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Number of books and chapters in edited volumes / books published, and papers in national/international conference-proceedings per teacher during the last five years

Sample Publications comprising
of
Books, Book Chapters and Conference Publications

S.No	Description	Link to resource
1.	Books	Link1
2.	Book Chapters	Link2
3.	Conference Publications	Link3

Big Data in Medical Image Processing

R. Suganya • S. Rajaram • A. Sheik Abdullah

CRC Press
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A SCIENCE PUBLISHERS BOOK

Big Data in Medical Image Processing

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A SCIENCE PUBLISHERS BOOK

Contents

1

Big Data in Medical Image Processing

1.1 An Introduction to Big Data

Big data technologies are being increasingly used for biomedical and healthcare informatics research. Large amounts of biological and clinical data have been generated and collected at an exceptional speed and scale. Recent years have witnessed an escalating volume of medical image data, and observations are being gathered and accumulated. New technologies have made the acquisition of hundreds of terabytes/petabytes of data possible, which are being made available to the medical and scientific community. For example, the new generation of sequencing technologies enables the dispensation of billions of DNA sequence data per day, and the application of electronic health records (EHRs) is documenting large amounts of patient data. Handling out these large datasets and processing them is a challenging task. Together with the new medical opportunities arising, new image and data processing algorithms are required for functioning with, and learning from, large scale medical datasets. This book aims to scrutinize recent progress in the medical imaging field, together with new opportunity stemming from increased medical data availability, as well as the specific challenges involved in Big data. "Big Data" is a key word in medical and healthcare sector for patient care. NASA researchers coined the term big data in 1967 to describe the huge amount of information being generated by supercomputers. It has evolved to include all data streaming from various sources—cell phones, mobile devices, satellites, Google, Amazon, Twitter, etc. The impact of big data is deep, and it will have

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Object Oriented Analysis and Design Using UML

D Jeya Mala
S Geetha

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OBJECT ORIENTED ANALYSIS AND DESIGN
Using UML

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  Contains case studies, examples, and real-life situations
- **Concept map at the start of each chapter**
  Enables students to visualize the hierarchy of concepts
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WCVA

Super Resolution Mapping of Trees for Urban Forest Monitoring in Madurai City Using Remote Sensing

D. Synthiya Vinothini(✉), B. Sathyabama, and S. Karthikeyan

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Abstract. This paper proposes a super resolution mapping of trees pixel swapping method in Madurai city. Identifying and mapping the vegetation specifically trees is a significant issue in remote sensing applications where the lack of height information becomes a hard monocular recognition task. The density and shape of the trees gets affected by other man-made objects which gives rise to an erroneous recognition. The quality of recognition may be affected by various terms like resolution, visibility, sizes or scale. Predicting trees when they are partially blocked from view is also a challenging task. A common problem associated with the application of satellite images is the frequent occurrence of mixed pixels. The motivation of this work is to extract trees using pixel swapping method. Pixel-swapping algorithm is a simple and efficient technique for super resolution mapping to change the spatial arrangement of sub-pixels in such a way that the spatial correlation between neighboring sub-pixels would be maximized. Soft classification techniques were introduced to avoid the loss of information by assigning a pixel to multiple land-use/land-cover classes according to the area represented within the pixel. This soft classification technique generates a number of fractional images equal to the number of classes. Super resolution mapping was then used to know where each class is located within the pixel, in order to obtain detailed spatial patterns. The aim of supper resolution mapping is to determine a fine resolution map of the trees from the soft classification result. The experiment is conducted with images of Madurai city obtained from WorldView2 satellite. The accuracy of the pixel swapping algorithm was 98.74%.

Keywords: Super resolution mapping · Pixel swapping · Fuzzy C Means · Remote sensing · High resolution panchromatic image · Low resolution multispectral image · Urban forest

1 Introduction

The benefits of maintaining urban forests is of vital importance in terms of health, aesthetic and recreational benefits in industrialized cities. Well managed urban forests provide renewable resources for biological organisms and are also a vital source for maintaining environmental stability and ecological biodiversity. The groundwork of urban forest management is procuring detailed forest inventory information, but for

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Security Challenges in the IoT Paradigm for Enterprise Information Systems

