Deep Convolutional Neural Network Based Approach For

The 6th IEEE Conference on Data Science and Machine Learning Applications is aimed to gather researchers and Applications developers from a wide range of Data Science related areas such as data analytics, computational intelligence, machine learning, deep learning, pattern recognition, databases, Big Data and Visualization. The Conference will provide opportunities for technical collaboration among data science and machine learning researchers, developers and practitioners in Saudi Arabia, GCC countries and Middle East region. Acceptance will be based primarily on originality, significance and quality of contribution. All submissions will undergo a blind peer review process before acceptance and possible inclusion in the proceedings of the conference.

This book covers a large set of methods in the field of Artificial Intelligence - Deep Learning applied to real-world problems. The fundamentals of the Deep Learning approach and different types of Deep Neural Networks (DNNs) are first summarized in this book, which offers a comprehensive preamble for further problem-oriented chapters. The most interesting and open problems of machine learning in the framework of Deep Learning are discussed in this book and solutions are proposed. This book illustrates how to implement the zero-shot learning with Deep Neural Network Classifiers, which require a large amount of training data. The lack of annotated training data naturally pushes the researchers to implement low supervision algorithms. Metric learning is a long-term research but in the framework of Deep Learning approaches, it gets freshness and originality. Fine-grained classification with a low inter-class variability is a difficult problem for any classification tasks. This book presents how it is solved, by using different modalities and attention mechanisms in 3D convolutional networks. Researchers focused on Machine Learning, Deep learning, Multimedia and Computer Vision will want to buy this book. Advanced level students studying computer science within these topics will also find this book useful.

This book constitutes the proceedings of the Second International Workshop on Thoracic Image Analysis, TIA 2020, held in Lima, Peru, in October 2020. Due to COVID-19 pandemic the conference was held virtually. COVID-19 infection has brought a lot of attention to lung imaging and the role of CT imaging in the diagnostic workflow of COVID-19 suspects is an important topic. The 14 full papers presented deal with all aspects of image analysis of thoracic data, including: image acquisition and reconstruction, segmentation, registration, quantification, visualization, validation, population-based modeling, biophysical modeling (computational anatomy), deep learning, image analysis in small animals, outcome-based research and novel infectious disease applications.

This book constitutes the proceedings of the 4th International Conference on Computational Intelligence, Cyber Security, and Computational Models, ICC3 2019, which was held in Coimbatore, India, in December 2019. The 9 papers presented in this volume were carefully reviewed and selected from 38 submissions. They were organized in topical sections named: computational intelligence; cyber security; and computational models.

This book collects 14 articles from the Special Issue entitled "Deep Learning Applications with Practical Measured Results in
Electronics Industries” of Electronics. Topics covered in this Issue include four main parts: (1) environmental information analyses and predictions, (2) unmanned aerial vehicle (UAV) and object tracking applications, (3) measurement and denoising techniques, and (4) recommendation systems and education systems. These authors used and improved deep learning techniques (e.g., ResNet (deep residual network), Faster-RCNN (faster regions with convolutional neural network), LSTM (long short term memory), ConvLSTM (convolutional LSTM), GAN (generative adversarial network), etc.) to analyze and denoise measured data in a variety of applications and services (e.g., wind speed prediction, air quality prediction, underground mine applications, neural audio caption, etc.). Several practical experiments were conducted, and the results indicate that the performance of the presented deep learning methods is improved compared with the performance of conventional machine learning methods.

The three-volume set LNCS 9900, 9901, and 9902 constitutes the refereed proceedings of the 19th International Conference on Medical Image Computing and Computer-Assisted Intervention, MICCAI 2016, held in Athens, Greece, in October 2016. Based on rigorous peer reviews, the program committee carefully selected 228 revised regular papers from 756 submissions for presentation in three volumes. The papers have been organized in the following topical sections: Part I: brain analysis, brain analysis - connectivity; brain analysis - cortical morphology; Alzheimer disease; surgical guidance and tracking; computer aided interventions; ultrasound image analysis; cancer image analysis; Part II: machine learning and feature selection; deep learning in medical imaging; applications of machine learning; segmentation; cell image analysis; Part III: registration and deformation estimation; shape modeling; cardiac and vascular image analysis; image reconstruction; and MR image analysis.

Multimodal Scene Understanding: Algorithms, Applications and Deep Learning presents recent advances in multi-modal computing, with a focus on computer vision and photogrammetry. It provides the latest algorithms and applications that involve combining multiple sources of information and describes the role and approaches of multi-sensory data and multi-modal deep learning. The book is ideal for researchers from the fields of computer vision, remote sensing, robotics, and photogrammetry, thus helping foster interdisciplinary interaction and collaboration between these realms. Researchers collecting and analyzing multi-sensory data collections – for example, KITTI benchmark (stereo+laser) - from different platforms, such as autonomous vehicles, surveillance cameras, UAVs, planes and satellites will find this book to be very useful. Contains state-of-the-art developments on multi-modal computing Shines a focus on algorithms and applications Presents novel deep learning topics on multi-sensor fusion and multi-modal deep learning

