

Recognition Of Sleep Stages Based On A Combined Neural

The four-volume set LNCS 11334-11337 constitutes the proceedings of the 18th International Conference on Algorithms and Architectures for Parallel Processing, ICA3PP 2018, held in Guangzhou, China, in November 2018. The 141 full and 50 short papers presented were carefully reviewed and selected from numerous submissions. The papers are organized in topical sections on Distributed and Parallel Computing; High Performance Computing; Big Data and Information Processing; Internet of Things and Cloud Computing; and Security and Privacy in Computing. Cognitive Informatics, Computer Modelling, and Cognitive Science: Theory, Case Studies, and Applications presents the theoretical background and history of cognitive science to help readers understand its foundations, philosophical and psychological aspects, and applications in a wide range of engineering and computer science case studies. Cognitive science, a cognitive model of the brain, knowledge representation, and information processing in the human brain are discussed, as is the theory of consciousness, neuroscience,

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intelligence, decision-making, mind and behavior analysis, and the various ways cognitive computing is used for information manipulation, processing and decision-making. Mathematical and computational models, structures and processes of the human brain are also covered, along with advances in machine learning, artificial intelligence, cognitive knowledge base, deep learning, cognitive image processing and suitable data analytics.

This Edited Volume gathers a selection of refereed and revised papers originally presented at the Third International Symposium on Signal Processing and Intelligent Recognition Systems (SIRS'17), held on September 13–16, 2017 in Manipal, India. The papers offer stimulating insights into biometrics, digital watermarking, recognition systems, image and video processing, signal and speech processing, pattern recognition, machine learning and knowledge-based systems. Taken together, they offer a valuable resource for all researchers and scientists engaged in the various fields of signal processing and related areas. Established in 1982 as the leading reference on electroencephalography, Drs. Niedermeyer's and Lopes da Silva's text is

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now in its thoroughly updated Fifth Edition. An international group of experts provides comprehensive coverage of the neurophysiologic and technical aspects of EEG, evoked potentials, and magnetoencephalography, as well as the clinical applications of these studies in neonates, infants, children, adults, and older adults. This edition includes digital EEG and advances in areas such as neurocognition. Three new chapters cover the topics of Ultra-Fast EEG Frequencies, Ultra-Slow Activity, and Cortico-Muscular Coherence. Hundreds of EEG tracings and other illustrations complement the text.

Advances in Computing and Data Sciences
Sport and the Brain: The Science of Preparing, Enduring and Winning, Part B
Volume 1: Theory, Case Studies, and Applications

Knowledge Management in Organizations
Fuzzy Mathematical Analysis and Advances in Computational Mathematics

23rd International Conference, BIS 2020, Colorado Springs, CO, USA, June 8–10, 2020, Proceedings

Image Analysis and Recognition

This edited volume on machine learning and big data analytics (Proceedings of ICMLBDA 2021) is intended to be used as a reference book for researchers and practitioners in the disciplines of computer science,

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electronics and telecommunication, information science, and electrical engineering. Machine learning and Big data analytics represent a key ingredients in the industrial applications for new products and services. Big data analytics applies machine learning for predictions by examining large and varied data sets—i.e., big data—to uncover hidden patterns, unknown correlations, market trends, customer preferences, and other useful information that can help organizations make more informed business decisions.

The leading reference on electroencephalography since 1982, Niedermeyer's *Electroencephalography* is now in its thoroughly updated Sixth Edition. An international group of experts provides comprehensive coverage of the neurophysiologic and technical aspects of EEG, evoked potentials, and magnetoencephalography, as well as the clinical applications of these studies in neonates, infants, children, adults, and older adults. This edition's new lead editor, Donald Schomer, MD, has updated the technical information and added a major new chapter on artifacts. Other highlights include complete coverage of EEG in the intensive care unit and new chapters on integrating other recording devices with EEG; transcranial electrical and magnetic stimulation; EEG/TMS in evaluation of cognitive and mood disorders; and sleep in premature infants, children and adolescents, and the elderly. A companion website includes fully searchable text and image bank. EEG signal processing is one of the hottest areas of

