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Computer Vision Tools for Capsule Endoscopy Exam Analysis

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The wireless endoscopic capsule is a recent medical technology with proven clinical importance. One of its limitations, however, is the long annotation time that each exam needs from a trained specialist. A solution to this problem might lie in computer vision techniques, which can provide automatic and semiautomatic tools that help in reducing these annotation times. In this paper, we offer an introduction to wireless capsule endoscopy, showing its clinical importance and reviewing current state-of-the-art computer vision methods for this scenario. With this field clearly maturing and the expected increase in the clinical usage of wireless capsule endoscopy, we predict a very bright future for clinical and computer research on this topic.

1. Introduction

Enteroscopy is a very common medical procedure for diagnosing abnormalities in the human digestive system. There is a vast number of different techniques ranging from colonoscopy and push enteroscopy to full intraoperatory endoscopy. Either the limitations or the intrusive nature of these techniques have made the small intestine the most uncharted section of the gastointestinal tract, mostly due to its anatomical characteristics (average length surpassing seven meters) and difficult access. Wireless capsule endoscopy is a recent technological breakthrough that promises to change this scenario.

An endoscopic capsule is a small pill-shaped device that is swallowed by a patient, filming its gastro-intestinal tract for around 7 hours, typically reaching the colon before the battery runs out. Besides its proven diagnostic potential, allowing doctors to see ulcers, polyps and active bleeding in the small intestine, the capsule is shedding new light in the understanding of the clinical characteristics of the small intestine. Why is the small intestine so resilient to cancer? How does its regeneration mechanism work? These are but examples of the importance of the endoscopic capsule for clinical research.

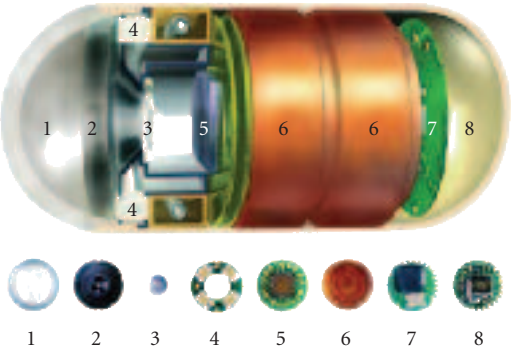

Figure 1: The wireless endoscopic capsule (1: optical dome; 2: lens holder; 3: lens; 4: illuminating LEDs; 5: CMOS imager; 6: battery; 7: ASIC transmitter; 8: antenna) (Adapted from [1]).

This very bright picture is somewhat marred by an unavoidable practical restriction: we are producing more data than we can handle. Each seven-hour video averages more than 60 thousand images. As technology advances, this number is bound to increase due to smaller power consumptions, better batteries, and higher video frame-rates. Currently, a doctor needs to sit down at a computer and view all these images in order to write a clinical report for each exam. This process takes more than one hour and can easily reach two. Faced with such a drastic bottleneck, how can this technology evolve? The solution might lie in computer vision, by creating automatic annotation tools that preselect all the important images. This can both reduce annotation times and automatically label data for clinical research.

The main contribution of this paper is thus to introduce this topic to the signal processing and computer vision communities. The multidisciplinary nature of this work is shown by the affiliation of the authors, coming from three different universities and two major hospitals in two countries. We will describe the wireless capsule in greater detail (Section 2), demonstrate its clinical importance and limitations (Section 3), cover the current state of the art in computer vision research (Section 4), and discuss short-and long-term goals for this field (Section 5).

2. The endoscopic capsule

The American Food and Drug Administration (FDA) approved the endoscopic capsule in 2001, for the purpose of "visualization of the small bowel mucosa as a tool in the detection of abnormalities of the small bowel." The capsule was developed by a team of Israeli and British scientists, and was marketed by Given Imaging Ltd., Israel [1]. Since its acceptance in 2001, and according to its distributor, over 400 thousand capsule exams have been performed worldwide. Another capsule distributor, Olympus [2], started marketing its own endoscopic capsule in 2006. This not only confirms the capsule success but also means lower capsule prices and enhanced popularity of this procedure. Both companies are furiously trying to develop and market a new type of capsule, with the specific purpose of diagnosing the colon, which is expected to boost capsule sales significantly.

The endoscopic capsule is the first autonomous microdevice to explore the human inner body of wide clinical application. From a technological perspective, it is an assembly of well-tried and tested components and techniques (Figure 1). The exterior shell is a disposable plastic capsule weighting 3.7 g and measuring 11 mm × 26 mm. CMOS sensors capture images focused via a wide-angle lens and illuminated by six blinking white light-emitting diodes (LEDs). Batteries power a UHF band radio transmitter that sends signals to eight receiving antennas taped to the patient's chest. Images are then stored in a hard drive carried in the patient's belt. The capsule is passively propelled by peristalsis. Its main limitation is battery capacity. Even though they occupy around 70% of the full capsule volume, the two silver oxide batteries are only good enough for endoscopic purposes due to ingenuous power-saving techniques such as flashing the illumination LEDs in sync with image capture, instead of providing constant illumination. Ideally, better batteries or smaller power consumptions could give us more imaging time (allowing the capsule to film the full length of the colon), or better video temporal resolution.

Although some improvements are now available, namely in the new Olympus' Endocapsule, most exams so far have 256 × 256 pixel resolution with three 8-bit color planes. Frame rate is approximately two per second, and an average exam has around 55 000 images where 100 are from the gastrointestinal tract entrance (exterior, teeth, esophagus, etc.), 4,000 from the stomach, 30 000 from the small intestine (duodenum, ileon, etc.) and 20 000 from the large intestine (cecum, colon, etc.), [3]. Of all 60 exams studied, only in one the capsule exited via the patient's anus.

The clinical procedure itself is very simple and painless, which is a major factor for its growing popularity. Patients are instructed to fast overnight. The exam begins by taping the eight antennas to the patient's chest following a defined pattern, and connecting them to the hard drive carried in the belt. The capsule starts transmitting as soon as it leaves its storage compartment and should be immediately swallowed by the patient. Water intake can begin after 2 hours and food can be taken after 4 hours. Patients are asked to avoid exercise and to constantly monitor a blinking light on the belt pack for confirmation of good signal reception. Once the exam is finished, data is downloaded from the belt pack recorder to a customized PC workstation. This process used to take 2 to 3 hours but it is now much faster, taking less than 30 minutes.

Proprietary software such as *Given Imaging's Rapid* [1] or *Olympus* [2] is then used to review the images. This means that the doctor needs to sit down in front of the PC, view the full 60 thousand images, annotate all the relevant ones, and create a final medical report. One can imagine that this task not only can take up to two hours to complete, but is also considered very tiring by doctors, who rarely manage to fully review two exams consecutively. Observation of clinical practice and direct cooperation with doctors have allowed the IEETA-UA team to develop an independent annotation software, *CapView 1.0* [4] (Figure 2), that provides facilities for exam management and browsing, normalized annotation language, customizable automatic report generation, and simple integration of automatic tools. This software is now used in routine clinical practice in three gastroenterology departments in Portugal responsible for over 200 capsule exams per year. Its normalized annotation facilities and simple exam management were the key factors for our successful computer vision research in this area. This is a part of the *CapView.org* [4] research framework that will be discussed in Section 5.

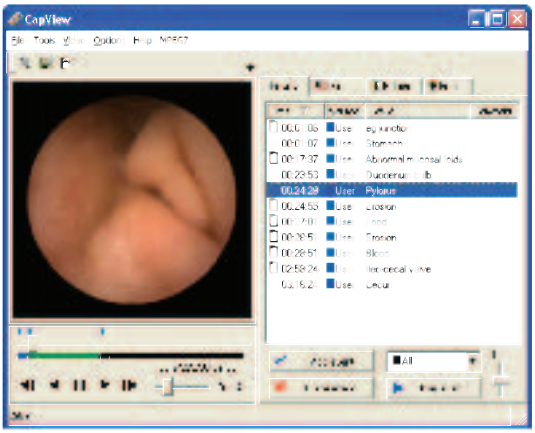

FIGURE 2: *CapView* exam annotation software developed by IEETA, University of Aveiro, Portugal, and currently used for routine work at two hospitals and a private clinic. Over 150 exams were already analyzed and annotated with this software tool.

3. Clinical importance and needs

3.1. Clinical importance of the endoscopic capsule

The gastrointestinal (GI) tract consists of the oesophagus, stomach and duodenum (upper GI tract), the jejunum, ileum (small bowel), colon, and rectum (Figures 3, 4). The advent of fibre optic gastrointestinal endoscopy in the early 1970s opened the door to effective diagnosis and biopsy of disease in the lumen of the stomach and duodenum (gastroduodenoscopy OGD) and shortly afterwards the colon and rectum (colonoscopy). Therapeutic endoscopy has developed enormously since then, bringing many interventions within the ability of the endoscopists and saving many patients from invasive surgery. Videoendoscopy in the 1980s improved image resolution and the ease of use of the equipment.

Most GI pathology occurs in the stomach, duodenum, and colon and the above techniques were thus of great clinical importance. The jejunum and ileum however, accounting for a significant amount of "obscure" bleeding, are the site of inflammation in most patients with Crohn's disease and a rare location for benign and malignant tumors. The clinical need for effective diagnostic small bowel imaging was evident. The jejunum and ileum have remained out of reach of a conventional endoscope, except for the first few centimeters of jejunum and last few of terminal ileum. Until wireless capsule endoscopy, all widely practiced techniques relied on the push of a flexible insertion tube propelling the endoscope along the bowel. The jejunum and ileum are the longest parts of the GI tract at up to 4.5 m and are arranged in many mobile loops, which make the mechanical disadvantage of push enteroscopy a rapidly insurmountable obstacle to progress. Early studies into the efficacy of wireless capsule endoscope (WCE) in clinical practice involved mainly trials of WCE against existing imaging methods in patients with "obscure" GI bleeding; those who had lost blood into the lumen with no cause found at OGD or colonoscopy [5]. A clear basis for superiority of WCE in sensitivity above contrast imaging and CT imaging was evident. WCE also received attention for the diagnosis and assessment of patients with suspected or known

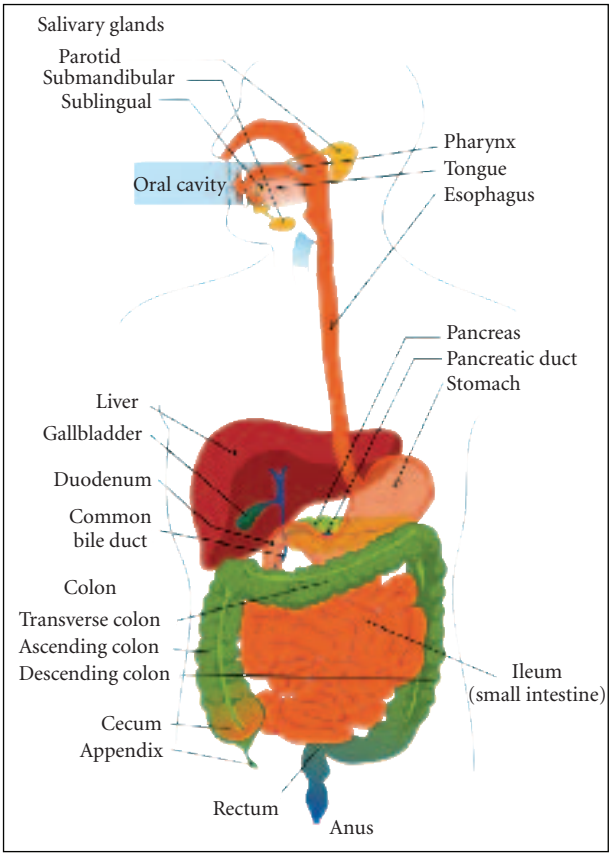

Figure 3: Diagram of the gastrointestinal tract.

Crohn's disease [6], a chronic inflammatory disease affecting any part of the GI tract, but most often localized in the distal small bowel. This disease is of increasing prevalence in the developed world, and causes significant morbidity to patients. It is difficult to diagnose, partly due to the lack of sensitivity of contrast radiology to minor mucosal disease. WCE offers greater sensitivity to diagnosis and also allows followup examination without exposing the patient to the hazards of ionising radiation.

Cancer of the small bowel is rare but often has a poor clinical outlook as it tends to be diagnosed late. WCE is more sensitive in detecting small bowel cancer including neuroendocrine tumours [7], lymphoma [8, 9], GI stromal tumours [8, 9] and carcinoma [8, 9]. It would therefore be expected to offer a clinical benefit in terms of cancer survival when employed in this group of patients. The hereditary Peutz-Jegher disease involves the formation of small bowel polyps with premalignant potential, especially when they reach a large size. Published series have suggested that WCE [10, 11] should now be the investigation of choice in those undergoing follow-up in interval surveillance for this condition.

(a) Oesophagus (b) Stomach

(c) Small intestine (d) Large intestine

Figure 4: Images from various topographic sections of the GI tract.

Patients with obscure diarrhoea abdominal pain and possible functional bowel disease have also been studied in series to assess potential diagnostic benefits of WCE, but in this heterogeneous group no clear benefit has been demonstrated to date [12].

The development of oesophageal capsules with a faster frame acquisition rate has allowed the noninvasive imaging of oesophageal conditions in select groups of patients. This form of WCE may be of clinical benefit in the assessment of endoscopic signs of portal hypertension and is safe and acceptable to patients [13, 14]. Early data from the colon WCE [15] launched for clinical use by given imaging in 2006 suggest that this may be effective in the recognition of colonic pathology while avoiding conventional endoscopy, but further clinical studies are required to establish the efficacy and appropriate role for this application of WCE technology.

In summary, small bowel WCE has allowed a diagnosis to be made in many patients with clinically significant disease when existing techniques would have done so, or done so later. It is also a safe procedure involving no radiation risk, it has been found to be acceptable to patients, and it requires little nursing supervision, as it is usually an ambulatory outpatient procedure. Development of WCE in the oesophagus and colon is at a relatively low stage of clinical development but could at some time replace some conventional diagnostic endoscopy.

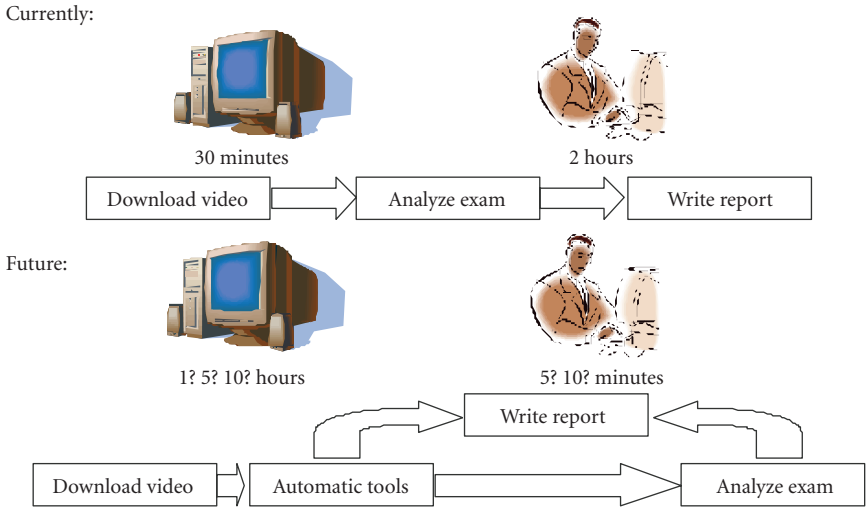

Figure 5: The main objective of automatic tools for endoscopic capsule is to reduce the time doctors need to analyze the resulting exam and to write the corresponding report. Typical clinical workflow means that doctors do not care how long the computer is processing, just as long as the actual time they have to sit in front of it is reduced to a minimum.

3.2. *Clinical need for better computational tools*

WCE capsule viewing times vary according to the clinician's experience, the complexity of the case, and the small bowel transit time. They range on average is from 45 to 90 minutes but can occasionally reach two full hours. The suspected blood indicator (SBI) in Given's Rapid Reporting Suite may be helpful but does not replace the need for a full clinician viewing of the video. Some time is spent in identifying the landmarks of pylorus and ileocaecal valve so that the clinician can focus on the small bowel section of the video. The above places a time burden on clinicians who practice in this field. There is some controversy regarding interobserver agreement between those of varying experience and training [16]. A reduction of the required viewing time for each video would be a major advantage, provided that the quality of the diagnostic report was not reduced (Figure 5). The existing systems have user-friendly viewing interfaces, but more could be done to perform automated enhancement of likely abnormalities and also to identify landmark sites on the trace by an automated process. Automated image highlighting of a suspected abnormality could also improve quality by raising possible pathology, which could have been missed by the clinician among many thousands of normal frames.

Data storage post WCE is important, as videos may need reexamination after a delayed interval. Loss of data would represent a clinical governance risk, and all electronic patient data must be stored in a manner approved by national guidelines for electronic patient records. Data storage needs consideration in terms of security, stability, and volume management. Integration of WCE reporting software into existing endoscopic reporting packages would allow easier audit of departmental practice.

The techniques necessary to lead to optimal WCE diagnosis in the upper GI tract and colon remain unclear as these fields are less well developed clinically. The future prospects for therapeutic WCE and for a capsule under real-time movement control by the clinician are intriguing possibilities, which if effectively realized are likely to bring considerable further clinical value to patients.

4. State of the art in computer vision research

The previous section has shown us the importance of capsule endoscopy as a vital diagnostic procedure for a number of clinical conditions. Important scientific articles such as by Iddan et al.[17] and Qureshi [18] are backed up by Given Imaging's impressive numbers: over 400 thousand capsule exams have been performed worldwide since 2001. It is thus quite clear that unless computer vision provides robust ways to overcome the most important problem of capsule endoscopy, long exam annotation times, the popularity of this technology will soon stop growing. Fritscher Ravens and Swain [19] comment that with the predictable cost reductions of individual capsules, the time a doctor needs to analyze the exam may soon become the most costly part of the procedure.

Although the use of image processing in WCE video analysis is still in its infancy, a significant number of papers have already been published. The applications of computer vision in capsule image analysis can be divided into four categories. The first category, which is clearly the most mature judging from the number and quality of papers published, considers the topographic segmentation of WCE video into meaningful parts such as mouth, oesophagus, stomach, small intestine, and colon (Section 4.1). The second category involves the detection of clinically significant video events (both abnormal and normal). Examples include bleeding, abnormality, intestinal fluids, intestinal contractions, and capsule retention (Section 4.2). The third category considers video analysis with respect to changes in consecutive frames in an attempt to adaptively adjust the video viewing speed (Section 4.3), and hence achieve a reduction in the viewing time. A final area of research has been identified, although not much work has been done on it. It focuses on using image processing techniques to enhance the viewing quality of raw images captured by the capsule (Section 4.4).

