



University of Jijel



International Symposium on
Signal Processing and its
Applications

08 – 12 JUILLET 2006

JIJEL, ALGERIE

TECHNICAL PROGRAM

FRIDAY, 07 JULY 2006

FRIDAY, 07 JULY 2006	
16 :00 – 19 :30	WELCOME AND REGISTRATION
20 :00 – 21 :00	DINNER AT KOTAMA HOTEL
21 :00 – 22 :00	“WELCOME TO JIJEL”: Talk by Mr. Salah BOUSELOUA

SATURDAY, 08 JULY 2006

08 :30 – 09 :30	REGISTRATION
09 :30 – 10 :30	OPENING CEREMONY – WELCOME MESSAGE
	Prof. Mohamed Rachid MEKIDECHE, Dean of the Faculty of Engineering
	Prof. Boualem BOASHASH, General Chair
	Prof. Azeddine BEGHADADI, Technical Program Committee Chair
	Atidel LAHOULOU, President of the Organizing Committee
	Abdelmalek ZENIR, Rector of the University of JIJEL – Official Opening of I3SPA'06
10 :30 – 11 :00	COFFEE BREAK
11 :00 – 12 :30	The Road to Success for Engineers, Scientists and Researchers in the Society. Boualem BOASHASH (University of Queensland, Brisbane, Australia / University of Sharjah, Sharjah, UAE)
12 :30 – 14 :00	LUNCH
14 :00 – 15 :30	Prostate Cancer Classification and Diagnosis using Multispectral Imagery. Ahmed BOURIDANE (Queen's University of Belfast, Belfast, UK)
15 :30 – 16 :00	COFFEE BREAK
16 :00 – 17 :30	La Télévision Numérique, Tendances Actuelles et Perspectives. Aoued BOUKELIF (Université Djilali Liabes, Sidi-Bel-Abbes, Algeria)
17 :30 – 20 :00	FREE
20 :00 – 21 :30	DINNER

SUNDAY, 09 JULY 2006

08 :30 – 10 :30	Singular Value Decomposition: Applications to Signal and Image Processing. Maamar BETTAYEB (University of Sharjah, Sharjah, UAE)	
10 :30 – 11 :00	COFFEE BREAK + POSTER SESSION (P1)	
11 :00 – 12 :30	Image Processing Evaluation: an HVS-Inspired Approach. Azeddine BEGHDADI (Université Paris 13, Paris, France)	
12 :30 – 14 :00	LUNCH	
14 :00 – 15 :30	Radar and Synthetic Aperture Radar Basics. Youcef SMARA (USTHB, Algiers, Algeria)	
15 :30 – 16 :00	COFFEE BREAK + POSTER SESSION (P2)	
16 :00 – 17 :30	PRACTICAL SESSIONS	
	SESSION A1	Image Processing Using Blind Separation Techniques. Adel BELOUHRANI (ENP, Algeria) Karim ABED_MERAIM (ENST, Paris, France)
	SESSION B1	SPIHT-based Image Compression and Watermarking. Ahmed BOURIDANE (Queen's University of Belfast, Belfast, UK)
	SESSION C1	Scientific Writing. Boualem BOASHASH (University of Queensland, Brisbane, Australia / University of Sharjah, Sharjah, UAE)
17 :30 – 20 :00	FREE	
20 :00 – 21 :30	DINNER	

MONDAY, 10 JULY 2006

08 :30 – 10 :30	<p>Clustering and Vector Quantization using Unsupervised Competitive Learning. Abdesslam BOUZERDOUM (University of Wollongong, Australia)</p>	
10 :30 – 11 :00	COFFEE BREAK + POSTER SESSION (P3)	
11 :00 – 12 :30	PRACTICAL SESSIONS	
	SESSION A2	<p>Analyse Multirésolution et ses Applications en Traitement d’Images. Amina SERIR (USTHB, Algeria)</p>
	SESSION B2	<p>SAR Radar Images Filtering. Youcef SMARA (USTHB, Algiers, Algeria)</p>
	SESSION C2	<p>Time-Frequency Analysis Application. Boualem BOASHASH (University of Queensland, Brisbane, Australia / University of Sharjah, Sharjah, UAE)</p>
12 :30 – 14 :00	LUNCH	
14 :30 – 19 :30	<p>EXCURSION TO VISIT JIJEL SITES</p> <p>“Ghar-El-Baz”</p> <p>“Les Grottes Merveilleuses”</p> <p>“Le port de Ziama”</p>	
20 :00 – 21 :30	DINNER	