Database Systems for Advanced Applications21st International Conference, DASFAA 2016, Dallas, TX, USA, April 16-19, 2016, Proceedings, Part ISpringer

This volume constitutes the refereed proceedings of the 9th International Conference on Image and Signal Processing, ICISP 2020, which was due to be held in Marrakesh, Morocco, in June 2020. The conference was cancelled due to the COVID-19 pandemic. The 40 revised full papers were carefully reviewed and selected from 84 submissions. The contributions presented in this volume were organized in the following topical sections: digital cultural heritage & color and spectral imaging; data and image processing for precision agriculture; machine learning
application and innovation; biomedical imaging; deep learning and applications; pattern recognition; segmentation and retrieval; mathematical imaging & signal processing.

This two volume set LNCS 9642 and LNCS 9643 constitutes the refereed proceedings of the 21st International Conference on Database Systems for Advanced Applications, DASFAA 2016, held in Dallas, TX, USA, in April 2016. The 61 full papers presented were carefully reviewed and selected from a total of 183 submissions. The papers cover the following topics: crowdsourcing, data quality, entity identification, data mining and machine learning, recommendation, semantics computing and knowledge base, textual data, social networks, complex queries, similarity computing, graph databases, and miscellaneous, advanced applications.

An introduction to a broad range of topics in deep learning, covering mathematical and conceptual background, deep learning techniques used in industry, and research perspectives. “Written by three experts in the field, Deep Learning is the only comprehensive book on the subject.” —Elon Musk, cochair of OpenAI; cofounder and CEO of Tesla and SpaceX Deep learning is a form of machine learning that enables computers to learn from experience and understand the world in terms of a hierarchy of concepts. Because the computer gathers knowledge from experience, there is no need for a human computer operator to formally specify all the knowledge that the computer needs. The hierarchy of concepts allows the computer to learn complicated concepts by building them out of simpler ones; a graph of these hierarchies would be many layers deep. This book introduces a broad range of topics in deep learning. The text offers mathematical and conceptual background, covering relevant concepts in linear algebra, probability theory and information theory, numerical computation, and machine learning. It describes deep learning techniques used by practitioners in industry, including deep feedforward networks, regularization, optimization algorithms, convolutional networks, sequence modeling, and practical methodology; and it surveys such applications as natural language processing, speech recognition, computer vision, online recommendation systems, bioinformatics, and videogames. Finally, the book offers research perspectives, covering such theoretical topics as linear factor models, autoencoders, representation learning, structured probabilistic models, Monte Carlo methods, the partition function, approximate inference, and deep generative models. Deep Learning can be used by undergraduate or graduate students planning careers in either industry or research, and by software engineers who want to begin using deep learning in their products or platforms. A website offers supplementary material for both readers and instructors.

This book reviews the state of the art in deep learning approaches to high-performance robust disease detection, robust and accurate organ segmentation in medical image computing (radiological and pathological imaging modalities), and the construction and mining of large-scale radiology databases. It particularly focuses on the application of convolutional neural networks, and on recurrent neural networks like LSTM, using numerous practical examples to complement the theory. The book’s chief features are as follows: It highlights how deep neural networks can be used to address new questions and protocols, and to tackle current challenges in medical image computing; presents a comprehensive review of the latest research and literature; and describes a range of different methods that employ deep learning for object or landmark detection tasks in 2D and 3D medical imaging. In addition, the book examines a broad selection of techniques for semantic segmentation using deep learning principles in medical imaging; introduces a novel approach to text and image deep embedding for a large-scale chest x-ray image database; and discusses how deep learning relational graphs can be used to organize a sizable collection of radiology findings from real clinical practice, allowing semantic similarity-based retrieval. The intended reader of this edited book is a professional engineer, scientist or a graduate student who is able to comprehend general concepts of image processing, computer vision and medical image analysis. They can apply computer science and mathematical principles into problem solving practices. It may be necessary to
have a certain level of familiarity with a number of more advanced subjects: image formation and enhancement, image understanding, visual recognition in medical applications, statistical learning, deep neural networks, structured prediction and image segmentation. Graphs are useful data structures in complex real-life applications such as modeling physical systems, learning molecular fingerprints, controlling traffic networks, and recommending friends in social networks. However, these tasks require dealing with non-Euclidean graph data that contains rich relational information between elements and cannot be well handled by traditional deep learning models (e.g., convolutional neural networks (CNNs) or recurrent neural networks (RNNs)). Nodes in graphs usually contain useful feature information that cannot be well addressed in most unsupervised representation learning methods (e.g., network embedding methods). Graph neural networks (GNNs) are proposed to combine the feature information and the graph structure to learn better representations on graphs via feature propagation and aggregation. Due to its convincing performance and high interpretability, GNN has recently become a widely applied graph analysis tool. This book provides a comprehensive introduction to the basic concepts, models, and applications of graph neural networks. It starts with the introduction of the vanilla GNN model. Then several variants of the vanilla model are introduced such as graph convolutional networks, graph recurrent networks, graph attention networks, graph residual networks, and several general frameworks. Variants for different graph types and advanced training methods are also included. As for the applications of GNNs, the book categorizes them into structural, non-structural, and other scenarios, and then it introduces several typical models on solving these tasks. Finally, the closing chapters provide GNN open resources and the outlook of several future directions.

