

Deep Learning I Korea University

This is part 2 of the 3-volume set CCIS 1252 until CCIS 1254 that constitutes the refereed proceedings of the 6th International Conference on Artificial Intelligence and Security, ICAIS 2020, which was held in Hohhot, China, in July 2020. The conference was formerly called "International Conference on Cloud Computing and Security" with the acronym ICCCS. The total of 178 full papers and 8 short papers presented in this 3-volume proceedings was carefully reviewed and selected from 1064 submissions. The papers were organized in topical sections as follows: Part I: artificial intelligence; Part II: artificial intelligence; Internet of things; information security; Part III: information security; big data and cloud computing; information processing.

Machine Learning and Decision Support in StrokeFrontiers Media SA
Deep Learning for Medical Image AnalysisAcademic Press

This book constitutes the refereed proceedings of the First MICCAI Workshop on Domain Adaptation and Representation Transfer, DART 2019, and the First International Workshop on Medical Image Learning with Less Labels and Imperfect Data, MIL3ID 2019, held in conjunction with MICCAI 2019, in Shenzhen, China, in October 2019. DART 2019 accepted 12 papers for publication out of 18 submissions. The papers deal with methodological advancements and ideas that can improve the applicability of machine learning and deep learning approaches to clinical settings by making them robust and consistent across different domains. MIL3ID accepted 16 papers out of 43 submissions for publication, dealing with best practices in medical image learning with label scarcity and data imperfection. The development of "intelligent" systems that can take decisions and perform autonomously might lead to faster and more consistent decisions. A limiting factor for a broader adoption of AI technology is the inherent risks that come with giving up human control and oversight to "intelligent" machines. For sensitive tasks involving critical infrastructures and affecting human well-being or health, it is crucial to limit the possibility of improper, non-robust and unsafe decisions and actions. Before deploying an AI system, we see a strong need to validate its behavior, and thus establish guarantees that it will continue to perform as expected when deployed in a real-world environment. In pursuit of that objective, ways for humans to verify the agreement between the AI decision structure and their own ground-truth knowledge have been explored. Explainable AI (XAI) has developed as a subfield of AI, focused on exposing complex AI models to humans in a systematic and interpretable manner. The 22 chapters included in this book provide a timely snapshot of algorithms, theory, and applications of interpretable and explainable AI and AI techniques that have been proposed recently reflecting the current discourse in this field and providing directions of future development. The book is organized in six parts: towards AI transparency; methods for interpreting AI systems; explaining the decisions of AI systems; evaluating interpretability and explanations; applications of explainable AI; and software for explainable AI.

Symmetry-adapted machine learning has shown encouraging ability to mitigate the security risks in information and communication technology (ICT) systems. It is a subset of artificial intelligence (AI) that relies on the principles of processing future events by learning past events or historical data. The autonomous nature of symmetry-adapted machine learning supports effective data processing and analysis for security detection in ICT systems without the interference of human authorities. Many industries are developing machine-learning-adapted solutions to support security for smart hardware, distributed computing, and the cloud. In our Special Issue book, we focus on the deployment of symmetry-adapted machine learning for information security in various application areas. This security approach can support effective methods to handle the dynamic nature of security attacks by extraction and analysis of data to identify hidden patterns of data. The main topics of this Issue include malware classification, an intrusion detection system, image watermarking, color image watermarking, battlefield target aggregation behavior recognition model, IP camera, Internet of Things (IoT) security, service function chain, indoor positioning system, and crypto-analysis.

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This book constitutes the post-conference proceedings of the Third International Workshop on Machine Learning, Optimization, and Big Data, MOD 2017, held in Volterra, Italy, in September 2017. The 50 full papers presented were carefully reviewed and selected from 126 submissions. The papers cover topics in the field of machine learning, artificial intelligence, computational optimization and data science presenting a substantial array of ideas, technologies, algorithms, methods and applications.

