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LEBLANC SULLIVAN

Analysis of Children's Sketches to Improve Recognition Accuracy in Sketch-Based Applications CRC Press

The need for intelligent machines in areas such as medical diagnostics, biometric security systems, and image processing motivates researchers to develop and explore new techniques, algorithms, and applications in this evolving field. Cross-Disciplinary Applications of Artificial Intelligence and Pattern Recognition: Advancing Technologies provides a common platform for researchers to present theoretical and applied research findings for enhancing and developing intelligent systems. Through its discussions of advances in and applications of pattern recognition technologies and artificial intelligence, this reference highlights core concepts in biometric imagery, feature recognition, and other related fields, along with their applicability.

Document Processing Using Machine Learning IGI Global

Face recognition attracts many researchers and has made significant progress in recent years. Face recognition is a type of biometric just like fingerprint and iris scans. This technology plays an important role in real-world applications, such as commercial and law enforcement applications, from here comes the importance of tackling this kind of research. In this research, we have proposed a method that integrates Principal Component Analysis (PCA) and Moment Invariant with face colour in gray scale to recognize face images of various pose. The PCA method is used to analyze the

face image because it is optimal with any similar face image analysis and it has been employed to extract the global information. The vectors of a face in the database that are matched with the one of face image will be recognized the owner. If the vector is not matched, the original face image will be reconsidered with moment invariant and face colour in gray scale extraction. Then, the face will be rematched. In this way, the unrecognized faces will be reconsidered again and some will be recognized accurately to increase the number of recognized faces and improve the recognition accuracy as well. We have applied our method on Olivetti Research Laboratory (ORL) database which is issued by AT&T. The database contains 40 different faces images with 10 each face. Our experiment is done by using the holdout to measure the recognition accuracy, as we divided about 2/3 of the data 280 faces for training, and about 1/3 which is 120 faces for testing. The results showed a recognition accuracy of 94% for applying PCA, and 96% after reconsidering the unrecognized patterns by dealing with pose-varied faces and face colour extraction. Our proposed method has improved the recognition accuracy with the additional features extracted (PCA + face colour in gray scale) with the consideration of the total time process.

Recognition of Emotions by Facial Geometry Using a Capsule Neural Network Springer Science & Business Media

Due to the rapid progress and advancements in deep learning and neural networks, many approaches and state-of-the-art researches have been conducted in these fields which cause developing various learning-based attacks leading to vulnerability of websites and portals. This kind of attacks decrease the security of the websites which results in releasing the sensitive and important personal information. These days, preserving the security of the websites is one of the most challenging tasks. CAPTCHA (Completely Automated Public Turing Test to Tell Computers and Humans Apart) is

kind of test which are developed by designers and are available in various websites to distinguish and differentiate humans from robots in order to protect the websites from possible attacks. In this dissertation, we proposed a CNN based approach to attack and break text-based CAPTCHAs. The proposed method has been compared with several state-of-the-art approaches in terms of recognition accuracy (RA). Based on the results, the developed method can break and recognize CAPTCHAs at high accuracy. Additionally, we wanted to check how to make these CAPTCHAs hard to be broken, so we employed five types of distortions in these CAPTCHAs. The recognition accuracy in presence of these noises has been calculated. The results indicate that adversarial noise can make CAPTCHAs much difficult to be broken. The results have been compared with some state-of-the-art approaches. This analysis can be helpful for CAPTCHA developers to consider these noises in their developed CAPTCHAs. This dissertation also presents a hybrid model based on CNN-SVM to solve text-based CAPTCHAs. The developed method contains four main steps, namely: segmentation, feature extraction, feature selection, and recognition. For segmentation, we suggested using histogram and k-means clustering. For feature extraction, we developed a new CNN structure. The extracted features are passed through the mRMR algorithm to select the most efficient features. These selected features are fed into SVM for further classification and recognition. The results have been compared with several state-of-the-art methods to show the superiority of the developed approach. In general, this dissertation presented deep learning-based methods to solve text-based CAPTCHAs. The efficiency and effectiveness of the developed methods have been compared with various state-of-the-art methods. The developed techniques can break CAPTCHAs at high accuracy and also in a short time. We utilized Peak Signal to Noise Ratio (PSNR), ROC, accuracy, sensitivity, specificity, and precision to evaluate and measure the performance analysis of different methods. The results indicate the superiority of the developed methods.