Computer vision has become increasingly important and effective in recent years due to its wide-ranging applications in areas as diverse as smart surveillance and monitoring, health and medicine, sports and recreation, robotics, drones, and self-driving cars. Visual recognition tasks, such as image classification, localization, and detection, are the core building blocks of many of these applications, and recent developments in Convolutional Neural Networks (CNNs) have led to outstanding performance in these state-of-the-art visual recognition tasks and systems. As a result, CNNs now form the crux of deep learning algorithms in computer vision. This self-contained guide will benefit those who seek to both understand the theory behind CNNs and to gain hands-on experience on the application of CNNs in computer vision. It provides a comprehensive introduction to CNNs starting with the essential concepts behind neural networks: training, regularization, and optimization of CNNs. The book also discusses a wide range of loss functions, network layers, and popular CNN architectures, reviews the different techniques for the evaluation of CNNs, and presents some popular CNN tools and libraries that are commonly used in computer vision. Further, this text describes and discusses case studies that are related to the application of CNN in computer vision, including image classification, object detection, semantic segmentation, scene understanding, and image generation. This book is ideal for undergraduate and graduate students, as no prior background knowledge in the field is required to follow the material, as well as new researchers, developers, engineers, and practitioners who are interested in gaining a quick understanding of CNN models.

Biopotential signals are often used by physicians to measure the activities of organs and tissues in the human body. This book describes the sources and characteristics of different biopotential signals and provides an understanding of how a range of signals can be modelled and analysed. The resulting information can be used to assist in the identification of disorders such as epilepsy, schizophrenia, PTSD and heart disease, among others. An emphasis is placed on the real challenges in biopotential signal processing due to the complex and non-stationary nature of signals. Following on from volume one, this book starts with a collection of chapters covering some of the latest developments in electroencephalography (EEG) signal analysis, then moves on to applications of electrocardiography (ECG) and otoscope signals. The
volume concludes with a discussion of other monitoring techniques. The chapters include biomedical examples and discussions of how each method can be used to study human organs. It is a valuable guide for all researchers and practitioners who are engaged in studies and research in the area of biomedical signals and their applications. Key Features Modelling and acquisition of biomedical signals for different disorders Implementation of methodologies and their impact on different cases Case studies and research directions Design and simulation examples

This must-read text/reference introduces the fundamental concepts of convolutional neural networks (ConvNets), offering practical guidance on using libraries to implement ConvNets in applications of traffic sign detection and classification. The work presents techniques for optimizing the computational efficiency of ConvNets, as well as visualization techniques to better understand the underlying processes. The proposed models are also thoroughly evaluated from different perspectives, using exploratory and quantitative analysis. Topics and features: explains the fundamental concepts behind training linear classifiers and feature learning; discusses the wide range of loss functions for training binary and multi-class classifiers; illustrates how to derive ConvNets from fully connected neural networks, and reviews different techniques for evaluating neural networks; presents a practical library for implementing ConvNets, explaining how to use a Python interface for the library to create and assess neural networks; describes two real-world examples of the detection and classification of traffic signs using deep learning methods; examines a range of varied techniques for visualizing neural networks, using a Python interface; provides self-study exercises at the end of each chapter, in addition to a helpful glossary, with relevant Python scripts supplied at an associated website. This self-contained guide will benefit those who seek to both understand the theory behind deep learning, and to gain hands-on experience in implementing ConvNets in practice. As no prior background knowledge in the field is required to follow the material, the book is ideal for all students of computer vision and machine learning, and will also be of great interest to practitioners working on autonomous cars and advanced driver assistance systems.

This book covers deep-learning-based approaches for sentiment analysis, a relatively new, but fast-growing research area, which has significantly changed in the past few years. The book presents a collection of state-of-the-art approaches, focusing on the best-performing, cutting-edge solutions for the most common and difficult challenges faced in sentiment analysis research. Providing detailed explanations of the methodologies, the book is a valuable resource for researchers as well as newcomers to the field. Get to grips with the basics of Keras to implement fast and efficient deep-learning models About This Book Implement various deep-learning algorithms in Keras and see how deep-learning can be used in games See how various deep-learning models and practical use-cases can be implemented using Keras A practical, hands-on guide with real-world examples to give you a strong foundation in Keras Who This Book Is For If you are a data scientist with experience in machine learning or an AI programmer with some exposure to neural networks, you will find this book a useful entry point to deep-learning with Keras. A knowledge of Python is required for this book. What You Will Learn Optimize step-by-step functions on a large neural network using the Backpropagation Algorithm Fine-tune a neural network to improve the quality of results Use deep learning for image and audio processing Use Recursive Neural Tensor Networks (RNTNs) to outperform standard word embedding in special cases Identify problems for which Recurrent Neural Network (RNN) solutions are suitable Explore the process required to implement
Autoencoders Evolve a deep neural network using reinforcement learning In Detail This book starts by introducing you to supervised learning algorithms such as simple linear regression, the classical multilayer perceptron and more sophisticated deep convolutional networks. You will also explore image processing with recognition of hand written digit images, classification of images into different categories, and advanced objects recognition with related image annotations. An example of identification of salient points for face detection is also provided. Next you will be introduced to Recurrent Networks, which are optimized for processing sequence data such as text, audio or time series. Following that, you will learn about unsupervised learning algorithms such as Autoencoders and the very popular Generative Adversarial Networks (GAN). You will also explore non-traditional uses of neural networks as Style Transfer. Finally, you will look at Reinforcement Learning and its application to AI game playing, another popular direction of research and application of neural networks. Style and approach This book is an easy-to-follow guide full of examples and real-world applications to help you gain an in-depth understanding of Keras. This book will showcase more than twenty working Deep Neural Networks coded in Python using Keras.