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research in digital signal processing applications and biomedical research. Analysis of EEG signals provides a crucial tool for diagnosis of neurobiological diseases. The problem of EEG signal classification into different sleep stages is primarily a pattern recognition problem using extracted features. Many methods of feature extraction have been applied to extract the relevant characteristics from a given EEG data. The EEG data was collected from publicly available source. The data consists of different age male & female recordings for a whole night of 8 hrs. The feature extraction was done by computing the Discrete Wavelet Transform and ANN using BP algorithm. The wavelet transform coefficients compress the number of data points into few features. The Approximation & Detailed coefficients obtained from Sub-band coding method provide important features of the EEG signals. In this project we have applied optimization techniques to reduce the computation complexity of the network without affecting the accuracy of the classification. Classification of the EEG data using neural network provides robust and improved Performance

The book shows how the various paradigms of computational intelligence, employed either singly or in combination, can produce an effective structure for obtaining often vital information from ECG signals. The text is self-contained, addressing concepts, methodology, algorithms, and case studies and applications, providing the reader with the necessary background augmented with step-by-step explanation of the more advanced concepts. It is structured in

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three parts: Part I covers the fundamental ideas of computational intelligence together with the relevant principles of data acquisition, morphology and use in diagnosis; Part II deals with techniques and models of computational intelligence that are suitable for signal processing; and Part III details ECG system-diagnostic interpretation and knowledge acquisition architectures. Illustrative material includes: brief numerical experiments; detailed schemes, exercises and more advanced problems.

Adaptive Processing of Brain Signals

Advances in Mechanical Engineering

Cognitive Informatics, Computer Modelling, and Cognitive Science

Proceedings of SocProS 2020, Volume 1

A Comprehensive Framework of Computational Intelligence

Business Information Systems

Proceedings of International Conference on

Computational Intelligence and Data Engineering

This volume presents the proceedings of the Fourth International Conference on the Development of Biomedical Engineering in Vietnam which was held in Ho Chi Minh City as a Mega-conference. It is kicked off by the Regenerative Medicine Conference with the theme "BUILDING A FACE" USING A REGENERATIVE MEDICINE APPROACH", endorsed mainly by the Tissue Engineering and Regenerative Medicine International Society (TERMIS). It is followed by the Computational Medicine Conference, endorsed mainly by the Computational Surgery International Network (COSINE) and the Computational Molecular Medicine

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of German National Funding Agency; and the General Biomedical Engineering Conference, endorsed mainly by the International Federation for Medical and Biological Engineering (IFMBE). It featured the contributions of 435 scientists from 30 countries, including: Australia, Austria, Belgium, Canada, China, Finland, France, Germany, Hungary, India, Iran, Italy, Japan, Jordan, Korea, Malaysia, Netherlands, Pakistan, Poland, Russian Federation, Singapore, Spain, Switzerland, Taiwan, Turkey, Ukraine, United Kingdom, United States, Uruguay and Viet Nam. Interest in using sleep stage patterns to determine the amount and quality of a pilot or astronaut's sleep has led to a series of Air Force sponsored studies. The ultimate goal of these studies is to be able to determine sleep stage from beat-by-beat heart rate data along (not using the EEG). Work performed at the University of Texas by Welch, et al, and Aldredge et al, has indicated that stage REM (rapid eye movement sleep) is refractory to detection by techniques which perform satisfactorily on the other sleep stages. In addition, the Welch algorithm performs more effectively when the times of occurrence of stage REM (or combined stages REM and 1) are already known. The purpose of this phase of study is to test the hypothesis that the occurrence of rapid eye movements can be detected by concurrent transient oscillations in the heart rate. A knowledge of REM occurrences would then greatly simplify recognition of the REM sleep stage. Alternatively, direct recognition of stage REM, 1 (stage REM + stage 1) sleep may be possible by spectral analysis of heart rate. Both possibilities are investigated. (Modified author abstract).