Connected Environments for the Internet of Things pp 3-17 | Cite as

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Abstract

A complex system has a large number of design variables, and decision-making requires real-time data collected from machines, processes, and diverse business environments. In this context, enterprise information systems (EISs) are used to support data acquisition, data analytics, communication, and related decision-making activities. Therefore, information technology infrastructure for data acquisition and sharing affects the performance of an EIS greatly. Our objective in the present work is to investigate the impact of security in the Internet of Things (IoT) paradigm for enterprise information systems. The breakthrough potential of the IoT conjures up immense possibilities for delivering value through new business models across industries, products, and service offerings. However, making IoT technologies reliable and secure is the key to realizing the potential of this breakthrough concept. Ensuring security and privacy of the IoT offerings is therefore a major concern for users and businesses. This chapter explores the potential of IoT-enabled smart services in EISs. It identifies security and privacy concerns for a variety of scenarios and discusses ways to address these concerns effectively.

Keywords

Enterprise information systems EIS Internet of things Security Data protection Privacy Security IoT

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Chapter 1
Cloud Computing Technologies for Green Enterprises:
Fundamentals of Cloud Computing for Green Enterprises

Parkavi Ravi
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ABSTRACT

Green computing, also called green equipment, is the environmentally sustainable to use of computers and related resources like - monitors, printer, storage devices, networking and communication systems - effectively with minimal or no impact on the environment. Green cloud is a catchphrase that refers to the potential environmental benefits that information technology (IT) services delivered over the Internet will present society. The word combines the words green meaning environmentally gracious and cloud, the traditional image for online and the shortened name for a type of service delivery model known as cloud processing.

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Author Index

Embedded Visual Cryptography for Secure Transmission of Bank cheque

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ABSTRACT
Today, banking system has carried banking for the customer's expediency, supporting set of services, where authentication plays a vital role. Due to the fabulous apprehension and growth in the field of hacking, that it is not safe to rely on web to accumulate all the information. So in order to beat this problem we have proposed an efficient algorithm for secured bank cheque authentication by Embedded image Cryptography scheme. It is a cryptographic approach that uses visual information as input, encryption and decryption is done by using human visual system. The proposed method Embedded Visual Cryptography Scheme (EVCS) uses gray threshold with morphological operation for secure transmission of bank cheque over the network. In this approach first apply gray threshold with morphological operation and divide the input image into different number of secret share images using traditional visual cryptography technique. Embed the each share into different cover images. Finally, stack the embedded images to get the original information of images. The performance of proposed method is calculated by using PSNR, UQI and MSE Value. The proposed EVCS shows the high performance in terms PSNR, UQI and MSE for secure transmission of bank cheque over network.

CCS Concepts
• **Big Data→Information Hiding and watermarking**

Keywords
Image Processing; Embedded visual cryptography; Gray threshold; Morphological Operation; Bank cheque

1. INTRODUCTION
Today, due to rapid growth in the field of banking system and its services, computer connected with web cannot be considered to be protected. In traditional banking system, there is a risk of falsification during transaction and transmission of bank cheques.

In online banking system, safety begins with the verification process. Verification depends up on the following factors:

- Something the customer knows (e.g. password, PIN number)
- Something the customer has (e.g. ATM card, smart card)
- Something the customer is (e.g. biometric characteristics such as Iris recognition, fingerprint etc)

But in any of the above verification methods, key elements like password or PIN number can be hacked and misused. So we have proposed a new method to shield the customer information and cheque details to avoid forgery during transmission over internet

A visual cryptography design is a type of secret image sharing which permits the encoding of a secret image into different shares. The disadvantage of visual cryptography design is that even a normal person is capable to decipher the secret image devoid of having any cryptographic information and computational tools. An embedded image cryptography scheme is a type of image cryptography scheme which consists of significant shares. In this paper, we proposed the method Embedded Visual Cryptography Scheme (EVCS) using gray threshold values with morphological erosion operations for secure transmission of bank cheque over the internetwork. Initially in this method apply gray threshold values with morphological operation and then split the input original image into diverse number secret share images using conventional visual cryptography system. Implant the each share image into different cover images. Finally, mound the implanted images to get the original information of image. For example, partition the input image into two share images. In that the random pixels in one shares and secret information in other share. In order to get the original image basically overlie the both shares of the images.

