems
<b>Místo publikace:</b>		Shannon
<b>Číslo/kód:</b>		October
<b>ISSN:</b>		0950-7051
<b>e-ISSN:</b>		1872-7409
<b>e-ISBN:</b>		
<b>Vydavatel:</b>		Elsevier
<b>Ročník:</b>		301
<b>Strany:</b>		"Article number: 112322"
<b>Abstrakt orig.:</b>	<p>Approximately 65 million individuals experience epilepsy globally. Surgery or medication cannot cure more than 3 epilepsy patients.However, through therapeutic intervention, anticipating a seizure can help us avoid it. According previous studies, aberrant activity inside the brain begins a few minutes before the onset of a seizure, known as a p state. Many researchers have attempted to anticipate the pre-ictal condition of a seizure; however, achieving high sensitivity and specificity remains challenging. Therefore, deep learning-based early diagnostic tools for epilepsy t using electroencephalogram (EEG) signals are urgently needed. Traditional methods perform well in binary epilep scenarios, such as normal vs. ictal, but poorly in ternary situations, such as ictal vs. normal vs. inter-ictal. This stud proposes a multi-scale dilated convolution-based network (MD-DCNN) to predict seizures or epilepsy. Traditional for epilepsy classification overfit due to insufficient training data (fewer subjects). Windowing 2-sec EEG recordin extracting the frequency sub-band from each window prevents overfitting in deep networks, which lack training da convert each segmented window and its sub-bands into scalogram images and input them into MD-DCNN. The pr MD-DCNN combines data from several scales without narrowing the acquisition domain. Integrating detailed info into high-level semantic features improves network interpretation and classification. The proposed MD-DCNN is e for two-class, three-class, and cross-database strategy problems using three publicly accessible databases. Experim show that the MD-DCNN statistically performs better than 13 other current approaches. This demonstrates its pote developing equipment capable of measuring, monitoring, and recording EEG signals to diagnose epilepsy. © 2024 B.V.</p>	
<b>Počet stran:</b>		16
<b>Poznámka:</b>		U autora Penhakera bylo požádáno o opravu afiliace na Scopus, kde je chybně uvedena i FIM
<b>Odkazy:</b>		<a href="https://www.sciencedirect.com/science/article/pii/S0950705124009560?via%3Dihub">https://www.sciencedirect.com/science/article/pii/S0950705124009560?via%3Dihub</a>
<b>Hlavní klíč:</b>		Brain-computer interface; Deep convolutional neural network; Electroencephalography; Epi disease
<b>Jazyk (originál):</b>		angličtina (eng)
<b>Titul anglicky:</b>		MD-DCNN: Multi-Scale Dilation-Based Deep Convolution Neural Network for epilepsy de using electroencephalogram signals
<b>Datum vložení:</b>		14.08.2024
<b>Financování:</b>		S -
<b>Financování:</b>		I -

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<b>Literární forma:</b>	D_ ČLÁNEK VE SBORNÍKU
<b>Rozšíření LiF:</b>	D_ Článek ve sborníku
<b>Titul (v originále):</b>	GCC Aware Glaucoma Detection Using Macula OCT Image Analysis Based on Deep CNN
<b>Rok publikace:</b>	2024
<b>Autor:</b>	H. Mekonen (Prac.:)
<b>Autor:</b>	T. Tadesse (Prac.:)
<b>Autor:</b>	Ondřej Krejcar (Prac.: CZAV)
<b>Autor:</b>	K. Abdella (Prac.:)
<b>Autor:</b>	D. Assefa (Prac.:)
<b>Název zdroje:</b>	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)
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<b>Ročník:</b>	14811 LNAI
<b>Strany:</b>	319-333
<b>Abstrakt orig.:</b>	<p>Glaucoma is a major public health challenge as it is the second leading cause of blindness next to cataract. Since vision loss caused by glaucoma is unrecoverable, an early, reliable diagnosis is desirable. Although complete eye examination is recommended for assessment of both structural and functional states of the disease, glaucomatous structural changes precede functional changes. Recently, classifying glaucomatous images taken from different modalities based on Deep Learning (DL) is increasingly being studied. Most of the researchers, however, focused on images generated from fundus camera and others on OCT scans taken from the optic nerve head (ONH). While others focused on specific information derived from the OCT machine itself including thickness and deviation maps