4.1. Topographic segmentation

A wireless capsule endoscope, being swallowed, is propelled by peristalsis through the entire gastrointestinal track passing vital organs such as the mouth, oesophagus, stomach, and small intestine; finally reaching the colon when its battery runs out. Different organs require different levels of attention from a clinical reviewer, so dividing the capsule video into meaningful gastrointestinal segments allows the expert to focus on particular areas of interest, thereby making the task of reporting easier. Moreover, gastric and intestinal transit times (GTT and ITT), which can be calculated from the topographic segmentation results, provide useful diagnostic cues for clinicians. It is also an important preprocessing step for more advanced automatic tools. As an example, users of Given's Rapid Reader software must interactively identify boundaries between the stomach and the intestine (pylorus); and intestine and colon (ileocaecal valve) before other functions (e.g., the suspected blood indicator (SBI) and capsule localization function) are enabled. Finding the pylorus in the video can be difficult and time-consuming, even for an experienced viewer, as visually the stomach tissue in the pyloric region and the tissue at the beginning of the intestine appear

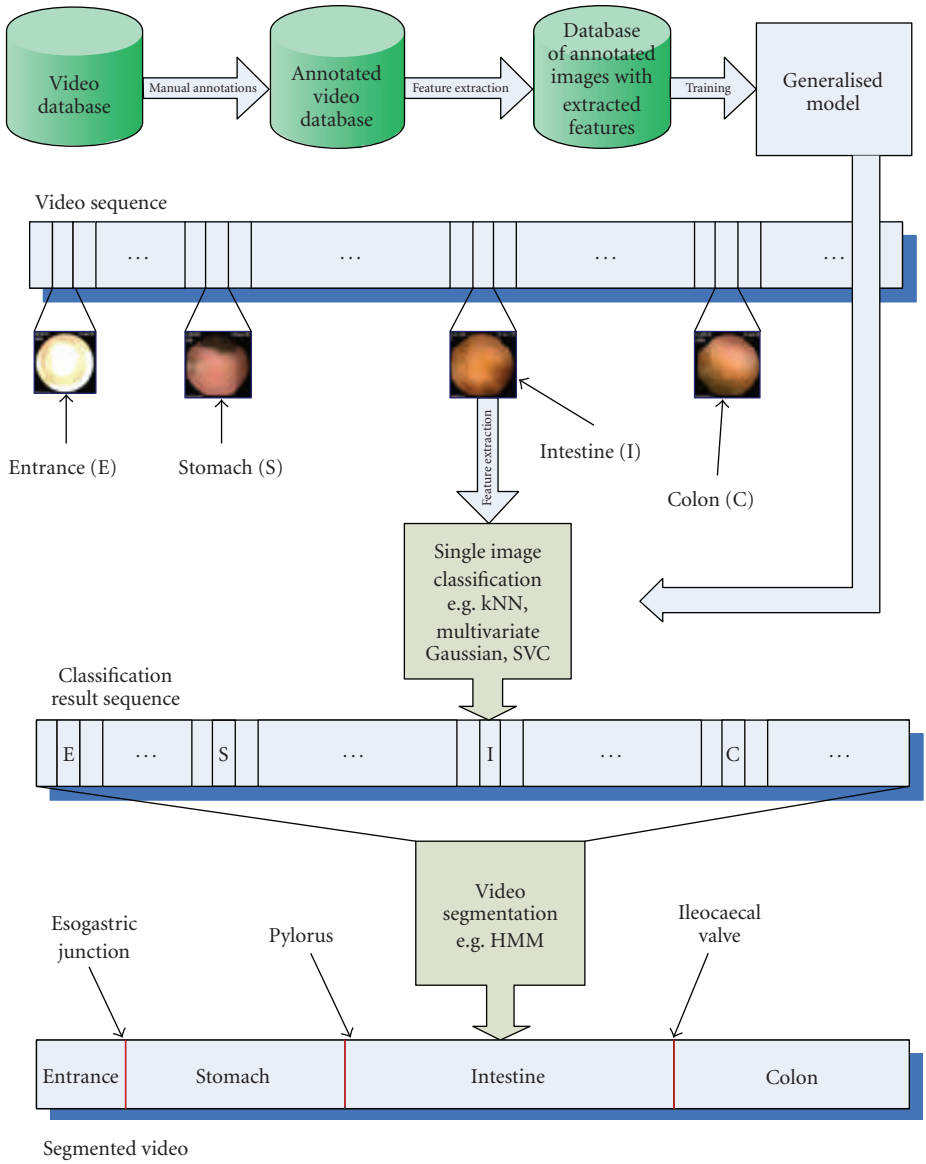

Figure 6: Typical structure of current topographic segmentation methods.

very similar. This problem also makes identifying the video frame where the capsule enters the IV difficult to locate. A further difficulty presents itself at this point as tissues are often contaminated with faecal material that occludes the camera view. To summarize, accurate topographic segmentation is a difficult and time consuming task that is currently undertaken by clinical experts immediately before the WCE video can be reviewed. A number

of computer vision algorithms have been developed addressing this problem, resulting in a significant number of publications [20, 21, 22, 23, 24, 25, 26, 27, 28]. Most of these algorithms can be divided into three separate tasks (feature selection, single image classification, video segmentation), as seen in Figure 6.

Feature selection

From a pattern recognition perspective, this task is probably the most important for this type of practical problems. Ideally, we should have a set of features that is capable of robustly discriminating between the several target classes, which has low interfeature correlation, and that is easily computed. Most work so far has used *content* features, defined as features obtained directly from an image. Typically, features used to classify different gastrointestinal tissues are based on color and texture information. In [20, 22, 24, 25, 27, 28], the authors consequently used image features extracted from compressed hue-saturation (HS) histograms as image features. The histograms are compressed using a discreet cosine transform (DCT) followed by principal component analysis (PCA). In [20, 22, 27], it was shown that a few principal components extracted from HS histograms carry enough information to provide relatively good discrimination between mouth, stomach, and intestine tissues.

Coimbra and Coinha [26] handled this task by studying the performance of the well-known MPEG-7 visual descriptors [29] for this specific scenario. Besides concluding that the two best visual descriptors have clearly scalable color [30] and homogenous texture [30], the authors observed that better features are needed for more complex tasks such as event detection. Although good results were obtained in [21, 23], the authors have later shown that the key for successful automatic tools might lie in combining *content* with *context* features [31]. This means that we should not only include features extracted directly from the images, but other *context features* such as body spatial location and capsule displacement velocity (Figure 7). We thus mimic more closely the clinician methodology for exam analysis, which draws on its additional expert knowledge for improved annotation. We predict that this will be especially important for the difficult task of event detection.

Finally, another important contribution was made by Mackiewicz et al. [24] by proposing to add texture information from presegmented square subimage regions (Figure 8). The algorithm selects valid subimages by a statistical analysis of five parameters (mean hue, saturation, intensity and standard deviation of hue and saturation) extracted from each subimage block, thereby ensuring that they contain only clear gastrointestinal tissue without any visual contamination, for example, bile, saliva, food remains, air bubbles, and so forth. For texture features, a texture measurement method based on singular value decomposition, introduced by Ashjari has been used [32]. In [25], another texture descriptor method introduced by Connah and Finlayson [33] was tested and was shown to perform successfully.

Single-image classification

Having extracted feature vectors, the next stage involves classifying them as belonging to one of the food-pipe organs (exceptionally the first class, called entrance, includes images of the mouth and oesophagus together with all the images which were acquired by the capsule camera before it was swallowed). Thus, we have four classes: entrance, stomach, intestine, colon. There is a wide variety of possible classifiers which can perform this classification

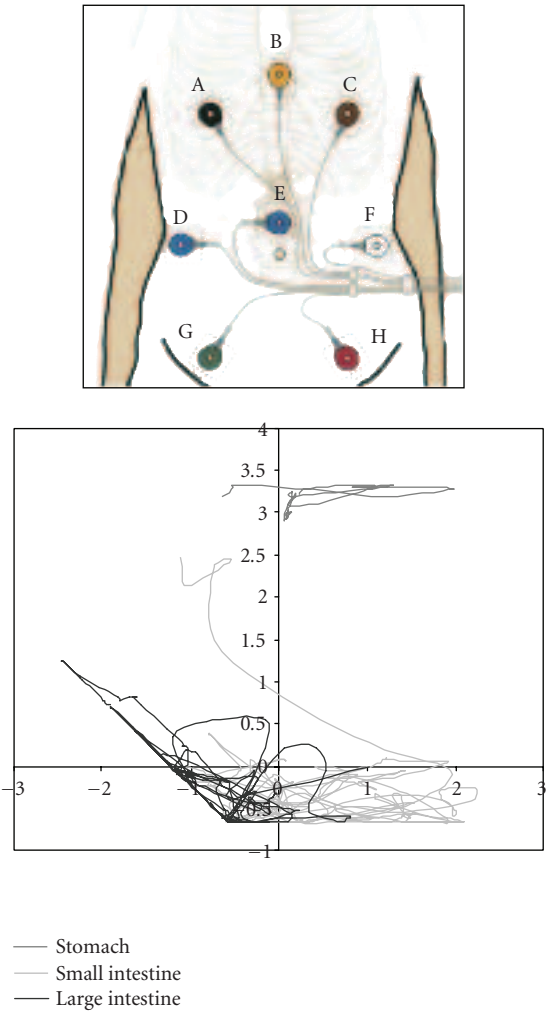

FIGURE 7: Using signal triangulation, we can obtain approximate 2D capsule spatial locations by selecting the three strongest signals from the eight antennas located on the patient's anterior abdominal wall. This is an example of a *context feature* which has been proven useful for improving automatic topographic segmentation methods.

task; relevant literature examples include kNN [20], multivariate Gaussian [21], and support vector classifier (SVC) [20, 23, 25].

The best classification results were found using SVC. Although *support vector machines* are currently very popular in computer vision research due to their typically good performance, this highlights some characteristics of this specific scenario. The most important one is that using these features, Gaussian distributions provide a poor modeling of our

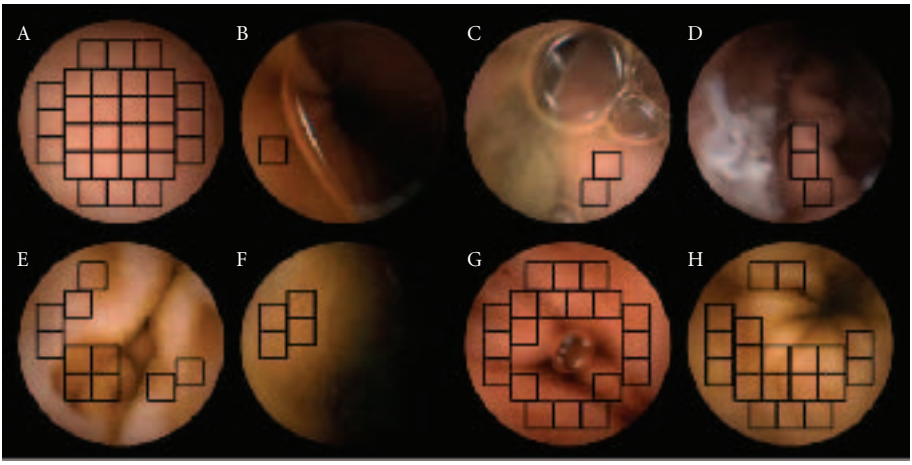

Figure 8: The spatial blocks that depict tissue more clearly are preselected before attempting topographic zone classification, therefore improving results. The key to event detection might lie in such approaches.

system. A nonlinear classifier such as SVC yields better results but it provides very little insight about the behavior of the system itself. This is even more serious if we consider that different training data sets result in significant differences in the classifier performance. As such, a clear objective for future research is to find features that allow us to create a more transparent and predictable model of our system, hopefully one that is linear.

Video segmentation

Having built the single-image classifiers, there are a number of methods which can be used to segment the video. In [20, 22], the authors present a fast algorithm for searching the boundary between two GI regions. It basically moves a cursor back and forth, depending on the classification of the current image, until two consecutive images belonging to different regions are found. This algorithm is extremely fast, but can produce large video segmentation errors due to misclassifications in the early iterations. In [23], the authors train four classifiers, one for each class. Images are assigned to a class by the SVM classifier with the largest positive distance to its corresponding hyperplane. A total segmentation error function with three varying parameters (region boundary positions) is then defined and minimized by consecutively varying one parameter in each cycle. Another approach is used in [25], where authors map the output of the single-image SVC classifier into four-class probabilities and use a hidden markov model (HMM) to estimate the most probable sequence of states. Having trained the state transition matrix, the standard Viterbi algorithm [34] is used to estimate this sequence.

The accuracy of WCE video segmentation algorithms is evaluated as the frame difference (error) between the point in the video where the boundary has been manually annotated (by a clinician) and the point automatically selected by the algorithm. Regardless of video segmentation method used, the smallest segmentation errors are found at the esogastric junction z_{EJ}, followed by the pylorus z_{P} and ileoceacal valve z_{ICV}. State-of-the-art results

show median errors around 2 images (out of 60 thousand) for z_{EJ}, 100 for z_{P} and 500 for z_{ICV}, which are quite close to manual segmentation errors performed by clinicians.

4.2. Event detection

The hardest and most important challenge of endoscopic capsule computer vision research is, without doubt, automatic event detection. From a clinical perspective, this is exactly what doctors need: the removal of all unimportant images and an automatic proposal for the annotation of all the relevant ones. It is hard to imagine a system that does not require human validation but if a doctor simply needs to validate/reject a small set of proposed annotations, then the time he needs to annotate a full exam is drastically reduced. It is thus obvious that all developed classifiers must have *recall* values very close to 100%. We cannot miss a single event otherwise clinicians cannot trust this system and will view the whole video anyway. In the eternal compromise between *accuracy* and *recall* values of a classifier, this probably means degrading our *accuracy*. The reason why event detection for this scenario is so challenging becomes now very clear: can we really afford to degrade our accuracy? As an example, if we have a classifier with 99% accuracy and apply it to the 60 thousand images that constitute an exam, we will have an average of around 600 false positives!

In summary, capsule endoscopy is very demanding regarding classifier performance for event detection. This probably explains why research has not been very successful on this field. There is, however, early work on several clinically important topics, which we will now describe.

Blood detection

The manufacturers of the Given capsule system [1] provide only one automatic image analysis function in their Rapid Reader software: the suspected blood indicator (SBI), which is designed to report the location in the video of areas of active bleeding. However, this tool has been reported to have insufficient specificity and sensitivity [35]. In [36, 37], the authors report on the classification performance of the SBI for a multitude of patients, locations and different visual clarities of blood (Figure 9). Besides relating poor performance, they conclude that the SBI does not detect bleeding lesions in the stomach or altered blood anywhere in the GI tract, and does not reduce the time required for interpretation of the capsule endoscopy procedure. Independent early work on this topic is described in [38] where authors propose an algorithm for detecting areas of bleeding in WCE videos, using expectation maximization (EM) clustering and a bayesian information criterion (BIC).

Intestinal fluid detection

In [39], the authors present an algorithm which detects areas in the WCE video comprising images completely obscured by intestinal juices. Early detection of such regions is highly beneficial since they can be removed from the sequence presented to the clinician, resulting in a shortening of the reviewing time. Intestinal fluids appear as yellowish to brownish semi-opaque turbid liquids often containing air bubbles as well as other artifacts. The authors point out that the most relevant feature of the intestinal fluids is the presence of small bubbles of different sizes and quasicircular shapes. The algorithm is based on texture analysis performed using Gabor filter banks.

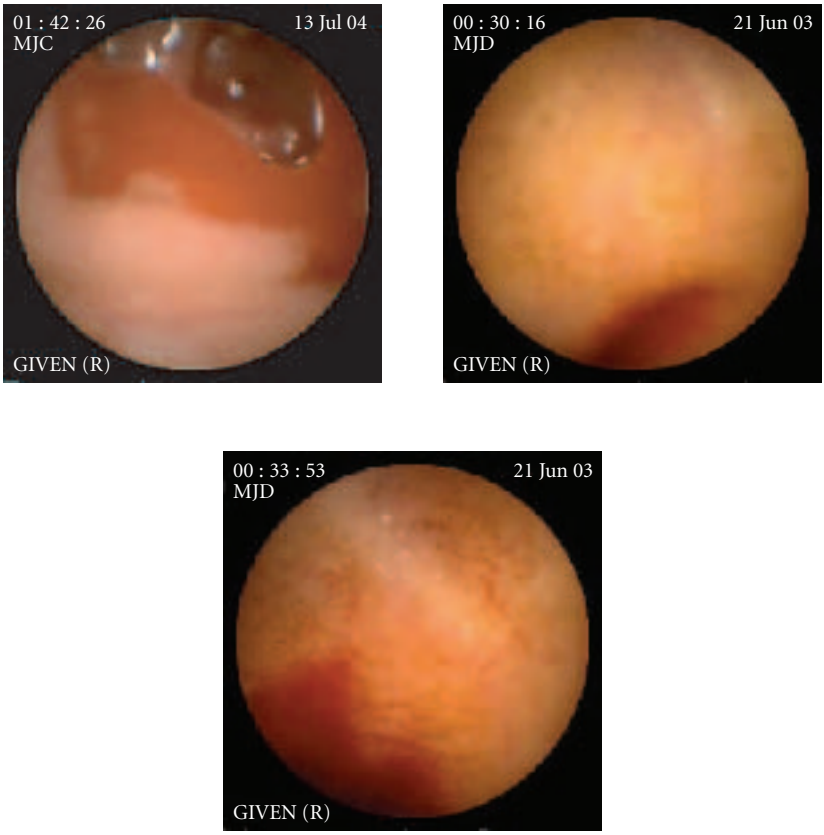

Figure 9: Examples of visible blood in endoscopic capsule video exams.

Generic abnormality detection

In [40], Boulougoura et al. describe early work on a system for discriminating between normal and abnormal tissues in WCE images. More theoretic work on this topic can be found in [26], where the authors measure the usefulness (classification potential, inter-coefficient redundancy, etc.) of MPEG-7 visual descriptors for detecting a variety of events (bleeding, ulcers, and polyps), registering the superior performance of the *scalable color* and *homogenous texture* descriptors.

Capsule speed estimation/retention detection

In [41, 42], the authors locate areas in the GI tract that might be affected by Crohn's disease (CD). In this work, a deformable ring model is used to locate the areas where the capsule moves more slowly or stops, which according to some researchers [43] may be indicative of CD. The ring model is used to map areas of interest in adjacent video frames by assuming constant motion through a tube-like surface.

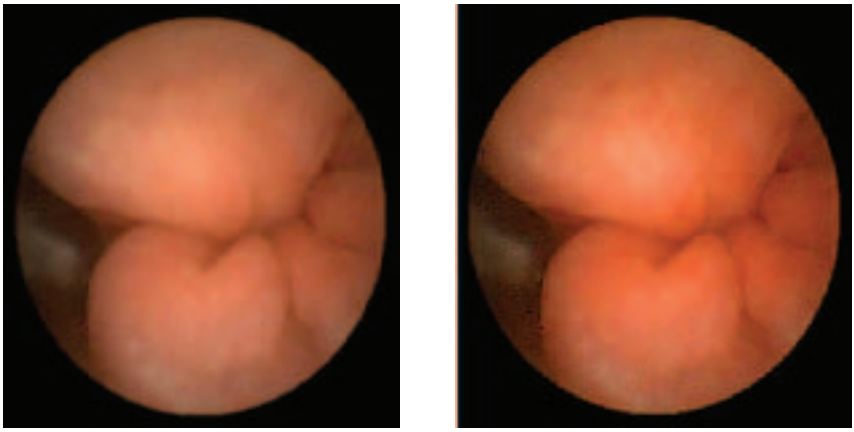

Figure 10: Example of a raw image (left) and an enhanced one (right). It is not clear whether such enhancements improve the quality of the clinical diagnostic.

Detection of intestinal contractions

Intestinal contractions, which are of some relevance to clinicians, constitute only around 1% of the WCE video. In [44], Vilariño et al. use ROC curves with ensembles of classifiers to detect these contractions based on 34 low-level image features from 9 consecutive frames including mean intensity; hole size; global contrast, and so forth. In [45], the authors introduce a two-stage contraction detection algorithm based on a support vector classifier.

4.3. Adaptive viewing speed adjustment

The main motivation for applying computer vision techniques to WCE video analysis is the potential improvement gained by reducing the overall time needed to review the data by alerting the expert to clinically significant video frames. This may be achieved not only by automatic detection of events or segmentation of the video into meaningful parts, but also by adjusting replay speed (number of frames displayed per second). The software supplied by both Given Imaging [1] and Olympus [2] includes such a control, although details of these algorithms are unknown. In [46], the authors propose a method for varying the frame rate in a capsule image sequence, which plays the video at high speed in stable regions and at a slower speed where significant changes between frames occur. The authors divide each frame into blocks and measure the similarity of colors between respective blocks in consecutive frames. In addition, the algorithm estimates motion displacement by extracting features using the KLT algorithm [18], tracking them using Newton-Raphson iterations. The authors conclude that using their method the viewing time may be reduced from 2 hours to around 30 minutes without loss of information.

The most obvious remark to this type of methods is that their practical usefulness is highly subjective. There are several possibilities for measuring image disparity and then modeling how this should interact with video playback speed. How do we measure which one is best for a clinician, the faster one, the one that leads to smaller manual annotation

errors? All research on this topic must handle this issue in a very convincing way, surely involving deployment in real clinical conditions for proper evaluation.

4.4. Image quality enhancement

To conclude, we cover an even more subjective and difficult to evaluate topic: image quality enhancement methods. Besides standard noise reduction methods, we can visually enhance the image somehow so that a clinician is faster and more accurate in detecting relevant events. The first commercial example is Olympus' annotation software [2], which uses some sort of contrast and texture enhancement algorithms for displaying the captured images. Reactions by clinicians were mixed. The images do look more appealing but are they really improving our ability to correctly diagnose an exam? Or are they, in fact, creating misleading visual artifacts?

5. Discussion and future research

The picture that emerges from the descriptions on the previous section is very positive as far as the future of this field is concerned. Although there have been a significant number of published papers, it is fair to say that this field is still in its infancy, and that there is a body of work that needs to be done.

Of all the different areas described, arguably the only mature one is topographic segmentation. The algorithms presented here were all tested on real-time WCE videos, and all proved to perform well and were effective in reducing the time needed to perform the video analysis. In their current form, they can be incorporated into real viewing software applications. Indeed, both the Norfolk and Norwich University Hospitals (N&NUH) in the UK are currently evaluating topographic segmentation software prototypes. In Portugal, three gastroenterology departments (two in public and one in a private hospital) have routine working versions of the *CapView 1.0 Annotation Software* [4], responsible for annotating over 150 exams per year, and where this functionality has already been integrated.

