Государственное образовательное учреждение
высшего профессионального образования
**«Томский государственный университет
систем управления и радиоэлектроники»**

ТЕМАТИЧЕСКИЙ РЕФЕРАТИВНЫЙ СБОРНИК № 14-2

“Small Vessel Detection”
(«Обнаружение малоразмерных судов»)

Публикации в трудах конференций

Источник: *Digital Library IEEEXplore*
Язык: *английский*
Глубина поиска: *1999 – 2011 гг.*
Дата формирования: *март 2011 г.*
Составитель: *В.И. Карнышев*

Томск – 2011

ТЕМАТИЧЕСКИЙ РЕФЕРАТИВНЫЙ СБОРНИК № 14-2

"Small Vessel Detection"

(«Обнаружение малоразмерных судов»)

Публикации в трудах конференций

"An effective quality improvement approach for low quality finger vein image"

In recent years, finger vein authentication technology becomes a new highlight in biometric technology. However, the acquired images are low quality because of near-infrared conditions and different structures in different parts of finger, which will severely impacts identification accuracy of the whole system. Therefore, it is necessary to improve the quality of images. In this paper, an effective approach for improving the quality of images is proposed. At first, edge-preserving filter is used for denoising, and then the small blurred finger vein textures are enhanced by elliptic highpass filter. Finally, histogram equalization enhances the contrast of images. The experimental images and estimation results show that the finger vein images become much clearer than original ones, and prove the proposed approach is efficient to improve the quality of images. [C1]

"Determination of gas leakage rate of gis-test systems by measurement of pressure and temperature"

Potential leakage of SF6gas in encapsulated switchgear can lead to larger outages of substations. Therefore effective SF6monitoring is necessary in to guarantee a certain level of reliability and to address growing environmental awareness. In order to analyze the switchgear condition, the detection of very small leakage rates is required. As broadly published, the measurement of gas density in SF6switchgear is superimposed by substantial fluctuation over the time. The fluctuation originates from non uniform and time-varying temperature distribution. In order to reduce the level of fluctuation in the measured signal, a two level model has been introduced and published in the past. The model is based on a thermal network which calculates the temperature distribution along the surface of the vessel. In a second step this model calculates either the gas pressure by means of an averaging algorithm or the gas density distribution by computational fluid dynamics (CFD). The combination of both models allows the prediction of pressure or density fluctuation at a certain position in the gas. The current paper shows recent development of a measurement system with special emphasis on practical applications. First practical experiences and results are carried out. [C2]

"New feature-based detection of blood vessels and exudates in color fundus images"

Exudates are one of the earliest and most prevalent symptoms of diseases leading to blindness such as diabetic retinopathy and wet macular degeneration. Certain areas of the retina with such conditions are to be photocoagulated by laser to stop the disease progress and prevent blindness. Outlining these areas is dependent on outlining the exudates, the blood vessels, the optic disc and the macula and the region between them. The earlier the detection of exudates in fundus images, the stronger the kept sight level. So, early detection of exudates in fundus images is of great importance for early diagnosis and proper treatment. In this paper, we provide a feature-based method for early detection of exudates. The method is based on segmenting all objects that have contrast with the background including the exudates. The exudates could then be extracted after eliminating the other objects from the image. We proposed a new method for extracting the blood vessel tree based on simple morphological operations. The circular structure of the optic disc is obtained using Hough transform. The regions representing the blood vessel tree and the optic disc are set to zero in the segmented image to get an initial estimate of exudates. The final estimation of exudates are obtained by morphological reconstruction. This method is shown to be promising as we can detect the very small areas of exudates. [C3]

"A 3D segmentation method of lung parenchyma based on CT image sequences"

Three dimensional (3D) pulmonary parenchyma segmentation is an indispensable step in CAD (Computer-Aided Detection) that used for pulmonary nodule detection based on CT images. In this paper, we proposed a simple and effective 3D lung parenchyma segmentation method, which combined the adaptive threshold, connected regional labeling and morphological operations. The method has four main steps. Firstly, the CT sequences images were binarized. Secondly, the lung parenchyma is extracted from the CT images by 3D connected component labeling. And then, the trachea is removed by 3D region growing. Finally, a sequence of

morphological operations is used to smooth the boundaries and fill the holes caused by small vessels, nodules and trachea/bronchus. Using our method to segment 20 group lung CT clinical data, the average segmentation accuracy is 91.55%, and the average time-consuming to deal with a single group data is 167.4563s(about 0.6 second for processing a single slice). The experimental results showed that this method can automatically and quickly segments the lung parenchyma, and which formed the basis for the follow-up pulmonary nodules computer-aided detection technology study. [C4]

"Underwater acoustic sensor localization using a broadband sound source in uniform linear motion"