TUESDAY, 11 JULY 2006

	FREE	
11 :00 – 12 :30	On the Certification of Biometric Data. Lahouari GHOUTI (Queen’s University of Belfast, Belfast, UK)	
12 :30 – 14 :00	LUNCH	
14 :00 – 15 :30	Vision par Ordinateur. Latifa HAMAMI (ENP, Algiers, Algeria)	
15 :30 – 16 :00	COFFEE BREAK + POSTER SESSION (P4)	
16 :00 – 17 :30	PRACTICAL SESSIONS	
	SESSION A3	Low-Level Treatment and Artificial Neural Networks. Abdesslam BOUZERDOUM (University of Wollongong, Australia) Azeddine BEGHADADI (Université Paris 13, Paris, France)
	SESSION B3	An online System for Retrieval of Audio Content from Multimedia Databases. Lahouari GHOUTI (Queen’s University of Belfast, Belfast, UK)
	SESSION C3	Scientific Writing. Boualem BOASHASH (University of Queensland, Brisbane, Australia / University of Sharjah, Sharjah, UAE)
17 :30 – 20 :00	FREE	
20 :00 – 21 :30	DINNER	

WEDNESDAY, 12 JULY 2006

08 :30 – 10 :30	Biometrics, When Machines are Used to Identify People. Mohamed DERICHE (King Fahd University of Petroleum and Minerals, Saoudia Arabia)
10 :30 – 11 :00	COFFEE BREAK
11 :00 – 12 :30	Towards Universal Robustness and Accessibility of Voice-Enabled Human-Computer Interfaces. Sid-Ahmed SELOUANI (Université de Moncton, Canada)
12 :30 – 14 :00	LUNCH
14 :00 – 16 :00	CLOSING CEREMONY
	Reading of Reports
	Global debate – Recommendations
	Distribution of Certificates of Participation
	Awards of the two best posters
16 :00 – 20 :00	FREE
20 :00 – 21 :30	DINNER

POSTER SESSIONS PROGRAM

POSTER SESSION (P1)

SUNDAY, 09 JULY 2006

10 :30 – 11 :00

Poster N°1	Optimisation d'un Classifieur Flou des Battements Cardiaques Mohammed Amine CHIKH (University of Tlemcen)
Poster N°2	Étude du Signal de la Variabilité Cardiaque par Application de la Transformée en Ondelettes Mohamed DAOUD (University of Mostaganem)
Poster N°3	Élaboration de Méthodes d'Evaluation d'Algorithmes de Segmentation d'Images Fella HACHOUF (University of Constantine)
Poster N°4	Segmentation Contextuelle des Images Radar SAR en vue de la Détection des Nappes d'Hydrocarbures Bahia LOUNIS (USTHB)
Poster N°5	La Segmentation d'Images : Principes et Algorithmes Abdelkrim MECHE (USTO)
Poster N°6	Algorithme d'Apprentissage Tolérant RPGT pour 'Analyse et le Diagnostique de l' ECG Mustapha MERAH (USTO)
Poster N°7	Fusion d'Images Médicales par la Transformée en Ondelettes Nassima MEZHOUD (university of Constantine)
Poster N°8	Classification des Différents Critères d'Évaluation de la Segmentation d'Images Nadia MHAMDA BOULOUDANI (ENP)
Poster N°9	A Cooperative Co-evolutionary Approach for Color Image Segmentation Salima NEBTI (University of Constantine)
Poster N°10	Echocardiographics Images Processing Nadia SOUAG (USTHB)