With regard to the detection of pathological events, the picture is not so bright. We have presented some studies in the previous section but they are invariably tested on very small data sets, and thus it is impossible to measure its usefulness for everyday clinical practice. This scenario poses exceptional performance demands on automatic classifiers, which will not be easily solved by conventional content-based analysis. In fact, doctors in their everyday routine have access to additional data besides images alone such as patient data, exam details, capsule data, and so forth. The key to this task will probably require us to mimic this procedure by adding *context* to our classifiers. A clear example is seen in [31] where adding capsule position, location, and displacement velocity allows us to obtain better results than content-based analysis alone.

Besides identifiable challenges such as these, the future of WCE research requires something else: a strong infrastructure. Most events are quite rare, making it difficult to create large sets for training and testing purposes. Digital storage space required for holding all these data is massive (each exam is currently about 800 Mb in size, and is expected to increase as image quality gets better). Medical annotation is not very reliable, meaning that we need several specialists to annotate the same event. Different research groups collect their own data making it impossible to compare different algorithms. It is thus not difficult to understand why event detection, the ultimate goal of computer vision in WCE image analysis, has not been an outstanding success after two years of research. In contrast, when we

look at other areas of WCE computer vision research such as topographic segmentation, where there is an abundance of relevant data in each video, we can find significant progress.

The *CapView.org* research framework [4] is slowly but steadily addressing this infrastructure problem. An annotation software, using an internationally accepted clinical standard for capsule annotation, is now available. It allows normalized annotation and provides simple file management facilities. The IEETA-CapDB database of WCE currently holds more than one thousand annotated exams and an alpha version of a web-access interface is currently being tested. Under this framework, there is a considerable effort for cooperation between various international universities and hospitals. A visible result is this paper, in which three universities and one hospital are involved. With this field clearly maturing and the expected increase in the clinical usage of WCE, we predict a very bright future for clinical and computer research in this topic.

Acknowledgments

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Report on The International Workshop on Multimedia Content Representation, Classification and Security (IWMRCS)

http://www.cs.itu.edu.tr/mrcs

The International Workshop on Multimedia Content Representation, Classification and Security (IWMRCS) has taken place from September 11–13, 2006 at Istanbul Technical University Campus, Istanbul.

The scope of IWMRCS was to bring together researchers and developers working on multimedia systems and to promote activities in various areas of multimedia content extraction, representation, classification and content security by providing a forum for the presentation of technical achievements and future directions.

IWMRCS is endorsed by the International Association of Pattern Recognition (IAPR) and is organized in cooperation with The European Association of Signal Processing (EURASIP). IWMRCS is sponsored by the İTÜ- Istanbul Technical University and TÜBİTAK- The Scientific and Technological Research Council of Turkey.

There were a total of 100 technical papers presented during the three days of workshop, which had been selected among 190 submissions in a peer-review process that engaged 155 reviewers. The acceptance rate was 52%. Distributed over six special, three regular and six poster sessions, these technical contributions were complemented by four keynote speakers lectured on content-based indexing and search, content representation, semi-supervised learning of content, and multimedia security. The social programme included a welcome dinner on September 11 and a Conference Banquet at Bosphorus Cruise on September 12.

The workshop attracted more than 130 participants from industry, universities and research laboratories all over the world. A proceedings book was published in Springer, LNCS.

Report on The International Conference on Artificial Neural Networks

(ICANN-2006) from 10–14 September 2006 in Athens, Greece, was very successful with about 300 participants, and 207 papers accepted out of a total of 472 (acceptance rate about 44%). The programme was framed by great invited talks by Grossberg, Taylor, Micheli-Tzanakou, Carpenter, Erdi, Wempter, and Bourbakis. A variety of state-of-the-art special sessions and excellent tutorials were highlights of the sessions. The proceedings were published by Springer, and extended papers selected by the International Journal of Neural Systems. More specific details of the programme can be found at www.icann2006.org.

Report on The 8th conference on Advanced Concepts for Intelligent Vision Systems

(ACIVS) was held in Antwerp (The Netherlands), 18–21 September 2006. ACIVS is a conference focusing on techniques for building adaptive, intelligent, safe and secure imaging systems. ACIVS has maintained the tradition of being a single track event with oral presentations 25 minutes each, even though the number of participants has been steadily growing every year (138 people registered in 2006).

In 2006, the Steering Committee comprised Jacques Blanc-Talon (DGA, France), Wilfried Philips (Ghent University, Belgium), Dan Popescu (CSIRO, Australia) and Paul Scheunders (University of Antwerp). The Program Committee gathered 52 scientists from 21 countries and was helped by a very large team of external reviewers. ACIVS 2006 consisted in four days of lecture sessions, both regular (25 mn) and poster sessions. Among 242 submissions, 45 papers were selected for oral presentations and 81 as posters. Moreover, ACIVS 2006 featured 3 invited talks:

Kathrin Berkner (Ricoh Innovations). Challenges and Opportunities for Processing of Digital Document Images - From File Formats to Device and Content Dependent Visual Representations.

Nikos Paragios (Ecole Centrale de Paris). Implicit Representations towards Content Extraction and Statistical Interpretation of Medical Images.

Dimitri Van de Ville (Ecole Polytechnique Federale de Lausanne). Polyharmonic B-spline Wavelets: From Isotropy to Directionality.

Though ACIVS is a conference on all areas of image processing, one of its major domain remains image and video compression. A third of the final program dealt with compression, motion estimation, moving object detection and other video applications. Topics related to clustering, pattern recognition and biometrics constituted another third of the conference. The last third was more related to the fundamentals of image processing.

The proceedings of ACIVS 2006 have been published by Springer Verlag in the *Lecture Notes in Computer Science* series (LNCS 4179). ACIVS was sponsored by the Faculty of Engineering Sciences (Ghent University), Philips Research, the IEEE Benelux Signal Processing chapter, Barco, DSP Valley, the FWO Research Community on Audiovisual Systems (AVS) and EURASIP.

Report on The First International Conference on Semantics and Digital Media Technology

(SAMT 2006, http://samt2006.org/) took place at 6–8 December 2006, Athens, Greece, gathering 130 participants. It was hosted by the Image, Video and Multimedia Systems Laboratory of the National Technical University of Athens (IVML/NTUA), collaborating with CERTH/ITI.

SAMT targets to narrow the large disparity between low-level descriptors that can be computed automatically from multimedia content and the richness and subjectivity of semantics in user queries and human interpretations of audiovisual media - The Semantic Gap. It addresses integrative research on knowledge, semantics and low-level multimedia processing.

SAMT started out as two workshops, EWIMT 2004 and EWIMT 2005. In 2006 it turned into the full-fledged conference SAMT featuring two workshops, three tutorials, one special session, two poster and demo sessions and the SAMT 2006 industry day. The program also included two invited keynote talks from Alan Smeaton and Guus Schreiber.

In cooperation with the European Commission DG Information Society, the third day of the conference was dedicated to featuring the launch of the 7th Framework ICT Research programme, with a projects poster and demo session and keynote talks EC officers Roberto Cencioni and Luis Rodriguez-Rosello.

There were 68 papers in total submitted to the conference. The selection process was very competitive with only 17 papers (25%) being selected for oral presentation and included in the SAMT 2006 proceedings. Apart from those, 17 more were accepted for poster proceedings without further review. In a second call for posters and demos, 26 more papers were submitted, out of which 19 were selected for poster proceedings.

The SAMT 2006 proceedings were published by Springer as part of the LNCS series, while the poster proceedings will appear online as part of CEUR-WS repository. Two journal special issues are scheduled for publication in 2008, with submission deadline on March 2007.

SAMT 2006 has been held in cooperation with the European Commission, EURASIP, COST 292, the IET and the K-Space network of excellence, with the support of several sponsors. SAMT 2007 will take place in Genova, hosted by IMATI/CNR.

Calendar of Events

Year	Date	Event	Location	EURASIP Involvement	Chairperson/Information
2007	May 3–5	The First International Conference on Immersive Telecommunications (Immerscom2007)	Verona, Italy	Cooperation	Ghassan AlRegib, Giovanni Iacovoni http://www.immerscom.org
	May 7–9	3DTV Conference 2007	Kos, Greece	Cooperation	Georgios Triantafyllidis http://www.3dtv-con.org
	May 10–11	The 4th Conference on Speech Technology and Human Computer Dialogue	Iasi, Romania	Cooperation	Corneliu Burileanu http://www.iit.tuiasi.ro/sped2007/
	May 20–25	Nonlinear Speech processing (Nolisp '07)	Paris, France	Cooperation	Mohamed Chetouani http://www.congres.upmc.fr/nolisp2007/
	June 4–8	Waveform Diversity & Design Conference	Pisa, Italy	Cooperation	Vinny Amuso, Maria Greco http://www.waveformdiversity.org/
	June 6–8	7th International Workshop on Image Analysis for Multimedia Interactive Services (WIAMIS 2007)	Santorini, Greece	Cooperation	Yiannis Kompatsiaris, Yannis Avrithis http://mkg.iti.gr/wiamis2007
	June 11–13	2nd International Conference on Body Area Networks (BodyNets 2007)	Florence, Italy	Cooperation	Romano Fantacci http://www.bodynets.org
	June 26–30	6th EURASIP Conference on Speech and Image Processing, Multimedia Communications and Services (ECSIPM 2007)	Maribor, Slovenia	Cooperation	Žarko F. Čučej http://ec2007.feri.uni-mb.si/
	June 25–27	Fifth International Workshop on Content-Based Multimedia Indexing (CBMI 2007)	Bordeaux, France	Cooperation	Jenny Benois-Pineau http://cbmi07.labri.fr/
	July 1–4	15th International Conference on Signal Processing	Cardiff, UK	Cooperation	Saeid Sanei http://www.cardiff.ac.uk/dsp2007
	August 1–3	Second International Conference on Cognitive Radio Oriented Wireless Networks and Communications (Crowncom 2007)	Orlando, Florida	Cooperation	Rajarathnam Chandramouli, Frederik Martin http://www.crowncom.org
	August 20–22	The 9th IASTED Conference on Signal and Image Processing (SIP 2007)	Honolulu, Hawaii	Cooperation	http://www.iasted.org/conferences/home-576.html
	August 27–29	IEEE Workshop on Machine Learning for Signal Processing (MLSP2007)	Tessaloniki, Greece	Cooperation	Kostas Diamantaras http://mlsp2007.conwiz.dk
	August 27–29	Third International Mobile Multimedia Communications Conference (MobiMedia)	Nafpaktos, Greece	Cooperation	Tasos Dagiuklas, Nicolas Sklavos http://www.mobimedia.org
	September 3–7	15th European Signal Processing Conference (EUSIPCO 2007)	Poznan, Poland	Sponsor	Marek Domanski http://www.eusipco2007.org
	September 9–12	7th International Conference on Independent Component Analysis and Signal Separation (ICA2007)	London, UK	Cooperation	Mark Plumbley http://www.ica2007.org
	September 12–14	49th International Symposium ELMAR 2007	Zadar, Croatia	Cooperation	Mislav Grgic http://www.elmar-zadar.org
	September 13–14	DSP Enabled Radio	Glasgow, UK	Cooperation	Stephan Weiss http://www.DSPenabledRadio.org
	September 24–25	1st EURASIP Workshop on RFID Technology	Vienna, Austria	Cooperation	Markus Rupp http://rfid07.ftw.at
	September 27–29	5th International Symposium on Image and Signal Processing ans Analysis (ISPA 2007)	Istanbul, Turkey	Cooperation	Sven Loncaric http://www.isispa.org

Year	Date	Event	Location	EURASIP Involvement	Chairperson/Information
2007	October 10–13	International Symposium on Mathematical Morphology (ISMM07)	Rio de Janeiro, Brazil	Cooperation	Junior Barrera http://ismm.dpi.inpe.br/2007/
	October 22–24	The Third Annual International Wireless Internet Conference (WICON2007)	Austin, Texas	Cooperation	Lili Qiu http://www.wicon.org
	November 7–9	26th Picture Coding Symposium (PCS 2007)	Lisboa, Portugal	Cooperation	Fernando Pereira http://www.pcs2007.org/
2008	August 25–29	16th European Signal Processing Conference (EUSIPCO 2008)	Lausanne, Switzerland	Sponsor	Jean Philip Thiran

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Creating exact 3D moving images as ghost-like replicas of 3D objects has been an ultimate goal in video science. Capturing 3D scenery, processing the captured data for transmission, and displaying the result for 3D viewing are the main functional components. These components encompass a wide range of disciplines: imaging and computer graphics, signal processing, telecommunications, electronics, optics and physics are needed.

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- Human factors

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Prospective contributors are invited to submit full papers electronically using the on-line submission interface, following the instructions available at http://www.3dtv-con.org. Papers should be in Adobe PDF format, written in English, with no more than four pages including figures, using a font size of 11. Conference proceedings will be published online by the IEEE.

Important Dates

1 December 2006	Special sessions and tutorials proposals
15 December 2006	Regular Paper submission
9 February 2007	Notification of acceptance
2 March 2007	Submission of camera-ready papers

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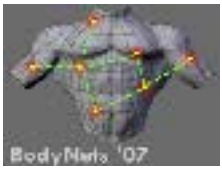

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Web Chair:
Thomas Watteyne
INRIA / France Telecom, France

Financial Chair:
Karen Decker, ICST, US

Conference Coordinator:
Zita Rozsa, ICST, Europe

Important Dates

Full paper due:
January 17, 2007
Notification of acceptance: March 12, 2007
Final version due:
April 11, 2007

CALL FOR PAPERS

With recent advances in Wireless Sensor Networks (WSNs), their practical applications in general sensing and monitoring are rapidly broadening. Although originally conceived for wide area environment or process monitoring, WSNs are increasingly being used in human computer interaction, brain computer interaction, gaming, and interactive digital arts, as well as in healthcare and patient monitoring. Despite the recent technological developments in sensing, embedded electronics, and sensor networking, several challenging issues need to be addressed. In particular, technological scaling, wireless communication and networking, sensor data processing and presentation are key aspects that need to be investigated in an integrated fashion for enabling visionary applications in the above areas of WSN. The aim of this conference is to bring researchers in WSN to address the following technical and application issues:

Body Area Networks and Human Computer Interaction
- Interactive Virtual Reality and Gaming
- Entertainment

Body Area Networks and Brain Computer Interaction
- Invasive BCI
- Non-invasive BCI

Wireless Communication and Networking Protocols:
- "In-body" networks
- "Near-body" networks

Applications
- WSN based Interactive Digital Art
- Ambient intelligence
- Smart Spaces, Personalization
- Healthcare and patient monitoring

Server side information processing:
- Data querying
- Event detection, classification, tracking

Middleware

Quality of service, security and fault-tolerance issues

Enabling technologies:
- Novel sensors and materials
- Transceivers
- Microcontrollers
- Hardware platform

In Network information processing:
- Data aggregation and fusion algorithms

Tools and test beds

Performance evaluation

Internetworking with heterogeneous networks

Submission Instructions:

Authors are invited to submit full papers of up to 8 pages, or short papers of up to 2 pages, in ACM conference proceedings format through COCUS (http://cocus.create-net.it). The proceedings will be an ACM Publication and the papers will be listed on the ACM digital library. Please refer to the website for more detailed information.

CrownCom 2007

Second International Conference on Cognitive Radio Oriented Wireless Networks and Communications

August 1-3, 2007, Orlando, Florida, USA

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Stevens Institute of Technology, USA

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Honggang Zhang
Create-Net, Italy

Access to the radio spectrum is presently regulated via license, where the rights to use specific spectral bands are granted exclusively to an individual operator, or completely unlicensed, where certain spectral bands are declared open for free use by any operator or individual following specific rules. While these paradigms have allowed the wireless communications sector to blossom in the past, there is much talk recently about the so-called "cognitive radio" paradigm, wherein spectrum may be efficiently shared in a more flexible fashion by a number of operators/users/systems. Cognitive radio can be thus viewed as an enabling technology that will benefit several types of players, by introducing new communications and networking models for the whole wireless world, creating better business opportunities for the incumbent operators and new technical dimensions for smaller operators, and helping shape an overall more efficient approach regarding spectrum requirements and usage in next generation wireless networks.

The aim of this conference is to bring together the state of the art research contributions that address the various aspects of cognitive wireless systems and technologies, including a broad range of communications, networking and implementation issues. We seek original and unpublished work not currently under review by any other journal/magazine/conference. Topics include, but are not limited to, the following:

- Wide-band spectrum sensing
- Interference metrics and measurement
- Multi-band, spectrum-agile and adaptive radio transceivers
- Radio resource management and dynamic spectrum sharing
- Cross-layer cognitive algorithms
- Bio and AI-inspired algorithms
- Wireless network co-existence
- Ultra-Wideband cognitive radio systems
- Platforms and hardware implementation for the support of cognitive radio
- Radio access protocols and algorithms for the PHY, MAC, and Network layers
- Linear network coding, cooperative coding and MIMO techniques for cognitive radio
- Simulation, modeling and analysis of cognitive wireless networks
- Self-organizing mesh networks and autonomic communications
- Test-bed and experimental prototypes
- Trust and security mechanisms
- Policies, economics and standardization for cognitive spectrum access

PANELS Proposals for panel discussions that focus on policy, economics, standards, applications, technology and deployment of cognitive radio networks are preferred. Potential panel organizers should submit a panel proposal of at most 5 pages, including biographical sketches of the proposed panelists, to the Panel Co-Chairs (peha@cmu.edu and ktlim@ece.gatech.edu) by April 1, 2007.

TUTORIALS The conference will include full-day and half-day tutorials. Tutorial proposals must include a title, abstract, intended audience, list of topics, and biography of the presenter. Proposal must be submitted to the Tutorials Co-Chairs (bushsf@research.ge.com and sbiswas@egr.msu.edu)

SPECIAL SESSIONS The conference will include special sessions to complement the regular sessions. Special session proposals must include a title, rationale for the special session, list of potential authors, and biography of the organizers. Proposals must be submitted to the Special Sessions Co-Chairs (ksubbala@stevens.edu and wlehr@cfp.mit.edu).

SUBMISSION INSTRUCTIONS Conference language is English. Papers should be concisely written. Suggested paper length for review is 6-page in IEEE conference proceedings format (two column and 10-point font). Papers exceeding 10-page limit will not be reviewed. Prospective author should submit PDF version of the full paper online through the COCUS system at http://cocus.create-net.org/.

PUBLICATION All submitted papers will be peer reviewed. Accepted full papers and work-in-progress papers will be published in the conference proceedings by IEEE and available at IEEE Xplore. Selected full papers will be published in a special issue by ACM/Springer MONET journal.

BEST PAPER AWARDS A best paper award and a best student paper award will be presented.

Important Dates	
Tutorial Proposals Due	March 1, 2007
Special Session Proposals Due	March 1, 2007
Paper Submission Due	March 15, 2007
Acceptance Notification	May 1, 2007
Camera-Ready Papers Due	June 1, 2007

http://www.crowncom.org

15th International Conference on Digital Signal Processing

July 1-4, 2007
Cardiff
Wales, UK

Call for Papers

The 15th International Conference on Digital Signal Processing (DSP 2007), the most longstanding conference in the area of DSP, organised in cooperation with the IEEE, will be held in Cardiff the capital of Wales, UK, July 1-4, 2007. DSP 2007 belongs to a series of events which had its genesis in London in 1968 and continued to Florence, Nicosia, Lemessos, and Santorini. The last meeting took place overlooking the cauldron in the bay of Fira, Santorini, in 2002. This now tranquil location was once the scene of a massive eruption which led directly to the extinction of one of Europe's oldest civilisations, the Minoans; in 2007 delegates will be brought right up to date in an area of rebirth, Cardiff Bay, the heart of Europe's youngest capital. The conference will contain a number of Special sessions organised by internationally recognised experts. The programme will also include presentations of new results in lecture and poster sessions, together with plenary sessions delivered by eminent scientists. Accepted papers will appear in IEEE Xplore.