Acoustic sensors deployed on the sea floor can be localized using a broadband sound source travelling along a linear trajectory at a constant velocity and a constant depth below the sea surface. The absolute positions (X- and Y-coordinates) of the sensors are estimated in two steps, assuming that the XY-plane coincides with the (flat) sea surface. First, a local Cartesian x-y coordinate system is set up in such a way that, when the sensors and the moving source are projected onto the local xy-plane, its origin coincides with the projection of one of the sensors (called the reference sensor) and the x-axis is parallel to the projection of the source's linear trajectory which intersects the positive y-axis. The projection of the source trajectory onto the xy-plane is described by three motion parameters: the source speed together with the time and horizontal range at which the source is at the closest point of approach (CPA) to the reference sensor. The relative positions (x- and y-coordinates) of all other sensors, along with the three motion parameters, are estimated by measuring the temporal variation of the differential time-of-arrival (DTOA) of the signal emitted by the moving source at each pair of sensors and then minimizing the sum of the squared deviations of the noisy DTOA estimates from their predicted values over a sufficiently long period of time for all pairs of sensors. This relative position estimation assumes a priori knowledge of the source depth, the sensor depths and the side (either left or right) on which the source transits past the reference sensor. In the second step, the relative position estimate of each sensor is converted into an absolute position estimate by rotating the x- and y-axes by an angle equal to the source bearing at CPA, followed by a translational displacement determined by the absolute position of the reference sensor. The source bearing at CPA can be estimated if either the direction of travel of the source or the absolute-- position of another sensor is known. It can also be derived together with the absolute position of the reference sensor if the absolute position of the moving source is known as a function of time (e.g. from a GPS receiver attached to the source). The proposed sensor localization method is applied to real acoustic data recorded in a shallow water experiment where a small vessel travelled at a constant speed (at zero depth) past a wide-aperture linear horizontal array of eight hydrophones mounted 1 m above the sea bed. Assuming that the absolute positions of two of the sensors are known, the effectiveness of the method is verified by comparing the estimated absolute positions of the other six sensors with their nominal values. [C5]

"Serial nonrigid vascular registration using weighted normalized mutual information"

Vascular registration is a challenging problem with many potential applications. However, registering vessels accurately is difficult as they often occupy a small portion of the image and their relative motion/deformation is swamped by the displacements seen in large organs such as the heart and the liver. Our registration method uses a vessel detection algorithm to generate a vesselness image (probability of having a vessel at any given voxel) which is used to construct a weighting factor that is used to modify the intensity metric to give preference to vascular structures while maintaining the larger context. Therefore, our proposing method uses fully data-driven calculated weights and needs no prior knowledge for the weight calculation. We applied our method to the registration of serial MRI lamb images obtained from studies on tissue engineered vascular grafts and demonstrate encouraging performance as compared to non-weighted registration methods. [C6]

"In vivo imaging of microvasculature using optical coherence tomography"

In vivo imaging technologies drive the development of improved cancer therapies by revealing critical aspects of the complex pathophysiology of solid tumors in small animal models. The abnormal vascular function, which predicts tumor malignant potential and presents broad barriers to effective treatment, has been studied at the subcellular size scale using multiphoton (MP) microscopy, and at significantly larger size scales using ultrasound, Г‚ВїCT and Г‚ВїMRI. However, limited in vivo imaging approaches exist to study the vascular function at the network level, i.e., with sufficient resolution to discern smaller vessels while maintaining a field of view and penetration depth large enough to reveal interconnectivity and inhomogeneities across the tumor and surrounding tissue. One promising technology operating at this size scale is optical frequency domain imaging (OFDI) using Doppler-methods to detect blood flow. [C7]

"Passive bistatic WiMAX radar for marine surveillance"

In this study we investigate the feasibility of using passive bistatic radar to exploit WiMAX communication signals

as transmitters of opportunity for marine surveillance. The range and Doppler characteristics of such a system are first assessed through ambiguity function analysis on a typical set of WiMAX data transmission waveforms. Theoretical simulations are then used to investigate the ability of passive WiMAX radar for detecting marine vessels within three busy shipping areas in the UK, and in the presence of noise and interference signals. The initial analysis shows a range resolution of 5.6 m is achievable. Additionally, the simulations demonstrate specific scenarios where WiMAX radar may be used as a low cost surveillance device for detecting both small and large marine vessels in port areas and open waters. [C8]

"Method of detecting kink-bearing vessels in a retinal fundus image"

Glaucoma is the second leading cause of blindness worldwide. The risk of glaucoma can be determined by calculating the cup to disc ratio in retinal fundus images. To accurately detect the optic cup, kinks or bends in small and medium vessels are important indicators of the cup boundary. In this paper, we present a method of detecting such vessels, through the extraction of patches and generation of hybrid features in a SVM-based model. The segmentation results show good potential for the further development of this method. [C9]

"Automated localization of macula-fovea area on retina images using blood vessel network topology"

In this paper, we propose a simple yet robust unsupervised algorithm for automated localization of macula-fovea area on retina images. The small sizes and weak contrast of the macula-fovea area on retina images make it unreliable to detect it directly. As such, we extract the retina blood vessel network topology based on local energy function of blood vessel widths and densities and use it as the main image cue to position the macula-fovea area. Regardless of the severity of most retinal diseases as well as variations in field clarity, the high level topology of the retinal blood vessel flows remains fairly predictable. Compared with conventional algorithms, our method can effectively localize the macula-fovea area on retina images with inadequate field clarity and diseased conditions. The algorithm is tested on both STARE and DRIVE retina image databases and gained satisfactory detection results. [C10]