This book presents a detailed review of the state of the art in deep learning approaches for semantic object detection and segmentation in medical image computing, and large-scale radiology database mining. A particular focus is placed on the application of convolutional neural networks, with the theory supported by practical examples. Features: highlights how the use of deep neural networks can address new questions and protocols, as well as improve upon existing challenges in medical image computing; discusses the insightful research experience of Dr. Ronald M. Summers; presents a comprehensive review of the latest research and literature; describes a range of different methods that make use of deep learning for object or landmark detection tasks in 2D and 3D medical imaging; examines a varied selection of techniques for semantic segmentation using deep learning principles in medical imaging; introduces a novel approach to interleaved text and image deep mining on a large-scale radiology image database.

Artificial intelligence and its various components are rapidly engulfing almost every professional industry. Specific features of AI that have proven to be vital solutions to numerous real-world issues are machine learning and deep learning. These intelligent agents unlock higher levels of performance and efficiency, creating a wide span of industrial applications. However, there is a lack of research on the specific uses of machine/deep learning in the professional realm. Machine Learning and Deep Learning in Real-Time Applications provides emerging research exploring the theoretical and practical aspects of machine learning and deep learning and their implementations as well as their ability to solve real-world problems within several professional disciplines including healthcare, business, and computer science. Featuring coverage on a broad range of topics such as image processing, medical improvements, and smart grids, this book is ideally designed for researchers, academicians, scientists, industry experts, scholars, IT professionals, engineers, and students seeking current research on the multifaceted uses and implementations of machine learning and deep learning across the globe.

Multimodal Behavioral Analysis in the Wild: Advances and Challenges presents the state-of-the-art in behavioral signal
processing using different data modalities, with a special focus on identifying the strengths and limitations of current technologies. The book focuses on audio and video modalities, while also emphasizing emerging modalities, such as accelerometer or proximity data. It covers tasks at different levels of complexity, from low level (speaker detection, sensorimotor links, source separation), through middle level (conversational group detection, addressee and addressee identification), and high level (personality and emotion recognition), providing insights on how to exploit inter-level and intra-level links. This is a valuable resource on the state-of-the-art and future research challenges of multi-modal behavioral analysis in the wild. It is suitable for researchers and graduate students in the fields of computer vision, audio processing, pattern recognition, machine learning and social signal processing. Gives a comprehensive collection of information on the state-of-the-art, limitations, and challenges associated with extracting behavioral cues from real-world scenarios Presents numerous applications on how different behavioral cues have been successfully extracted from different data sources Provides a wide variety of methodologies used to extract behavioral cues from multi-modal data