Deep learning is providing exciting solutions for medical image analysis problems and is seen as a key method for future applications. This book gives a clear understanding of the principles and methods of neural network and deep learning concepts, showing how the algorithms that integrate deep learning as a core component have been applied to medical image detection, segmentation and registration, and computer-aided analysis, using a wide variety of application areas. Deep Learning for Medical Image Analysis is a great learning resource for academic and industry researchers in medical imaging analysis, and for graduate students taking courses on machine learning and deep learning for computer vision and medical image computing and analysis. Covers common research problems in medical image analysis and their challenges Describes deep learning methods and the theories behind approaches for medical image analysis Teaches how algorithms are applied to a broad range of application areas, including Chest X-ray, breast CAD, lung and chest, microscopy and pathology, etc. Includes a Foreword written by Nicholas Ayache

This two-volume set of LNCS 12736-12737 constitutes the refereed proceedings of the 7th International Conference on Artificial Intelligence and Security, ICAIS 2021, which was held in Dublin, Ireland, in July 2021. The conference was formerly called "International Conference on Cloud Computing and Security" with the acronym ICCCS. The total of 93 full papers and 29 short papers presented in this two-volume proceedings was carefully reviewed and selected from 1013 submissions. Overall, a total of 224 full and 81 short papers were accepted for ICAIS 2021; the other accepted papers are presented in CCIS 1422-1424. The papers were organized in topical sections as follows: Part I: Artificial intelligence; and big data Part II: Big data; cloud computing and security; encryption and cybersecurity; information hiding; IoT security; and multimedia forensics

This book constitutes the refereed proceedings of the 7th International Workshop on Machine Learning in Medical Imaging, MLMI 2016, held in conjunction with MICCAI 2016, in

Athens, Greece, in October 2016. The 38 full papers presented in this volume were carefully reviewed and selected from 60 submissions. The main aim of this workshop is to help advance scientific research within the broad field of machine learning in medical imaging. The workshop focuses on major trends and challenges in this area, and presents works aimed to identify new cutting-edge techniques and their use in medical imaging.

Artificial Intelligence (AI) has attracted the attention of researchers and users alike and is taking an increasingly crucial role in our modern society. From cars, smartphones, and airplanes to medical equipment, consumer applications, and industrial machines, the impact of AI is notoriously changing the world we live in. In this context, Deep Learning (DL) is one of the techniques that has taken the lead for cognitive processes, pattern recognition, object detection, and machine learning, all of which have played a crucial role in the growth of AI. As such, this book examines DL applications and future trends in the field. It is a useful resource for researchers and students alike.

This book constitutes the proceedings of the 10th International Workshop on Machine Learning in Medical Imaging, MLMI 2019, held in conjunction with MICCAI 2019, in Shenzhen, China, in October 2019. The 78 papers presented in this volume were carefully reviewed and selected from 158 submissions. They focus on major trends and challenges in the area, aiming to identify new-cutting-edge techniques and their uses in medical imaging. Topics dealt with are: deep learning, generative adversarial learning, ensemble learning, sparse learning, multi-task learning, multi-view learning, manifold learning, and reinforcement learning, with their applications to medical image analysis, computer-aided detection and diagnosis, multi-modality fusion, image reconstruction, image retrieval, cellular image analysis, molecular imaging, digital pathology, etc.

In the past few years, with the evolution of advanced persistent threats and mutation techniques, sensitive and damaging information from a variety of sources have been exposed to possible corruption and hacking. Machine learning, artificial intelligence, predictive analytics, and similar disciplines of cognitive science applications have been found to have significant applications in the domain of cyber security. Machine Learning and Cognitive Science Applications in Cyber Security examines different applications of cognition that can be used to detect threats and analyze data to capture malware. Highlighting such topics as anomaly detection, intelligent platforms, and triangle scheme, this publication is designed for IT specialists, computer engineers, researchers, academicians, and industry professionals interested in the impact of machine learning in cyber security and the methodologies that can help improve the performance and reliability of machine learning applications.