"Towards a passive acoustic underwater system for protecting harbours against intruders"

The international rules for the protection of harbors against threats and intruders typically apply to threats emanating from the land side. Protection against actions and threats from the water side is much less regulated, apart from some individual cases. Potential threats from the water side may consist of intruders including divers with and without delivery vehicles, swimmers, small submarines, small vessels or unmanned underwater vehicles. To increase the level of readiness against underwater threats in harbors, the Netherlands Organization for Applied Scientific Research (TNO) and the Stevens Institute of Technology have recently combined their long-standing expertise on observation systems and sonar technology and are developing an integrated system that can be used to protect harbors from both surface and underwater intruders. In the fall of 2010, TNO and Stevens will initiate joint experiments in a harbour in The Netherlands, where passive acoustic systems from both parties will be combined. In this paper, potential performance of the experimental system is illustrated via simulations. Initial experimental results will be presented at the conference. [C11]

"Concurrent use of satellite imaging and passive acoustics for maritime domain awareness"

The research being conducted in the Center for Secure and Resilient Maritime Commerce (CSR), a DHS National Center of Excellence for Port Security examines some basic science issues and emerging technologies to improve the security of ports and inland waterways, as well as coastal and offshore operations. This research follows a layered approach utilizing above water and underwater surveillance techniques. The investigated layers include satellite-based wide area surveillance; HF Radar systems providing over-the-horizon monitoring; and nearshore and harbor passive acoustic surveillance. Integration of these systems is aimed at achieving vessel detection, classification, identification, and tracking. In this paper, we present the results of sea tests where satellite imagery was combined with concurrent passive acoustic surveillance. The wide area sensing was provided by the University of Miami CSTARS facility's electro-optical (EO) and synthetic aperture radar (SAR) satellite imaging capabilities. Satellites detected the ships using a panchromatic EO sensor FormoSat-2 and SAR from the COSMO-SkyMed constellation. The Stevens Passive Acoustic System was used for detecting sound produced by the same ships that were detected by satellites. Concurrent Satellite-Acoustic measurements provide the following advantages: 1. Increasing the probability of small vessel detection and decreasing false alarms. 2. The joint systems can provide redundant detection and classification in conditions where one of the systems fails. For example, EO satellite imaging does not work at night and in fog and cloudy conditions while acoustic detection has limits during stormy weather due to ambient noise. SAR imaging can detect vessels in all weather, but provides less detail about a specific vessel. 3. Acoustics can provide target classification and

bearing and satellites can give target localization and heading. SAR data can be used to estimate vessel speed in some cases. 4. Satelli--te imaging is helpful for the acoustic detection of an underwater target in cases when satellite information allows separation of surface and underwater targets. 5. Joint measurements provide more data (information) for target classification. Several tests were conducted in New York Harbor, where the satellite images and acoustic signatures of the same boats were recorded. The satellite registered a number of small boats. The small boats were acoustically detected at distances up to 4 km and the signal generated by a passenger ferry was observed at a distance up to 7 km. [C12]

"Robust layer-based boat detection and multi-target-tracking in maritime environments"

In this paper we present a robust solution to detect and track small and distant boats from thermal images captured by a camera mounted on an autonomous platform (buoy or patrol vessel). It is characterized by a multiple-layer and multiple-algorithm architecture, which uses a combination of algorithms relying on complementary image cues to generate detections that are robust with respect to variations of boat appearance, image quality, and environmental conditions. The core component of the image exploitation is a detection layer which provides the results of several detection algorithms in a motion-stabilized scene coordinate frame aligned with the estimated horizon line. In the autonomous system, detections are used to trigger alarms and to facilitate multi-target tracking. [C13]

"CUwPS: An integrated system for the detection, localization, and classification of underwater threats"

The Canadian Underwater Protection System (CUwPS) is an integrated system that provides means to detect, localize, classify, and then warn underwater threats, with the purpose of preventing attacks on vessels berthed at anchor or alongside. The primary sensors of the system are commercial-off-the-shelf (COTS) and are integrated into a workable set of equipment and concepts with specific adaptations to military platforms. CUwPS utilizes an area detection sensor which can detect and track underwater targets, in an area where protection is desired. In order to further scrutinize contacts and tracks deemed to be potential threats, Response Boats-small, fast and agile crafts-are dispatched and responsible for identification using a high resolution imaging type sonar. If a target is classified as a threat, underwater loudhailers can be used to transmit warnings and messages. Software was written to integrate the data from all the individual sensors of the CUwPS. This paper details the components of the CUwPS, explains its concept of operations, and details the fourth and final build trial, in which the system was used in Port Guard, a Canadian Forces exercise. CUwPS was tasked to protect assets berthed alongside a jetty at Canadian Forces Base Halifax, home port to the Canadian Atlantic Fleet. Throughout the course of the exercise, military divers simulated threats attempting to penetrate undetected into a protected area. [C14]

"Net based waterside security applications: From small solutions to maritime security networks"