2. Related Works
Sozan Abdulla [2] suggested that new visual cryptography algorithm for 24-bit bitmap color image. The algorithm is used for color image that represents a structure which takes quad portion of the pictures as an input and generates tri-images which communicate to three of the four input pictures. The dechipering requires only selecting a few subset of these tri-images, making clearness of them, and mounting them on top of each other, so the forth picture is rebuild by printing the tri-output images onto clearness and mounting them altogether. The rebuilt image is achieved in identical size with creative secret image. The protection of the method depends critically on the color composition and sharing of the original secret image. To improve the contrast and construct more clear the ensuing secret image.

Mizuho nakajima, Yasushi yamaguchi [3] conversed that extended visual cryptography algorithm for natural images. This paper presents a system which takes tri-pictures as an input and produces two images which communicate to two of the three input pictures. The third picture is rebuilt by printing the two output images onto transparencies and stacking them together. This technique is used to recover the excellence of the output images.

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Balasubramanian Raman
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Partha Pratim Roy
Debashis Sen *Editors*

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Springer

Crowd Disaster Avoidance System (CDAS) by Deep Learning Using eXtended Center Symmetric Local Binary Pattern (XCS-LBP) Texture Features

C. Nagananthini and B. Yogameena

Abstract In order to avoid crowd disaster in public gatherings, this paper aims to develop an efficient algorithm that works well in both indoor and outdoor scenes to give early warning message automatically. It also deals with high dense crowd and sudden illumination changing environment. To address this problem, first an XCS-LBP (eXtended Center Symmetric Local Binary Pattern) features are extracted which works well under sudden illumination changes. Subsequently, these features are trained using deep Convolutional Neural Network (CNN) for crowd count. Finally, a warning message is displayed to the authority, if the people count exceeds a certain limit in order to avoid the crowd disaster in advance. Benchmark datasets such as PETS2009, UCSD and UFC_CC_50 have been used for experimentation. The performance measures such as MSE (Mean Square Error), MESA (Maximum Excess over Sub Arrays) and MAE (Mean Absolute Error) have been calculated and the proposed approach provides high accuracy.

Keywords Crowd disaster · Texture feature · Convolutional neural network · People counting

1 Introduction

In reality, public safety needed places such as malls, stadiums, festivals and in public gatherings, crowd control and crowd management becomes paramount. One of the basic descriptions of the crowd status is crowd density. Counting its flow is an important process in crowd behavior analysis. It can also be used to measure the comfort level of the crowd for detecting potential risk in order to prevent overcrowd

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Henry Selvaraj • Dawid Zydek • Grzegorz Chmaj
Editors

Progress in Systems Engineering

Proceedings of the Twenty-Third International Conference on Systems Engineering

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Special Session: Computational Cognitive Science

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Special Session: From Boolean Problems to the Internet of Everything

Human Cognition and Vision Based Earlier Path Determination System for Indoor Mobile Robot Path Planning

N. Nithya and D. Tamil Selvi

1 Introduction

Vision is the powerful sensing method for autonomous mobile robot navigation. Computer vision is a process that mimicking the human perception system and helps to acquire the knowledge of the environment and taking decisions autonomously. Mobile Robot Navigation had three important skills such as localization, path planning and map building. Vision helps these three fundamental tasks. For example, Autonomous vehicle localization by object monitoring using scale invariant feature transform method and trajectory deviation errors were recovered using 3D space transformation and calibration line on the detected object[1]. Global navigation done by detecting or locating natural landmarks like doors, walls, and floor for indoor environment [2]. Detect static landmarks and moving human by single camera tracking and recognition system [3]. Cognition allows an autonomous mobile robot to get increased autonomy in matters of learning, knowledge about its environment. Cognitive science processes are explained in terms of functionalities which inside people's head like to perceive, store, recall, taking decisions. An important aspect of cognitive based human like perception and decision making of mobile robots being able to safely move in it is environment like the human brain and its thought process.