This book covers both classical and modern models in deep learning. The primary focus is on the theory and algorithms of deep learning. The theory and algorithms of neural networks are particularly important for understanding important concepts, so that one can understand the important design concepts of neural architectures in different applications. Why do neural networks work? When do they work better than off-the-shelf machine-learning models? When is depth useful? Why is training neural networks so hard? What are the pitfalls? The book is also rich in discussing different applications in order to give the practitioner a flavor of how neural architectures are designed for different types of problems. Applications associated with many different areas like recommender systems, machine translation, image captioning, image classification, reinforcement-learning based gaming, and text analytics are covered. The chapters of this book span three categories: The basics of neural networks: Many traditional machine learning models can be understood as special cases of neural networks. An emphasis is placed in the first two chapters on understanding the relationship between traditional machine learning and neural networks. Support vector machines, linear/logistic regression, singular value decomposition, matrix factorization, and recommender systems are shown to be special cases of neural networks. These methods are studied together with recent feature engineering methods like word2vec. Fundamentals of neural networks: A detailed discussion of training and regularization is provided in Chapters 3 and 4. Chapters 5 and 6 present radial-basis function (RBF) networks and restricted Boltzmann machines. Advanced topics in neural networks: Chapters 7 and 8 discuss recurrent neural networks and convolutional neural networks. Several advanced topics like deep reinforcement learning, neural Turing machines, Kohonen self-organizing maps, and generative adversarial networks are introduced in Chapters 9 and 10. The book is written for graduate students, researchers, and practitioners. Numerous exercises are available along with a solution manual to aid in classroom teaching. Where possible, an application-centric view is highlighted in order to provide an understanding of the practical uses of each class of techniques. Deep learning, a branch of Artificial Intelligence and machine learning, has led to new approaches to solving problems in a variety
of domains including data science, data analytics and biomedical engineering. Deep Learning for Data Analytics: Foundations, Biomedical Applications and Challenges provides readers with a focused approach for the design and implementation of deep learning concepts using data analytics techniques in large scale environments. Deep learning algorithms are based on artificial neural network models to cascade multiple layers of nonlinear processing, which aids in feature extraction and learning in supervised and unsupervised ways, including classification and pattern analysis. Deep learning transforms data through a cascade of layers, helping systems analyze and process complex data sets. Deep learning algorithms extract high level complex data and process these complex sets to relatively simpler ideas formulated in the preceding level of the hierarchy. The authors of this book focus on suitable data analytics methods to solve complex real world problems such as medical image recognition, biomedical engineering, and object tracking using deep learning methodologies. The book provides a pragmatic direction for researchers who wish to analyze large volumes of data for business, engineering, and biomedical applications. Deep learning architectures including deep neural networks, recurrent neural networks, and deep belief networks can be used to help resolve problems in applications such as natural language processing, speech recognition, computer vision, bioinformatics, audio recognition, drug design, and medical image analysis. Presents the latest advances in Deep Learning for data analytics and biomedical engineering applications. Discusses Deep Learning techniques as they are being applied in the real world of biomedical engineering and data science, including Deep Learning networks, deep feature learning, deep learning toolboxes, performance evaluation, Deep Learning optimization, deep auto-encoders, and deep neural networks Provides readers with an introduction to Deep Learning, along with coverage of deep belief networks, convolutional neural networks, Restricted Boltzmann Machines, data analytics basics, enterprise data science, predictive analysis, optimization for Deep Learning, and feature selection using Deep Learning. This book constitutes the refereed proceedings of the 5th International Conference on Information Processing, ICIP 2011, held in Bangalore, India, in August 2011. The 86 revised full papers presented were carefully reviewed and selected from 514 submissions. The papers are organized in topical sections on data mining; Web mining; artificial intelligence; soft computing; software engineering; computer communication networks; wireless networks; distributed systems and storage networks; signal processing; image processing and pattern recognition. Deep learning algorithms have brought a revolution to the computer vision community by introducing non-traditional and efficient solutions to several image-related problems that had long remained unsolved or partially addressed. This book presents a collection of eleven chapters where each individual chapter explains the deep learning principles of a specific topic, introduces reviews of up-to-date techniques, and presents research findings to the computer vision community. The book covers a broad scope of topics in deep learning concepts and applications such as accelerating the convolutional neural network inference on field-programmable gate arrays, fire detection in surveillance applications, face recognition, action and activity recognition, semantic segmentation for autonomous driving, aerial imagery registration,
robot vision, tumor detection, and skin lesion segmentation as well as skin melanoma classification. The content of this book has been organized such that each chapter can be read independently from the others. The book is a valuable companion for researchers, for postgraduate and possibly senior undergraduate students who are taking an advanced course in related topics, and for those who are interested in deep learning with applications in computer vision, image processing, and pattern recognition.