The protection of military harbours is a complex task. A force protection system integrates several sensors and databases for ashore and waterside surveillance: • passive sensors (acoustic, magnetic, CCTV, IR, FO fence) • active sensors (Radar, Diver Detection Sonar) • remote / autonomous vehicles for inspection and surveillance • chart database • information database Additionally a network-based waterside security application should integrate several additional sources and services e.g.: • WEB based Automatic Identification System (AIS) • Satellite based AIS • Access to online databases e.g. weather information, ship register data • C4I data e.g. MCCIS (NATO C4I system) or JoCIS (EADS export C4I system) Also, new technical possibilities of modern multi touch HMI approaches and aspects of user centric man machine interface design will be discussed. [C15]

"The study of pre-processing method of brain vessel segmentation based on parameterized statistical model"

For the 3D brain MRI parameterized statistical model segmentation method, the pre-processing method of brain image is brought forward for the model. First the DWM(directional weighted median) filter and Gaussian template are used to de-noise the brain MRI image. Then the Laplacian operator is used to sharpen the image, and the Robert operator is used to realize the edge detection, which can improve the measurement accuracy. And the MIP (maximum intensity projection) algorithm is applied to extract the largest connected component. The image of only brain vessel and part brain tissue can be obtained and the influence of background and no brain vessels like tissue to the images is eliminate. After pre-processing stage, the brain image is analyzed as the input to the parameterized statistical model. The small branches of the brain vessel can be segmented. [C16]

"Automated detection and classification of pulmonary nodules in 3D thoracic CT images"

Computer-aided diagnosis (CAD) systems for recognition of pulmonary nodules are of great importance for early diagnosis of lung cancer. In this paper, we propose a CAD system for automated detection and classification of pulmonary nodules in 3D computerized-tomography (CT) images. First, we segment lung parenchyma from the CT data using a thresholding method. Afterwards, we apply Gaussian filters for noise reduction and nodule enhancement. Then, we use intensity and volumetric shape Index (SI) for detecting suspicious nodule candidates that include both nodules and vessels. Besides, by using SI, we can recognize nodules that are attached to vessels, pleural wall or mediastinal surface. Next, features such as sphericity, mean and variance of the gray level, elongation and border variation of potential nodules are extracted to classify detected nodules to malignant and benign groups. Fuzzy KNN is employed to classify potential nodules as non-nodule or nodule with different degree of malignancy. To assess our proposed method, 63 thoracic CT scans, from the Lung Image Database Consortium (LIDC), are recruited. Our method achieved sensitivity of 88% for nodule detection with approximately 10.3 False-Positive (FP)/subject; also the achieved classification of nodules is concordant with radiologists' opinion. Considering nodules of small size, as well as those with irregular shape, the results of nodule detection and classification are reasonable. [C17]

"A system trade model for the monitoring of coastal vessels using HF surface wave radar and ship automatic identification systems (AIS)"

Coastal nations have an interest in maritime domain awareness for applications in national security, coastal conservancy, fishery and stewardship of the exclusive economic zones (EEZs) along their coastlines. Using our previously developed HF radar and AIS ship detection models we find signal to noise ratio (SNR) as a function of range, including ducted propagation for the AIS radio signals. We use these SNR estimates to find probability of detection Pdand then explore multiple systems and stations at variable spacings along the coast. Our example HF radar has significant power and aperture, similar to the Pisces radar. The AIS model is for high power (12.5 W) AIS and a significantly elevated receiver (≈ 250 ft asl). A combined system of HF radar and AIS shows good capability (Pd> 0.9) to ranges of ≈ 125 km for small ships and to 200 km for large ships. Considering a system of sites separated by 100 km we find that a Pdof > 0.9 can be maintained to a distance off shore of 130 km even for small, 120 ton, ships. [C18]

"Detection of small gas bubble using ultrasonic transmission-mode tomography system"

This paper presents the development of an ultrasonic transmission-mode tomography system for the detection of small gas bubble using higher frequency ultrasonic sensors. The selection of the sensors is important and must be suitable to the application design. Consideration on the natural limitation of ultrasonic wave is also noted as the higher the frequency of the ultrasonic transducer, the better the sensitivity but lower penetration depth. 16-pairs of these ultrasonic sensors are installed and fixed inside a sensor jig which is designed to hold all the sensors. The sensor jig is also mounted on the circumference of a vertical column which will be used as the investigated process vessel. The developments presented also include the non-invasive fabrication techniques, the electronic measurement circuits, image reconstruction technique, and finally on the imaging results of the proposed system. [C19]

"Passive acoustic sensing for detection of small vessels"

This paper investigates the system requirements and signal processing tools for a semi-autonomous passive acoustic boat detection framework for monitoring marine environments. The objective is to develop a surveillance system which provides wide area coverage, automatic (boat) detection, and ultimately the ability to communicate real-time alerts (i.e., a bell-ringer system). A critical challenge for a successful system is the ability to accurately detect (and possibly classify) targets in the presence of noise. A wavelet detection algorithm has been developed to identify the presence of a boat in acoustic signals overwhelmed by noise from snapping shrimp and humpback whales. A feature extraction tool is introduced to examine the harmonically related structures in shipping noise. These methods are applied on acoustic data collected in a series of field tests in Hawaii, in which small-scale sensor networks were deployed near Marine Protected Areas (MPA) to assess the ability to monitor boat activity. A simulation tool developed based on Bellhop is introduced to study boat signatures under different environmental conditions. [C20]