Special Sessions

TBA

Indicative Topics of Interest

Adaptive signal processing
Array processing, radar and sonar
Biomedical signal and image processing
Bioinformatics and genomic signal processing
Blind equalization
Blind source separation
Collaborative networking
Computer vision and pattern recognition
Data fusion
Design and implementation of signal processing systems
Detection and estimation theory
Distributed Signal Processing
Image and multidimensional signal processing
Information forensics and security
Joint source-channel coding
Machine learning for signal processing
Multimedia signal processing
Multimudal signal processing
Multivariate statistical analysis
Musical signal processing
Nonlinear signal processing
Progressive data transmission
Sensor array and multichannel systems
Speech and language processing
Time-frequency and time-scale analysis

Expected dates (to be confirmed):

Electronic paper submission	February 19, 2007
Acceptance notification	April 2, 2007
Camera-ready papers	April 9, 2007
Conference	July 1-4, 2007

www.cardiff.ac.uk/dsp2007/

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T. Reed, USA
A. Sayed, USA
A. N. Skodras, Greece
A. Zoubir, Germany

CALL FOR PAPERS
3rd IET/EURASIP Conference on

DSP *enabled* Radio

Glasgow, Scotland, UK
13th/14th September 2007
http://www.DSPenabledRadio.org

In the past decade, digital signal processing (DSP) algorithms and architectures for baseband processing have brought applications such as 3G mobile communications and wireless LAN to mass markets. Since then, further progress in DAC and ADC technology has permitted DSP to be applied at IF sampling rates up to several 100 MHz, which has opened up a large range of advanced DSP algorithms to be deployed for – potentially reconfigurable – communications system functions such as modulation, synchronisation, equalisation, coding, and many more. This development is expected to continue, and opportunities such as software defined radio (SDR) architectures forming the basis for cognitive radios for improved spectrum efficiency and reliable and ubiquitous communication are likely to become reality within the next couple of years.

This 2 day event forms a continuation of two previous conferences of identical title held in Livingston, Scotland, in 2003, and in Southampton in 2005, which were each attended by more than 120 international researchers and industrialist. Both events were co-sponsored by the Institution of Engineering and Technology (IET — formerly the Institution of Electrical Engineers, IEE) and the European Association for Signal Processing (EURASIP). This third conference IET/EURASIP will comprise of an invited keynote speaker, a number of invited contributions on key topics, oral presentations, poster sessions, and a small industrial exhibition for companies demonstrating the latest hardware and software for DSP enabled radio. Prospective authors are invited to submit original contributions on all aspects of DSP enable radio, including, but not limited to:

- hardware platforms
- mixed signal techniques
- application case studies
- sample rate conversion
- RF and IF processing
- ultra-wideband radio
- standards, IEEE802.1x
- SDR implementation
- FPGA architectures
- system-on-chip
- rapid prototyping
- cognitive radio
- power control
- RF linearisation
- Tx/Rx beamforming
- MIMO systems
- algorithms and architecture
- digital up/downconversion
- standards and inter-operability
- emerging standards: WiMAX etc
- synchronisation and equalisation
- equalisation / channel estimation
- beamforming/smart antennas
- wireless sensor / ad-hoc networks

Papers will be reviewed on the basis of a two page extended abstract of sufficient detail to permit reasonable evaluation. The deadline for submission is June 29, 2007, with notification of decision by July 20, 2007. Accepted papers will be edited into a bound digest of the event, available on CD, and be included in IEEExplore. The cover page of the summary should include paper title, names of authors and their affiliation, as well as the complete address, telephone numbers and e-mail of the corresponding author.

Detailed information on the extended abstract and paper submission, technical program, accommodation, and travel will be posted on the conference web site http://www.DSPenabledRadio.org.

Bob Stewart, General Chair
Stephan Weiss and Eugen Pfann, Technical Co-Chairs
Dept. of Electronic & Electrical Engineering
University of Strathclyde
Glasgow G1 1XW, Scotland, UK
{r.stewart,s.weiss,e.pfann}@eee.strath.ac.uk

6th EURASIP Conference
EC-SIPMCS 2007
June 27 – 30, Maribor, Slovenia
Call for Papers

http://ec2007.feri.uni-mb.si

This conference is initiated by the European Association for Speech, Signal and Image Processing (EURASIP) in order to start a new tradition of conferences, each devoted to a specific area of discipline. It is focused on Speech and Image Processing, Multimedia Communications and Services (EC-SIPMCS). The goal of EC-SIPMCS is to promote the interface researchers involved in the development and applications of methods and techniques within the framework of speech/image processing, multimedia communications and services.
The 6th EC-SIPMCS will be held in Maribor, Slovenia from June 27 – June 30, 2007.

Topics of Interest
The program includes keynote and invited lectures by eminent international experts, peer reviewed contributed papers, posters, invited sessions on the same or related topics, industrial presentations and exhibitions around but not limited to the following topics:

- Image and Video Processing
- Image and Video Coding
- Image Scanning, Display and Printing
- Image and Video Indexing and Retrieval
- Speech and Audio Processing
- Watermarking and Encryption
- Digital Signal Processing (DSP)
- Standards and Related Issues
- ICT in e-learning/consulting
- Digital Video Broadcasting (DVB)
- Video Streaming and Videoconferencing Multimedia Signal Processing
- Multimedia Databases
- Multimedia and DTV Technologies
- Multimedia Communications and Networking
- Multimedia Human-Machine Interface and Interaction
- Multimedia Services and Applications

Publications
All accepted papers will be published in CD Proceedings that will be available at the Conference. Abstracts of accepted papers will be printed and included in the INSPEC database. Selected papers will be considered for possible publication in scholarly journals.

Tutorial and Special Sessions
Those willing to prepare a tutorial course during EC-SIPMCS 2007 Conference and those willing to organize special session EC-SIPMCS 2007 Conference should contact dr. Zarko Cucej at ec2007@uni-mb.si.

Submission Guidelines Regular Papers
Papers must be submitted electronically by March 18, 2007. Each paper will be evaluated by at least two independent reviewers, and will be accepted based on its originality, significance and clarity. Papers must not exceed 6 pages single spaced 11-point font.

Important Dates
Paper and Poster Submissions: **March 18, 2007**
Notification of acceptance: **April 20, 2007**
Camera ready copy due: **May 6, 2007**
Author Registration: **May 6, 2007**

General Chair
dr. Zarko Cucej,
University of Maribor,
Faculty of Electrical Engineering and Computer Science,
Maribor, Slovenia

Program Chair
dr. Peter Planinsic,
University of Maribor,
Faculty of Electrical Engineering and Computer Science,
Maribor, Slovenia

For further information pleas visit: http://ec2007.feri.uni-mb.si

49th International Symposium ELMAR-2007 focused on Mobile Multimedia

12-14 September 2007
Zadar, Croatia

CALL FOR PAPERS

The 49th International Symposium ELMAR-2007 focused on Mobile Multimedia will be held in the beautiful old town Zadar on the Croatian Adriatic coast. While the scientific program is expected to create stimulating professional interaction, the crystal clear Adriatic Sea, warm summer atmosphere and wealth of historic monuments promise a pleasant and memorable stay. The aim of the symposium is to promote the interface of researchers working in multimedia and mobile networking fields to study new solutions and applications. Besides, ELMAR symposia traditionally invites original contributions from navigation systems, marine electronics, and related areas. The scientific program includes keynote talks by eminent international experts and contributed papers. Papers accepted by two independent reviewers will be published in symposium proceedings available at the symposium and abstracted in the INSPEC and IEEExplore database. ELMAR-2007 symposium is sponsored by the Croatian Society Electronics in Marine (ELMAR), technically co-sponsored by IEEE Signal Processing Society, IEEE Region 8 and IEEE Croatia Section, and organized in cooperation with EURASIP (European Association for Signal, Speech and Image Processing).

TOPICS

MULTIMEDIA

- Image and Video Processing for Mobile Multimedia
- Video Coding for Wireless Communication Channels
- Multimedia Communication over Mobile Wireless Networks
- 4G Forthcoming Standards and Mobile Multimedia Services
- Mobile Broadband; DVB-H; Handheld & Wearable Computers; Personal Multimedia Devices
- Speech and Audio Processing
- Multimedia Applications
- Security and Rights Management (Biometrics; Face Recognition)

ELECTRONICS IN MARINE

- Navigation Systems
- Ship Electronic Systems
- Power Electronics and Automation
- Wireless Communications
- Antennas and Propagation
- Sound and Vibration
- Remote Sensing / Monitoring
- Meteorology
- Sea Ecology

KEYNOTE TALKS

- Prof. Ramjee Prasad, Aalborg University, Denmark
  "Title - TBD"
- Dr. Ismail Khalil Ibrahim, Johannes Kepler University Linz, Austria
  "Mobile Multimedia: Bringing Users into Focus"
- Dr.-Ing. Elmar Noeth, Friedrich-Alexander-Universitaet Erlangen-Nuernberg, Germany
  "Does Multimodality really help? The Classification of Emotion and of On/Off-Focus in Multimodal Dialogue - Two Case Studies."

SUBMISSION

"Author's Kit" is available here: **www.elmar-zadar.org** **IMPORTANT:** Web-based (online) paper submission of papers in PDF format is required for all authors. No e-mail, fax, or postal submissions will be accepted. Authors should prepare their papers according to ELMAR-2007 paper sample, convert them to PDF based on IEEE requirements, and submit them using web-based submission system by April 02, 2007.

SCHEDULE OF IMPORTANT DATES

Deadline for submission of full papers	April 02, 2007
Notification of acceptance mailed out by	May 02, 2007
Deadline for submission of camera-ready papers	May 09, 2007
Preliminary program available on the web-site by	May 23, 2007
Registration deadline	June 06, 2007

For further information please visit: www.elmar-zadar.org






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15th European Signal Processing Conference

EUSIPCO 2007

September 3-7, 2007, Poznań, Poland

Just in the centre of Europe!

European Association for Signal, Speech and Image Processing

CALL FOR PAPERS

The 2007 European Signal Processing Conference (EUSIPCO-2007) is the fifteenth in a series of conferences promoted by EURASIP, the European Association for Signal, Speech, and Image Processing. The conference will be organized by Poznań University of Technology, Faculty of Electronics and Telecommunications and PTETiS Society.

As usual, EUSIPCO-2007 areas of interest will cover all aspects of signal processing theory and applications as listed below. Proposals for special sessions and tutorials are strongly encouraged. Accepted papers will be published in the proceedings of EUSIPCO-2007. Acceptance will be based on quality, relevance and originality.

The conference topics include:

- Audio and Electroacoustics
- Design and Implementation of Signal Processing Systems
- DSP Applications and Embedded Systems
- Emerging Technologies in Signal Processing
- Signal Processing for Communications
- Image and Multidimensional Signal Processing
- Medical Imaging
- Image and Video Analysis
- Multimedia Signal Processing
- Speech Processing and Coding
- Image, Video and Audio Compression
- Nonlinear Signal Processing
- Sensor Array and Multichannel Processing
- Signal Detection and Estimation
- Signal Processing Applications (Biology, Geophysics, Seismic, Radar, Sonar, Remote Sensing, Astronomy, Bio-informatics, Positioning, etc.)
- Signal Processing Algorithms and their Implementations in Communication Systems
- Hardware Solutions for Signal Processing
- Education on Signal Processing

Submission

Procedures to submit a paper, proposals for sessions/tutorials, can be found at www.eusipco2007.org. Submitted papers must be final, full papers, no more than five pages long all inclusive and strictly conforming to the format specified on the EUSIPCO web site.

Best Student Paper Awards

Student authors who appear as first authors in a paper may enter the student paper contest.

Important Dates (updated)

Proposals for Special Sessions and Tutorials:	December 11, 2006
Electronic submission of Full papers (4 pages A4):	February 5, 2007
Notification of Acceptance:	May 11, 2007
Submission of Camera-Ready Papers and Registration:	June 10, 2007

www.eusipco2007.org

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About EURASIP:

The European Association for Signal, Speech and Image Processing (www.eurasip.org) was founded on 1 September 1978 to: "improve communication between groups and individuals that work within the multidisciplinary, fast growing field of Signal Processing in Europe and elsewhere, and to exchange and disseminate information in the field all over the world". The association exists to promote the efforts of researchers by providing a learned and professional platform for dissemination and discussion of all aspects of signal processing. EURASIP is a non profit organization which is governed by its Administrative Committee (AdCom).

EURASIP Areas of Interest:

- Continuous and discrete time signal theory
- Applications of signal processing
- Systems and technology
- Speech communication
- Image processing and communication.

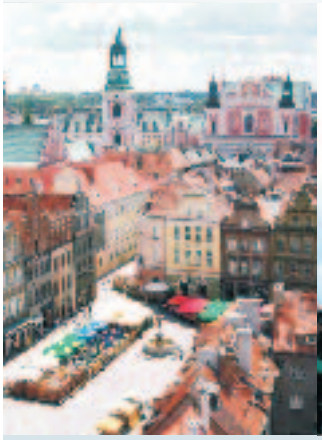
EURASIP sponsors and co-sponsors a number of conferences within Europe and the rest of the world each year. The main event is EUSIPCO (European Signal Processing Conference), which is now recognized as one of the premier signal processing conferences, attracting delegates and papers from all over the world. The venues of consecutive conferences are: Lausanne, Switzerland (1980); Erlangen, Germany (1983); Hague, the Netherlands (1986); Grenoble, France (1988); Barcelona, Spain (1990); Brussels, Belgium (1992); Edinburgh, UK (1994); Trieste, Italy (1996); Rhodes, Greece (1998); Tampere, Finland (2000); Toulouse, France (2002); Vienna, Austria (2004); Antalya, Turkey (2005); Florence, Italy (2006).

About Poznań

Poznań, a capital of Wielkopolska province, is the fifth biggest city in Poland with population of 580 000. It is halfway between Berlin and Warsaw but it is older than each one of them. Poznań is easily accessible, since it is located in central Europe and it is easy to get there both from Western and Eastern part of the continent and also from the rest of the world.

Poznań-Ławica International Airport is situated only 6 km from the conference venue. There are a lot of direct flights to many of European cities. The conference site is in the city centre, in a walking distance from the main railway station, as well as a variety of hotels of various standards.

Poznań is a dynamic economic, academic, scientifical and cultural centre. Thanks to its excellent economic performance and International Fair the city is often called the economic capital of Poland. It is an excellent place for organizing conferences because it is also a centre of academic life. There are 22 universities and other institutions of higher education with over 120 000 students. Among the universities there is Poznań University of Technology one of the biggest and most recognized technical universities in Poland. Thanks to such a considerable number of students the city has got a creative and unforgettable atmosphere. An abundance of monuments and interesting places from all époques creates pleasant surroundings for social meetings after conference sessions.



www.eusipco2007.org

PRELIMINARY ANNOUNCEMENT

The 2008 European Signal Processing Conference (EUSIPCO-2008) is the sixteenth in a series of conferences promoted by EURASIP, the European Association for Signal, Speech, and Image Processing (www.eurasip.org). Formerly biannual, this conference is now a yearly event. This edition will take place in Lausanne, Switzerland, organized by the Swiss Federal Institute of Technology, Lausanne (EPFL).

EUSIPCO-2008 will focus on the key aspects of signal processing theory and applications as listed below. Exploration of new avenues and methodologies of signal processing will also be encouraged. Accepted papers will be published in the Proceedings of EUSIPCO-2008. Acceptance will be based on quality, relevance and originality. Proposals for special sessions and tutorials are also invited.

Areas of Interest

- *Audio and Electroacoustics*
- *Design and Implementation of Signal Processing Systems*
- *Image and Multidimensional Signal Processing*
- *Multimedia Signal Processing*
- *Signal Detection and Estimation*
- *Sensor Array and Multichannel Processing*
- *Signal Processing for Communications*
- *Speech Processing*
- *Education in Signal Processing*
- *Nonlinear Signal Processing*
- *Medical Imaging and Image Analysis*
- *Signal Processing Applications (Biology, Geophysics, Seismic, Radar, Sonar, Remote Sensing, Astronomy, Bio-informatics, Positioning etc.)*
- *Emerging Technologies*

Best Student Paper Awards

There will be a student paper contest. Student authors who appear as first authors in a paper may enter the student paper contest.

Submissions

Procedures to submit a paper, proposals for special sessions/tutorials, will be detailed at www.eusipco2008.org. Submitted papers must be camera-ready, final, no more than five pages long all inclusive and conforming to the format that will be specified on the EUSIPCO web site above.

More details will be given in due time on our web site:

www.eusipco2008.org

European Association for Signal, Speech and Image Processing

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ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE
Lausanne

IMMERSCOM 2007

The First International Conference on Immersive Telecommunications

May 3 - 5, 2007, Verona, Italy

General Co-Chairs

Ghassan AlRegib
Georgia Institute of Technology, USA

Giovanni Iacovoni
CREATE-NET, Trento, Italy

Steering Committee Chair

Imrich Chlamtac
CREATE-NET, Trento, Italy

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Interactive Media Technology Center (IMTC), USA

Workshops Chair

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Webmaster

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Finance Chair

Karen Decker
ICST

Conference Coordinator

Zita Rozsa
ICST

www.immerscom.org

IMMERSCOM is the first international conference that focuses on bridging the traditional gap between immersive technologies and networking for the capturing, processing, analyzing, transmitting and enabling the remote fruition of objects, environments, and bio-entities.

The strategic objectives of IMMERSCOM are:

+ Introduction of networking as the instrument for the remote fruition of immersive multimedia content.

+ Assessing the sensing, processing, transmission and fruition technologies currently available for immersive telecommunication applications.

+ Promoting interdisciplinary flow of technical information among industry systems designers and researchers with feedback from the end users.

Topics include but are not limited to:

Interfaces for Immersive Interaction:

3D Scanning technologies and devices
3D Reconstruction/Visualization techniques
Stereoscopic and auto-stereoscopic interfaces
Mixed and Augmented reality interfaces
Immersive interactive environments
Affective User Interfaces
Human factors for immersive interaction
Issues in handheld devices
Wearable devices and haptics
Interfaces for tele-presence
Multi-modal interfaces
Perceptual interfaces

Technologies for Immersion:

Video/Image rendering
3D modeling
Pervasive sensing
Data fusion
3D displays technology
Mobility issues for immersion
Tele-reality
Body tracking
Gesture recognition
Macro- and micro-kinematics modeling

Prototypes:

Medical and biomedical applications
Computer animations / games
Education and training
Virtual museums and tourism
Virtual manufacturing and e-commerce

Networking for Immersive Applications:

Multimedia networking for rich 3D Visualization
Mixed/Augmented reality delivery
Networked management for immersive applications
QoS for immersive applications
Perceptual factors in 3D transmission
Networking for tele-presence
Real-time network protocols for immersive applications
Joint source and channel coding for rich 3D visualization and interactive applications
Network support for mobile end systems in immersive applications

Proposals are solicited for Workshops to be held as part of the IMMERSCOM conference.Workshops can be half-day or full-day and will be held on May 2, 2007. The deadline for workshop proposals is October 30, 2006.

Please contact the Workshops Chair Andrea Fusiello at andrea.fusiello@univr.it

Prospective authors are invited to submit papers of not more than (12) pages including results, figures and references. Paper will be Accepted only by electronic submission through the conference web site.

Full paper due: MONDAY DECEMBER 18, 2006

Notification of acceptance: MONDAY FEBRUARY 18, 2007

Camera-ready Manuscripts due: MONDAY MARCH 05. 2007

5th International Symposium on

Image and Signal Processing and Analysis
ISPA 2007

September 27-29, 2007, Istanbul, Turkey

http://www.isispa.org

Call for Papers

The 5th International Symposium on Image and Signal Processing and Analysis (ISPA 2007) will take place in Istanbul, Turkey, from September 27-29, 2007. The scientific program of the symposium consists of invited lectures, regular papers, and posters. The aim of the symposium is to foster interaction of researchers and exchange of new ideas. Prospective authors are invited to submit their manuscripts reporting original work, as well as proposals for special sessions.

Co-Operations and Co-Sponsorships

- European Association for Signal Processing (EURASIP)
- IEEE Region 8*

Symposium Topics

A. Image and Video Processing
B. Image and Video Analysis
C. Image Formation and Reproduction
D. Signal Processing
E. Signal Analysis
F. Applications

For a detailed list of subtopics please visit ISPA 2007 web site.

Important Dates

Submission of full paper: February 15, 2007
Notification of acceptance/rejection: April 15, 2007
Submission of camera-ready papers and registration: May 15, 2007

Symposium Venue

Located in the center of the Old World, Istanbul is one of the world's great cities famous for its historical monuments and scenic beauties. It is the only city in the world which spreads over two continents: it lies at a point where Asia and Europe are separated by a narrow strait - the Bosphorus. Istanbul has been the cradle for many civilizations for over 2500 years and has a very rich history. It has been the capital of three great empires, the Roman, Byzantine and Ottoman empires, and for more than 1,600 years over 120 emperors and sultans ruled the world from here. Istanbul is the heart of Turkey with respect to entertainment, culture, education, shopping, imports and exports, tourism and the arts. The symposium will be organized in the congress center of the Bogazici University.