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In this paper we describe a waveform recognition method that extracts characteristic parameters from wave- forms and a method of automated sleep stage scoring using decision tree learning that is in practice regarded as one of the most successful machine learning methods. In our method, first characteristics of EEG, EOG and EMG are compared with characteristic features of alpha waves, delta waves, sleep spindles, K-complexes and REMs. Then, several parameters that are necessary for sleep stage scoring are extracted. We transform these extracted parameters into a few discrete variables using canonical discriminant analysis and the discretization method based on a random walk, and then a committee that consists of several small decision trees is formed from a small number of training instances. Furthermore final sleep stages are decided by a majority decision of the committee. Our method was applied to the digitized PSG chart data, provided by the Japan Society of Sleep Research and we carried out an evaluation experiment. The experiment indicated that our method can quickly execute learning and classification and precisely score sleep stages.

This book constitutes the thoroughly refereed proceedings of the 15th International Conference on Image Analysis and Recognition, ICIAR 2018, held in Póvoa de Varzim, Portugal, in June 2018. The 91 full papers presented together with 15 short papers were carefully reviewed and selected from 179 submissions. The papers are organized in the following topical sections: Enhancement, Restoration and Reconstruction, Image Segmentation, Detection, Classification and Recognition, Indexing and Retrieval,

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Computer Vision, Activity Recognition, Traffic and Surveillance, Applications, Biomedical Image Analysis, Diagnosis and Screening of Ophthalmic Diseases, and Challenge on Breast Cancer Histology Images.

Sleep Disorders and Sleep Deprivation

Sleep Related Breathing Disorders and Sleep Stages from Ecg Signals

Sleep Stages Classification Using Wt and Ann

EEG Lossy Compression and Its Impact on EEG-Based Pattern Recognition

Electronic Devices, Circuits, and Systems for Biomedical Applications

Challenges and Intelligent Approach

Artificial Intelligence and Evolutionary Computations in Engineering Systems

Clinical practice related to sleep problems and sleep disorders has been expanding rapidly in the last few years, but scientific research is not keeping pace. Sleep apnea, insomnia, and restless legs syndrome are three examples of very common disorders for which we have little biological information. This new book cuts across a variety of medical disciplines such as neurology, pulmonology, pediatrics, internal medicine, psychiatry, psychology, otolaryngology, and nursing, as well as other medical practices with an interest in the management of sleep pathology. This research is not limited to very young and old patients—sleep disorders reach across all ages and ethnicities. Sleep Disorders and Sleep Deprivation presents a structured analysis that explores the following: Improving awareness among the general public and health care professionals. Increasing investment in interdisciplinary somnology and sleep medicine research training and mentoring activities. Validating and developing new and existing technology for diagnosis and treatment. This book will be of interest to those looking to learn more about the enormous public health burden of sleep disorders and sleep deprivation and the strikingly limited

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capacity of the health care enterprise to identify and treat the majority of individuals suffering from sleep problems.

The three-volume set LNCS 12305, 12306, and 12307 constitute the refereed proceedings of the Third Chinese Conference on Pattern Recognition and Computer Vision, PRCV 2020, held virtually in Nanjing, China, in October 2020. The 158 full papers presented were carefully reviewed and selected from 402 submissions. The papers have been organized in the following topical sections: Part I: Computer Vision and Application, Part II: Pattern Recognition and Application, Part III: Machine Learning.

Sleep is an essential activity for humans. It affects our physical and mental health. So monitoring sleep continuously can help detect changes in sleep patterns that may be caused by sleep disorders or other diseases. For a long term sleep monitoring system, the most important requirement is comfort. The less the system contacts the body, the better it is. The hydraulic bed sensor developed by the University of Missouri (MUHBS) is such a sensor. It is placed under the mattress and hence, it has no contact with the body. The ultimate goal of this work is to recognize sleep stages using this non-invasive bed sensor. Sleep data were collected with this bed sensor and a Mindo- Hydra wearable EEG device as the ground truth. The EEG device detects our brain waves by wearing it on the forehead. The processing of the brain waves provided the sleep stages detected by its automatic algorithm. The sleep stage recognition system which classifies Awake, REM and NREM sleeps was then developed with this collected data. But, due to the lower accuracy of this ground truth, the performance of the developed method wasn't truly reflective of actual sleep stages. For the purpose of verifying the developed methods, two other databases: the MIT Polysomnographic Database (MITBPD) and the Sleep-EDF Database (Expanded) were also studied here. Similar features are extracted from the bed sensor dataset were calculated from the two databases. The result with the MITBPD exceeded previous work using the same database. The result with the sleep- EDF

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comparable with previous work using different databases, but the proposed method used simpler features. Thus, performances of these two databases verified that the developed method are used to solve sleep stage recognition problem. It further showed the potential of monitoring sleep using the MUHBS, if a reliable ground truth system can be obtained.