POSTER SESSION (P2)

SUNDAY, 09 JULY 2006

15 :30 – 16 :00

Poster N°1	Algorithmes d'Apprentissage pour la Classification de Phénomènes Tamazouzt AIT SAADI (University of Mostaganem)
Poster N°2	Amélioration de la Reconstruction d'Image à partir des Hologrammes Numériques Omar CHAAB (University of Mostaganem)
Poster N°3	Filtres Analogiques Pour Détection de Mouvement Oumelkheir HANNACHI (ENSET-Oran)
Poster N°4	Codage Scalable des Vecteurs Mouvement pour un Nouveau Standard : Contribution à l'Amélioration de l'Efficacité de la Compression Vidéo (H.264/MPEG-4 et JPEG-2000), Saliha KHERIS (University of SBA)
Poster N°5	A Comparison of a Wavelet Method and Wilk's Algorithm for Image Restoration Messaoud MAOUNI (University of Skikda)
Poster N°6	Artificial Neural Networks with Discrete Wavelet Transform for Time Series Prediction: Application for Solar Radiation Signal, Adel MELLIT (University Centre of Médéa)
Poster N°7	Reconnaissance d'écriture Manuscrite par l'Analyse en Composantes Principales et les Réseaux de Neurones Azzeddine MENASRIA (university of Constantine)
Poster N°8	Design of Two-Dimensional Recursive Digital Filters using Genetic Algorithms Fatiha MESKINE (University Centre of Mascara)
Poster N°9	Non Synthetic Virtual Objects Principle Brahim NINI (University of Oum El Bouaghi)
Poster N°10	Localisation d'Objets Superposés dans une Scène Multifformes Hafida SENOUSI (USTO)

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POSTER SESSION (P3)

MONDAY, 10 JULY 2006

10 :30 – 11 :00

Poster N°1	Methodes de filtrage d'images radar SAR - Amplitude et Single Look Complex Lynda BOUCHEMAKH (USTHB)
Poster N°2	Cryptage Chaotique d'Image à Déclanchement par Générateur BBS Aissa BOUKHARI (USTHB)
Poster N°3	Study and Performance Evaluation of the Embedded Still Image Coding Method: Set Partitioning In Hierarchical Trees, Abdelkader BOUKHOBZA (University of SBA)
Poster N°4	Identification par Filtre de Kalman des Paramètres d'une Batterie au Plomb Aissa BOUTTE (USTO)
Poster N°5	Improvement of Land Cover Map from Satellite Imagery Using DST and DSMT Radja KHEDAM (USTHB)
Poster N°6	Filgranage dans le Domaine Compressé de JPEG2000 Zahir MAHROUK (University of Oum El Bouaghi)
Poster N°7	Application des Ondelettes à la Segmentation et à la Détection d'Inclinaison dans les Images Documents Ourida MEGHERBI (University of Tizi Ouzou)
Poster N°8	Fuzzy Integral-Based Mixture to Speed-up Support Vector Machines: An Application for Handwritten Digit Recognition, Hassiba NEMMOUR (USTHB)
Poster N°9	Fusion d'Images Satellitaires par la Méthode des Signatures Spectrales Nadia OUARAB (USTHB)
Poster N°10	Create a Secret Key for Halftone Image and Gray Level Image Zohra TIFEDJADJINE (University of Batna)

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POSTER SESSION (P4)