Paper Submission Procedure

Papers including title, author list and affiliations, figures, results, and references should not exceed six A4 pages. Detailed instructions for electronic submission are available on the ISPA web site. All papers will be subject to a peer-review process with at least two reviewers. All accepted papers will be published in the symposium proceedings in book form and on CD-ROM, which will be available through IEEE Publications Center and in IEEExplore digital library.

Call for Special Session Proposals

Prospective organizers of special sessions are invited to send proposals to Special Session Co-Chairs, according to instructions provided on the ISPA web site. The aim of a special session is to provide an overview of the state-of-the-art and current research directions in specific fields of image and signal processing and analysis.

Best Student Paper Award

Best Student Paper Award in the amount of 300 EUR will be given to a student author. The student's name must appear first on the paper and the paper must be presented at the symposium to be eligible for the award.

* request pending

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Bogazici University, Turkey
Sabanci University, Turkey
University of Zagreb, Croatia

Honorary Chair
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University of Zagreb, Croatia

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Information Tech. Chair
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University of Zagreb, Croatia

Symposium Secretariat
Gulbin Akgun
Sabanci University, Faculty of Engineering and Natural Sciences
Tel: 216 483 9543
Fax: 216 483 9550
secretariat@isispa.org

2007 IEEE Workshop on

Machine Learning for Signal Processing

August 27-29, 2007, Thessaloniki, Greece

Sponsored by the IEEE Signal Processing Society
in Cooperation with EURASIP

Call for Papers

The seventeenth of a series of IEEE workshops on Machine Learning for Signal Processing will be held in Thessaloniki, Greece (www.greecetravel.com/thessaloniki). The ancient city of Thessaloniki founded in 316 BC was named after the half-sister of the Macedonian king Alexander the Great. It is located in a privileged geographical position on the shores of the Aegean Sea. Today the city is a major business hub of the Balkans hosting three institutes of higher education including Greece's largest university. Every September Thessaloniki holds the International Trade Fair, while numerous other activities happen throughout the year.

The workshop is sponsored by the IEEE Signal Processing society (SPS) and organized by the MLSP technical committee of the IEEE SPS. The workshop will feature keynote addresses, technical presentations, special sessions and tutorials, all of which will be included in the registration. Papers are solicited for, but not limited to, the following areas: Learning Theory and Modeling; Bayesian Learning and Modeling; Sequential Learning; Sequential Decision Methods; Information-theoretic Learning; Neural Network Learning; Graphical and Kernel Models; Bounds on performance; Blind Signal Separation and Independent Component Analysis; Signal Detection; Pattern Recognition and Classification, Bioinformatics Applications; Biomedical Applications and Neural Engineering; Intelligent Multimedia and Web Processing; Communications Applications; Speech and Audio Processing Applications; Image and Video Processing Applications.

A **data analysis and signal processing competition** is being organized in conjunction with the workshop. This year's competition is the third consecutive event and previous competitions resulted in novel and superbly performing approaches to challenging problems in the fields of ICA and multichannel signal denoising, helping progress the mission of the MLSP community. The goal of the competition is to advance the current state-of-the-art in various signal processing domains in both theoretical and practical aspects. The problems are selected to reflect the current trends to evaluate existing approaches on common benchmarks as well as areas where crucial developments are thought to be necessary. Details of the competition will be announced on the workshop website.

Selected papers from MLSP 2007 will be considered for a special issue of the Journal of VLSI Signal Processing Systems for Signal, Image, and Video Technology to appear in 2008. The winners of the data analysis and signal processing competition will also be invited to contribute to the special issue.

MLSP'2007 webpage: http://mlsp2007.conwiz.dk/

Paper Submission Procedure

Prospective authors are invited to submit a double column paper of up to six pages using the electronic submission procedure described at the workshop homepage. Accepted papers will be published in a bound volume by the IEEE after the workshop and a CDROM volume will be distributed at the workshop.

Program Committee

Karim Abed-Meraim	Amir Assadi	Jon Barker	Jon Atli Benediktsson
Adrian Bors	Luis Castedo Ribas	Lai-Wan Chan	Jocelyn Chanussot
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University of Athens, Greece

Competition Chairs
Deniz ERDOGMUS
Oregon Graduate Institute, USA

Vince CALHOUN
Olin Neuropsychiatry Res. Ctr.
Yale University, USA

Schedule

Submission of full paper:
March 30, 2007

Notification of acceptance:
April 30, 2007

Camera-ready paper
and author registration:
May 11, 2007

MobiMedia

Third International Mobile Multimedia Communications Conference
(formerly MSAN)
August 27-29, 2007: Nafpaktos, Greece

CALL FOR PAPERS

Scope:

The successful development of multimedia services and applications in mobile environments requires adopting an interdisciplinary approach where both multimedia and networking issues are addressed jointly. Multimedia semantic characteristics, Human Interpretation of audiovisual information, extraction and usage of semantic information, coding standards and its interaction with networking, mobility and security protocols are research issues that need to be carefully examined when proposing new solutions. Many are the applications that will be enabled by the new standards for mobile networking, such as triple services for mobile networks, digital television, video streaming, interactive gaming, navigation services, context aware services, and immersive communications in virtual environments. The efficient delivery of multimedia applications and services over emerging diverse and heterogeneous wireless networks is a challenging research objective. The research effort for the 3G/4G vision of interworking among heterogeneous technologies to achieve multimedia session continuity, retain multimedia QoS characteristics etc., amplifies the need to evaluate the conditions and restrictions under which delivery of such services can be accomplished.

Within this scope, MobiMedia is intended to provide a unique international forum for researchers from industry and academia, working in multimedia coding, and mobile networking fields to study new applications, solutions, and standards. Original unpublished contributions are solicited that can improve the knowledge and practice in the integrated design of efficient technologies and the relevant provision of advanced mobile multimedia applications.

Technical program:

The conference will also include invited panels to facilitate for exchanging ideas and discussion, and specific sessions and workshops on focused interest areas. Submissions of proposals on workshops and special sessions on emerging topics are invited. Please submit proposals to Technical Program Chairs and Workshop Chairs.

Paper submission and publication:

Mobimedia 2007 invites manuscripts that present original materials not previously published in, or currently under review by, another conference or journal. Submissions should be full-length papers of up to 7 pages or short papers of up to 4 pages (including all figures and references) formatted according to http://www.acm.org/sigs/pubs/proceed/template.html. Full-length papers should report on completed work and will be considered for oral presentations. Short papers should report on work in progress or discuss open problems, and will be considered for poster presentations. A separate abstract of no longer than 200 words should be submitted as well. Submissions will be judged by their originality, significance, interest, clarity, relevance, and correctness. Papers will be submitted by electronic submission through COCUS system: http://cocus.create-net.it. All papers should be electronically submitted in Adobe PDF format.

Workshops:

Proposals for half-day workshops to be held in conjunction with the conference are solicited. A maximum of 2 pages should be submitted which include the workshop name, its scope and a list of topic of interests. Proposals should be submitted to both the Workshop Chairs.

Important dates:

- Workshop proposals:	January 20, 2007
- Special session proposals:	March 15, 2007
- Deadline Submission:	April 30, 2007
- Notification of acceptance:	June 8, 2007
- Submission of camera-ready papers:	July 2, 2007

Students award and grants:

Five student prizes will be awarded to the best papers authored by full time students as first author.

General Co-Chairs
Tasos Dagiuklas
TEI of Mesolonghi, Greece

Nicolas Sklavos
TEI of Mesolonghi, Greece

Technical Co-Chairs
Magda El-Zarki
University of California, USA

Rahim Tafazolli
CCSR, Univ. of Surrey, UK

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Create-Net, Italy

Luigi Atzori,
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Ericsson Research, Germany

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Barddal University, Brazil

Conference Chair
Kitti H. Kovacs
ICST, Europe

Local Host by

Dept of Telecommunications Systems and Networks,
TEI of Mesolonghi,
Nafpaktos, Greece

Sponsored by

For further information:
www.mobimedia.org

FIRST CALL ***February 2006***

NOLISP'07

AN ISCA TUTORIAL AND RESEARCH WORKSHOP ON

NON-LINEAR SPEECH PROCESSING

After the success of NOLISP'03 held in Le Croisic, and NOLISP'05 held in Barcelona, we are pleased to present

NOLISP'07

22-25 May 2007, Paris, France

Local Organizers : **University Pierre and Marie Curie (UPMC)**

AIMS OF THE WORKSHOP

Many specifics of the speech signal are not well addressed by the conventional models currently used in the field of speech processing. The purpose of the workshop is to present and discuss novel ideas, work and results related to alternative techniques for speech processing, which depart from mainstream approaches.

FOCUS OF THE WORKSHOP

Contributions are expected in the following domains (non-limited list):

I. Non-Linear Approximation and Estimation
II. Non-Linear Oscillators and Predictors
III. Higher-Order Statistics
IV. Independent Component Analysis
V. Nearest Neighbours
VI. Neural Networks
VII. Decision Trees
VIII. Non-Parametric Models
IX. Dynamics of Non-Linear Systems
X. Fractal Methods
XI. Chaos Modeling
XII. Non-Linear Differential Equations
XIII. Others

All fields of speech processing are targeted by the workshop, namely :

1. Speech Production
2. Speech Analysis and Modeling
3. Speech Coding
4. Speech Synthesis
5. Speech Recognition
6. Speaker Identification/ Verification
7. Speech Enhancement / Separation
8. Speech Perception
9. Others

SCIENTIFIC COMMITTEE

Frédéric BIMBOT, IRISA, Rennes (France)
Mohamed CHETOUANI, UPMC, Paris (France)
Gérard CHOLLET, ENST, Paris (France)
Tariq DURRANI, University of Strathclyde, Glasgow (UK)
Marcos FAÚNDEZ-ZANUY, EUPMt, Barcelona (Spain)
Bruno GAS, UPMC, Paris (France)
Hynek HERMANSKY, OGI, Portland (USA)
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Kuldip PALIWAL, University of Brisbane (Australia)
Bojan PETEK, University of Ljubljana (Slovenia)
Jean ROUAT, University of Sherbrooke (Canada).
Jean SCHOENTGEN, Univ. Libre Bruxelles (Belgium)
Isabel TRANCOSO, INESC (Portugal)

SUBMISSION

Prospective authors are invited to submit a 3 to 4-page paper proposal in English, which will be evaluated by the Scientific Committee. Final papers will be due 1 month *after* the workshop, for inclusion in the CD-ROM proceedings.

KEY DATES

Submission (full paper):	15 January 2007
Notification of acceptance:	23 February 2007
Workshop:	22-25 May 2007
Final (revised) paper:	25 June 2007

ORGANISING COMMITTEE : Mohamed CHETOUANI (UPMC), Bruno GAS (UPMC), Amir HUSSAIN (Stirling), Maurice MILGRAM (UPMC), Jean-Luc ZARADER (UPMC).

CONTACT : nolisp07@ccr.jussieu.fr
WEB SITE : http://www.congres.upmc.fr/nolisp2007/

PCS 2007

26th Picture Coding Symposium

(www.pcs2007.org)

November 7-9, 2007, Lisbon, Portugal

Call for Papers

Picture Coding Symposium (PCS) is an international forum devoted specifically to advancements in visual data coding. Since 1969, PCS has provided the meeting place for the visual coding community: industry, research, academia and users. The 26th PCS will be held in Lisbon, Portugal, on 7-9 November 2007, just before the 16th International Packet Video Workshop that will be held in Lausanne, Switzerland, on 12-13 November 2007.

Topics

Topics of interest include, but are not limited to:

- *Coding of still and moving pictures*
- *Content-based and object-based coding*
- *Scalable video coding*
- *Coding of multiview video and 3D graphics*
- *Modeling and synthetic coding*
- *Virtual/augmented reality and telepresence*
- *Coding for mobile, IP and sensor networks*
- *High fidelity visual data processing and coding*
- *Analysis for coding and adaptation*
- *Transcoding and transmoding*
- *Joint audio and visual processing and coding*
- *Subjective and objective quality assessment metrics and methods*
- *Error robustness, resilience and concealment*
- *Coding and indexing for database applications*
- *Protection and integrity of visual data*
- *Persistent association of information to visual data*
- *Joint source and channel coding*
- *Implementation architectures and VLSI*
- *New applications and techniques for visual data coding*
- *Standards for visual data coding*

Organization

General Chair

Fernando Pereira
IST-IT, Lisbon, Portugal

Program Chair

Paulo Lobato Correia
IST-IT, Lisbon, Portugal

Special Sessions Chair

Luis Ducla Soares
ISCTE-IT, Lisbon, Portugal

Deadlines

Submission of special sessions

June 1, 2007

Submission of extended summaries

June 10, 2007

Notification of acceptance

September 3, 2007

Submission of camera-ready papers

September 21, 2007

Paper Submission

Prospective authors are invited to submit extended summaries of no more than four (4) pages, in English, with font size 11, including results, figures and references. Submissions will be accepted only in PDF format and should be made using the on-line submission system available at *www.pcs2007.org.*

Special Sessions Submission

Proposals for special sessions must include a title, rationale, session outline, session chair, a list of authors who have agree to present a paper, and a tentative title and abstract of each paper. Proposals should be sent to the Special Session Chair at lds@lx.it.pt before June 1, 2007.

Accepted papers will be published in the Workshop CD Proceedings.

CALL FOR PAPERS

The Ninth IASTED International Conference on

Signal and Image Processing

~SIP 2007~

August 20 – 22, 2007
Honolulu, Hawaii, USA

SPONSOR
The International Association of Science and Technology for Development (IASTED)

- Technical Committee on Image Processing
- Technical Committee on Signal Processing

COOPERATING SOCIETY

European Association for Signal Processing

PURPOSE
This conference is an international forum for researchers and practitioners interested in the advances in and applications of signal and image processing. It is an opportunity to present and observe the latest research, results, and ideas in these areas. All papers submitted to this conference will be peer evaluated by at least two reviewers. Acceptance will be based primarily on originality and contribution.

LOCATION
O'ahu, home to the major tourist centers of Honolulu and Waikiki, is a tropical destination so beautiful and unique that you may never want to leave. The vibrant colours of the hibiscus will live forever in your memory. In Hawaii you will experience Aloha, "the breath of life."

SCOPE
SIP 2007 will be comprised of the following 3 symposia:

1) Signal Processing and Applications (SPA 2007)
2) Acoustics, Speech Processing, and Applications (ASPA 2007)
3) Image Processing and Applications (IPA 2007)

ONLINE CALL FOR PAPERS
Visit the online Call for Papers to find out how to submit your paper, as well as other conference details. www.iasted.org/conferences/submit-576.html.

IMPORTANT DEADLINES
Submissions due: **April 1, 2007**
Notification of acceptance: **May 15, 2007**
Final manuscript due: **June 1, 2007**
Registration and full payment: **June 15, 2007**

For more information, or to be placed on our mailing list, please contact:

IASTED Secretariat – SIP 2007
Phone: +1 403 288 1195
Fax: + 1 403 247 6851
calgary@iasted.org
www.iasted.org

2007 International Waveform Diversity & Design Conference

June 4 - 8, 2007

Pisa, Italy

Organizing Committee

General Chairs
Prof. Vinny Amuso, USA
Prof. Maria Greco, Italy

Technical Chairs
Dr. Eric Mokole, USA
Prof. Chris Baker, UK

Publicity Chair
Prof. Shannon Blunt, USA

Tutorial Chair
Maj. Todd Hale, USA

Student Involvement Chair
Prof. Eli Saber, USA

Awards Chair
Prof. Hugh Griffiths, UK

Call for Papers

Recent advances in hardware technology are enabling a much wider range of design freedoms to be explored for sensor and communication systems. As a result, there are emerging and compelling changes in system requirements such as more efficient spectrum usage, higher sensitivities, transmitter/receiver agility, greater information content, improved robustness to errors, etc. The combination of these is fueling a worldwide interest in the subject of waveform design and the use of waveform diversity techniques. This third conference in the on-going series will continue to build on the success of the previous two conferences by bringing together researchers from numerous diverse backgrounds and specialties to facilitate the exchange and cross-fertilization of ideas and research.

The WDD organizing committee invites original contributions to Waveform Diversity and Design in the general areas of Communications, Radar, Sonar, etc. Specifically, topics to be included are:

Radar Systems
Sonar Systems
3G/4G Communication Systems
Laser Systems
Interference Suppression
RF Compatibility
Space-Time Adaptive Processing
Channel Estimation/Equalization
Software Agile Radio/Radar
Passive Sensing Operation
Target-adaptive Matched Filtering

Multi-function Operation
Impulsive Systems
Tomography
Ultra-wideband Operation
Target Detection
Tracking
Interferometry
SAR/ISAR
MIMO Communications
RF Hitchhiking
Error Correction Coding

Modulation Schemes
Multiple-access Schemes
Multi-user Operation
Bandwidth-on-Demand
Synchronization
RF Imaging
Hardware Efficiency
Bi-static/Multi-static Operation
Sensor Fusion
Polarimetry
EM Phenomenology

Abstracts of **1,000-1,500 words** are solicited which should include examples of data and illustrations. Send abstracts to the Conference organizer at WaveformDiversity@rl.af.mil in Word 97 or later, or (preferably) PDF format before **8 December 2006**. Receipt of abstracts will be acknowledged by e-mail. Conference organizer contact: Patricia Woodard, (315) 330-2215. Additional information is available at http://www.waveformdiversity.org.

Authors of accepted papers will be notified by **9 February 2007** and will receive instructions for publication at that time. Complete papers of a **maximum of five pages** (including text and illustrations) will be required by **30 March 2007**.

Dates to Remember:

Abstracts Due	**8 Dec 2006**
Notification of Acceptance of Papers	**9 Feb 2007**
Final Papers Due	**30 Mar 2007**

WIAMIS 2007

8th International Workshop on Image Analysis for Multimedia Interactive Services

http://mkg.iti.gr/wiamis2007

June 6-8, 2007,Petros Nomikos Conference Center, Santorini Island, Greece

General Chairs

Yiannis Kompatsiaris
Informatics and Telematics Institute, Greece

Yannis Avrithis
National Technical University of Athens, Greece

Special Sessions Chair

Murat Tekalp
College of Engineering, Koc University, Turkey

Technical Program Committee (tentative)

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EPFL, Switzerland

Prof. Moncef Gabbouj
Tampere University of Tech., Finland

Dr. Paola Hobson
Motorola Labs, UK

Prof. Aggelos K. Katsaggelos
Northwestern University, USA

Prof. Dong Yoon Kim
Ajou University, Korea

Stefanos Kollias
National Technical University of Athens, Greece

Prof. Benoit Macq
Universite Catholique de Louvain, Belgium

Dr. Jan Nesvadba
Philips Research Laboratories Eindhoven, The Netherlands

Prof. Fernando Pereira
IST, Portugal

Prof. Thomas Sikora
Technical University Berlin, Germany

Prof. Michael G. Strinztis
Informatics and Telematics Institute, Greece

First Call for Papers

The International Workshop on Image Analysis for Multimedia Interactive Services (WIAMIS) is one of the main international fora for the presentation and discussion of the latest technological advances in interactive multimedia services. The objective of the workshop is to bring together researchers and developers from academia and industry working in all areas of image, video and audio applications, with a special focus on analysis. After Louvain (1997), Berlin (1999), Tampere (2001), London (2003), Lisboa (2004), Montreux (2005), Incheon (2006), WIAMIS2007 is held in Santorini, Greece.

Topics of interest include, but are not limited to:

- Multimedia content analysis and understanding
- Content-based browsing, indexing and retrieval of images, video and audio
- 2D/3D feature extraction
- Advanced descriptors and similarity metrics for audio and video
- Relevance feedback and learning systems
- Segmentation of objects in 2D/3D image sequences
- Identification and tracking of regions in scenes
- Voice/audio assisted video segmentation
- Analysis for coding efficiency and increased error resilience
- Analysis and understanding tools for content adaptation
- Multimedia content adaptation tools, transcoding and transmoding
- Content summarization and personalization strategies
- Data hiding and copyright protection of multimedia content
- Semantic mapping and ontologies
- Multimedia analysis for advanced applications
- Multimedia analysis hardware and middleware

Paper Submission

Prospective contributors are invited to submit extended summaries electronically using the on-line submission interface, following the instructions available at http://mkg.iti.gr/wiamis2007. Extended summaries should be in Adobe PDF format, written in English, with no more than four pages including figures, using a font size of 11.