We present a novel approach to combining artificial intelligence components for biomedical signal processing. The modular algorithm mimics the step-by-step type procedure of a human expert and includes the two assessment steps most important for sleep stage scoring, pattern recognition in electrophysiological signal channels and rule evaluation for classifying the current sequence patterns. The application of sleep stage scoring is a complex task in medical informatics. The ARTISANA (artificial intelligence in sleep analysis) algorithm we have developed provides high rates of correspondence with the results produced by human experts. Additional features are the transparent decision-making process and information about the detailed structure of sleep. This has been achieved by utilizing neural networks for pattern recognition and neuro-fuzzy systems for rule evaluation. The AI components chosen to perform these two classification steps were particularly successful due to their individual strengths.

Soft Computing for Problem Solving

8th International Conference, BIH 2015, London, UK, August 30-September 2, 2015. Proceedings

Niedermeyer's Electroencephalography

Proceeding of the Second International Conference on Smart Vehicular Technology, Transportation, Communication and Applications, October 25-28, 2018 Mount Emei, China, Part 2
Bandwidth Reduction of Sleep Information

Algorithms and Architectures for Parallel Processing

ECG Signal Processing, Classification and Interpretation

This book constitutes the proceedings of the

International Conference on Brain Informatics and Health, BIH 2015, held in London, UK, in August/September 2015. The 42 full papers presented were carefully reviewed and selected from 82 submissions. Following the success of past conferences in this series, BIH 2015 has a strong emphasis on emerging trends of big data analysis and management technology for brain research, behavior learning, and real-world applications of brain science in human health and wellbeing.

This book highlights papers presented at the Second International Conference on Smart Vehicular Technology, Transportation, Communication and Applications (VTCA 2018), which was held at Mount Emei, Sichuan Province, China from 25 to 28 October 2018. The conference was co-sponsored by Springer, Southwest Jiaotong University, Fujian University of Technology, Chang'an University, Shandong University of Science and Technology, Fujian Provincial Key Lab of Big Data Mining and Applications, and the National Demonstration Center for Experimental Electronic Information and Electrical Technology Education (Fujian University of Technology). The conference was intended as an international forum for researchers and professionals engaged in all areas of

smart vehicular technology, vehicular transportation, vehicular communication, and applications.

This book gathers selected papers presented at the 6th International Conference on Artificial Intelligence and Evolutionary Computations in Engineering Systems, held at the Anna University, Chennai, India, from 20 to 22 April 2020. It covers advances and recent developments in various computational intelligence techniques, with an emphasis on the design of communication systems. In addition, it shares valuable insights into advanced computational methodologies such as neural networks, fuzzy systems, evolutionary algorithms, hybrid intelligent systems, uncertain reasoning techniques, and other machine learning methods and their application to decision-making and problem-solving in mobile and wireless communication networks.

Sport and the Brain: The Science of Preparing, Enduring and Winning, Part B, Volume 233 reflects recent advancements in the understanding of how elite athletes prepare for, and perform at, peak levels under the demands of competition. Topics discussed in this new release include a section on Exploring the Applicability of the Contextual Interference Effect in Sports

Practice, The Resonant System: Linking Brain-body-environment in Sport Performance, the Effects of Acute High-intensity Exercise on Cognitive Performance in Trained Individuals: A Systematic Review, Moving Concussion Care to the Next Level: The Emergence and Role of Concussion Clinics in the UK, and Neurocognitive Mechanisms of the Flow State. This longstanding series takes a multidisciplinary approach, focusing on aspects of psychology, neuroscience, skill learning, talent development and physiology. Takes a multidisciplinary approach, focusing on aspects of psychology, neuroscience, skill learning, talent development and physiology Focuses on sports and the brain Contains expertise and an international focus of contributors Adopts the novel approach of having a target article with critical commentaries on the lessons learned from British multiple gold medalists at Olympic and World Championships