Unconstrained Face Recognition BoD – Books on Demand

Cross disciplinary biometric systems help boost the performance of the conventional systems. Not only is the recognition accuracy significantly improved, but also the robustness of the systems is greatly enhanced in the challenging environments, such as varying illumination conditions. By leveraging the cross disciplinary technologies, face recognition systems, fingerprint recognition systems, iris recognition systems, as well as image search systems all benefit in terms of recognition performance. Take face recognition for an example, which is not only the most natural way human beings recognize the identity of each other, but also the least privacy-intrusive means because people show their face publicly every day. Face recognition systems display superb performance when they capitalize on the innovative ideas across color science, mathematics, and computer science (e.g., pattern recognition, machine learning, and image processing). The novel ideas lead to the development of new color models and effective color features in color science; innovative features from wavelets and statistics, and new kernel methods and novel kernel models in mathematics; new discriminant analysis frameworks, novel similarity measures, and new image analysis methods, such as fusing multiple image features from frequency domain, spatial domain, and color domain in computer science; as well as system design, new strategies for system integration, and different fusion strategies, such as the feature level fusion, decision level fusion, and new fusion strategies with novel similarity measures.

Human Activity Recognition and Behaviour Analysis MDPI

This book is to chart the progress in applying machine learning, including deep learning, to a broad range of image analysis and pattern recognition problems and applications. In this book, we have assembled original research articles making unique contributions to the theory, methodology and applications of machine learning in image analysis and pattern recognition.

Document Image Processing John Wiley & Sons

What features or information can we observe from a face, and how can these information help us to understand the person concerned, in terms of their well-being and what can we learn about and from each given feature? This book answers these questions by first dividing a face's multiple characteristics into two main categories: original (or physiological) features and features that change over a lifetime. The first category, original features, may be further divided into two sub-classes: features special (or unique) to an individual, and features common to a particular group. The second, changed features, can also be subdivided into two groups: features altered due to disease or features altered by other external factors. From these four sub-categories, four different applications — facial identification using original and special features; beauty analysis using original common features; facial diagnosis by disease changed features; and expression recognition through affect-changed features — are identified. The book will benefit researchers, professionals, and graduate students working in the field of computer vision, pattern recognition, security/clinical practice, and beauty analysis, and will also be useful for interdisciplinary research.

Document Analysis and Recognition – ICDAR 2021 Springer Science & Business Media

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

Machine Learning in Document Analysis and Recognition Springer

This book reports recent advances in the use of pattern recognition techniques for computer and robot vision. The sciences of pattern recognition and computational vision have been inextricably intertwined since their early days, some four decades ago with the emergence of fast digital computing. All computer vision techniques could be regarded as a form of pattern recognition, in the broadest sense of the term. Conversely, if one looks through the contents of a typical international pattern recognition conference proceedings, it appears that the large majority (perhaps 70-80%) of all pattern recognition papers are concerned with the analysis of images. In particular, these sciences overlap in areas of low level vision such as segmentation, edge detection and other kinds of feature extraction and region identification, which are the focus of this book.

Facial Affect Recognition Accuracy in Individuals with Substance Use Disorders Springer Science & Business Media

The article is devoted to the problem of improving the efficiency of neural network means of emotion recognition by the geometry of the human face.

It is shown that one of the most significant drawbacks of modern neural network means of emotion recognition, which are used in General-purpose information systems, is the lack of recognition accuracy under the influence of characteristic interference. It is proposed to improve the accuracy of recognition through the use of capsule neural network model, which has increased adaptability to the analysis of noisy images. As a result of the research, a neural network model of the CapsNet type was developed, designed to recognize basic emotions taking into account such interference as face rotation. It is shown experimentally that in the analysis of undistorted images CapsNet slightly exceeds the accuracy of the classical convolutional neural network type LaNet, which is approximately equal to its resource intensity. The accuracy of CapsNet recognition of undistorted images is somewhat inferior to modern types of convolution networks, which have a much higher resource consumption compared to it. When detecting emotions on rotated images, the accuracy of CapsNet is comparable with the accuracy of modern types of convolution networks and significantly exceeds the accuracy of LaNet. Prospects for further research in the field of neural network recognition of emotions on the geometry of the face can be associated with the improvement of architectural solutions of the capsule neural network in the direction of reducing the number of training iterations while ensuring acceptable recognition accuracy.