Important Dates

26 January 2007	**Paper Submission**
9 March 2007	**Notification of acceptance**
16 April 2007	**Submission of camera-ready papers**

INFORMATICS & TELEMATICS INSTITUTE

IVML

WICON 2007 Call for Papers

The Third Annual International Wireless Internet Conference
Austin, Texas, USA, October 22-24, 2007
http://www.wicon.org

Wireless Internet is quickly becoming a reality thanks to fast evolution of various wireless access technologies. Convergence of heterogeneous wireless networks, enabled by interworking and wireless mesh networking technologies, further brings wireless Internet into various application scenarios. On the other hand, new wireless Internet architectures, services, and solutions are still desired in order to achieve the ultimate goal of wireless Internet access anytime anywhere.

The Wireless Internet Conference (WICON) will continue to provide a premier international forum to discuss novel research results related to the emerging Wireless Internet. The focus of WICON 2007 will be on advanced wireless access technologies, wireless mesh networks, interworking of heterogeneous networks, next generation wireless Internet, and industrial practice methodology. Given the existence of many other conferences on mobile ad hoc networks and sensor networks, papers that are oriented to these networks are discouraged unless they directly focus on the conference theme of the Wireless Internet.

WICON 2007 is soliciting both academic research and industry practice papers. Industry practice papers must have at least one author from industry and should describe interesting technical aspects of industrial applications, prototypes, experiences, and standards; performance and design details are encouraged, whereas papers focused on marketing or product information will not be accepted. Topics of interest include, but are not limited to, the following:

Wireless access technologies
- Wireless LANs, WiMedia, WiMAX, Bluetooth
- 3G and 4G cellular networks

Wireless multi-hop mesh networks
- New mesh network architecture
- WiFi, UWB, Bluetooth wireless mesh networks
- Scalable MAC and routing protocols
- Multi-radio and multi-channel mesh networks
- QoS, security, and mobility management

Convergence of various wireless technologies
- Roaming, Interworking, and UMA
- Cognitive radios and programmable radios for wireless Internet
- Adaptive transport layer protocols

Testbed and measurements
- Protocol design, implementation, and testbed setup of wireless Internet
- Measurement of wireless Internet and performance analysis

Next generation wireless Internet
- Novel wireless Internet architecture
- New services and applications
- New algorithms for scalable, reliable, and high speed wireless Internet

SUBMISSION INSTRUCTIONS: Papers will be submitted by electronic submission through COCUS system: http://cocus.create-net.it. The page limit is 10 pages in IEEE double column format with fonts not smaller than 10 points. Please see the important dates below:

Paper submission due	**May 30, 2007**
Notification of acceptance	**July 22, 2007**
Camera ready paper due	**September 1, 2007**

Selected papers will be published on a special issue of ACM Mobile Networks and Applications.

WORKSHORPS: Proposals for workshops should be submitted to the Workshop Chair directly at yry@cs.yale.edu. Evaluation of workshop proposals will be based on the expertise and experience of the instructors, and on the relevance of the subject matter.

PANELS: Proposals for panel discussions that focus on the next generation wireless Internet are encouraged. Potential panel organizers should submit a panel proposal to the Panel Chair directly a sujata.banerjee@hp.com.

Posters/Demos: The conference will include a poster/demo session that highlights experiments and testbeds that demonstrate the successful implementation of recent or on-going research work. Please contact Poster/Demo Chair directly at shakkott@ece.utexas.edu.

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Fifth International Workshop on

Content-Based Multimedia Indexing, CBMI-2007

June 25-27, 2007
Bordeaux, France

CBMI 2007 CALL FOR PAPERS

Following the four successful previous events of CBMI (Toulouse 1999, Brescia 2001, Rennes 2003 and Riga 2005), the LABRI/*University of Bordeaux* will organize the next CBMI event. CBMI'07 aims at bringing together the various communities involved in the different aspects of Content-Based Multimedia Indexing. The scientific program of CBMI'07 will include the presentation of invited plenary talks, special sessions as well as regular sessions with contributed research papers.

Authors are encouraged to submit extended papers to the Special Issue of Signal Processing: Image Communication journal, EURASIP on CBMI. Topics of interest for submissions include, but are not limited to:

- Multimedia indexing and retrieval (image, audio, video, text)
- Multimedia content extraction
- Matching and similarity search
- Construction of high level indices
- Multi-modal and cross-modal indexing
- Content-based search techniques
- Multimedia data mining
- Presentation tools
- Meta-data compression and transformation
- Handling of very large scale multimedia database
- Organisation, summarisation and browsing of multimedia documents
- Applications
- Evaluation and metrics

PAPER SUBMISSION

Prospective authors are invited to submit full papers of not more than eight (8) pages including results, figures and references. Papers will be accepted only by electronic submission through the conference web site: http://cbmi07.labri.fr/. Style files (Latex and Word) are provided for the convenience of the authors.

Submission of full paper (to be received by):	**January 25, 2007**
Notification of acceptance:	**March 10, 2007**
Submission of camera-ready papers:	**April 10, 2007**

WORKSHOP VENUE

CBMI'07 will be held in Bordeaux (France) on June 25-27, 2007

For further information: http://cbmi07.labri.fr/

Multimedia Understanding
through
Semantics, Computation and Learning

Semantic Multimodal
Analysis of Digital Media

Call for Papers

The 4th Conference on Speech Technology and Human – Computer Dialogue

"SpeD 2007"

sped2007.tuiasi.ro

Organized by

University "POLITEHNICA" of Bucharest
Faculty of Electronics, Telecommunications and Information Technology,
Speech Technology and Human - Computer Dialogue Laboratory

Romanian Academy – Section of Information Science and Technology,
Research Institute for Artificial Intelligence

Institute for Computer Science - Romanian Academy, Iaşi Branch
"Alexandru Ioan Cuza" University of Iaşi

Technical University "Gheorghe Asachi" of Iaşi

In cooperation with

The European Association for Signal and Image Processing (EURASIP)

Iaşi, Romania
May 10-11, 2007

The "**SpeD 2007**" Organizing Committee takes great pleasure to invite you to attend the 4th Conference on Speech Technology and Human – Computer Dialogue, at Iaşi, Romania. "**SpeD 2007**" will bring together academic people, researchers and practitioners to present their achievements in speech technology and related fields. "**SpeD 2007**" is a conference and international forum dedicated to presenting the latest digital signal processing, speech technology and human-computer dialogue research.

Topics

● Speech Analysis, Representations and Models. ● Speech Coding ● Speech Recognition. ● Speaker Identification and Verification. ● Text-to-Speech Synthesis. ● Information Retrieval and Indexing from Speech / Multimedia Documents. ● Internet Applications: Voice over IP Systems. ● Speech Resources Acquisition, Management and Use. ● Natural Language Processing. ● Tagging, Parsing and Translation Problems for Text and Speech Corpora Processing. ● Prosody Models and Generation. ● Emotions and Expressive Speech Synthesis. ● Human-Computer Dialogue Strategies. ● Language Resources and Knowledge Representation in Spoken Dialogue Systems. ● Multimodality in Human-Machine Communication. ● Speech Interface Design and Human Factors Engineering. ● Assistive Technologies and Universal Access Based on Speech and Dialogue. ● Speech Interface Implementation for Embedded / Network-Based Applications.

"**SpeD 2007**" is mainly an invitational Conference. A small number of non-invited papers will also be accepted. All papers will be refereed.

Schedule

● Notification of participation and brief proposal submission (title, authors, short abstract, contact information): **December 01, 2006**. ● Submission of camera-ready papers (information for authors are provided on the Conference site): **January 15, 2007**. ● Notification of acceptance and observations of the reviewers: **January 31, 2007**. ● Submission of final paper: **February 15, 2007**.

EURASIP JOURNAL ON ADVANCES IN SIGNAL PROCESSING

Scope

The overall aim of EURASIP Journal on Applied Signal Processing (EURASIP JASP) is to bring science and applications together with emphasis on practical aspects of signal processing in new and emerging technologies. It is directed as much at the practicing engineers as at the academic researchers. EURASIP JASP will highlight the diverse applications of signal processing and encourage a cross fertilization of techniques. All papers should attempt to bring theory to life with practical simulations and examples. Tutorial articles on topics of interest are also welcomed. EURASIP JASP employs paperless, electronic review process to foster fast and speedy turnaround in review process.

There are two different issues: regular issues and special issues. The regular issues publish collections of papers without special solicitation. The special issues have specifically aimed and targeted topics of interest contributed by authors responding to a particular Call-for-Papers or by invitation, edited by invited guest editor(s). Regular papers can be submitted at any time, while special issue papers can be submitted only based on planned schedules and submission guidelines of the Call-for-Papers. Proposals for special issues can be submitted directly to the Editor-in-Chief.

Subjects

Subject areas include, but are by no means limited to:

- Signal processing theory, algorithm, architecture, design, and implementation
- Speech processing, coding, compression, and recognition
- Audio signal processing, coding, and compression
- Image/video processing, coding, compression, restoration, analysis and understanding, and communications
- Multimedia signal processing and technology
- Signal processing for communications and networking
- Statistical and adaptive signal processing
- Nonlinear signal processing techniques
- Signal processing design tools
- Signal processing for security, authentication, and cryptography
- Analog signal processing
- Signal processing for smart sensor and systems

Application areas include, but not limited to: communications; networking; sensors and actuators; radar and sonar; medical imaging; biomedical applications; remote sensing; consumer electronics; computer vision; pattern recognition; robotics; fiber optic sensing/transducers; industrial automation; transportation; stock market and financial analysis; seismography; avionics.

Indexed/Abstracted In

The articles of the EURASIP JASP are reviewed/indexed in Acoustics Abstracts; Computer and Communications Security Abstracts (CCSA); CompuMath Citation Index; Current Contents: Engineering, Computing & Technology; CSA Engineering Research Database; CSA High Technology Research Database with Aerospace; CSA High Technology Research Database with Metadex; Engineering Information databases including (Compendex and Paperchem); INIST-CNRS (Pascal Database); INSPEC; JournalSeek Database; Mathematical Reviews; Science Citation Index Expanded; Scopus; Technology and Management (TEMA); and Zentralblatt für Mathematik.

Editor-in-Chief

EURASIP JOURNAL ON AUDIO, SPEECH, AND MUSIC PROCESSING

Scope

The aim of "EURASIP Journal on Audio, Speech, and Music Processing" (EURASIP JASMP) is to bring together researchers and engineers working on the theory and applications of EURASIP Journal on Audio, Speech, and Music Processing. EURASIP JASMP will be an interdisciplinary journal for the dissemination of all basic and applied aspects of speech communication and audio processes. Its primary objectives are:

- To publish papers on the advancement of both human speech communication science and automatic speech and audio systems
- To allow rapid and wide diffusion of excellent contributions in these areas
- To provide world-wide, barrier-free access to the full text of research articles
- To conduct a rapid but thorough review process in order to assure high quality papers
- To provide immediate web access once a paper is editorially approved

The journal will be dedicated to having original research work, but will also allow tutorial and review articles. Articles will deal with both theoretical and practical aspects of EURASIP Journal on Audio, Speech, and Music Processing.

Subjects

Subject areas include (but are not limited to):

- Speech and audio technology, as well as related science and engineering methods
- Speech analysis, synthesis, coding, recognition, speaker verification, language modeling and recognition, human speech production and perception, speech enhancement
- Room acoustics, human audition, analysis, synthesis, and coding of music and other audio, transducers, active sound and noise control
- Speech and audio separation, computational auditory scene analysis and independent component analysis

Editor-in-Chief

EURASIP JOURNAL ON BIOINFORMATICS AND SYSTEMS BIOLOGY

Scope

The overall aim of "EURASIP Journal on Bioinformatics and Systems Biology" (EURASIP JBSB) is to publish research results related to signal processing and bioinformatics theories and techniques relevant to a wide area of applications into the core new disciplines of genomics, proteomics, and systems biology.

The journal is intended to offer a common platform for scientists from several areas including signal processing, bioinformatics, statistics, biology and medicine, who are interested in the development of algorithmic, mathematical, statistical, modeling, simulation, data mining, and computational techniques, as demanded by various applications in genomics, proteomics, system biology, and more general in health and medicine.

Papers should emphasize original results related to the theoretical and algorithmic aspects of signal processing and bioinformatics, in close connection with the applications to genomics, proteomics, systems biology and medicine. Tutorial papers, especially those emphasizing strong components of signal processing or bioinformatics in multidisciplinary views of genomics, proteomics and systems biology are also welcome. The journal will embrace a wide range of topics, and will accommodate different exposition styles, to help scientists with various backgrounds, e.g., engineering, bioinformatics, or biology, to interact effortlessly and to facilitate the exchange of information across the multidisciplinary areas involved. EURASIP JBSB employs a paperless, electronic submission and evaluation system to promote a rapid turnaround in the peer review process.

The journal publishes two types of issues: regular issues and special issues. Regular issues publish collections of papers without special solicitation. The special issues feature specifically aimed and targeted topics of interest contributed by authors responding to a particular Call-for-Papers or by invitation, edited by invited guest editor(s). Regular papers can be submitted at any time, while special issue papers can be submitted only based on planned schedules and submission guidelines of the Call-for-Papers. Proposals for special issues can be submitted directly to the Editor-in-Chief.

Subjects

Subject areas include (but are by no means limited to):

- Reverse engineering of biological circuits
- Data mining methods for genomics and proteomics
- Signal Processing theory and techniques for systems biology
- Modeling and simulation of biological networks
- Nanotechnology in genomics and proteomics
- Signal processing methods in sequence analysis

- Information theoretic approaches to genomics and proteomics
- Microarray image and data analysis
- Noise models in high-throughput technologies
- Integration of heterogeneous data

Editor-in-Chief

EURASIP JOURNAL ON EMBEDDED SYSTEMS

Scope

"EURASIP Journal on Embedded Systems" is an international journal that serves the large community of researchers and professional engineers who deal with the theory and practice of embedded systems, particularly encompassing all practical aspects of theory and methods used in designing homogeneous as well as heterogeneous embedded systems that combine data-driven and control-driven behaviors.

There are two different issues: regular issues and special issues. The regular issues publish collections of papers without special solicitation. The special issues have specifically aimed and targeted topics of interest contributed by authors responding to a particular Call-for-Papers or by invitation, edited by invited guest editor(s). Regular papers can submitted at any time, while special issue papers can be submitted only based on planned schedules and submission guidelines of the Call-for-Papers. Proposals for special issues can be submitted directly to Editor-in-Chief.

Subjects

Original full and short papers, correspondence and reviews on design and development of embedded systems, methodologies applied for their specification, modeling and design, and adaptation of algorithms for real-time execution are encouraged for submission.

The coverage includes complex homogeneous and heterogeneous embedded systems, specification languages and tools for embedded systems, modeling and verification techniques, hardware/software trade-offs and co-design, new design flows, design methodologies and synthesis methods, platform-based design, component-based design, adaptation of signal processing algorithms to limited implementation resources, rapid prototyping, computing structures and architectures for complex embedded systems, real-time operating systems, methods and techniques for the design of low-power systems, interfacing with the real world, novel application case studies and experiences, and does not exclude other interesting related and emerging topics like software defined radio. Example applications include wireless and data communication systems, speech processing, image and video-processing, digital signal processing applications as well as control and instrumentation.

Editor-in-Chief

EURASIP JOURNAL ON IMAGE AND VIDEO PROCESSING

Scope

EURASIP Journal on Image and Video Processing is intended for researchers from both academia and industry, who are active in the multidisciplinary field of image and video processing. The scope of the journal covers all theoretical and practical aspects of the domain, from basic research to application development.

Contributed articles on image and video processing may be focused on specific techniques (e.g., wavelets, mathematical morphology, Markov models), diverse functionalities and services (e.g., classification, compression, identification, protection, recognition, restoration and segmentation), within the context of various activity sectors (e.g., multimedia, medical, aerial, robotics, security, communications, arts) employing diverse data formats (e.g., black and white, gray scale, color, multi spectral, infra red, video, stereo, 3-D).

There are two different issues: regular issues and special issues. The regular issues publish collections of papers without special solicitation. The special issues have specifically aimed and targeted topics of interest contributed by authors responding to a particular Call-for-Papers or by invitation, edited by invited Guest Editor(s). Regular papers can submitted at any time, while special issue papers can be submitted only based on planned schedules and submission guidelines of the Call-for-Papers. Proposals for special issues can be submitted directly to the Editor-in-Chief.

Editor-in-Chief

EURASIP JOURNAL ON INFORMATION SECURITY

Scope

The overall goal of the EURASIP Journal on Information Security, sponsored by the European Association for Signal Processing (EURASIP), is to bring together researchers and practitioners dealing with the general field of information security, with a particular emphasis on the use of signal processing tools to enable the security of digital contents. As such, it addresses any work whereby security primitives and multimedia signal processing are used together to ensure the secure access to the data. Enabling technologies include watermarking, data hiding, steganography and steganalysis, joint signal processing and encryption, perceptual hashing, identification, biometrics, fingerprinting, and digital forensics.

The EURASIP Journal on Information Security is published using an open access publishing model, which makes the full-text of all peer-reviewed papers freely available online with no subscription or registration barriers. EURASIP Journal on Information Security employs a paperless, electronic submission and evaluation system to promote a rapid turnaround in the peer review process. Fairness and transparency of the review process are pursued by traditional and innovative means, including the possibility of reviewers of accepted papers to disclose their identity and publish a brief commentary together with the article.

In addition to creating an international forum for the publication of high quality papers in the broad range of information security, the EURASIP Journal on Information Security aims at reaching the highest quality standards with regard to the experimental section of published papers. To this aim it is required that, whenever present, experimental results are carried out and described by strictly adhering to the scientific principle of experiment reproducibility. For this reason, the editorial board will ensure that the following specific requirements are satisfied, along with the usual requirements of originality and theoretical rigour:

- All the algorithms proposed or tested within the papers must be accompanied by a detailed pseudo-code or block diagram description;
- All the parameters that are necessary to implement and run the algorithms must be listed in a proper table;
- The actual values of the parameters used for the experiments must be clearly detailed;
- A detailed description of the data set used for training or performance evaluation must be given.

At the same time, it is strongly recommended that the authors share the source code of the algorithms (written in a widely diffused language, e.g. ansi c-code) with readers and reviewers. To this aim specific tools are made available by the electronic submission procedure to upload any relevant piece of the software together with the manuscript. Once the paper is

accepted and published, the source code will be freely available to readers under the Creative Commons Non-Commercial License, which allows the free re-use of the source code for all non-commercial purposes.

In order to further facilitate the verification of results and the comparison among competing schemes, a section of the journal will be expressly devoted to experimental evaluation, i.e., papers whose goal is that of comparing existing systems, testing existing algorithms against new data sets, reporting experimental evidence that results published by someone else are wrong (in this last case software sharing is a mandatory requirement).

EURASIP Journal on Information Security publishes two types of issues: regular issues and special issues. Regular issues publish collections of papers without special solicitation. Special issues feature specifically aimed and targeted topics of interest contributed by authors responding to a particular Call for Papers or by invitation, edited by invited guest editor(s). Regular papers can be submitted at any time, while special issue papers can be submitted only based on planned schedules and submission guidelines of the Call for Papers. Proposals for special issues can be submitted directly to the Editor-in-Chief.

Subjects

Subject areas include (but are by no means limited to):

- Digital rights management
- Data hiding
- Watermarking
- Fingerprinting and traitor tracing
- Authentication
- Identification
- Perceptual hashing
- Steganography and steganalysis
- Joint signal processing and encryption
- Signal processing in the encrypted domain
- Biometrics
- Digital forensics

Editor-in-Chief

Mauro Barni, University of Siena, Italy

EURASIP JOURNAL ON WIRELESS COMMUNICATIONS AND NETWORKING

Scope

The overall aim of EURASIP Journal on Wireless Communications and Networking (EURASIP JWCN) is to bring science and applications together on wireless communications and networking technologies with emphasis on signal processing techniques and tools. It is directed at both practicing engineers and academic researchers. EURASIP JWCN highlights the continued growth and new challenges in wireless technology, both for application development and basic research. Papers should emphasize original results relating to the theory and/or applications of wireless communications and networking. Tutorial papers, especially those emphasizing multidisciplinary views of communications and networking, are also welcomed. EURASIP JWCN employs a paperless, electronic submission and evaluation system to promote a rapid turnaround in the peer review process.

The journal publishes two types of issues: regular issues and special issues. Regular issues publish collections of papers without special solicitation. The special issues feature specifically aimed and targeted topics of interest contributed by authors responding to a particular Call-for-Papers or by invitation, edited by invited guest editor(s). Regular papers can be submitted at any time, while special issue papers can be submitted only based on planned schedules and submission guidelines of the Call-for-Papers. Proposals for special issues can be submitted directly to the Editor-in-Chief.