**13th International Conference on Biomedical Engineering
Proceedings of Third International Symposium on Signal Processing and Intelligent Recognition Systems (SIRS-2017), September 13-16, 2017, Manipal, India**

**Detection of the K-Complex in Human EEG
Sleep Records**

**Automated Sleep Stage Scoring by Decision
Tree Learning**

**6th International Conference, ICACDS 2022,
Kurnool, India, April 22-23, 2022, Revised
Selected Papers, Part II**

An Unmet Public Health Problem

Electronic Devices, Circuits, and Systems for Biomedical Applications: Challenges and Intelligent Approaches explains the latest information on the design of new technological solutions for low-power, high-speed efficient biomedical devices, circuits and systems. The book outlines new methods to enhance system performance, provides key parameters to explore the electronic devices and circuit biomedical applications, and discusses innovative materials that improve device performance, even for those with smaller dimensions and lower costs. This book is ideal for graduate students in biomedical engineering and medical informatics, biomedical engineers, medical device designers, and researchers in signal processing. Presents major design challenges and research potential in biomedical systems Walks readers through essential concepts in advanced biomedical system design Focuses on healthcare system design for low power-efficient and highly-secured biomedical electronics

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th On behalf of the organizing committee of the 13 International Conference on Biomedical Engineering, I extend our w- mest welcome to you. This series of conference began in 1983 and is jointly organized by the YLL School of Medicine and Faculty of Engineering of the National University of Singapore and the Biomedical Engineering Society (Singapore). First of all, I want to thank Mr Lim Chuan Poh, Chairman A*STAR who kindly agreed to be our Guest of Honour to give th the Opening Address amidst his busy schedule. I am delighted to report that the 13 ICBME has more than 600 participants from 40 countries. We have received very high quality papers and inevitably we had to turndown some papers. We have invited very prominent speakers and each one is an authority in their field of expertise. I am grateful to each one of them for setting aside their valuable time to participate in this conference. For the first time, the Biomedical Engineering Society (USA) will be sponsoring two symposia, ie "Drug Delivery S-tems" and "Systems Biology and Computational Bioengineering". I am thankful to Prof Tom Skalak for his leadership in this initiative. I would also like to acknowledge the contribution of Prof Takami Yamaguchi for organizing the NUS-Tohoku's Global COE workshop within this conference. Thanks also to Prof Fritz Bodem for organizing the symposium, "Space Flight Bioengineering". This year's

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conference proceedings will be published by Springer as an IFMBE Proceedings Series.

The paper presents the development of a computer algorithm for the detection of K-complexes in the normal human sleep electroencephalogram (EEG). The detection scheme applies time and frequency domain pattern recognition techniques to a single channel (central area recording site) of digitized EEG data to identify waveforms as K-complexes. The detection of K-complexes resulted in an accuracy of 62.5% (7.3% miss error and 30.2% false detections). The primary source of false detections was the identification of Delta wave activity as K-complexes. The detection scheme is also used for scoring sleep EEG data as K-complex (Stage 2) or non-K-complex (Stages 1 and REM) sleep stages. Results of the sleep scoring effort provide an accuracy of 94% when compared to the usually scored EEG. (Author).

This book includes the original, peer-reviewed research articles from the International Conference on Computational Intelligence and Computing (ICCIC 2020), held in September 2020 on a virtual platform jointly organized by SR Group of Institutions, Jhansi, India, IETE, Kolkata Centre, India, and Eureka Sciencetech Research Foundation, Kolkata India. It covers the latest research in image processing, computer vision and pattern recognition, machine learning, data mining, big

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data and analytics, information security and privacy, wireless and sensor networks and IoT applications, artificial intelligence, expert systems, natural language processing, image processing, computer vision, artificial neural networks, fuzzy logic, evolutionary optimization, rough sets, web intelligence, intelligent agent technology, virtual reality, and visualization.