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1.1 Cognitive Perception

Perception or sensing an environment is a fundamental state of cognition. Computer vision and its algorithms give robust sensing capabilities to robot needs to perceive the world similar to human. Object detection is used to detect and estimate the location of landmarks [2], obstacles, and goal points [4] in an image and video frames without prior knowledge of its location information. However, in a perception there is typically sensory degradation or lack of perceptual cues affects the cognition. The visual systems are suffer from low image resolution, poor lighting conditions, pose deformation, occlusion, and scale variation. Occlusion is one of the major issues in an indoor clutter environment [5] for navigable space extraction and object localization in vision based path planning. For example, in automated video surveillance system human object partially occludes each other in crowd scenes [6]. Detection of partially occluded doors in landmark based navigation using data-driven Markov chain Monte Carlo(DDMCMC) [2]. Usually multiple objects are situated along the navigation path, in the indoor environment. Due to view point variation of robots, the required goal point may be partially occluded by other objects. In this way vision sensor is more compatible in robot navigation compare than other sensors like laser range finders and ultrasonic sensors. Shape feature is often sufficient cue for object detection. Many techniques have been developed for shape feature based object detection [7–11] is to identify and locate the target object in the environment image. Contour-based methods are more simple and effective for object detection and they work well in partial occlusion. The occluded parts or missing parts of an object, which result in the changes of object shapes, and it greatly decreases the true positive rate of the detection algorithm. Numerous techniques have been proposed for detection of occlusion in shape based and template based detection methods. Shape reconstruction is an efficient methodology to recover the missed portions or edge curves of object shape in the edge map. It computes which contour

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Track 8

Active Learning Environment for achieving Higher-Order Thinking skills in Engineering Education

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***Abstract*—Higher-order thinking, known as higher order thinking skills (HOTS), is a conception of education reorganization based on learning taxonomy. Skills involving analysis, evaluation and synthesis are considered to be of higher order, requiring diverse learning and teaching methods than the customary learning of facts and concepts. HOTS involves the learning of complex judgmental skills such as critical thinking and problem solving. They are activated when individuals encounter unfamiliar problems, uncertainties, questions, or dilemmas. Successful application of the skills results in justifications, decisions, performances, and products that are valid within the context of existing knowledge that encourages continued growth in other intellectual skills. The major difficulty in attaining HOTS among engineering students is that we still pursue the traditional approach of teacher-centered classroom where the teacher is an active transmitter and the students are passive recipients. To achieve HOTS among engineering students we establish an Active Learning Environment (ALE) with the effective usage of Information and communication technologies (ICT). Active learning is embodied in a learning environment where the teachers and students are actively engaged with the content through discussions, problem-solving, critical thinking, or a multitude of activities that encourage interaction among learners, instructors and the material. Supporting to active learning, the ICT usage lends itself to more student-centered learning. This paper demonstrates the strategies to achieve HOTS through various ALE strategies like Role Play, Jigsaw, Brainstorming, debate, Mind map etc for Concept Understanding and Group assignments, combined mini projects, Discussion on Topics, Quiz, and Puzzles for Concept Applying. We have applied various learning strategies and assessed the student outcomes. HOTS is achieved by developing applications or products, with improved inter personal skills and lifelong learning skills. The evidence for the effectiveness of ALE among engineering students is showed by great improvement in their academic result, placement record and research interests**

Keywords- Information and communication technologies, Higher-order thinking, student-centered learning, Active Learning Environment

I. INTRODUCTION

Thinking is not something most of us really think about – it is something we perform or see to. For educationalists, how a student thinks is as vital as what he is thinking about. In some scenarios it is not enough to just remember and understand a case, something more than this level is necessary to see a problem; higher order thinking is necessary at every grade level, especially at Engineering Education.

The nature of human thought and reason is the focus of a field of philosophy called epistemology. Epistemologists still debate the definition of *knowledge*. A classic definition, on the ideas in Plato's dialogue *Theaetetus*, is that for something to consider as knowledge it must be *reasonable*, *true*, and *believed*. We use this delicacy about Plato to make what we consider a significant point. Even outwardly simple knowledge rests on some past higher-order thinking. Facts and concepts did not self-materialize. They were observed and analyzed until they were widely recognized and yet still debated. When we teach students to do higher-order thinking, we are not just teaching them some expensive skills useful for the flexibility and adaptability required for a successful life in our 21st century "information age"; rather we are teaching them to be human.

Higher-order thinking skills drive beyond basic observation of facts and memorization. They are what we are talking about when we want our students to be evaluative, creative and innovative. In 1987, the National Research Council sponsored a project [1] that attempted to synthesize all the many theories about higher-order thinking. The express goal of the project was to make recommendations about how to foster higher-order thinking in students.