Subjects

Subject areas include, but are by no means limited to: Ad hoc networks; Channel modeling and propagation; Detection, estimation, and synchronization; Diversity and space-time techniques; End-to-end design techniques; Error control coding; Iterative techniques for joint optimization; Modulation techniques (CDMA, OFDM, multicarrier, spread-spectrum, etc.); Multiuser, MIMO channels, and multiple access schemes; Network performance, reliability, and quality of service; Resource allocation over wireless networks; Security, authentication, and cryptography; Signal processing techniques and tools; Ultra wideband systems; Wireless network services and medium access control.

Editor-in-Chief

SIGNAL PROCESSING

Editorial Policy

Signal Processing is an interdisciplinary journal presenting the theory and practice of signal processing. Its primary objectives are the following:

- dissemination of research results and of engineering developments to all signal processing groups and individuals;
- presentation of practical solutions to current signal processing problems in engineering and science.

The editorial policy and the technical content of the journal are the responsibility of the Editor-in-Chief and the Editorial Board. The journal is self-supporting from the subscription income and contains a minimum amount of advertisements. Advertisements are subject to the prior approval of the Editor-in-Chief. The journal welcomes contributions from every country in the world.

Scope

Signal Processing incorporates all aspects of the theory and practice of signal processing (analogue and digital). It features original research work, tutorial and review articles, and accounts of practical developments. It is intended for a rapid dissemination of knowledge and experience to engineers and scientists working on signal processing research, development, or practical application.

Subjects

Subject areas covered by the journal include: Signal Theory; Stochastic Processes; Detection and Estimation; Spectral Analysis; Filtering; Communication Signal Processing; Biomedical Signal Processing; Geophysical and Astrophysical Signal Processing; Earth Resources Signal Processing; Acoustic and Vibration Signal Processing; Signal Processing Systems; Software Developments; Image Processing; Pattern Recognition; Optical Signal Processing; Multidimensional Signal Processing; Data Processing; Remote Sensing; Signal Processing Technology; Speech Processing; Radar Signal Processing; Sonar Signal Processing; Special Signal Processing; Industrial Applications; New Applications.

Editor-in-Chief

SIGNAL PROCESSING: IMAGE COMMUNICATION

Editorial Policy

Signal Processing: Image Communication is an international journal for the development of the theory and practice of image communication. Its primary objectives are the following:

- to present a forum for the advancement of the theory and practice of image communication;
- to simulate cross fertilization between areas similar in nature which have traditionally been separated, for example, various aspects of visual communications and information systems;
- to contribute to a rapid information exchange between the industrial and academic environments.

The editorial policy and the technical content of the journal are the responsibility of the Editor-in-Chief and the Editorial Board. The journal is self-supporting from the subscription income and contains a minimum amount of advertisements.

Advertisements are subject to the prior approval of the Editor-in-Chief. The journal welcomes contributions from every country in the world.

Scope

Signal Processing: Image Communication publishes articles relating to aspects of design, implementation, and use of image communication systems. Signal Processing: Image Communication features original research work, tutorial and review articles, and accounts of practical developments.

Subjects

Subject areas covered by the journal include: TV, HDTV, and 3DTV systems; Visual Science; Image; TV and Advanced TV; Broadcasting; Image Storage and Retrieval; Graphic Arts; Electronic Printing; Image Transmission; Interactive Image Coding Communication; Imaging Technology; Display Technology; VLSI Processors for Image Communications.

Editor-in-Chief

SPEECH COMMUNICATION

Editorial Policy

The journal's primary objectives are the following:

- to present a forum for the advancement of human and human-machine speech communication science;
- to stimulate cross fertilization between different fields of this domain;
- to contribute towards the rapid and wide diffusion of scientifically sound contributions in this domain.

Speech Communication is an interdisciplinary journal whose primary objective is to fulfill the need for the rapid dissemination and thorough discussion of basic and applied research results. In order to establish frameworks of inter-relate results from the various areas of the field, emphasis will be placed on viewpoints and topics of a transdisciplinary nature. The editorial policy and the technical content of the journal are the responsibility of the Editors and the Institutional Representatives. The Institutional Representatives assist the Editors in the definition and the control of editorial policy as well as in maintaining connections with scientific associations, international congresses, and regional events. The Editorial Board contributes towards the gathering of material for publication and assists the Editors in the editorial process.

Scope

Speech Communication is an interdisciplinary journal for the development and dissemination of all basic and applied aspects of speech communication processes. Speech Communication features original research work, tutorial and review articles dealing with the theoretical, empirical, and practical aspects of this scientific field.

Subject Coverage

Subject areas covered in this journal include:

- Basics of oral communication and dialogue: modelling of production and perception processes; phonetics and phonology; syntax; semantics of speech communication; cognitive aspects.
- Models and tools for language learning: functional organisation and developmental models of human language capabilities; acquisition and rehabilitation of spoken language; speech and hearing defects and aids.
- Speech signal processing: analysis; coding; transmission; enhancement, robustness to noise.
- Models for automatic speech communication: speech recognition; language identification; speaker recognition; speech synthesis; oral dialogue.

- Development and evaluation tools: monolingual and multilingual databases; assessment methodologies; specialised hardware and software packages; field experiments; market development.
- Multimodal human-computer interface: using speech I/O in combination with modalities, for example, gesture and handwriting.

Editors-in-Chief

Special Issue on

Distributed Signal Processing Techniques for Wireless Sensor Networks

CALL FOR PAPERS

Recent advances in hardware and wireless communications technologies have made possible the design of low-cost, low-power, multifunctional sensor devices. When deployed in a large number across a geographical area, these sensor devices collaborate among themselves to create a network for distributed sensing and automated information gathering, processing, and communication. Wireless sensor networks are a special case of wireless ad hoc networks that assume a multihop communication framework with no infrastructure, where the sensor devices cooperate to convey information from a source to a destination. This revolutionary technology will present a huge impact on a broad range of applications: monitoring the health status of humans, animals, plants, and civil-engineering structures, control and instrumentation of industrial machines and home appliances, energy conservation, security, detection of chemical and biological leaks. The upcoming years will very likely witness a growing demand for intelligent sensor systems that will be networked with wireless local area networks (WLANs) and Internet for increased functionality and performance.

In general, the design of wireless sensor networks is subject to the following requirements:

- low energy consumption, which is manifested in minimal energy expenditure in each sensor node and efficient usage of power-saving sleep/wake-up modes
- scalability with the increase in the number of sensors with the goal to extract information from noisy spatiotemporal measurements collected at the nodes
- broadcast communication paradigm and the increased possibility of packet collisions and congestions
- absence of centralized communication infrastructure
- possibility of frequent node failures and network topology changes

The goal of this special issue is to present the state-of-the-art results and emerging signal processing approaches for wireless sensor networks that can cope with the above-mentioned challenges. Submitted articles must not have been previously published and must not be currently submitted for publication elsewhere. Topics of interest include the following:

- distributed estimation, detection, inference, and learning algorithms
- clock and carrier synchronization techniques
- design of distributed modulation techniques
- distributed power control algorithms
- performance bounds and statistical analysis

Due to the existence of a concurrent call for proposals, papers dealing with localization and tracking applications will not be accepted.

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Special Issue on

Advanced Signal Processing and Pattern Recognition Methods for Biometrics

CALL FOR PAPERS

Biometric identification has established itself as a very important research area primarily due to the pronounced need for more reliable and secure authentication architectures in several civilian and commercial applications. The recent integration of biometrics in large-scale authentication systems such as border control operations has further underscored the importance of conducting systematic research in biometrics. Despite the tremendous progress made over the past few years, biometric systems still have to reckon with a number of problems, which illustrate the importance of developing new biometric processing algorithms as well as the consideration of novel data acquisition techniques. Undoubtedly, the simultaneous use of several biometrics would improve the accuracy of an identification system. For example the use of palmprints can boost the performance of hand geometry systems. Therefore, the development of biometric fusion schemes is an important area of study. Topics related to the correlation between biometric traits, diversity measures for comparing multiple algorithms, incorporation of multiple quality measures, and so forth need to be studied in more detail in the context of multibiometrics systems. Issues related to the individuality of traits and the scalability of biometric systems also require further research. The possibility of using biometric information to generate cryptographic keys is also an emerging area of study. Thus, there is a definite need for advanced signal processing, computer vision, and pattern recognition techniques to bring the current biometric systems to maturity and allow for their large-scale deployment.

This special issue aims to focus on emerging biometric technologies and comprehensively cover their system, processing, and application aspects. Submitted articles must not have been previously published and must not be currently submitted for publication elsewhere. Topics of interest include, but are not limited to, the following:

- Fusion of biometrics
- Analysis of facial/iris/palm/fingerprint/hand images
- Unobtrusive capturing and extraction of biometric information from images/video
- Biometric identification systems based on face/iris/palm/fingerprint/voice/gait/signature
- Emerging biometrics: ear, teeth, ground reaction force, ECG, retina, skin, DNA
- Biometric systems based on 3D information

- User-specific parameterization
- Biometric individuality
- Biometric cryptosystems
- Quality measure of biometrics data
- Sensor interoperability
- Performance evaluation and statistical analysis

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Special Issue on

Signal Processing for Data Converters

CALL FOR PAPERS

Data converters (ADCs and DACs) ultimately limit the performance of today's communication systems. New concepts for high-speed, high-resolution, and power-aware converters are therefore required, which also lead to an increased demand for high-speed and high-resolution sampling systems in the measurement industry. Present converter technologies operate on their limits, since the downscaling of IC technologies to deep submicron technologies makes their design increasingly difficult. Fortunately, downscaling of IC technologies allows for using additional chip area for digital signal processing algorithms with hardly any additional costs. Therefore, one can use more elaborate signal processing algorithms to improve the conversion quality, to realize new converter architectures and technologies, or to relax the requirements on the analog design. Pipelined ADCs constitute just one example of converter technology where signal processing algorithms are already extensively used. However, time-interleaved converters and their generalizations, including hybrid filter bank-based converters and parallel sigma-delta-based converters, are the next candidates for digitally enhanced converter technologies, where advanced signal processing is essential. Accurate models constitute one foundation of digital corrected data converters. Generating and verifying such models is a complex and time-consuming process that demands high-performance instrumentation in conjunction with sophisticated software defined measurements.

The aim of this special issue is to bring forward recent developments on signal processing methods for data converters. It includes design, analysis, and implementation of enhancement algorithms as well as signal processing aspects of new converter topologies and sampling strategies. Further, it includes design, analysis, and implementation of software defined measurements for characterization and modeling of data converters.

Topics of interest include (but are not limited to):

- Analysis, design, and implementation of digital algorithms for data converters
- Analysis and modeling of novel converter topologies and their signal processing aspects
- Digital calibration of data converters
- Error identification and correction in time-interleaved ADCs and their generalizations
- Signal processing for application-specific data converters (communication systems, measurement systems, etc.)

- New sampling strategies
- Sampling theory for data converters
- Signal processing algorithms for data converter testing
- Influence of technology scaling on data converters and their design
- Behavioral models for converter characterization
- Instrumentation and software defined measurements for converter characterization

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Special Issue on Distributed Space-Time Systems

CALL FOR PAPERS

Diversity is a powerful technique to mitigate channel fading and to improve robustness to cochannel interference in a wireless network. Space-time wireless systems traditionally use multiple colocated antennas at the transmitter and receiver along with appropriate signal design (also known as space-time coding) to realize spatial diversity in the link. Typically this diversity can augment any frequency and time diversity available to the receiver. Multiple antennas also offer the ability to use spatial multiplexing to dramatically increase the data rate.

A recent development in this area aims at dispensing with the need for colocated antennas. Popularly known as the cooperative diversity technique, this uses the antennas at multiple user terminals in a network in the form of a virtual antenna array to realize spatial diversity in a distributed fashion. Such techniques create new challenges in the design of wireless systems.

The purpose of this call for papers is to address some of these challenges such as new protocols for cooperative diversity, cross-layer design, cooperative multiplexing, space-time coding for distributed antennas, cooperative channel estimation and equalization, selecting the right users for participating in a cooperative network, modulation specific issues like OFDMA and CDMA, and distributed space-time processing for sensor networks.

Papers on the following and related topics are solicited for this special issue:

- New protocols for cooperative diversity systems
- Cross-layer protocol design
- Signal design for distributed space-time systems
- Cooperative channel estimation and equalization
- Cooperative MIMO systems
- Distributed space-time processing for sensor networks
- Power allocation in distributed space-time systems
- Fast algorithms and efficient architectures for virtual MIMO receivers
- Energy efficient relay network architectures

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Special Issue on
MIMO Transmission with Limited Feedback

CALL FOR PAPERS

During the past decade, multiple-antenna transmission (MIMO) systems have matured. However, when comparing their *potential* capacities with their *achieved* throughputs, we notice large gaps. The price for the MIMO advantages is implementation complexity and the use of specific signal processing tools that cannot be directly inferred from one-to-one (i.e. single-channel) systems. For instance, water-filling does not seem feasible due to the large amount of required feedback information. State-of-the-art standards like 3GPP and WiMax support only very limited feedback. Nevertheless, adaptive modulation and coding (AMC) schemes, selective space-time coding, as well as antenna selection have shown that significant improvements are achievable even with very limited feedback. In this setting, MIMO-OFDM schemes are of central interest to industry and academia. For instance, an important challenge is to find an adequate representation of the MIMO channel's quality—independently of the system architecture and signal processing techniques currently available. A proper labeling or characterization of the MIMO channel quality regardless of the spatial processing to be used enables deciding on the reception or transmission strategy to use (e.g. with or without channel state information, to optimize diversity or rate, etc.) and, thus, on the amount of feedback that is required in transmission.

MIMO transmission can be point-to-point or distributed, in fact, when looking not just into the physical layer, but also into the link layer, feedback load is especially critical in multiuser MIMO systems because of its much higher number of degrees of freedom. Opportunistic scheduling strategies have been developed which (more or less heuristically) take into account the requirements on QoS.

This special issue focuses on such transmission systems with limited feedback and provides an overview of the state of the art.

Topics of interest include (but are not limited to):

- Adaptive modulation and coding
- Selective space-time coding
- Antenna and beam selection
- Adaptive beamforming techniques
- Codebook selection for CSI feedback
- Rate distortion for feedback systems
- Approximate water-filling techniques

- Feedback in highly mobile environments
- MIMO with statistical feedback
- Nonlinear/adaptive MIMO precoding
- Fundamental limits on performance and robustness
- Opportunistic schemes
- MIMO and QoS diversity
- Inclusion of MIMO concepts in wireless standards
- Feedback in MIMO-OFDM and OFDMA schemes
- Cross-layer approaches to multiuser MIMO scheduling

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Special Issue on Multihop-Based Cellular Networks

CALL FOR PAPERS

The deployment of 3G cellular networks is intended to meet the rapidly increasing number of mobile subscribers and the growing demand for new high data rate services such as mobile Internet, video conferencing, and interactive gaming. With the anticipated growth rates in cellular communications, the demand is still likely to exceed the available resources. This fact necessitates research towards practical capacity/coverage enhancement and power reduction techniques for the evolution of cellular networks towards 4G.

Motivated by a growing number of applications, there has been recently elevated interest in the design of wireless ad hoc networks that do not depend on a fixed infrastructure where nodes communicate via multihop transmission. Multihop transmission can possibly lead to coverage extension, capacity enhancement, QoS improvement, and power reduction. Deploying wireless ad hoc network architectures for a large-scale personal wireless communication system in which any mobile station (MS) can communicate with its base station (BS) via an arbitrary number of hops may not be practically feasible. Therefore, it is prudent to combine the benefits of the centralized architecture of traditional wireless cellular networks with the distributed architecture of pure wireless ad hoc networks into a joint design that allows for controlled multihop transmissions in cellular networks. In multihop-based cellular networks, an MS which meets a predefined set of conditions, for example, is located in a specific area inside the cell or cannot establish a direct connection with the BS, will use other mobile or fixed stations as relays to communicate with its BS. To enable the successful and efficient integration of multihop transmission in cellular networks, there is an essential need for signal processing research to address a wide range of problems.

Original contributions are solicited related to all aspects of signal processing for multihop-based cellular networks. Topics of interest include, but are not limited to:

- Performance analysis
- Advanced antenna techniques
- Centralized and decentralized detection and estimation
- Distributed signal processing algorithms
- Cooperative diversity and coding techniques
- Cross-layer designs
- Resource allocation algorithms
- QoS support mechanisms

- Channel modeling
- Synchronization and localization
- Test bed design and experimental measurements

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Special Issue on

Cooperative Localization in Wireless Ad Hoc and Sensor Networks

CALL FOR PAPERS

One of the major requirements for most applications based on wireless ad hoc and sensor networks is accurate node localization. In fact, sensed data without position information is often less useful.

Due to several factors (e.g., cost, size, power), only a small fraction of nodes obtain the position information of the anchor nodes. In this case, a node has to estimate its position without a direct interaction with anchor nodes and a cooperation between nodes is needed in a multihop fashion. In some applications, none of the nodes are aware of their absolute position (anchor-free) and only relative coordinates are estimated instead.

Most works reported in the literature have studied cooperative localization with the emphasis on algorithms. However, very few works give emphasis on the localization as estimation or on the investigation of fundamental performance limits as well as on experimental activities. In particular, the fundamental performance limits of multihop and anchor-free positioning in the presence of unreliable measurements are not yet well established. The knowledge of such limits can also help in the design and comparison of new low-complexity and distributed localization algorithms. Thus, measurement campaigns in the context of cooperative localization to validate the algorithms as well as to derive statistical models are very valuable.

The goal of this special issue is to bring together contributions from signal processing, communications and related communities, with particular focus on signal processing, new algorithm design methodologies, and fundamental limitations of cooperative localization systems. Papers on the following and related topics are solicited:

- anchor-based and anchor-free distributed and cooperative localization algorithms that can cope with unreliable range measurements
- derivation of fundamental limits in multihop and anchor-free localization scenarios
- new localization algorithms design methodologies based, for example, on statistical inference and factor graphs
- low-complexity and energy-efficient distributed localization algorithms
- distributed ranging and time synchronization techniques

- measurement campaigns and statistical channel modeling
- algorithm convergence issues
- UWB systems
- localization through multiple-antenna systems
- experimental results

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Special Issue on Wireless Video

CALL FOR PAPERS

Video transport is becoming increasingly important for a large variety of applications and networks. Wireless information exchange will be dominated by basic human communication such as messaging, voice, and video communication. Because of its typically large bandwidth requirements, video communication will emerge as the dominant and most critical form of traffic in and beyond 3G/4G wireless systems. Digital video transmission over wireless connections has proven to be a challenging task, given the hostile communication environment, characterized by unpredictable connection quality and significant error rates, a limited available bandwidth, and severe energy constraints. When developing a reliable and effective video transmission system over a wireless-based network, many different technical problems must be addressed, some of which may be application- or network-specific.

This special issue will focus on the most recent advances in applications involving video communication over wireless links. For example, P2P or multicast streaming applications will be addressed, in which the scalability characteristics of the audiovisual codecs may be exploited to define new scheduling and prioritization algorithms for the efficient delivery of time-sensitive traffic. Video transmission over wireless LANs with critical bandwidth requirements and severe energy constraints, such as sensor networks, will also be addressed.

List of Topics

Papers on the following and related topics are solicited:

- Video coding for wireless transmission
  - Advanced video coding algorithms
  - Distributed video coding
  - Error resilience and error concealment techniques
  - Joint source-channel coding
  - Joint restoration and coding
- Video distortion estimation and quality assessment for wireless transmission
- Multiple access for wireless video
- Adaptive techniques for video delivery over wireless networks
- Cross-layer design and optimization techniques for wireless video transmission

- Quality of service support for video delivery over wireless networks
- Wireless video protocols and standards
- DVB-H and mobile TV
- Distributed wireless video communications
- Wireless P2P video streaming

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Special Issue on Wireless Cooperative Networks

CALL FOR PAPERS

Motivations

Cooperative networks are gaining increasing interest from ICT society due to the capability of improving the performance of communication systems as well as providing a fertile environment for the development of context-aware services.

Cooperative communications and networking is a new communication paradigm involving both transmission and distributed processing promising significant increase of capacity and diversity gain in wireless networks, by counteracting faded channels with *cooperative diversity.*

On one hand, the integration of long-range and short-range wireless communication networks (e.g., infrastructured networks such as 3G, wireless ad hoc networks, and wireless sensor networks) improves the performance in terms of both area coverage and quality of service (indeed representing a form of diversity reflected in a greater capacity and number of potential users). On the other hand, the cooperation among heterogeneous nodes, as in the case of wireless sensor networks, allows a distributed space-time signal processing supporting, with a reduced complexity or energy consumption per node, environmental monitoring, localization techniques, distributed measurements, and so forth.