As computer and space technologies have been developed, geoscience information systems (GIS) and remote sensing (RS) technologies, which deal with the geospatial information, have been rapidly maturing. Moreover, over the last few decades, machine learning techniques including artificial neural network (ANN), deep learning, decision tree, and support vector machine (SVM) have been successfully applied to geospatial science and engineering research fields. The machine learning techniques have been widely applied to GIS and RS research fields and have recently produced valuable results in the areas of geoscience, environment, natural hazards, and natural resources. This book is a collection representing novel contributions detailing machine learning techniques as applied to geoscience information systems and remote sensing.

Designing molecules and materials with desired properties is an important prerequisite for advancing technology in our modern societies. This requires both the ability to calculate accurate microscopic properties, such as energies, forces and electrostatic multipoles of specific configurations, as well as efficient sampling of potential energy surfaces to obtain corresponding macroscopic properties. Tools that can provide this are accurate first-principles calculations rooted in quantum mechanics, and statistical mechanics, respectively. Unfortunately, they come at a high computational cost that prohibits calculations for large systems and long time-scales, thus presenting a severe bottleneck both for searching the vast chemical compound space and the stupendously many dynamical configurations that a molecule can assume. To overcome this challenge, recently there have been increased efforts to accelerate quantum simulations with machine learning (ML). This emerging interdisciplinary community encompasses chemists, material scientists, physicists, mathematicians and computer scientists, joining forces to contribute to the exciting hot topic of progressing machine learning and AI for molecules and materials. The book that has emerged from a series of workshops provides a snapshot of this rapidly developing field. It contains tutorial material explaining the relevant foundations needed in chemistry, physics as well as machine learning to give an easy starting point for interested readers. In addition, a number of research papers defining the current state-of-the-art are included. The book has five parts (Fundamentals, Incorporating Prior Knowledge, Deep Learning of Atomistic Representations, Atomistic Simulations and Discovery and Design), each prefaced by editorial commentary that puts the respective parts into a broader scientific context.

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This book includes impactful chapters which present scientific concepts, frameworks, architectures and ideas on sensing technologies and machine learning techniques. These are relevant in tackling the following challenges: (i) the field readiness and use of intrusive sensor systems and devices for capturing biosignals, including EEG sensor systems, ECG sensor systems and electrodermal activity sensor systems; (ii) the quality assessment and management of sensor data; (iii) data preprocessing, noise filtering and calibration concepts for biosignals; (iv) the field readiness and use of nonintrusive sensor technologies, including visual sensors, acoustic sensors, vibration sensors and piezoelectric sensors; (v) emotion recognition using mobile phones and smartwatches; (vi) body area sensor networks for emotion and stress studies; (vii) the use of experimental datasets in emotion recognition, including dataset generation principles and concepts, quality insurance and emotion elicitation material and concepts; (viii) machine learning techniques for robust emotion recognition, including graphical models, neural network methods, deep learning methods, statistical learning and multivariate empirical mode decomposition; (ix) subject-independent emotion and stress recognition concepts and systems, including facial expression-based systems, speech-based systems, EEG-based systems, ECG-based systems,

electrodermal activity-based systems, multimodal recognition systems and sensor fusion concepts and (x) emotion and stress estimation and forecasting from a nonlinear dynamical system perspective. This book, emerging from the Special Issue of the Sensors journal on “Emotion and Stress Recognition Related Sensors and Machine Learning Technologies” emerges as a result of the crucial need for massive deployment of intelligent sociotechnical systems. Such technologies are being applied in assistive systems in different domains and parts of the world to address challenges that could not be addressed without the advances made in these technologies.

Big data modeling is very challenging to handle using traditional database modeling and management systems. This book will teach you how to model big data using the latest and more efficient tools such as ERWIN, ANACONDA (Python), and WEKA to model data.

This book constitutes the refereed proceedings of the 8th International Workshop on Machine Learning in Medical Imaging, MLMI 2017, held in conjunction with MICCAI 2017, in Quebec City, QC, Canada, in September 2017. The 44 full papers presented in this volume were carefully reviewed and selected from 63 submissions. The main aim of this workshop is to help advance scientific research within the broad field of machine learning in medical imaging. The workshop focuses on major trends and challenges in this area, and presents works aimed to identify new cutting-edge techniques and their use in medical imaging.