Deep Learning for Chest Radiographs enumerates different strategies implemented by the authors for designing an efficient convolution neural network-based computer-aided classification (CAC) system for binary classification of chest radiographs into "Normal" and "Pneumonia." Pneumonia is an infectious disease mostly caused by a bacteria or a virus. The prime targets of this infectious disease are children below the age of 5 and adults above the age of 65, mostly due to their poor immunity and lower rates of recovery. Globally, pneumonia has prevalent footprints and kills more children as compared to any other immunity-based disease, causing up to 15% of child deaths per year, especially in developing countries. Out of all the available imaging modalities, such as computed tomography, radiography or X-ray, magnetic resonance imaging, ultrasound, and so on, chest radiographs are most widely used for differential diagnosis between Normal and Pneumonia. In the CAC system designs implemented in this book, a total of 200 chest radiograph images consisting of 100 Normal images and 100 Pneumonia images have been used. These chest radiographs are augmented using geometric transformations, such as rotation, translation, and flipping, to increase the size of the dataset for efficient training of the Convolutional Neural Networks (CNNs). A total of 12 experiments were conducted for the binary classification of chest radiographs into Normal and Pneumonia. It also includes in-depth implementation strategies of exhaustive experimentation carried out using transfer learning-based approaches with decision fusion, deep feature extraction, feature selection, feature dimensionality reduction, and machine learning-based classifiers for implementation of end-to-end CNN-based CAC system designs, lightweight CNN-based CAC system designs, and hybrid CAC system designs for chest radiographs. This book is a valuable resource for academicians, researchers, clinicians, postgraduate and graduate students in medical imaging, CAC, computer-aided diagnosis, computer science and engineering, electrical and electronics engineering, biomedical engineering, bioinformatics, bioengineering, and professionals from the IT industry. Provides insights into the theory, algorithms, implementation, and application of deep-learning techniques for medical images such as transfer learning using pretrained CNNs, series networks, directed acyclic graph networks, lightweight CNN models, deep feature extraction, and conventional machine learning approaches for feature selection, feature dimensionality reduction, and classification using support vector machine, neuro-fuzzy classifiers Covers the various augmentation techniques that can be used with medical images and the CNN-based CAC system designs for
binary classification of medical images focusing on chest radiographs Investigates the development of an optimal CAC system design with deep feature extraction and classification of chest radiographs by comparing the performance of 12 different CAC system designs
Annotation The 2017 Chinese Automation Congress (CAC 2017) will provide a platform for all scholars and technicians in automation and intelligent manufacturing from academy and industry to share ideas, and to present the latest scientific and technical advances.
This book proposes a novel neural architecture, tree-based convolutional neural networks (TBCNNs), for processing tree-structured data. TBCNNs are related to existing convolutional neural networks (CNNs) and recursive neural networks (RNNs), but they combine the merits of both: thanks to their short propagation path, they are as efficient in learning as CNNs; yet they are also as structure-sensitive as RNNs. In this book, readers will also find a comprehensive literature review of related work, detailed descriptions of TBCNNs and their variants, and experiments applied to program analysis and natural language processing tasks. It is also an enjoyable read for all those with a general interest in deep learning.
This master thesis presents the process of designing and implementing a CNN-based architecture for image recognition included in a larger project in the field of fashion recommendation with deep learning. Concretely, the presented network aims to perform localization and segmentation tasks. Therefore, an accurate analysis of the most well-known localization and segmentation networks in the state of the art has been performed. Afterwards, a multi-task network performing RoI pixel-wise segmentation has been created. This proposal solves the detected weaknesses of the pre-existing networks in the field of application, i.e. fashion recommendation. These weaknesses are basically related with the lack of a fine-grained quality of the segmentation and problems with computational efficiency. When it comes to improve the details of the segmentation, this network proposes to work pixel-wise, i.e. performing a classification task for each of the pixels of the image. Thus, the network is more suitable to detect all the details presented in the analysed images. However, a pixel-wise task requires working in pixel resolution, which implies that the number of operations to perform is usually large. To reduce the total number of operations to perform in the network and increase the computational efficiency, this pixel-wise segmentation is only done in the meaningful regions of the image (Regions of Interest), which are also computed in the network (RoI masks). Then, after a study of the more recent deep learning libraries, the network has been successfully implemented. Finally, to prove the correct operation of the design, a set of experiments have been satisfactorily conducted. In this sense, it must be noted that the evaluation of the results obtained during testing phase with respect to the most well-known architectures is out of the scope of this thesis as the experimental conditions, especially in terms of dataset, have not been suitable for doing so. Nevertheless, the proposed network is totally prepared to perform this
evaluation in the future, when the required experimental conditions are available. Fundamentals of Brain Network Analysis is a comprehensive and accessible introduction to methods for unraveling the extraordinary complexity of neuronal connectivity. From the perspective of graph theory and network science, this book introduces, motivates and explains techniques for modeling brain networks as graphs of nodes connected by edges, and covers a diverse array of measures for quantifying their topological and spatial organization. It builds intuition for key concepts and methods by illustrating how they can be practically applied in diverse areas of neuroscience, ranging from the analysis of synaptic networks in the nematode worm to the characterization of large-scale human brain networks constructed with magnetic resonance imaging. This text is ideally suited to neuroscientists wanting to develop expertise in the rapidly developing field of neural connectomics, and to physical and computational scientists wanting to understand how these quantitative methods can be used to understand brain organization. Extensively illustrated throughout by graphical representations of key mathematical concepts and their practical applications to analyses of nervous systems Comprehensively covers graph theoretical analyses of structural and functional brain networks, from microscopic to macroscopic scales, using examples based on a wide variety of experimental methods in neuroscience Designed to inform and empower scientists at all levels of experience, and from any specialist background, wanting to use modern methods of network science to understand the organization of the brain

This book provides a structured treatment of the key principles and techniques for enabling efficient processing of deep neural networks (DNNs). DNNs are currently widely used for many artificial intelligence (AI) applications, including computer vision, speech recognition, and robotics. While DNNs deliver state-of-the-art accuracy on many AI tasks, it comes at the cost of high computational complexity. Therefore, techniques that enable efficient processing of deep neural networks to improve key metrics—such as energy-efficiency, throughput, and latency—without sacrificing accuracy or increasing hardware costs are critical to enabling the wide deployment of DNNs in AI systems. The book includes background on DNN processing; a description and taxonomy of hardware architectural approaches for designing DNN accelerators; key metrics for evaluating and comparing different designs; features of DNN processing that are amenable to hardware/algorithm co-design to improve energy efficiency and throughput; and opportunities for applying new technologies. Readers will find a structured introduction to the field as well as formalization and organization of key concepts from contemporary work that provide insights that may spark new ideas.