The relevance of this topic is also reflected by numerous sessions in current international conferences on the field as well as by the increasing number of national and international projects worldwide financed on these aspects.

List of topics

This issue tries to collect cutting-edge research achievements in this area. We solicit papers that present original and unpublished work on topics including, but not limited to, the following:

- Physical layer models, for example, channel models (statistics, fading, MIMO, feedback)
- Device constraints (power, energy, multiple access, synchronization) and resource management

- Distributed processing and resource management for cooperative networks, for example, distributed compression in wireless sensor networks, channel and network codes design
- Performance metrics, for example, capacity, cost, outage, delay, energy, scaling laws
- Cross-layer issues, for example, PHY/MAC/NET interactions, joint source-channel coding, separation theorems
- Multiterminal information theory
- Multihop communications
- Integration of wireless heterogeneous (long- and short-range) systems

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Special Issue on

Text Mining in Bioinformatics

CALL FOR PAPERS

Bioinformatics is the science of creating and advancing algorithms, computational and statistical techniques, and theory to solve formal and practical problems stemmed from the management and analysis of biological data.

A fundamental issue that biological researchers encounter today is how to make effective use of the enormous amount of biomedical data to improve their understanding of complex biological systems. The biomedical data repositories are formed from various ways such as bibliographic information from electronic medical journals, gene expression data from microarray experiments, protein identification and quantification data from proteomics experiments, and genomic sequences gathered by the Human Genome Project. The ability to automatically and effectively extract, integrate, understand, and make use of information embedded in such heterogeneous unstructured data remains a challenging task.

Submissions should address theoretical developments, computational aspects, or specific applications. Suitable topics for this special issue include but are not limited to:

- Application and assessment of Text Mining (TM) algorithms,
- Identification and retrieval of relevant documents from one or more large collections of documents,
- Information extraction from biomedical literatures,
- Entities' extraction from unstructured biomedical data sets,
- Improving and assessing data quality in TM,
- Automated construction, expansion, and curation of ontologies for different domain,
- Integration of information retrieval to TM in biomedical domains,
- Sequence clustering/classification,
- Evaluation methods for TM,
- Visualization,
- Mining multirelational data.

Authors should follow the EURASIP JBSB manuscript format described at the journal site http://www.hindawi.com/journals/bsb/. Prospective authors should submit an electronic copy of their complete manuscript through the EURASIP JBSB's manu-script tracking system at http://www.hindawi.com/mts/, according to the following timetable.

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Special Issue on

Reconfigurable Computing and Hardware/Software Codesign

CALL FOR PAPERS

This special issue addresses the advances in reconfigurable computing architecture in algorithm implementation methods, and in automatic mapping methods of algorithms into hardware and processor spaces, indicating the changes in codesign flow due to the introduction of new reconfigurable hardware platform. Using this platform, the designer faces a new paradigm of computing and programming: the computing system is capable for runtime and autonomous modification of its functionalities following the changing needs of applications.

This new scenario of hardware/software codesign provides a great improvement in the embedded system design and implementation. Rapidly changing user requirements—the evolution of networking, handheld and mobile communication appliances—demand extreme flexibility of systems' functionality even after manufacturing. To cope effectively and timely with the new challenges, the new and more sophisticated dynamic reconfiguration strategies together with codesign methods have to be developed.

Authors are invited to submit their papers addressing design methodologies of sophisticated reconfiguration approaches to this special issue of the EURASIP Journal of Embedded Systems. Accepted papers will need to meet normal journal requirements of completeness, originality, and quality of presentation.

This special issue is intended to present innovative reconfigurable architectures, the state of the art of configurable computing area, and the emerging methodologies and real-world applications. The topics of interest include, (but are not limited to)

- Languages, modeling, and theoretical aspects of dynamic reconfiguration
    - modeling HW/SW reconfigurable systems with SystemC
    - specification languages for reconfigurable systems description
    - theoretical models for representing, validating, and exploiting reconfigurable systems
    - hardware/software partitioning tool for mapping applications to reconfigurable architecture
    - offline and online methods for reconfigurable cores placement and scheduling
- Novel reconfigurable SOC architectures and successful experiences
    - operating systems support for reconfigurable SOC architectures

- embedded partial reconfigurable architectures
- multi-FPGAs solutions
- fault-tolerance using reconfigurable hardware
- automotive and reconfigurable computing
- innovative applications of dynamically reconfigurable systems

Papers on other related topics will also be considered. All papers should address reconfigurable computing systems that are related to the HW-SW Codesign. Papers on subjects outside of this scope (i.e., not suitable for embedded applications) will not be considered.

Authors should follow the EURASIP JES manuscript format described at the journal site http://www.hindawi.com/journals/es/. Prospective authors should submit an electronic copy of their complete manuscript through the EURASIP JES Manuscript Tracking System at http://www.hindawi.com/mts/, according to the following timetable:

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Special Issue on Multicarrier Systems

CALL FOR PAPERS

Over the past decade, multicarrier transmission has become some of the hottest topics in wireless communications. Recent IEEE 802.11 standards for wireless local area networks are based on OFDM, and the IEEE 802.16 standards for wireless metropolitan area networks (both fixed and mobile) include a physical layer based on OFDM/TDMA and one physical layer based on orthogonal frequency-division multiple access (OFDMA). Furthermore, the 3GPP-LTE Group, working on fourth-generation (4G) cellular system specifications, has converged to OFDM-based transmission and multiple access.

Although the literature is now abundant on multicarrier transmission, many problems related to the use of this technology in future wireless systems are still looking for efficient solutions. This special issue will be devoted to multicarrier transmission, related technolgies, and their application in future wireless systems. Topics of interest include, but are not limited to:

- OFDM/OFDMA
- Multicarrier CDMA
- Channel estimation, synchronization, and equalization
- Peak power reduction
- Linear precoding
- MIMO-OFDM
- Space-time-frequency codes
- Multiuser interference in cellular systems
- Radio resource allocation
- Applications and implementation issues
- Frequency-domain signal processing

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Manuscript Due	May 1, 2007
First Round of Reviews	August 1, 2007
Publication Date	November 1, 2007

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Special Issue on

Wireless Telemedicine and Applications

CALL FOR PAPERS

Wireless telemedicine, a growing new interdisciplinary field, calls for innovation in information and communications technology for facilitating reliable, comprehensive, and quality clinical care service at a distance. It will eventually contribute to improving the quality of healthcare of everyone. Though advances in wireless communications and networking are vital to deliver telemedicine services, they also face great challenges, for example the failure delivery of a service may end up with loss of human lives. This is the motivation behind this special issue.

This special issue focuses on the novel and practical ways, but solid contributions, to improve wireless telemedicine and applications. Papers that do not focus on wireless telemedicine and applications will not be reviewed. Specific interests are (but not limited to) in the following areas:

- Network architectures for wireless telemedicine
- Mobile service platform for continuity of healthcare
- Complexity of wireless telemedicine systems
- New sensor and medical RFID technologies
- Network privacy and security in healthcare
- Wireless network research issues to support healthcare
- Wireless telemedicine applications
- Electromagnetic interference issues
- Signal processing techniques in wireless telemedicine systems

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Manuscript Due	June 1, 2007
First Round of Reviews	September 1, 2007
Publication Date	December 1, 2007

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Special Issue on

Cognitive Radio and Dynamic Spectrum Sharing Systems

CALL FOR PAPERS

Aims and Scope of the Special Issue

The ever-growing need for wireless communications which provide high data rates entails a substantial demand for new spectral resources and more flexible and efficient use of existing resources. Several measurement campaigns conducted in the recent years show that frequency spectrum in the range 30 MHz-3 GHz is most of the time unused leading to low average occupancy rates and motivating to allow more flexible spectrum use. Promising solution to exploit spectrum in a flexible way is via cognitive radio and dynamic spectrum sharing systems which use innovative spectrum management and allow different systems to share the same frequency band. Significant potential improvements offered with such approaches and also positive view from regulatory bodies have led to exploding interest in this field recently. However, such paradigm shift introduces many new design challenges that have to be solved in order to enable proper functioning of the spectrum sharing and cognitive radio systems. Recent research efforts include considerations of different physical layer technologies, spectrum sensing, coexistence mechanisms between legacy and secondary users, and shared medium access among many secondary users.

The objective of this special issue is to showcase the most recent developments and research in this field, as well as to enhance its state-of-the-art. Original and tutorial articles are solicited in all aspects of cognitive radio and spectrum sharing including system and network protocol design, enabling technologies, theoretical studies, practical applications, and experimental prototypes.

Topics of Interest:

Topics of interest include, but are not limited to:

- Spectrum measurements and current usage
- Spectrum regulations
- Spectrum sensing and awareness techniques
- Dynamic spectrum management
- Capacity and achievable data rates in cognitive radio
- Multiuser spectrum sharing:

- Priority resource allocation
- Cooperation and competition of users
- Auction-based spectrum sharing

- Coexistence of spectrum sharing and legacy narrowband systems
- Physical layer design of spectrum sharing systems:
  - OFDM, OQAM, UWB, CDMA, SDR
  - MIMO component in spectrum sharing
- Applications of cognitive radio & spectrum sharing
- Standardization of cognitive radio and spectrum sharing: IEEE P1900, IEEE 802.22, ITU-R activities

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Manuscript Due	June 1, 2007
First Round of Reviews	October 1, 2007
Publication Date	February 1, 2008

GUEST EDITORS:

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Special Issue on

Theory and Applications in Multiuser/Multiterminal Communications

CALL FOR PAPERS

After fifty years of development in information theory, much is known for point-to-point communication systems; the source-channel separation theorem generally allows for decoupled data compression and channel coding, and practical codes and designs are now able to come extremely close to the Shannon limit. However, practical communications systems (especially in wireless scenarios) often involve multiple users, either for the sake of better utilization of limited resources, or due to nonideal effects of real systems. Multiuser settings substantially change the picture of information theory study; for example, it is known that source-channel separation does not always hold, and that feedback can strictly increase capacity in some settings. There has been intensive research very recently on relay and broadcast channels, and some important results have been obtained. However, most problems in multiuser information theory still remain open, and even less is understood about efficient designs in real applications.

Things become even more interesting and challenging when distributed nodes and terminals in a wireless ad hoc or sensor network are viewed as "users." First, new characteristics and performance metrics emerge that are largely ignored in information and communication theory, including source burstiness, network throughput, delay, fairness, and other application-specific considerations. A cross-layer approach in analysis and design is both desireable and promising. Second, many existing network designs are based on heuristics or inadequate principles, so reverse engineering can lead to better designs, facilitate cross-fertilization among relevant fields such as computing, networking, control and communications, and foster understanding of the interconnection between information theory and communication networks.

This special issue aims to present current state of the art and new development in theory, design, and relevant applications concerning multiuser/multiterminal communications. Research papers, expository papers, and surveys are all welcome.

Topics of interest include, but are not limited to:

- Multiuser information theory
- Information theory with queuing and delay
- Distributed source coding
- Joint source/channel coding

- Network coding
- Distributed and cooperative processing in wireless networks
- System performance analysis and fundamental tradeoffs, both theoretical and numerical
- Efficient design and resource management, interference management, multiuser detection
- Cross-layer design and analysis
- Relevant applications in ad hoc and sensor networks

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Manuscript Due	August 1, 2007
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EURASIP Journal on

Audio, Speech, and Music Processing

http://www.hindawi.com/journals/asmp/

Aims and Scope

EURASIP Journal on Audio, Speech, and Music Processing is a peer-reviewed, open access journal, which aims at bringing together researchers, scientists and engineers working on the theory and applications of the processing of various audio signals, with a specific focus on speech and music.

The journal is dedicated to original research work, but also allows tutorial and review articles. Articles deal with both theoretical and practical aspects of audio, speech, and music processing.

Manuscript Submission

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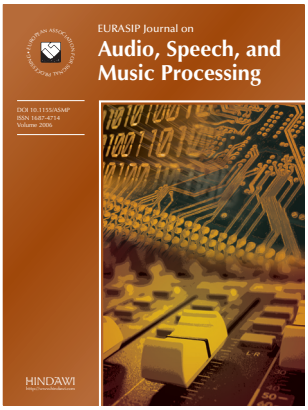

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EURASIP Journal on
Bioinformatics and Systems Biology

http://www.hindawi.com/journals/bsb/

Aims and Scope

EURASIP Journal on Bioinformatics and Systems Biology is a peer-reviewed, open access journal, offering a common platform for scientists from several areas including signal processing, bioinformatics, statistics, biology and medicine, who are interested in the development of algorithmic, mathematical, statistical, modeling, simulation, data mining, and computational techniques, as demanded by various applications in genomics, proteomics, system biology, and more general in health and medicine.

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EURASIP Journal on Embedded Systems

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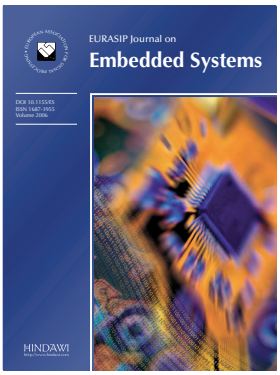

Aims and Scope

EURASIP Journal on Embedded Systems is a peer-reviewed, open access journal that serves the large community of researchers and professional engineers who deal with the theory and practice of embedded systems, including complex homogeneous and heterogeneous embedded systems, specification languages and tools for embedded systems, modeling and verification techniques, hardware/software trade-offs and codesign, new design flows, design methodologies and synthesis methods, platform-based design, component-based design, adaptation of signal processing algorithms to limited implementation resources, rapid prototyping, computing structures and architectures for complex embedded systems, real-time operating systems, methods and techniques for the design of low-power systems, interfacing with the real world, novel application case studies and experiences.

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EURASIP Journal on Image and Video Processing

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Aims and Scope

EURASIP Journal on Image and Video Processing is a peer-reviewed, open access journal, intended for researchers from both academia and industry, who are active in the multidisciplinary field of image and video processing. The scope of the journal covers all theoretical and practical aspects of the domain, from basic research to the development of applications.

Contributed articles on image and video processing may be focused on specific techniques, on diverse functionalities and services, within the context of various activity sectors (e.g., multimedia, medical, aerial, robotics, security, communications, arts), or on employing diverse data formats.

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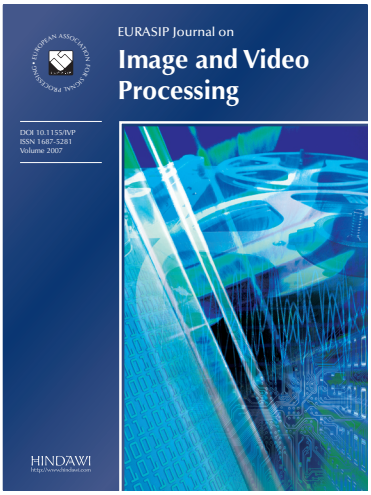

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EURASIP Journal on

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Information Security

Aims and Scope

The overall goal of the EURASIP Journal on Information Security (EURASIP JIS), sponsored by the European Association for Signal Processing (EURASIP), is to bring together researchers and practitioners dealing with the general field of information security, with a particular emphasis on the use of signal processing tools to enable the security of digital contents. As such, it addresses any work whereby security primitives and multimedia signal processing are used together to ensure the secure access to the data. Enabling technologies include watermarking, data hiding, steganography and steganalysis, joint signal processing and encryption, perceptual hashing, identification, biometrics, fingerprinting, and digital forensics.

The EURASIP JIS is published using an open access publishing model, which makes the full text of all peer-reviewed papers freely available online with no subscription or registration barriers. EURASIP JIS employs a paperless, electronic submission and evaluation system to promote a rapid turnaround in the peer-review process. Fairness and transparency of the review process are pursued by traditional and innovative means, including the possibility of reviewers of accepted papers to disclose their identity and publish a brief commentary together with the article.

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International Journal of

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Biomedical Imaging

Aims and Scope

Generally speaking, the scope of biomedical imaging covers data acquisition, image reconstruction, and image analysis, involving theories, methods, systems, and applications. While tomographic and postprocessing techniques have become increasingly sophisticated, traditional and emerging modalities play more and more critical roles in anatomical, functional, cellular, and molecular imaging. The overall goal of the International Journal of Biomedical Imaging (IJBI) is to promote research and development of biomedical imaging by publishing high-quality papers, reviews, and tutorials in this rapidly growing interdisciplinary field.

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Computational Intelligence and Neuroscience

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Aims and Scope

Computational Intelligence and Neuroscience is a forum for the publication of research in the interdisciplinary field of neural computing, neural engineering and artificial intelligence, where neuroscientists, cognitive scientists, engineers, psychologists, physicists, computer scientists, and artificial intelligence investigators among others can publish their work in one periodical that bridges the gap between neuroscience, artificial intelligence and engineering.

The journal provides research and review papers at an interdisciplinary level, with the field of intelligent systems for computational neuroscience as its focus. This field includes areas like artificial intelligence, models and computational theories of human cognition, perception and motivation; brain models, artificial neural nets and neural computing. All items relevant to building theoretical and practical systems are within its scope, including contributions in the area of applicable neural networks theory, supervised and unsupervised learning methods, algorithms, architectures, performance measures, applied statistics, software simulations, hardware implementations, benchmarks, system engineering and integration and innovative applications.

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VLSI Design

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VLSI Design is a peer-reviewed, open access journal, which presents state-of-the-art papers in VLSI design, computer-aided design, design analysis, design implementation, simulation and testing. Topics relating to both theory and applications are discussed. The journal's scope also includes papers that address technical trends, pressing issues, and educational aspects in VLSI Design.

The journal provides a dynamic, high-quality, international forum for original papers and tutorials by academic, industrial, and other scholarly contributors in VLSI Design.

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Forthcoming Volumes in the EURASIP Book Series on Signal Processing and Communications

Signal Processing for the Acoustic Human-Machine Interface

Walter Kellermann and Herbert Buchner; ISBN: 977-5945-16-X

This monograph presents a coherent treatment of the state of the art in acoustic signal processing for speech and audio, especially for 'natural' human-machine interfaces, where users are untethered and mobile. This area has attracted many researchers in recent years due to that novel highly advanced signal processing algorithms promise significant practical benefits. For a direct access to the state of the art, this book is designed as a textbook and reference for graduate students, practicing engineers, and researchers with some background in digital signal processing.

The book starts with a discussion of the properties of acoustic systems and speech and audio signals involved in the scenario, and then defines the fundamental problems and basic signal processing concepts for both reproduction and acquisition of such signals. For each of these concepts, we start with single-channel algorithms and then strongly emphasize the increasingly important multichannel techniques, which open the door to new solutions by exploiting the spatial domain.

The first of these concepts to describe is the extension of acoustic echo cancellation from the single-channel case to multiple loudspeaker channels, to the combination with microphone arrays, and also to nonlinear echo paths.

For the enhancement of speech and audio signals as acquired in noisy and reverberant environments, we first examine single-channel noise reduction and dereverberation schemes. Multichannel schemes are discussed in three chapters on statistical multichannel signal enhancement, classical spatial filtering (supervised beamforming), and blind signal separation for convolutive mixtures, which can be seen as blind beamforming.

As an additional building block of natural human-machine interfaces, localization of sources, e.g., as needed for supervised beamforming, is addressed and the current state of the art is reviewed.

Finally, the integration of several of the above algorithmic modules into real-world systems is discussed, by way of both general strategies and specific examples.

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Forthcoming Volumes in the EURASIP Book Series on Signal Processing and Communications

Genetic and Evolutionary Computation for Image Processing and Analysis

Edited by: Stefano Cagnoni, Evelyne Lutton, and Gustavo Olague

ISBN: 977-5945-22-4

Image analysis and processing is steadily gaining relevance within the large number of application fields to which genetic and evolutionary computation (GEC) techniques are applied. Although more and more examples of such applications can be found in literature, they are scattered, apart from a few exceptions, in proceedings and journals dedicated to more general topics. This book is the first attempt to offer a panoramic view on the field, by describing applications of most mainstream GEC techniques to a wide range of problems in image processing and analysis. More than 20 leading researchers in the field have contributed to this book, covering topics ranging from low-level image processing to high-level image analysis in advanced computer vision applications. Although the book is mainly application-oriented, particular care has been given to introducing GEC methods, in each chapter, at a level which makes them accessible to a wide audience. The expected target of the book comprises practitioners and researchers in image analysis and processing who may not be familiar with GEC techniques. At the same time, the book can as well be of interest for researchers in evolutionary computation, since most contributions focus on applications of genetic and evolutionary techniques which are based on nontrivial implementations of such methods. This feature reflects the nature of the contributions which are authored both by researchers for which GEC is the main field of interest and by researchers whose work is mainly focused on image processing and analysis.

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