TUESDAY, 11 JULY 2006

15 :30 – 16 :00

Poster N°1	Contributions to the Optimisation of the Video Transmission Chain Nawal BENMOUSSAT (USTO)
Poster N°2	Techniques de Traitement des Signaux Ultrasonores dans le CND Kamal BENNAMANE (University of Tizi Ouzou)
Poster N°3	A Frequency-Dependent Speech Enhancement Method Chaabane BOUBAKIR (University of Jijel)
Poster N°4	Adapted Analysis Tools for the Detection of the Defects of the Rotating Machines: Spectral, Cepstral Analysis and Envelope Detection, Mohamed BOUFENAR (ENP)
Poster N°5	Segmentation en Locuteurs de Documents Audio: Une Nouvelle Approche Belkacem FERGANI (USTHB)
Poster N°6	Modélisation de la Propagation des Signaux Ultrasonores dans un des Tissus Biologiques Mourad GRIMES (University of Jijel)
Poster N°7	Measure the Long-Range Persistence in Global Solar Radiation Signals Using Fractal Dimension Samia HARROUNI (USTHB)
Poster N°8	Débruitage par Ondelettes et Analyse du Spectre Singulier (SSA) : Application aux séries temporelles des coordonnées d'une station DORIS, Sofiane KHELIFA (Centre National des Techniques Spatiales, CNTS)
Poster N°9	DSP Implementation of Blind Sources Identification Algorithm Abdelfettah MEZIANE (USTHB)
Poster N°10	Acquisition and Image Processing of Gamma and X Radiations System Realization : Robot Realization Tarek NOUIOUA (USTO)

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Prostate Cancer Classification and Diagnosis using Multispectral Imagery

Dr. Ahmed BOURIDANE

Queen's University Belfast, UK

Quantitative cell imagery in cancer pathology has progressed greatly in the last 25 years. The application areas are mainly those in which the diagnosis is still critically reliant upon the analysis of biopsy samples, which remains the only conclusive method for making an accurate diagnosis of the disease. Biopsies are usually analysed by a trained pathologist who, by analysing the biopsies under a microscope, assesses the normality or malignancy of the samples submitted. Different grades of malignancy correspond to different structural patterns as well as to apparent textures. In the case of prostate cancer, four major groups have to be discriminated: Stroma, Benign Prostatic Hyperplasia, Prostatic Intraepithelial Neoplasia and Prostatic Carcinoma. Recently, multispectral imagery has been used to solve this multi-class problem. Unlike conventional RGB colour space, multispectral images allow the acquisition of a large number of spectral bands within the visible spectrum, resulting in a large feature vector size. For such a high dimensionality, pattern recognition techniques suffer from the well-known “curse of dimensionality” problem. This talk proposes a novel round robin tabu search (RR-TS) algorithm to address the curse-of dimensionality for this multi-class problem. The experiments have been carried out on a number of prostate cancer textured multispectral images and the results obtained have been assessed and compared with previously reported works. The system achieved 98-100% classification accuracy when testing on 2 data sets. It outperformed Principal Component/Linear Discriminant classifier (PCA-LDA), Tabu Search/Nearest Neighbour Classifier (TS-1NN), and Bagging/Boosting with Decision Tree Classifier.

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La Télévision Numérique : Tendances Actuelles et Perspectives

Dr. Aoued BOUKELIF

Université de Sidi-Bel-Abbes, Algérie

La technique audio-visuelle a connu ces dernières années un essor vertigineux. Les médias parlent de révolution technique, de véritable explosion du paysage audio-visuel. En réalité, nous ne sommes qu'à l'aube d'une révolution scientifique profonde car il y'a là un terrain qui n'a pas fini d'être exploré. Les possibilités ouvertes par de telles performances font rêver (télé-conférence, télétexte, vidéotex, messagerie électronique, interactivité, multimédia, hypermédia).

Ce sont de véritables défis qui font repousser toujours plus loin et de manière imprévisible et illimitée les frontières de la technologie audiovisuelle, dont l'impact n'a pas encore été pleinement ressenti.

Le voyage serait d'ailleurs moins intéressant si nous savions ce qui nous attendait après chaque tournant.

Il fut un temps où la télévision était simplement un véhicule d'informations et le public acceptait en grande partie ses limitations de qualité .

L'idée du récepteur TV dédié exclusivement aux émissions TV a cédé le pas à celle d'un moniteur multifonctions.

L'avènement du récepteur TV numérisé permet de pallier les défauts propres aux récepteurs TV analogiques, notamment la suppression des défauts de cross-couleur et cross-luminance ainsi que l'atténuation de scintillement.