Third International Conference, ICT4AWE 2017, Porto, Portugal, April 28-29, 2017, Revised Selected Papers

Detection of REM sleep stage and eye movement from beat-to-beat heart rate

ICCIDE 2021

Third Chinese Conference, PRCV 2020, Nanjing, China, October 16-18, 2020, Proceedings, Part II Advances in Signal Processing and Intelligent Recognition Systems

ICCIC 2020

Machine Learning and Big Data Analytics (Proceedings of International Conference on Machine Learning and Big Data Analytics (ICMLBDA) 2021)

Recognition of Sleep Stages from Sensor Data

This book – in conjunction with the volumes LNCS 8588 and LNAI 8589 – constitutes the refereed proceedings of the 10th International Conference on Intelligent Computing, ICIC 2014, held in Taiyuan, China, in August 2014. The 58 papers of this volume were carefully reviewed and selected from numerous submissions. The

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papers are organized in topical sections such as machine learning; neural networks; image processing; computational systems biology and medical informatics; biomedical informatics theory and methods; advances on bio-inspired computing; protein and gene bioinformatics: analysis, algorithms, applications.

This book contains the refereed proceedings of the 14th International Conference on Knowledge Management in Organizations, KMO 2019, held in Zamora, Spain, in July 2019. The 46 papers accepted for KMO 2018 were selected from 109 submissions and are organized in topical sections on: knowledge management models and analysis; knowledge transfer and learning; knowledge and service innovation; knowledge creation; knowledge and organization; information systems and information science; data mining and intelligent science; social networks and social aspects of KM; big data and IoT; and new trends in IT.

This book constitutes the thoroughly refereed proceedings of the third International Conference on Communication Technologies for Ageing Well and e-Health, ICT4AWE 2017, held in Porto, Portugal in April 2017. The 10 full papers presented were carefully reviewed and selected from 32 submissions. The papers aim at contributing to the understanding of relevant trends of current research on ICT for Ageing Well and eHealth including the collection and evaluation of day/night end user behavior patterns through the adoption of wearable technologies.

Information and Communication Technologies for Ageing Well and e-Health

**15th International Conference, ICIAR 2018, Póvoa de Varzim, Portugal, June 27–29, 2018, Proceedings
Basic Principles, Clinical Applications, and Related**

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Fields

Intelligent Computing in Bioinformatics

14th International Conference, KMO 2019, Zamora, Spain, July 15–18, 2019, Proceedings

Unraveling Sleep and Its Disorders Using Novel Analytical Approaches

Recognition of Sleep Stages from Sensor Data

Abstract: "Electroencephalogram (EEG) has been widely used in EEG-based pattern recognition systems such as epileptic seizure, sleep stage, emotion, alcoholics and person recognitions. However, one of the major challenges of EEG is the huge amounts of data that need to be processed, transmitted and stored. Developing effective EEG compression algorithms is therefore necessary. As EEG lossy compression algorithms achieve a much higher Compression Ratio (CR) than lossless ones, most studies related to EEG compression focus on lossy algorithms. Studies also indicate that EEG signals under brain disorders, for example, epilepsy are different from the normal EEG, especially on frequency. Numerous lossy compression algorithms have been proposed with none being reported as the best algorithm. This project focuses on developing an EEG lossy compression algorithm to maximize CR while minimizing the loss of information. This research also focuses on developing an EEG lossy compression algorithm for epileptic EEG signals. EEG lossy compression algorithms allow advanced CR compared to lossless ones; however data is lost in the reconstructed signals including diagnosing and biometric information, which may negatively affect EEG-

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based applications. Little work has been done in evaluating the effect of lossy compression on EEG-based seizure recognition systems. Hence, this research evaluates the impacts of EEG lossy compression on EEG-based pattern recognition systems including person, seizure, alcoholics, age, and gender recognition systems. Evaluation experiments conducted on a wide range of public EEG datasets show that the proposed EEG lossy compression algorithms give better compression performances than some recent lossy compression algorithms. In addition, lossy compression algorithms do have the impact on EEG-based pattern recognition systems as the recognition performances decrease when compression increases. However, it is feasible to apply lossy compression to EEG-based pattern recognition systems and using lossy compression is still more advantageous than using lossless approaches."