"Utilization of ASAR wave mode data for shipping safety"

Safety of shipping is a growing concern. The causes of shipping casualties are various, while over 30% of the casualties are due to bad weather. Heavy sea state and severe weather conditions have caused the loss of more than 200 large cargo vessels within 20 years between 1981 and 2000. Remote sensing techniques, particularly the active microwave radar provides global sea surface observations for detecting heavy sea state and bad weather independent of clouds and sunlight and therefore it can contribute to shipping safety. A dataset of

synthetic aperture radar (SAR) images spans nearly two decades since the launch of ERS-1 in 1991 for operational observations. When no other operations are requested, ERS-1, 2 SAR and ENVISAT ASAR can collect data as small images of 10 km times 5 km size every 200 km or 100 km along the satellite's orbit. This kind of data is called SAR wave mode data and can be acquired continuously and globally over the sea surface. Using the integral wave parameters derived from SAR wave mode data, global sea state statistics can be carried out. In the present paper, significant wave height and zero upcrossing wave periods derived from ASAR wave mode data using the CWAVEENV empirical algorithm are compiled into a global wave atlas. Wave steepness is a crucial parameter for shipping safety. By using integral wave parameters derived from ASAR wave mode data, wave steepness is calculated and compiled to the global wave atlas as well. [C21]

"Automatic Segmentation of Hepatic Vessels in Abdominal MDCT Image"

Hepatic vessel trees are the key structures for hepatic disease diagnosis and liver surgery planning. They are especially useful in estimating the volumes of the left and right hepatic lobes, integral for maximizing the safety of the donor and the recipient during a living donors liver transplantation (LDLT). In this paper, we propose the following steps for the automated segmentation of hepatic vessel trees in contrast abdominal MDCT images: (1) canny edge detection for ascertaining the location of the hepatic vessel, (2) extraction of hepatic vessel candidates by threshold filtering around the detected edge, (3) addition of true negatives, defined as hepatic vessel pixels-except for the extracted vessels, as the brightness of these pixels is less than the threshold, according to the pre and post section connections, and (4) removal of false positives, defined as small connected regions smaller than 9 voxels without connections to pre or post sections. The proposed method correctly segments the hepatic vessel regions. [C22]

"A fibre-optic catheter-tip force sensor with MRI compatibility: A feasibility study"

This paper presents the development of a low-cost, Magnetic Resonance Imaging (MRI) compatible fibre-optic sensor for integration with catheters allowing the detection of contact forces between blood vessel walls and the catheter tip. Three plastic optical-fibres are aligned inside a plastic catheter in a circular pattern. A reflector is attached to a separate small part of the catheter tip, which is connected with a small deformable material to the aligned optical-fibres. In this manner a force at the catheter tip leads to a deformation of the elastic material and thus a modulation of the light yields, this is sent and received through the optical-fibres. An electronic circuit amplifies the retrieved light signal and the output voltage is used to classify the forces on the tip. The materials used are of the shelf and have a low magnetic susceptibility making this sensor fully MRI-compatible and inexpensive. Preliminary, experimental results demonstrated good force linearity in static loading and unloading conditions. The sensor was also tested in an artificial blood artery showing good dynamic response. [C23]

"Image processing and machine learning for diagnostic analysis of microcirculation"

This study focuses on detection of capillaries and small blood vessels in the videos recorded from the lingual surface using Microscan SDF system. The purpose of this study is to quantitatively monitor and assess the changes that occur in microcirculation during resuscitation period. The results assist physicians in making diagnostically and therapeutically important decisions such as determination of the effectiveness of the resuscitation process. The proposed algorithm applies advanced digital image processing methods to provide quantitative assessment of video signals for detection and characterization of capillaries. The objective of the algorithm is to segment capillaries, estimate the presence and velocity of Red Blood Cells (RBCs), and identify the distribution of blood flow in capillaries for a variety of normal and abnormal cases. The algorithm first, stabilizes each frame to follow the variations in the consecutive frames. Then, time-averaging techniques are applied to the frames to reduce the motion artifact. Histogram equalization, wavelet transform, and median filtering are the subsequent steps applied to accurately detect the blood vessels in each frame. In order to estimate the velocity of RBCs, space time diagrams are obtained through cross-correlation calculations. This study aims to reduce the human interaction as well as the computation time. [C24]

"GIS-enabled maritime awareness system (GMAS)"