Un format à écran large (16/9) permet d'améliorer **la sensation de réalisme** de la scène et introduit **un effet de présence** car l'image devient le seul stimulus qui parvient à l'œil.

Ce cours traitera de plusieurs applications telles que la norme MPEG 3 , la télévision Numérique terrestre , ainsi que le mariage de la télévision , la téléphonie et l'Internet, technique connue sous le nom de "tri play " .

Le contenu se décline selon les axes suivants :

- Parallèle entre la télévision analogique et la télévision numérique
- Circuits de la télévision numérique
- Avantages de la technologie numérique
- Les télévisions numériques à cinq processeurs
- Fonctions des différents processeurs
- Traitement du signal vidéo
- Principes de base d'un générateur de caractères
- Circuits de l'affichage à l'écran (OSD)
- Télévision numérique terrestre (TNT)

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Singular Value Decomposition: Applications to Signal and Image Processing

Professor Maamar BETTAYEB

Electrical & Computer Engineering Department College Of Engineering

Advisor to the Chancellor for Graduate Studies & Scientific Research

and

Director, Research and Studies Center / University Of Sharjah / United Arab Emirates

Singular Value Decomposition (SVD) has broad applications in Science and Engineering, including Mathematics, Physics, Chemistry, Geophysics, Astrophysics, Econometrics, Communications, Control, Cryptography, Biomedical, etc...

Successful SVD solutions have been reported to problems in Detection, Classification, Data Compression, Spectral Estimation, Image and Signal Processing, etc... SVD can be used to estimate harmonic signals embedded in noise, detect and identify periodicities, extract signal from noisy measurement, identify time series models, determine the effective rank of matrices, solve related least squares problems, identify the order of dynamic systems, etc...

The strength of the SVD is in its robustness to experimental noisy data and its ability to resolve ill-conditioned problems which frequently occur in real life applications.

An overview of this powerful numerical tool, its properties and some successful applications in Signal and Image Processing is presented. Relation between SVD, Karhunen-Loeve Expansion, Separation of Variables and Principal Component Analysis is also discussed.

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RADAR AND SYNTHETIC APERTURE RADAR BASICS

Prof. Youcef SMARA

Laboratory of Image Processing and Radiation. Faculty of Electronics and Computer Science. (USTHB)

This course reviews the theory and application of aerospace remote sensing imaging radar methods to earth science studies. Imaging radars offer earth scientists a unique and powerful set of methods to study the surface characteristics and topographic form of the crust and oceans, including ice and vegetation cover, over large regions at very high spatial resolution. Over the past 30 years remote sensing imaging radar methods have benefited from major conceptual and technological advances.

The course will provide an introduction to radar imaging which have globally three aspects : i) physical aspect, ii) geometric aspect and iii) statistical aspect. The basics of radar, the nomenclature and fundamental definitions will be reviewed at the beginning of the short course. The concept of radar imaging will be carried out by extending the concepts of high resolution radar. Synthetic Aperture Radar (SAR) Image Formation Processing is intended to provide the student with an in depth study of signal processing options for SAR image formation.

The course begins with fundamentals (frequency, wavelength); moves rapidly to introduce the radar range equation; and then provides summaries of antennas, radar cross section. Following this is a detailed discussion of radar imaging, covering synthetic aperture radar SAR. The course provides a quantitative description of virtually all topics relevant to modern radar. Examples of actual radars are cited.

COURSE OUTLINE:

1. Introduction to Radar. Definition of radar; brief history.
2. Interaction of Radar Systems with the External Environment. Radar cross section: polarization scattering matrix.
3. Typical block diagram of radar imagery.
4. Synthetic Aperture Radar (SAR). Synthetic Aperture Radar (SAR); slant and ground planes; SAR equations; down-range and cross-range resolution; SAR form of radar equation; SAR image quality parameters.
5. Elementary Radar Signal Processing. Matched filter; linear-FM pulses; pulse-compression. Range-Doppler processing; correlation of Doppler and cross-range.
6. Speckle definition and filtering
7. Radar Systems.