This book covers various topics, including collective intelligence, intelligent transportation systems, fuzzy systems, Bayesian network, ant colony optimization, data privacy and security, data mining, data warehousing, big data analytics, cloud computing, natural language processing, swarm intelligence, and speech processing. This book is a collection of high-quality research work on cutting-edge technologies and the most-happening areas of computational intelligence and data engineering. It includes selected papers from the International Conference on Computational Intelligence and Data Engineering (ICCID 2021).

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In this book, the field of adaptive learning and processing is extended to arguably one of its most important contexts which is the understanding and analysis of brain signals. No attempt is made to comment on physiological aspects of brain activity; instead, signal processing methods are developed and used to assist clinical findings. Recent developments in detection, estimation and separation of diagnostic cues from different modality neuroimaging systems are discussed. These include constrained nonlinear signal processing techniques which incorporate sparsity, nonstationarity, multimodal data, and multiway techniques. Key features: Covers advanced and adaptive signal processing techniques for the processing of electroencephalography (EEG) and magneto-encephalography (MEG) signals, and their correlation to the corresponding functional magnetic resonance imaging (fMRI) Provides advanced tools for the detection, monitoring, separation, localising and understanding of functional, anatomical, and physiological abnormalities of the brain Puts a major emphasis on brain dynamics and how this can be evaluated for the assessment of brain activity in various states such as for brain-computer interfacing emotions and mental fatigue analysis Focuses on multimodal and multiway adaptive processing of brain signals, the new direction of brain signal research

This book constitutes the proceedings of the 23rd International Conference on Business Information Systems, BIS 2020, which was planned to take place in Colorado Springs, CO, USA. Due to the COVID-19

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pandemic, the conference was held fully online during June 8–10, 2020. This year's theme was "Data Science and Security in Business Information Systems". The 30 contributions presented in this volume were carefully reviewed and selected from 86 submissions. The book also contains two contributions from BIS 2019. The papers were organized in the following topical sections: Data Security, Big Data and Data Science, Artificial Intelligence, ICT Project Management, Applications, Social Media, Smart Infrastructures.

Combination of AI Components for Biosignal Processing- Application to Sleep Stage Recognition Modeling, Simulation and Optimization

Proceedings of International Conference on Computational Intelligence and Computing

Advances in Smart Vehicular Technology,

Transportation, Communication and Applications

4th International Conference on Biomedical Engineering in Vietnam

10th International Conference, ICIC 2014, Taiyuan, China, August 3-6, 2014, Proceedings

Electroencephalography

What can we learn from spontaneously occurring brain and other physiological signals about an individual's cognitive and affective state and how can we make use of this information? One line of research that is actively involved with this question is Passive Brain-Computer-Interfaces (BCI). To date most BCIs are aimed at assisting patients for whom brain signals could form an alternative output channel as opposed to more common human output channels, like speech and moving the hands. However, brain signals (possibly in combination with other physiological signals) also form an output channel above and beyond the more

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usual ones: they can potentially provide continuous, online information about an individual's cognitive and affective state without the need of conscious or effortful communication. The provided information could be used in a number of ways. Examples include monitoring cognitive workload through EEG and skin conductance for adaptive automation or using ERPs in response to errors to correct for a behavioral response. While Passive BCIs make use of online (neuro)physiological responses and close the interaction cycle between a user and a computer system, (neuro)physiological responses can also be used in an offline fashion. Examples of this include detecting amygdala responses for neuromarketing, and measuring EEG and pupil dilation as indicators of mental effort for optimizing information systems. The described field of applied (neuro)physiology can strongly benefit from high quality scientific studies that control for confounding factors and use proper comparison conditions. Another area of relevance is ethics, ranging from dubious product claims, acceptance of the technology by the general public, privacy of users, to possible effects that these kinds of applications may have on society as a whole. In this Research Topic we aim to publish studies of the highest scientific quality that are directed towards applications that utilize spontaneously, effortlessly generated neurophysiological signals (brain and/or other physiological signals) reflecting cognitive or affective state. We especially welcomed studies that describe specific real world applications demonstrating a significant benefit compared to standard applications. We also invited original, new kinds of (proposed) applications in this area as well as comprehensive review articles that point out what is and what is not possible (according to scientific standards) in this field. Finally, we welcomed manuscripts on the ethical issues that are involved. Connected to the Research Topic was a workshop (held on June during the Fifth International Brain-Computer Interface Meeting, June 3-7, 2013, Asilomar, California) that brought

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together a diverse group of people who were working in this field. We discussed the state of the art and formulated major challenges as reflected in the first paper of the Research Topic.