Cardiac MRI is the gold standard for quantification of cardiac volumetry, function, and blood flow. Despite the wealth of information that may be gleamed from these acquisitions, its use has been limited primarily to academic and specialty clinics due to the need for specialty trained physicians and technologists required for planning of these scans. Recently,
deep convolutional neural networks (DCNNs) have shown promise in automating various aspects of radiological workflows, such as landmark localization. However, a primary limitation to applying DCNNs to clinical practice include uncertainty of how well an algorithm will perform outside of the environment in which it was trained. Moreover, these systems are often seen as "black boxes", which fail to provide an explanation of how an answer was achieved. Providing a way in which clinical end users may have confidence in these systems is therefore essential for clinical adoption of any medically focused DCNN system. With these concerns in mind, I explore the potential automating the planning of Cardiac MR imaging planes using DCNN. In the first chapter, I explore the potential of automating the prescription of long-axis and short axis imaging planes by localizing the landmarks. To preserve the iterability in the DCNN, I regress pseudoprobability heatmaps (termed heatmap regression) centered at the valve and apex landmarks. I demonstrate that this approach of heatmap regression not only accurately identifies the landmarks, it is additionally able to recreate imaging planes similar to those defined by the ground truth landmarks or those acquired by a technologist at the time of original acquisition. In my second chapter, I explore the potential to applying these DCNNs within a clinical setting. I first established the importance of our angulation metric for assessing the accuracy imaging plane. To assess the generalizability of this system to different clinical environments, I calculated the angulation error between ground truth defined and DCNN predicted imaging planes. As an additional level of comparison, angulation error was calculated for technologist acquired imaging planes. I found that this system of DCNNs generally achieved similar or better performance compared to a technologist. Finally, in my third chapter, I explore the potential of adapting my DCNN algorithm to different clinical environments, using the differences in imaging characteristics seen at 1.5T vs 3T as a model system. To achieve this, I developed a methodology for selecting cases with greatest model uncertainty for transfer learning. I moreover developed two novel uncertainty metrics based either strength of prediction or test-time augmentation spatial variance pseudoprobability maps. To assess the performance of this approach, I used a model trained on only 1.5T long-axis images, and calculated pseudoprobability metrics of 3T long-axis images. We assessed the potential of each pseudoprobability metric by ranking 3T long-axis images by either increasing, decreasing, or random values. I found that 3T images with the highest uncertainty most efficiently increased the transfer learning data-efficiency for the apex, consistent with a good uncertainty metric. Moreover, I found that incorporation of 1.5T data into the transfer learning process helped preserve the initial performance at 1.5T. NAECON is the oldest and premier IEEE Conference presenting research in all aspects of theory, design and applications of aerospace systems and sensors.

Deep learning and image processing are two areas of great interest to academics and industry professionals alike. The
areas of application of these two disciplines range widely, encompassing fields such as medicine, robotics, and security and surveillance. The aim of this book, 'Deep Learning for Image Processing Applications', is to offer concepts from these two areas in the same platform, and the book brings together the shared ideas of professionals from academia and research about problems and solutions relating to the multifaceted aspects of the two disciplines. The first chapter provides an introduction to deep learning, and serves as the basis for much of what follows in the subsequent chapters, which cover subjects including: the application of deep neural networks for image classification; hand gesture recognition in robotics; deep learning techniques for image retrieval; disease detection using deep learning techniques; and the comparative analysis of deep data and big data. The book will be of interest to all those whose work involves the use of deep learning and image processing techniques.

Fourth International Conference on Information and Communication Technology for Competitive Strategies targets state-of-the-art as well as emerging topics pertaining to information and communication technologies (ICTs) and effective strategies for its implementation for engineering and intelligent applications.

It is our belief that researchers and practitioners acquire, through experience and word-of-mouth, techniques and heuristics that help them successfully apply neural networks to difficult real world problems. Often these 'tricks' are theoretically well motivated. Sometimes they are the result of trial and error. However, their most common link is that they are usually hidden in people’s heads or in the back pages of space-constrained conference papers. As a result newcomers to the field waste much time wondering why their networks train so slowly and perform so poorly. This book is an outgrowth of a 1996 NIPS workshop called Tricks of the Trade whose goal was to begin the process of gathering and documenting these tricks. The interest that the workshop generated motivated us to expand our collection and compile it into this book. Although we have no doubt that there are many tricks we have missed, we hope that what we have included will prove to be useful, particularly to those who are relatively new to the field. Each chapter contains one or more tricks presented by a given author (or authors). We have attempted to group related chapters into sections, though we recognize that the different sections are far from disjoint. Some of the chapters (e.g., 1, 13, 17) contain entire systems of tricks that are far more general than the category they have been placed in.