Return

SPIHT-based Image Compression and Watermarking

Dr. Ahmed BOURIDANE

Queen's University Belfast, UK

Through this seminar, we will describe the state of the art scalable image compression technique, namely SPIHT. Although the SPIHT algorithm has been proposed for more than 10 years, it is still adopted in the literature for its proven coding performance and low complexity in comparison with other related techniques. For instance, the SPIHT algorithm which provides competitive coding results with JPEG-2000, is more than 5 times faster than JPEG-2000 in coding and up to 10 times faster in decoding. We will show how such an algorithm which exploits similarities through wavelet sub-bands is also capable of exploring inter-redundancy across spectral planes for the compression of colour and multispectral images. Finally, we show how the properties exhibited in the SPIHT algorithm can be exploited for image watermarking in the compressed bit-stream thereby providing attractive performances for security purposes and promising results in terms of robustness and imperceptibility of the watermark message.

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Clustering and Vector Quantization using Unsupervised Competitive Learning

Professor Abdesslam BOUZERDOUM

Professor of Computer Engineering and Head School of Electrical
Computer & Telecommunications Engineering
University of Wollongong, Australia

Clustering and vector quantization are used in image compression, image segmentation, classification, and object tracking in video environments, to name a few. In this lecture we present several unsupervised learning approaches for vector quantization and clustering using competitive and self-organizing networks. In unsupervised learning there is no external teacher or feedback from the environment to say what the outputs should be or whether they are correct. The system must discover for itself patterns, features, regularities, correlations, or categories in the input data and code for them in the output. Two applications will be discussed in detail, namely image compression using vector quantization and color image segmentation.

CONTENTS

- Objectives
- Self-Organizing Networks (SONs)
- Principles of Self-Organization
- Unsupervised Learning
- Hebbian Learning
- Principle Component Analysis (PCA)
- Self-Organized PCA
- Competitive Learning (CL)
- Image Processing Applications of CL

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Analyse Multirésolution et ses Applications en Traitement d'images

Mme Amina SERIR

Faculté d'électronique et informatique / U.S.T.H.B

L'image est devenue de nos jours un support physique d'information privilégié. Traiter une image, c'est essentiellement en extraire l'information jugée utile, la mettre en forme, la nettoyer de parasites éventuels, l'analyser, la transmettre ou la stocker, la fusionner avec d'autres informations,

Le but du traitement numérique d'images est d'élaborer des algorithmes permettant d'effectuer automatiquement des opérations ou tâches qui peuvent être : l'analyse (segmentation, texture, classification, fusion), le codage, la quantification et la compression, la transmission ou l'archivage, la synthèse et la restauration. Aucun algorithme « universel » ne peut convenir à l'extrême diversité des applications et des images (robotique, biomédicale, biométrique, portrait, vidéo, satellitaires optique et radar....). Néanmoins, on peut utiliser des notions très importantes en imagerie qui sont des notions d'échelle et de résolution, afin d'affiner les algorithmes suscités.

Les représentations multiéchelle ou multirésolution permettent l'analyse graduée qui consiste à extraire l'information relative à une échelle d'analyse considérée et d'établir la corrélation inter-échelle.

Par conséquent, le traitement s'effectue sur la représentation numérique de l'image et est basé essentiellement sur les corrélations existant entre les différentes informations numériques la représentant. Nous pouvons mettre en évidence trois représentations : La représentation par les passages par zéro, la représentation pyramidale et la représentation par bancs de filtres. Nous pouvons montrer que la transformation en ondelettes apporte un formalisme mathématique unifié aux diverses représentations à travers les analyses multirésolution et multiéchelle.

Une transformée en ondelettes discrète est réalisable au moyen d'un banc de filtres à réponse impulsionnelle finie itéré sur la bande basse. Une étude approfondie des bancs de filtres permet de réaliser des analyses multirésolutions et multiéchelles moyennant des transformations polyphases et en utilisant un lifting. Il est donc possible de proposer des configurations de bancs de filtres non linéaires.