of macular and ONH scans, and en-face images. However, the glaucomatous eye can be more effectively detected by analyzing the degeneration of the ganglion cell complex (GCC) by using original OCT complete scans as input. The current study used deep segmentation models to extract the GCC region which is composed of the retinal nerve fiber layer and ganglion cells with the inner plexiform layer. Convolutional Neural Network (CNN) based classifiers were used for detecting glaucomatous pathologies by paying attention to the GCC region of the macula Spectral Domain OCT (SD-OCT) scans. Model training and validation was carried out on a dataset composed of 1,262 locally acquired macula SD-OCT B-scans (432 non-glaucomatous and 830 glaucomatous) from four different regions of the macula: superior outside, inferior outside, inferior inside and central macula regions. Transfer learning was employed for segmentation as well as classifying the dataset. Three deep segmentation models, namely SegNet, PSPNet, and RAG-Netv2 were employed for segmentation and five CNN models, namely VGG16, VGG19, ResNet50, EfficientNetV1 and InceptionV3 were used for classification purpose. SegNet showed the best performance for retina layer segmentation with 97.89% accuracy, 87.0% recall, 87.5% F1-score, 88.0% precision, 89.0% mean dice coefficient, and 81.0% mean_IOU. In terms of classification of glaucomatous and normal images, the maximum accuracy of 94.3% was obtained using VGG16 computed on the superior outside macula region, with 93.3% precision, 91.7% recall, 91.8% F1-score and 91.7% AUC. The study demonstrated that using GCC aware DL model based on macular B-scans shows great promise in the accurate screening of glaucoma and suggests that incorporating DL into macula SD-OCT for glaucoma assessment has the potential to fill some gaps in current practices and clinical workflow. To the best of our knowledge, such a DL scheme that considers the effect of the different GCC regions for the purpose of glaucoma screening hasn't been reported in the literature before. © The Author(s), under exclusive license to Springer Nature Switzerland AG 2024.</p>
<b>Počet stran:</b>	15
<b>Médium:</b>	PO
<b>Odkazy:</b>	<a href="https://link.springer.com/chapter/10.1007/978-3-031-70819-0_25">https://link.springer.com/chapter/10.1007/978-3-031-70819-0_25</a>
<b>Hlavní klíč:</b>	Deep Learning; Ganglion Cell Complex; Glaucoma; Optical Coherence Tomography; Retinal Nerve Fiber Layers
<b>Jazyk (originál):</b>	angličtina (eng)
<b>Datum konání:</b>	09.09.2024
<b>Datum vložení:</b>	28.09.2024
<b>Financování:</b>	S -

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<b>Literární forma:</b>	J_ČLÁNEK V ODBORNÉM PERIODIKU
<b>Rozšíření LiF:</b>	Jimp
<b>Titul (v originále):</b>	Advancements in High-Performance Computing in Early Diagnosis of Alzheimer's Disease: A Systematic Review
<b>Rok publikace:</b>	2024
<b>Autor:</b>	Ayca Kirimtat (Prac.: DěkFIM)
<b>Autor:</b>	Ondřej Krejcar (Prac.: CZAV)
<b>Autor:</b>	Petra Marešová (Prac.: KE)
<b>Autor:</b>	Ali Bin Selamat (Prac.: CZAV)
<b>Autor:</b>	Kamil Kuča (Prac.: KCh)
<b>Název zdroje:</b>	IEEE Access
<b>Místo publikace:</b>	Piscataway
<b>Číslo/kód:</b>	November
<b>ISSN:</b>	2169-3536
<b>e-ISSN:</b>	2169-3536
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<b>Vydavatel:</b>	IEEE
<b>Ročník:</b>	12
<b>Strany:</b>	156492-156504
<b>Abstrakt orig.:</b>	<p>Background: The key histopathological features of Alzheimer's disease (AD) include extensive brain shrinkage and amyloid plaques made up of amyloid beta (A<math>\beta</math>) deposition, as well as neurofibrillary tangles (NFTs) made up of hyperphosphorylated microtubule-associated Tau protein. The existence of AD is primarily a complicated biological and neurodegenerative illness, and various computer modeling techniques to overcome the complexity of the disease are needed. Moreover, the study of brain disorders, large-scale brain models, or connectomes, depends heavily on high-performance computing (HPC).