Being aware of maritime activities is important for homeland security. We have worked with the US Coast Guard to develop a waterway visual surveillance system on Elba Island, in Savannah, GA for maritime awareness. With the system, we developed an enhanced temporal difference algorithm based on active zone (ETD-AZ) to detect waterway moving objects, including container ships, commercial vessels, small vessels, sailboats, tugboats, and dolphins, etc. In the algorithm, active zone is first defined to model the imaging locations of moving objects that appear in the waterway; the model reduces noises caused by winds, clouds, and waves in the near-view fields. A thresholded difference map is computed by using temporal difference and thresholding methods. The thresholded difference map is further processed by applying morphological operations to remove noises. A final

decision rule is derived to decide whether an image contains moving objects or not based on motion pixels in thresholded difference map and in the difference map after morphological operation. The proposed ETD-AZ algorithm has been tested using 21, 844 night and day images taken from Aug. 1-2, 2008, in different weather conditions: sunny, cloudy, windy, stormy with lightening, etc. The algorithm detected 89 of 94 waterway moving objects with 5.3% false negative rate while maintaining a low false positive rate of 4.0% for a total of 21, 478 non-object images. When focusing only on vessels, it detected 78 of 79 moving vessels with a 1.3% false negative rate. [C25]

"Identification of the small-scale x-ray perturbations during magnetic reconnection in the T-10 tokamak plasma"

Analysis of the magnetic reconnection is one of the key elements in studies of the fast evolution of magnetic structures in variety of astrophysics phenomena and laboratory plasmas. In high temperature collisionless plasma magnetic reconnection can be facilitated by small-scale magnetic perturbations generated inside the reconnection layer around X-points of the magnetic islands. Present paper considers possible mechanisms of the small-scale plasma perturbations and represents detailed description of the diagnostic techniques used for identification of the perturbations in the T- 10 tokamak (R=1.5m, a=0.3m). The small-scale plasma perturbations are identified in the T-10 tokamak using Si surface barrier detectors with enhanced spatial and temporal resolution (dr~3-5mm, and dt~ 300 ns, accordingly), 3D X-ray tomographic arrays based on multi-wire gas detectors, AXUV detectors, and fast magnetic probe placed at the movable rod positioned close to the plasma surface. Simultaneous measurements of the nonthermal electrons (20-200keV) generated during the reconnection are provided by 2D CdTe tomographic arrays (10 vertical and 6 horizontal detectors), Ge PHA spectrometer, and miniature in-vessel X-ray spectrometer based on CdTe detector with movable 2D Soller collimators. Initial experiments have indicated generation of the small- scale X-ray perturbations in frequency range 150-300 kHz during fast stage of the magnetic reconnection during sawtooth collapse. The perturbations appear as bursts at multiple frequencies, which can indicate possible role of the nonlinear interaction of the MHD modes. Another type of the high-frequency perturbations (~300 kHz) are observed during minor disruptions in plasma with relatively low density. Perturbations in the case are accompanied by bursts of the nonthermal X-ray radiation, which can indicate possible connection of the perturbations with the nonthermal electrons. [C26]

"Acoustic detection of motor vessel signals in very shallow water"

A number of security threats and interdiction problems in shallow waterways and the very shallow littorals involve small vessels, which offer difficult detection problems. In water depths on the order of a wavelength, sound propagates with considerable involvement of the bottom, whose bulk and shear moduli, as well as velocities and attenuation vary with depth into the sediment. This problem has been studied with a two dimensional finite-element code, to illustrate the consequences of computational assumptions pertinent to these parameters and their gradients with depth into the sediment. Both time harmonic (steady state) and transient (animated pulse) sequences are treated in two dimensional depictions. [C27]

"Non-invasive localization and quantification of graded ischemia using Electromechanical Wave Imaging in vivo"

Electromechanical Wave Imaging (EWI) has recently been introduced as a non-invasive, ultrasound-based imaging modality, which could map the electrical activation of the heart in various echocardiographic planes in mice, dogs and humans in vivo. By acquiring radio-frequency (RF) frames at very high frame rates (390-520Hz), the onset of small, localized, transient deformations resulting from the electrical activation of the heart, i.e., generating the electromechanical wave (EMW), can be mapped. The correlation between the EMW and the electrical activation speed and pacing scheme has previously been reported. In this study, we pursue the development of EWI and analysis of the EMW properties in dogs in vivo for early detection of ischemia. EWI was performed in normal and ischemic open-chested dogs during sinus rhythm. Ischemia of increasing severity was obtained by gradually occluding the left-anterior descending (LAD) coronary artery. EWI was shown to be sensitive to the presence of intermediate ischemia. EWI localized the ischemic region when the LAD was occluded at 60% and beyond and was capable of mapping the increase of the ischemic region size as the LAD occlusion level increased. Those results indicate that EWI could be used to assess electrical conduction properties of the myocardium, and detect ischemic onset and disease progression entirely non-invasively. [C28]

"3D elasticity imaging on an open-chest dog heart"