L'extension de la transformée en ondelettes au cas bidimensionnel, pour des raisons de simplicité et d'efficacité a souvent exploité la séparabilité des axes horizontal et vertical. Il en résulte une décorrélation partielle de l'image qui se traduit par la présence de nombreux coefficients de forte énergie le long des contours.

Afin de résoudre ce problème, de nombreuses transformées orientées ont été conçues.

Certaines reposent sur des bancs de filtres directionnels fixes analysant l'image à des échelles, positions et orientations données (analyse non adaptative : transformée de Radon, ridgelets, curvelets, contourlets, ondelettes complexes, transformée cortex et pyramide orientable).

D'autres suivent une approche adaptative décrite par un modèle géométrique donnant explicitement la direction d'analyse locale (analyse adaptative : matching pursuit, paquets d'ondelettes, brushlets, beamlets, wedgelets, bandelettes, directionlets).

Après une étude comparative des différentes transformées, nous mettons en évidence leur impact sur les différentes préoccupations du traitement numérique d'images.

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On the Certification of Biometric Data

Dr. Lahouari GHOUTI

Queen's University Belfast, UK

In this presentation, we discuss the problem of the certification of biometric data such as fingerprint and iris images. People can be identified through the verification of certified, cryptographically secure documents. The certificates, associated with the personal documents, consist of a compact representation of a biometric feature (fingerprint or iris) can be efficiently used to authenticate the personal documents.

In this presentation, novel results will be presented and performance comparison with an existing system (Microsoft) outlined.

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Vision par Ordinateur

Dr. Latifa HAMAMI

Ecole Nationale Polytechnique, Alger

I. Introduction & Définitions

I.1. Définitions de l'Image :

I.2. Traitement : traitement + analyse + interprétation

I.3. Mathématiquement

I.4. Que peut-on faire d'une image ?

I.5. Vue d'ensemble de la spécialité

I.6. Les différents niveaux de représentation de l'image

I.7. Historique et applications

II. Acquisition et Formation de l'Image

II.1. Formation de l'Image

II.2. La vision humaine

II.3. Colorimétrie

II.4 Les images binaires

II.4.1 Codage par segments (lignes ou colonnes).

II.4.2 Codage par contours

II.4.3 Codage par régions

II.4.4. Codage par forme

III Traitements préliminaires: l'atténuation du bruit

IV. Segmentation

IV.1 Approches frontières

IV.1.1 Détection de contours par le calcul du gradient

IV.1.2 Détection de contours par le Laplacien

IV.1.3 Amincissement des lignes de contours

IV.2 Approches régions

IV.2.1 Méthodes basées sur l'exploitation de l'histogramme

IV.2.2 Croissances de régions

IV.2.3 Segmentation par relaxation

IV.3 Segmentation des images texturées

IV.4 Coopération par fusion région/ contour

V. La reconnaissance

V.1 Le schéma de la reconnaissance des formes

V.2 Les méthodes de la RdF

V.3 Décisions

V.4 Méthodes statistiques

V.5 Autres méthodes

V.6. Méthodes structurelles

V.7. Comparaison dynamique de chaînes de symboles

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An Online System for the Retrieval of Audio Content from Multimedia Databases

Dr. Lahouari GHOUTI

Queen's University Belfast, UK

In this presentation, we discuss the problem of audio content retrieval from multimedia databases. A novel scheme, recently developed by the author, based on the emerging balanced multiwavelets will be introduced in details. The search efficiency is achieved by designing a compact representation of the perceptual content of the database records. Such a representation, known as robust hashes or perceptual fingerprints, is the key to the search success. Retrieval performance is given and performance comparison with an existing system (Philips) outlined.