</p> <p>Objectives: This systematic review intends to answer five key questions about the function of the HPC in the early diagnosis of the AD, as the best contender for dealing with the high-dimensional problems. This review also intends to review the previous articles on the HPC for the early diagnosis of the AD and the computational performance solutions in the literature, which could be used for increasing the diagnostic speed and the research output. Methods: The previous articles on the topic are found using the following search codes: ALL= ("parallel processing"AND "Alzheimer's disease"OR "high performance computing"AND "Alzheimer's disease"OR "parallel computing"AND "Alzheimer's disease"OR "parallel processing"AND "Alzheimer"OR "high performance computing"AND "Alzheimer"OR "parallel computing"AND "Alzheimer") between the years 2014 and 2023. The scientific literature analysis based on the visualizations is conducted using the VOSviewer program. Using both the inclusion and exclusion criteria, 298 results, which include 196 open access papers, 71 papers with enriched cited references and 12 review articles, are analyzed. Results: According to the findings of the classifications, AD is the most frequent cause of dementia globally, and there is currently no specific therapy that slows its course. However, the HPC could provide some rapid computations of various modeling methodologies, allowing each aspect of the brain to be seen. Some institutes are attempting to simulate prospective remedies for the disease. Conclusion: Various approaches are integrated to be utilized in the literature with the help of the HPC in this review, and to enlighten readers about the current status of the HPC technologies for the early detection and treatment of the AD across the world. The high-performance algorithms and approaches for the AD are major scientific challenges that may encounter several issues as well. © 2013 IEEE.</p>
<b>Počet stran:</b>	13
<b>Médium:</b>	O
<b>Odkazy:</b>	<a href="https://ieeexplore.ieee.org/document/10731686">https://ieeexplore.ieee.org/document/10731686</a>
<b>Hlavní klíč:</b>	Alzheimer's disease; diagnosis; high-performance computing; review; synapse loss
<b>Jazyk (originál):</b>	angličtina (eng)
<b>Titul anglicky:</b>	Advancements in High-Performance Computing in Early Diagnosis of Alzheimer's Disease: A Systematic Review
<b>Datum vložení:</b>	08.11.2024
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<b>Stav:</b>	Přijatý
<b>Literární forma:</b>	D_ČLÁNEK VE SBORNÍKU
<b>Rozšíření LiF:</b>	D_Článek ve sborníku
<b>Titul (v originále):</b>	Proposal of an Algorithm for Predicting the Potential of a Photovoltaic System
<b>Rok publikace:</b>	2024
<b>Autor:</b>	I. Bridova (Prac.:)
<b>Autor:</b>	P. Brida (Prac.:)
<b>Autor:</b>	M. Moravcik (Prac.:)
<b>Autor:</b>	Ondřej Krejcar (Prac.: CZAV)
<b>Název zdroje:</b>	10th 2024 International Conference on Control, Decision and Information Technologies, CoDIT 2024
<b>Místo publikace:</b>	"Neuvedeno"
<b>ISSN:</b>	2576-3547
<b>ISBN:</b>	979-8-3503-7397-4
<b>e-ISSN:</b>	2576-3555
<b>e-ISBN:</b>	
<b>Strany:</b>	272-277
<b>Abstrakt orig.:</b>	The article presents a proposal of an algorithm for predicting the energy potential of a photovoltaic system. After a thorough study of real data on the amount of energy produced for the year 2022 from the photovoltaic system and meteorological data for the monitored period, a methodology for the design of a predictive solution algorithm was proposed, and subsequently the algorithm itself was developed to predict the amount of energy produced depending on meteorological data. © 2024 IEEE.
<b>Počet stran:</b>	6
<b>Médium:</b>	PO
<b>Poznámka:</b>	Bez indexace na WOS.
<b>Odkazy:</b>	<a href="https://ieeexplore.ieee.org/document/10708588">https://ieeexplore.ieee.org/document/10708588</a>
<b>Hlavní klíč:</b>	Photovoltaic systems;Renewable energy sources;Accuracy;Urban areas;Weather forecasting;Wind power generation;Prediction algorithms;Proposals;Information technology;Monitoring
<b>Jazyk (originál):</b>	angličtina (eng)
<b>Titul anglicky:</b>	Proposal of an Algorithm for Predicting the Potential of a Photovoltaic System
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<b>Autor:</b>	N.Q. Do (Prac.:)
<b>Autor:</b>	Ali Bin Selamat (Prac.: CZAV)
<b>Autor:</b>	Ondřej Krejcar (Prac.: CZAV)
<b>Autor:</b>	Hamido Fujita (Prac.: CPT)
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