This book reviews all aspects of the use of machine learning in contemporary dentistry, clearly explaining its significance for dental imaging, oral diagnosis and treatment, dental designs, and dental research. Machine learning is an emerging field of artificial intelligence research and practice in which computer agents are employed to improve perception, cognition, and action based on their ability to “learn”, for example through use of big data techniques. Its application within dentistry is designed to promote personalized and precision patient care, with enhancement of diagnosis and treatment planning. In this book, readers will find up-to-date information on different machine learning tools and their applicability in various dental specialties. The selected examples amply illustrate the opportunities to employ a machine learning approach within dentistry while also serving to highlight the associated challenges. Machine Learning in Dentistry will be of value for all dental practitioners and researchers who wish to learn more about the potential benefits of using machine learning techniques in their work.

When the domestic government, the private sector, and people in various professional fields talk about long-term care issues, they all focus on creating a warm and home-like care institution. However, we actively emphasize the importance of community-based long-term care. For “aging in place”, the development of domestic non-institutional care is still in its infancy, and some long-term care needs must still be met through institutional care, and the facilitation of the extension or outreach of community-based care and respite service platforms for the development of community-based long-term care still rely on institutional care. The history of the development of long-term care in Taiwan is much shorter than that of Japan, Europe, the United States, and Canada. Despite years of hard work and rapid development, the long-term care resources needed to establish a complete system in terms of universalization, fairness, accessibility, and selectivity are not available. In the future, based on the soundness of institutional care, it hoped that outreach will move toward the goals of community care and aging in place. We hope the studies in this Special Issue will help further develop clinical medicine for healthcare and sustainability.

This book promotes and facilitates exchanges of research knowledge and findings across different disciplines on the design and investigation of deep learning (DL)–based data analytics of IoT (Internet of Things) infrastructures. Deep Learning for Internet of Things Infrastructure addresses emerging trends and issues on IoT systems and services across various application domains. The book investigates the challenges posed by the implementation of deep learning on IoT networking models and services. It provides fundamental theory, model, and methodology in interpreting, aggregating, processing, and analyzing data for intelligent DL-enabled IoT. The book also explores new functions and technologies to provide adaptive services and intelligent applications for different end users. FEATURES Promotes and facilitates exchanges of research knowledge and findings across different disciplines on the design and investigation of DL-based data analytics of IoT infrastructures Addresses emerging trends and issues on IoT systems and services across various application domains Investigates the challenges posed by the implementation of deep learning on IoT networking models and services Provides fundamental theory, model, and methodology in interpreting, aggregating, processing, and analyzing data for intelligent DL-enabled IoT Explores new functions and technologies to provide adaptive services and intelligent applications for different end users Uttam Ghosh is an Assistant Professor in the Department of Electrical Engineering and Computer Science, Vanderbilt University, Nashville, Tennessee, USA. Mamoun Alazab is an Associate Professor in the College of Engineering, IT and Environment at Charles Darwin University, Australia. Ali Kashif Bashir is a Senior Lecturer/Associate Professor and Program Leader of BSc (H) Computer Forensics and Security at the Department of Computing and Mathematics, Manchester Metropolitan University, United Kingdom. Al-Sakib Khan Pathan is an Adjunct Professor of Computer Science and Engineering at the Independent University, Bangladesh.

This book constitutes the proceedings of the 6th International Workshop on Machine Learning in Medical Imaging, MLMI 2015, held in conjunction with MICCAI 2015, in Munich in October 2015. The 40 full papers presented in this volume were carefully reviewed and selected from 69 submissions. The workshop focuses on major trends and challenges in the area of machine learning in medical imaging and present works aimed to identify new cutting-edge techniques and their use in medical imaging.

This book constitutes the post-conference proceedings of the 4th International Conference on Machine Learning, Optimization, and Data Science, LOD 2018, held in Volterra, Italy, in September 2018. The 46 full papers presented were carefully reviewed and selected from 126 submissions. The papers cover topics in the field of machine learning, artificial intelligence, reinforcement learning, computational optimization and data science presenting a substantial array of ideas, technologies, algorithms, methods and applications.