Return

Biometrics, When Machines Are Used to Identify People

Dr. Mohamed DERICHE

King Fahd University of Petroleum and Minerals, Saoudia Arabia

The aim of the presentation is to expose the participants to the fundamentals of biometrics. Biometrics is the science and technology of measuring and statistically analyzing biological data. In information technology, biometrics usually refers to technologies for measuring and analyzing human body characteristics such as fingerprints, eye retinas and irises, voice patterns, facial patterns, and hand measurements, especially for identifying people. Often seen in science-fiction action adventure movies, face pattern matchers and body scanners seem about to emerge as replacements for computer passwords. Biometrics makes it possible to replace the traditional methods of identification and verification with physiological or behavioural qualities of a person. The major advantage is that these characteristics can not be stolen or shared.

There are numerous biometric techniques currently in use. Some are widely used while others are under still under investigation. Examples include: Fingerprint, Face, Iris, Hand geometry, Retinal pattern, Signature, Speech Recognition, to mention a few. In the presentation we will cover: motivation for such systems, fundamentals of such systems, algorithms used, examples in industry, and the future research directions in this area especially as it applies to the region.

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Towards Universal Robustness and Accessibility of Voice-Enabled Human-Computer Interfaces

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Recently, in the context of rapidly growing network applications, there seems to be an abiding vision to provide computer-based media where no sophisticated training is required. Among these applications, voice-enabled services are rapidly gaining popularity. In fact, easier-to-use development tools, lower costs, availability of broadband channels and potentially higher return on investment, have made this technology attractive to a wider variety of institutional and individual users. However, despite a dramatic increase in the performance of computers, designing and implementing efficient voice-enabled systems remains hard, and substantial time and effort is required to develop and deploy these applications today. My presentation will focus on middleware and interfaces that produce voice-enabled services, and tools that enable systems to invoke operations on target objects. These applications must be robust, efficient, and accessible in order to make a positive impact on Human-Computer Interaction (HCI). Robustness is necessary to adapt rapidly to environment-change requirements that span an increasingly wide range of media types and situations. Efficiency is necessary to support the demand of performance-sensitive voice-enabled services. Providing accessibility, means removing obstacles that prevent people with special needs or those who lack a certain type of literacy from participating in substantial life activities, including the use of services, products, and information. Hence, the presentation will focus on some innovative techniques and tools that have improved the HCI of real-life applications that I have developed by:

- rigorously identifying bottlenecks and key sources of weaknesses of vocal interfaces;
- optimizing end-to-end middleware performance by considering naturalness of text-to-speech systems and robustness of automatic speech recognition engines;
- simplifying and automating the training, adaptation, validation, and evolution.

I will present middleware testbed environments which permit me to conduct extensive experiments that implement lower-level programming mechanisms by addressing the issue of noise reduction and the robustness of large-vocabulary continuous-speech recognition systems in adverse conditions. For this purpose, strategies based on subspace filtering that has been proven very effective in the area of speech enhancement will be presented. I will compare original hybrid techniques that combine the Karhonen-Loève Transform (KLT), Multilayer Perceptron (MLP) and Genetic Algorithms (GAs) in order to get less-variant Mel-frequency parameters. The advantages of these methods include that they do not require estimation of either noise or speech spectra. I have also applied and demonstrated these optimization techniques in the context of speaker adaptation, and I have developed middleware optimization techniques that can yield highly efficient and user-adaptable systems, without sacrificing flexibility, reuse, or standards-conformance. Higher-level programming mechanisms will also be investigated by presenting systems that allow Internet voice searching and navigating (IVSN) and automatic user profile building and training (AUPB&T). The problem with current engines is that their vocabularies are usually suited for general use and that visually challenged users have no easy means of training the engine, as well as the fact that other users generally shun this type of input method, because of the long and picky training process. The solution I will present is a system that will accept user documents and favorite web pages, and will feed them to a text-to-speech module in order to automatically build, train a user profile, and enrich its lexicon. The results show that the developed spoken-query information retrieval system that includes AUPB&T yields significant improvement, compared to the Microsoft baseline system. Finally, I will give some indications about the potential of transversal research that might lead to mature middleware technologies in the context of real-life applications such as healthcare systems and Web-based learning systems.

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