Many important space and military missions require maximal alertness which is dependent on adequate amounts of rest and sleep. In order to study sleep-wakefulness patterns in realistic space and military situations, it is necessary to monitor the level of arousal with simplified reliable band-limited devices. The limited time bandwidth available for the transmission of sleep information necessitates the development of a technique for data compression. This report describes the possibility of extracting sleep information from heart rate data. Several features of heart rate which contain sleep information are computed and analysis of variance is used to indicate the suitability of these measures for the pattern recognition of sleep stages from heart rate data. (Author).

The two-volume proceedings CCIS 1613 + 1614 constitute revised selected papers from the 6th International Conference on Advances in Computing and Data Sciences, ICACDS 2022, which was held in Kurnool, India in April 2022. The total of 69 full papers presented in the proceedings was carefully reviewed and selected from 411 submissions. The papers focus on advances in next generation computing technologies in the areas of advanced computing and data sciences.

This book includes selected peer-reviewed papers presented at International Conference on Modeling, Simulation and Optimization, organized by National Institute of Technology, Silchar, Assam, India, during 3–5 August 2020. The book covers topics of modeling, simulation and optimization, including computational modeling and simulation, system modeling and simulation, device/VLSI modeling and simulation, control theory and applications, modeling and simulation of energy system and optimization. The book disseminates various models of diverse systems and includes solutions of emerging challenges of diverse

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scientific fields.

Computational Algorithm for AI Technology, Proceedings of ICAIECES 2020

Pattern Recognition and Computer Vision

18th International Conference, ICA3PP 2018, Guangzhou, China, November 15-17, 2018, Proceedings, Part III

Proceedings of CoMSO 2020

Select Proceedings of CAMSE 2020

ICBME 2008, 3-6 December 2008, Singapore

Using Neurophysiological Signals that Reflect Cognitive or Affective State

This book introduces a physiologically driven approach to detect sleep related breathing disorder events as well as different sleep stages by evaluating an ECG signal. The introductory chapters provide medical background knowledge concerning this sleep induced breathing failure and the ECG. On this basis, the following chapter discloses the connection between features extracted from the ECG and the occurrence of sleep related breathing disorder events or sleep stages. The features are derived from the heart rate and the morphological side effects of cardiac load fluctuations. In the subsequent chapters, the extracted features are evaluated by applying pattern recognition methods to answer the central question: Is it possible to reduce the diagnostic complexity of this disease by simply recording and processing an ECG signal? The assessment of the presented approach starts by selecting the most suitable classifiers. Subsequently, these classifiers are put to tests in patient dependent

and independent scenarios. The achieved classification rates for the sleep related breathing disorder episodes as well as the sleep stages prove that an ECG driven basic diagnosis is feasible.

The edited volume includes papers in the fields of fuzzy mathematical analysis and advances in computational mathematics. The fields of fuzzy mathematical analysis and advances in computational mathematics can provide valuable solutions to complex problems. They have been applied in multiple areas such as high dimensional data analysis, medical diagnosis, computer vision, hand-written character recognition, pattern recognition, machine intelligence, weather forecasting, network optimization, VLSI design, etc. The volume covers ongoing research in fuzzy and computational mathematical analysis and brings forward its recent applications to important real-world problems in various fields. The book includes selected high-quality papers from the International Conference on Fuzzy Mathematical Analysis and Advances in Computational Mathematics (FMAACM 2020).

This book presents the select proceedings of Congress on Advances in Materials Science and Engineering (CAMSE 2020). It focuses on the state-of-the-art research, development, and commercial prospective of recent advances in mechanical engineering. The book covers various synthesis and fabrication routes of functional and smart materials for applications in

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mechanical engineering, manufacturing, physics, chemical and biological sciences, metrology, optimization and artificial intelligence among others. This book will be a useful resource for researchers, academicians as well as professionals interested in the highly interdisciplinary field of materials science and mechanical engineering.

Brain Informatics and Health