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For ‘Recent Progress in Brain and Cognitive Engineering’ Brain and Cognitive Engineering is a converging study field to derive a better understanding of cognitive information processing in

the human brain, to develop “human-like” and neuromorphic artificial intelligent systems and to help predict and analyze brain-related diseases. The key concept of Brain and Cognitive Engineering is to understand the Brain, to interface the Brain, and to engineer the Brain. It could help us to understand the structure and the key principles of high-order information processing on how the brain works, to develop interface technologies between a brain and external devices and to develop artificial systems that can ultimately mimic human brain functions. The convergence of behavioral, neuroscience and engineering research could lead us to advance health informatics and personal learning, to enhance virtual reality and healthcare systems, and to “reverse engineer” some brain functions and build cognitive robots. In this book, four different recent research directions are presented: Non-invasive Brain-Computer Interfaces, Cognitive- and Neural-rehabilitation Engineering, Big Data Neurocomputing, Early Diagnosis and Prediction of Neural Diseases. We cover numerous topics ranging from smart vehicles and online EEG analysis, neuroimaging for Brain-Computer Interfaces, memory implantation and rehabilitation, big data computing in cultural aspects and cybernetics to brain disorder detection. Hopefully this will provide a valuable reference for researchers in medicine, biomedical engineering, in industry and academia for their further investigations and be inspiring to those who seek the foundations to improve techniques and understanding of the Brain and Cognitive Engineering research field.

We are entering the era of big data, and machine learning can be used to analyze this deluge of data automatically. Machine learning has been used to solve many interesting and often difficult real-world problems, and the biometrics is one of the leading applications of machine learning. This book introduces some new techniques on biometrics and machine learning, and new proposals of using machine learning techniques for biometrics as well. This book consists of two parts: "Biometrics" and "Machine Learning for Biometrics." Parts I and II contain four and three chapters, respectively. The book is reviewed by editors: Prof. Jucheng Yang, Prof. Dong Sun Park, Prof. Sook Yoon, Dr. Yarui Chen, and Dr. Chuanlei Zhang.

The proceedings set LNCS 11727, 11728, 11729, 11730, and 11731 constitute the proceedings of the 28th International Conference on Artificial Neural Networks, ICANN 2019, held in Munich, Germany, in September 2019. The total of 277 full papers and 43 short papers presented in these proceedings was carefully reviewed and selected from 494 submissions. They were organized in 5 volumes focusing on theoretical neural computation; deep learning; image processing; text and time series; and workshop and special sessions.

The six-volume set LNCS 11764, 11765, 11766, 11767, 11768, and 11769 constitutes the refereed proceedings of the 22nd International Conference on Medical Image Computing and Computer-Assisted Intervention, MICCAI 2019, held in Shenzhen, China, in October 2019. The 539 revised full papers presented were carefully reviewed and selected from 1730 submissions in a double-blind review process. The papers are organized in the following topical sections: Part I: optical imaging; endoscopy; microscopy. Part II: image segmentation; image registration; cardiovascular imaging; growth, development, atrophy and progression. Part III: neuroimage reconstruction and synthesis; neuroimage segmentation; diffusion weighted magnetic resonance imaging; functional neuroimaging (fMRI); miscellaneous neuroimaging. Part IV: shape; prediction; detection and localization; machine learning; computer-aided diagnosis; image reconstruction and synthesis. Part V: computer assisted interventions; MIC meets CAI. Part VI: computed tomography; X-ray imaging.

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The twenty last years have been marked by an increase in available data and computing power. In parallel to this trend, the focus of neural network research and the practice of training neural networks has undergone a number of important changes, for example, use of deep learning machines. The second edition of the book augments the first edition with more tricks, which have resulted from 14 years of theory and experimentation by some of the world's most prominent neural network researchers. These tricks can make a substantial difference (in terms of speed, ease of implementation, and accuracy) when it comes to putting algorithms to work on real problems.

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