Myocardial ischemia and infarction alter myocardial viability and contractility. We have hypothesized that contractility changes can be detected by ultrasound strain imaging. Current ultrasound strain imaging methods are mainly 1D and 2D. However, heart motion is complex and 3D. Previous studies showed that 3D speckle

tracking on a left ventricular (LV) phantom and a 3D LV simulation reduced low dimensional tracking error. Before applying this method clinically, 3D speckle tracking was tested using 3D RF data acquired with a commercial 3D scanner (iE33, Philips, Andover, MA) on an openchest dog heart. Image data were recorded before and after occlusion of the left anterior descending (LAD) coronary artery to detect acute ischemia induced by this occlusion. Following a local animal protocol, 3D RF volume data were acquired on an open-chest dog heart using a commercial 2D phased array (X7-2, Philips, Andover, MA) placed in front of the anterior wall of the left-ventricle with a small water stand-off. The LAD artery was occluded to produce acute ischemia. Data acquisition before and after occlusion includes 52 volumes/cycle and 46 volumes/cycle (frame rate = 77 Hz), respectively. Each data volume covered 77.5 degrees in the azimuthal direction, 70 degrees in the zenithal direction, and 6.5 cm in depth (anterior wall) at a transmit frequency of 3.8 MHz. 3D speckle tracking was applied to estimate strain with tracking resolution of 1 mm in the axial direction and 7 mm in azimuthal and zenithal directions. Frame-to-frame tracking results were accumulated referenced to the heart geometry at the end of diastole. 3D speckle tracking successfully estimated the displacement in three directions. Radial strains at the end of systole derived from accumulated 3D displacements referenced to the end of diastole in the zoomed region detected abnormal wall thinning due to LAD occlusion. Unlike 1D or 2D methods, 3D speckle tracking can estimate 3D motion and reduce low dimensional trac- king error for 3D complex cardiac motion, as suggested in our previous studies. By accounting for out-of-plane motion, strain imaging using 3D tracking may allow more accurate detection of abnormal myocardial deformation associated with myocardial ischemia or infarction. [C29]

"Evaluation of retinal vessel segmentation methods for microaneurysms detection"

Microaneurysms (MAs) are the earliest sign of diabetic retinopathy and manifest as small reddish spots on the retina. Generally, algorithm design for MAs detection starts by separating the vascular system from the background for a posterior analysis of candidate MAs presence. Following this approach, this paper assesses three different methods for vessel segmentation and how they affect posterior MAs detection. The robustness in developing automatic screening systems for MAs detection is discussed and a methodology to detect candidate MAs in retinal images is introduced. The algorithm combines different vessel segmentation methods with region growing to evaluate which is the best to provide candidate MAs detection. [C30]

"Enhancement of optic cup detection from ARGALI using key points"

We propose a method for improving the accuracy of the optic cup detected from the ARGALI system. This method makes use of key points from the branching points of large vessels, the analysis of intensity variation and kinks from small vessels to obtain an enhanced optic cup. Measures used to assess the detection of the optic cup showed an 11% and 40% improvement in the mean average overlap and relative area difference respectively over the previous method. The difference in the CDR error was also shown to be reduced to less than 0.1CDR units. The improved optic cup detection is more consistent with the clinical ground truth, facilitating its use in ARGALI for mass screening for glaucoma for early detection to save sight. [C31]

"Using HF surface wave radar and the ship Automatic Identification System (AIS) to monitor coastal vessels"

We compare the ship detection capabilities of the automatic identification system AIS (installed on some ships) and coastal, surface wave HF radars, showing how to use both systems together to enhance ship detection performance in coastal regions. Practical reasons to want better real-time awareness of the location, velocity and type of vessels along coasts include vessel safety, protection of the coastal environment and national security. Our model for the HF radar aspect uses an example radar with significant power and aperture, similar to the Pisces radar. The AIS model is for the high power (12.5 W) AIS unit and a significantly elevated receiver (~ 250 ft asl). The HF system show good capability to ranges of ~ 150 km for small ships to 250 km for large ships. The AIS system shows excellent capability out to a typical horizon of ~ 50 km with irregular coverage beyond using ducted propagation to several hundred km and more. Use of both systems allows monitoring of both AIS and non-AIS equipped ships and enhances probability of detection for situations where both systems are functional. [C32]

"Hyperspectral imaging and diagnosis of intestinal ischemia"

Intestinal ischemia results from a variety of disorders that cause insufficient blood flow to the intestine. The type and prognosis of ischemic injury depends on the blood vessels involved, the underlying medical condition, and the swiftness with which the problem is brought to medical attention for diagnosis and treatment. Hyperspectral imaging has developed as a compact imaging and spectroscopic tool that can he used for different applications including medical diagnostics. In this paper, the application of hyperspectral imaging as a visual supporting tool to detect the intestinal ischemia during surgeries is evaluated. It will he useful for rapid diagnosing tissue

abnormalities. The images are captured using an infrared hyperspectral camera (900-1700m). Using hyperspectral images, the spectral signatures for normal intestine, clamped ischemic intestine and other abdominal organs are created. The high-dimensional data are compressed using wavelet transform and classified using support vector machine (SVM). The performance of this method is evaluated for detection of ischemic intestine in an abdominal surgery on a pig. The criteria to evaluate performance are based on false negative rate (FNR) and false positive rate (FPR). This technique is able to detect ischemic intestine with a small FPR and FNR. [C33]

"Microangiography system for investigation of metabolic syndrome in rat model using synchrotron radiation"