The eight-volume set comprising LNCS volumes 9905-9912 constitutes the refereed proceedings of the 14th European Conference on Computer Vision, ECCV 2016, held in Amsterdam, The Netherlands, in October 2016. The 415 revised papers presented were carefully reviewed and selected from 1480 submissions. The papers cover all aspects of computer vision and pattern recognition such as 3D computer vision; computational photography, sensing and display; face and gesture; low-level vision and image processing; motion and tracking; optimization methods; physics-based
vision, photometry and shape-from-X; recognition: detection, categorization, indexing, matching; segmentation, grouping and shape representation; statistical methods and learning; video: events, activities and surveillance; applications. They are organized in topical sections on detection, recognition and retrieval; scene understanding; optimization; image and video processing; learning; action activity and tracking; 3D; and 9 poster sessions.

Work with advanced topics in deep learning, such as optimization algorithms, hyper-parameter tuning, dropout, and error analysis as well as strategies to address typical problems encountered when training deep neural networks. You'll begin by studying the activation functions mostly with a single neuron (ReLu, sigmoid, and Swish), seeing how to perform linear and logistic regression using TensorFlow, and choosing the right cost function. The next section talks about more complicated neural network architectures with several layers and neurons and explores the problem of random initialization of weights. An entire chapter is dedicated to a complete overview of neural network error analysis, giving examples of solving problems originating from variance, bias, overfitting, and datasets coming from different distributions. Applied Deep Learning also discusses how to implement logistic regression completely from scratch without using any Python library except NumPy, to let you appreciate how libraries such as TensorFlow allow quick and efficient experiments. Case studies for each method are included to put into practice all theoretical information. You'll discover tips and tricks for writing optimized Python code (for example vectorizing loops with NumPy). What You Will Learn

Implement advanced techniques in the right way in Python and TensorFlow
Debug and optimize advanced methods (such as dropout and regularization)
Carry out error analysis (to realize if one has a bias problem, a variance problem, a data offset problem, and so on)
Set up a machine learning project focused on deep learning on a complex dataset

Who This Book Is For
Readers with a medium understanding of machine learning, linear algebra, calculus, and basic Python programming.

One stop guide to implementing award-winning, and cutting-edge CNN architectures
Key Features
Fast-paced guide with use cases and real-world examples to get well versed with CNN techniques
Implement CNN models on image classification, transfer learning, Object Detection, Instance Segmentation, GANs and more
Implement powerful use-cases like image captioning, reinforcement learning for hard attention, and recurrent attention models
Book Description
Convolutional Neural Network (CNN) is revolutionizing several application domains such as visual recognition systems, self-driving cars, medical discoveries, innovative eCommerce and more. You will learn to create innovative solutions around image and video analytics to solve complex machine learning and computer vision related problems and implement real-life CNN models. This book starts with an overview of deep neural networks with the example of image classification and walks you through building your first CNN for human face detector. We will learn to use concepts like
transfer learning with CNN, and Auto-Encoders to build very powerful models, even when not much of supervised training data of labeled images is available. Later we build upon the learning achieved to build advanced vision related algorithms for object detection, instance segmentation, generative adversarial networks, image captioning, attention mechanisms for vision, and recurrent models for vision. By the end of this book, you should be ready to implement advanced, effective and efficient CNN models at your professional project or personal initiatives by working on complex image and video datasets. What you will learn From CNN basic building blocks to advanced concepts understand practical areas they can be applied to Build an image classifier CNN model to understand how different components interact with each other, and then learn how to optimize it Learn different algorithms that can be applied to Object Detection, and Instance Segmentation Learn advanced concepts like attention mechanisms for CNN to improve prediction accuracy Understand transfer learning and implement award-winning CNN architectures like AlexNet, VGG, GoogLeNet, ResNet and more Understand the working of generative adversarial networks and how it can create new, unseen images Who this book is for This book is for data scientists, machine learning and deep learning practitioners, Cognitive and Artificial Intelligence enthusiasts who want to move one step further in building Convolutional Neural Networks. Get hands-on experience with extreme datasets and different CNN architectures to build efficient and smart ConvNet models. Basic knowledge of deep learning concepts and Python programming language is expected. The four-volume set LNCS 8925, 8926, 8927, and 8928 comprises the refereed post-proceedings of the Workshops that took place in conjunction with the 13th European Conference on Computer Vision, ECCV 2014, held in Zurich, Switzerland, in September 2014. The 203 workshop papers were carefully reviewed and selected for inclusion in the proceedings. They were presented at workshops with the following themes: where computer vision meets art; computer vision in vehicle technology; spontaneous facial behavior analysis; consumer depth cameras for computer vision; "chalearn" looking at people: pose, recovery, action/interaction, gesture recognition; video event categorization, tagging and retrieval towards big data; computer vision with local binary pattern variants; visual object tracking challenge; computer vision + ontology applies cross-disciplinary technologies; visual perception of affordance and functional visual primitives for scene analysis; graphical models in computer vision; light fields for computer vision; computer vision for road scene understanding and autonomous driving; soft biometrics; transferring and adapting source knowledge in computer vision; surveillance and re-identification; color and photometry in computer vision; assistive computer vision and robotics; computer vision problems in plant phenotyping; and non-rigid shape analysis and deformable image alignment. Additionally, a panel discussion on video segmentation is included.