CNN Model for Recognition of Text-based Captchas and Analysis of Learning Based Algorithms' Vulnerabilities to Visual Distortion John Wiley & Sons

This book presents ample, richly illustrated account on results and experience from a project, dealing with the analysis of data concerning behavior patterns on the Web. The advertising on the Web is dealt with, and the ultimate issue is to assess the share of the artificial, automated activity (ads fraud), as opposed to the genuine human activity. After a comprehensive introductory part, a full-fledged report is provided from a wide range of analytic and design efforts, oriented at: the representation of the Web behavior patterns, formation and selection of telling variables, structuring of the populations of behavior patterns, including the use of clustering, classification of these patterns, and devising most effective and efficient techniques to separate the artificial from the genuine traffic. A series of important and useful conclusions is drawn, concerning both the nature of the observed phenomenon, and hence the characteristics of the respective datasets, and the appropriateness of the methodological approaches tried out and devised. Some of these observations and conclusions, both related to data and to methods employed, provide a new insight and are sometimes surprising. The book provides also a rich bibliography on the main problem approached and on the various methodologies tried out.

Computer Analysis of Images and Patterns Springer Nature

Machine Learning in Document Analysis and Recognition Springer Science & Business Media

Evaluation of Face Recognition Algorithms Under Noise CRC Press

The book first defines the problems, various concepts and notions related to activity recognition, and introduces the fundamental rationale and state-of-the-art methodologies and approaches. It then describes the use of artificial intelligence techniques and advanced knowledge technologies for the modelling and lifecycle analysis of human activities and behaviours based on real-time sensing observations from sensor networks and the Internet of Things. It also covers inference and decision-support methods and mechanisms, as well as personalization and adaptation techniques, which are required for emerging smart human-machine pervasive systems, such as self-management and assistive technologies in smart healthcare. Each chapter includes theoretical background, technological underpinnings and practical implementation, and step-by-step information on how to address and solve specific problems in topical areas. This monograph can be used as a textbook for postgraduate and PhD students on courses such as computer systems, pervasive computing, data analytics and digital health. It is also a valuable research reference resource for postdoctoral candidates and academics in relevant research and application domains, such as data analytics, smart cities, smart energy, and smart healthcare, to name but a few. Moreover, it offers smart technology and application developers practical insights into the use of activity recognition and behaviour analysis in state-of-the-art cyber-physical systems. Lastly, it provides healthcare solution developers and providers with information about the opportunities and possible innovative solutions for personalized healthcare and stratified medicine.

Hybrid Intelligent Techniques for Pattern Analysis and Understanding Springer Science & Business Media

A timely book containing foundations and current research directions on emotion recognition by facial expression, voice, gesture and biopotential signals This book provides a comprehensive examination of the research methodology of different modalities of emotion recognition. Key topics of discussion include facial expression, voice and biopotential signal-based emotion recognition. Special emphasis is given to feature selection, feature reduction, classifier design and multi-modal fusion to improve performance of emotion-classifiers. Written by several experts, the book includes several tools and techniques, including dynamic Bayesian networks, neural nets, hidden Markov model, rough sets, type-2 fuzzy sets, support vector machines and their applications in emotion recognition by different modalities. The book ends with a discussion on emotion recognition in automotive fields to determine stress and anger of the drivers, responsible for degradation of their performance and driving-ability. There is an increasing demand of emotion recognition in diverse fields, including psycho-therapy, bio-medicine and security in government, public and private agencies. The importance of emotion recognition has been given priority by industries including Hewlett Packard in the design and development of the next generation human-computer interface (HCI) systems. Emotion Recognition: A Pattern Analysis Approach would be of great interest to researchers, graduate students and practitioners, as the book Offers both foundations and advances on emotion recognition in a single volume Provides a thorough and insightful introduction to the subject by utilizing computational tools of diverse domains Inspires young researchers to prepare themselves for their own research Demonstrates direction of future research through new technologies, such as Microsoft Kinect, EEG systems etc.

Acoustical and Environmental Robustness in Automatic Speech Recognition Machine Learning in Document Analysis and Recognition

The main idea and the driver of further research in the area of face recognition are security applications and human-computer interaction. Face recognition represents an intuitive and non-intrusive method of recognizing people and this is why it became one of three identification methods used in e-passports and a biometric of choice for many other security applications. This goal of this book is to provide the reader with the most up to date research performed in automatic face recognition. The chapters presented use innovative approaches to deal with a wide variety of unsolved issues.

Speech Recognition Using Articulatory and Excitation Source Features Springer Nature

This book addresses the task of processing online handwritten notes acquired from an electronic whiteboard, which is a new modality in handwriting recognition research. The main motivation of this book is smart meeting rooms, aim to automate standard tasks usually performed by humans in a

meeting. The book can be summarized as follows. A new online handwritten database is compiled, and four handwriting recognition systems are developed. Moreover, novel preprocessing and normalization strategies are designed especially for whiteboard notes and a new neural network based recognizer is applied. Commercial recognition systems are included in a multiple classifier system. The experimental results on the test set show a highly significant improvement of the recognition performance to more than 86%.