The study ultimately describes higher-order thinking as thinking that is non-algorithmic (Involving paths of action for solving problems that are not specified in advance), complex (Involving problem solving where multiple solutions are possible), Effortful (Involving considerable mental energy directed toward problem solving), Nuanced judgments (Involving subtle, less-than-obvious decisions

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MIMO-OFDM Channel Estimation using Distributed Compressed Sensing

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Abstract—**This paper proposes a method of sparse channel estimation using compressed sensing for MIMO-OFDM system. The channel estimation is formulated as a sparse recovery problem because of the maximum delay spread in the high data rate OFDM communication systems. The proposed Distributed Compressed Sensing (DCS) algorithm for channel estimation in MIMO-OFDM system exploits the join sparsity of the MIMO channel. It takes less number of iterations in solving the channel estimation problem and runs much faster than the existing Compressive Sampling Matching Pursuit (CoSaMP). Simulation results demonstrate the validity of the algorithm. For the MIMO channels of unknown sparse degrees, the proposed DCS algorithm gives good channel estimation performance with less number of subcarriers reducing the complexity of the system.**

Keywords—MIMO-OFDM; sparse; DCS; CoSAMP; compressed sensing.

I. INTRODUCTION

Orthogonal Frequency Division Multiplexing (OFDM) has become a popular technique for transmission of signals over wireless channels. Several wireless standards adopt OFDM technology such as, Digital Audio Broadcasting (DAB), Digital Video Broadcasting (DVB), the IEEE 802.11a Local Area Network (LAN) and the IEEE 802.16a Metropolitan Area Network (MAN) standard [1].

A Multiple-Input Multiple-Output (MIMO) communication system combined with the OFDM modulation technique holds the potential to drastically improve the spectral efficiency and link reliability in wireless communication systems [2]. Current OFDM based WLAN (Wireless Local Area Network) standards (such as IEEE802.11a/g) use variations of QAM (Quadrature Amplitude Modulation) schemes for subcarrier modulations which require a coherent detection at the OFDM receiver and consequently requires an accurate (or near accurate) estimation of Channel State Information (CSI).

Linear channel estimation methods for the MIMO-OFDM systems have been studied in many works [3]. Based on the assumption of rich multipath, the methods, such as least squares (LS), lead to bandwidth inefficiency, where more subcarriers are required to obtain accurate channel estimation. In high data rate communication systems, due to maximum delay spread and high sampling rate, the channel power is mainly concentrated in few dominant taps. Assuming total channel taps to be L and T of them nonzero $T << L$, it is called as T-sparse channel [4] [5]. Exploiting the sparsity, with less number of subcarriers N, it is able to reconstruct the sparse channel $(N << L)$ as in [6] and [7], where a matching pursuit (MP) algorithm was applied to sparse channel estimation. MP is easy to be implemented but not stable. Several modified compressive sensing recovery algorithms, such as Compressive Sampling Matching Pursuit (CoSaMP) [8], Orthogonal Matching Pursuit (OMP) [3]-[5] were proposed. However, the shortcoming of these algorithms in MIMO-OFDM channel estimation is that it requires more number of iterations to estimate the channel and also the sparsity of the multipath channel which is hardly available in many practical applications.

MIMO channels exhibit joint sparsity across the component channels between any pair of transmit and receive antenna because of the antenna spacing being much smaller than the path length [9]. The joint sparsity model of the Channel Impulse Response (CIR) vector in MIMO-OFDM system allows for distributed channel estimation. The proposed DCS algorithm enables the distributed estimation of the sparse channel leveraging the joint sparsity without the knowledge of channel sparsity.

The rest of the paper is organized as follows. Section II gives the system model. Section III introduces a brief overview of compressive sensing and gives an elaborate pseudo code for the proposed DCS algorithm. Section IV provides the simulation result. Conclusions and future work are drawn into Section V.

Notations used: Throughout the paper, $\|\bullet\|_n$ denotes the l_n norm function, $\mathbf{b}|_\Lambda$ is a vector consisting of elements of the vector $\mathbf{b}$ corresponding to the indices given by the index set Λ and Λ^C denotes the complement of the index set Λ and $\text{supp}(\mathbf{x}, i)$ denotes the index set of maximum i elements in the vector $\mathbf{x}$.

II. SYSTEM MODEL

Consider a MIMO-OFDM system with n_t transmit antennas and n_r receive antennas. It is assumed that the OFDM symbol has N subcarriers. Let $\mathbf{g}(n,m)$ be a $L \times 1$ channel impulse response (CIR) vector between the m^{th} transmit antenna and the n^{th} receive antenna. The

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