Iris Analysis for Biometric Recognition Systems Springer Nature

The need for automatic speech recognition systems to be robust with respect to changes in their acoustical environment has become more widely appreciated in recent years, as more systems are finding their way into practical applications. Although the issue of environmental robustness has received only a small fraction of the attention devoted to speaker independence, even speech recognition systems that are designed to be speaker independent frequently perform very poorly when they are tested using a different type of microphone or acoustical environment from the one with which they were trained. The use of microphones other than a "close talking" headset also tends to severely degrade speech recognition - performance. Even in relatively quiet office environments, speech is degraded by additive noise from fans, slamming doors, and other conversations, as well as by the effects of unknown linear filtering arising reverberation from surface reflections in a room, or spectral shaping by microphones or the vocal tracts of individual speakers. Speech-recognition systems designed for long-distance telephone lines, or applications deployed in more adverse acoustical environments such as motor vehicles, factory floors, or outdoors demand far greater degrees of environmental robustness. There are several different ways of building acoustical robustness into speech recognition systems. Arrays of microphones can be used to develop a directionally-sensitive system that resists interference from competing talkers and other noise sources that are spatially separated from the source of the desired speech signal.

Image Analysis and Recognition IntechOpen

This six-volume set of LNCS 14187, 14188, 14189, 14190, 14191 and 14192 constitutes the refereed proceedings of the 17th International Conference on Document Analysis and Recognition, ICDAR 2021, held in San José, CA, USA, in August 2023. The 53 full papers were carefully reviewed and selected from 316 submissions, and are presented with 101 poster presentations. The papers are organized into the following topical sections: Graphics Recognition, Frontiers in Handwriting Recognition, Document Analysis and Recognition.

Reading Your Counterpart Springer Science & Business Media

Document Processing Using Machine Learning aims at presenting a handful of resources for students and researchers working in the document image

analysis (DIA) domain using machine learning since it covers multiple document processing problems. Starting with an explanation of how Artificial Intelligence (AI) plays an important role in this domain, the book further discusses how different machine learning algorithms can be applied for classification/recognition and clustering problems regardless the type of input data: images or text. In brief, the book offers comprehensive coverage of the most essential topics, including: · The role of AI for document image analysis · Optical character recognition · Machine learning algorithms for document analysis · Extreme learning machines and their applications · Mathematical foundation for Web text document analysis · Social media data analysis · Modalities for document dataset generation This book serves both undergraduate and graduate scholars in Computer Science/Information Technology/Electrical and Computer Engineering. Further, it is a great fit for early career research scientists and industrialists in the domain.

Recognition of Whiteboard Notes World Scientific

Face recognition has been actively studied over the past decade and continues to be a big research challenge. Just recently, researchers have begun to investigate face recognition under unconstrained conditions. Unconstrained Face Recognition provides a comprehensive review of this biometric, especially face recognition from video, assembling a collection of novel approaches that are able to recognize human faces under various unconstrained situations. The underlying basis of these approaches is that, unlike conventional face recognition algorithms, they exploit the inherent characteristics of the unconstrained situation and thus improve the recognition performance when compared with conventional algorithms. Unconstrained Face Recognition is structured to meet the needs of a professional audience of researchers and practitioners in industry. This volume is also suitable for advanced-level students in computer science.

Improvement of Face Recognition Using Principal Component Analysis and Moment Invariant John Wiley & Sons

Substance use, like many human behaviors, occurs along a broad continuum from no use to extremely heavy use. Satisfactory interpersonal interaction involves understanding others' facial affect. There is a lack of research on facial affect recognition accuracy in individuals with substance use disorders. This archival study will seek to explore individuals with substance use disorders facial affect recognition accuracy. This archival study was conducted with data from 10 Project Working Recovery consumers. These consumers had met the admission criteria for PWR, including being at least 18 years old, presenting with a substance use disorder, and being psychiatrically and medically stable enough to receive services at the intensive outpatient level. Data was collected as part of Project Working Recovery's clinical service; consumers were informed of the objectives, benefits, and possible inconveniences prior to completing the Diagnostic Analysis of Nonverbal Accuracy 2-Adult Facial Expressions (DANVA2-AF). The DANVA2-AF was administered and consumers were asked to identify the facial affect of 24 stimuli. Demographic data and results from the DANVA2-AF were analyzed to explore the study objective.

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