Metabolic syndrome refers to a clustering of cardiovascular disease risk factors. We investigated the characteristics of vascular endothelial function in coronary arteries of rats using a microangiography technique. For this study, we developed a microangiography system using a real-time imaging system and a third generation synchrotron radiation source at SPring-8. An X-ray direct-conversion type detector with 6-μm spatial resolution was used for real-time biomedical imaging. For synchrotron radiation radiography, a long source-to-object distance and a small source spot can produce high-resolution images. Microangiographic images were obtained without image blurring and were stored in a digital frame memory system at a maximum speed of 30 frame/s with a 1024 Ч 1024-pixel, 10-bit format. The vasorelaxation response in the coronary arteries was determined using coronary microangiography of ex vivo beating hearts for evaluating vascular endothelial dysfunction in metabolic syndrome. In imaging experiments, the small coronary arteries were visualized after iodine contrast agent injection into the coronary artery. We assessed the magnitude of coronary artery vasorelaxation before and after administration of drugs that modulate endothelial control of the coronary arteries in the rat model. [C34]

"Tracking of Blood Vessels in Retinal Images Using Kalman Filter"

We present an automatic method to segment the blood vessels in retinal images. Our method is based on tracking the center of the vessels using the Kalman filter. We define a linear model to track the blood vessels, suitable for both the detection of wide and thin vessels in noisy images. The estimation of the next state is computed by using gradient information, histogram of the orientations and the expected structure of a vessel. Seed points are detected by a set of matched filters in different widths and orientations. Tracking is carried out for all detected seed points, however we retrace the segmentation for seeds with small confidence. Our algorithm also handles branching points by proceeding in the previous moving direction when no dominant gradient information is available. The method is tested on the public DRIVE database and shows good results with a low false positive rate. [C35]

"Filtering, segmentation and region classification by hyperspectral mathematical morphology of DCE-MRI series for angiogenesis imaging"

Segmenting dynamic contrast enhanced-MRI series of small animal, which are intrinsically noisy and low contrasted images with low resolution, is the aim of this paper. To do this, a segmentation method taking into account the temporal (spectral) and spatial information is presented on several series. The idea is to start from a temporal classification, and to build a probability density function of contours conditionally to this classification. Then, this function is segmented to find potentially tumorous areas. The method is presented on several series after a range normalization histogram in order to compare the series. [C36]

"Locally adaptive fuzzy pulmonary vessel segmentation in contrast enhanced CT data"

Pulmonary vascular tree segmentation is the fundamental basis for different applications, such as the detection and visualization of pulmonary emboli (PE). Such an application requires an accurate and reliable segmentation of pulmonary vessels with varying diameters. We present a novel fuzzy approach to pulmonary vessel segmentation in contrast enhanced computed tomography (CT) data that considers a radius estimate of the current vessel to adapt the segmentation parameters. Hence, our method allows to capture even vessels with small diameters while suppressing leakage into surrounding structures in close proximity of vessels with large diameters. The method has been evaluated on different chest CT scans of patients referred for PE and demonstrates promising results. For quantitative validation, randomly selected sub-volumes that have been semi-automatically segmented by a medical expert have been used as reference to compare the locally adaptive method against the same method with global parameters. [C37]

"Small retinal vessel extraction using modified Canny edge detection"

This paper presents a modified Canny edge detector to detect retinal blood vessels especially small vessels. The detector is designed as a local dynamic hysteresis thresholding value generator based on Canny edge detector. It adapts knowledge of the location of major vessels to define a small neighborhood and generate the local hysteresis threshold values to detect meaningful edges especially the edges of small blood vessels that may be missing using Canny edge detector alone. The effectiveness of the modified Canny edge detector is demonstrated by the preliminary experimental results obtained with the proposed method. A comparative test is also presented to highlight the performance differences between the modified Canny edge detector with origin Canny edge detector. [C38]

"Parametric imaging of blood perfusion with low-cost diagnostic ultrasound equipment"

Developments on ultrasound contrast-specific imaging methods make it possible to detect the deep microvessel and evaluate blood perfusion noninvasively. In this study, we attempt to implement the perfusion parametric imaging to quantitatively assess blood perfusion of organs with the low-cost diagnostic ultrasound equipment. A novel ultrasound contrast imaging method called pulse inversion harmonic sum squared differences (PIHSSD) is proposed, which combines pulse inversion harmonic (PIH) method with pulse inversion sum squared differences (PISSD) method. Time-intensity curves (TICs) in each small region of interest (ROI) are gained from a sequence of PIHSSD images. The perfusion parametric images are acquired based on the parameters estimated from TICs. The perfusion parametric imaging was implemented using the modified diagnostic ultrasound equipment with pulse inversion transmit/receive mode. The flow phantom was used to validate the PIHSSD method for the perfusion parametric imaging, and the results suggested that the PIHSSD method can provide 11.9 to 17.5 dB higher contrast-to-tissue ratio (CTR) than PIH method. The experiments of the kidney of the rabbit were performed while keeping the relative position between transducer and organ basically unchanged during the examination. The results also showed that the CTR of PIHSSD images were higher than that of PIH images. The perfusion parametric images of the kidney of the rabbit were obtained including peak intensity (PI), area under curve (AUC), peak intensity time (PIT) and mean transit time (MTT). It was indicated that the parametric images based on PIHSSD method can possess more accurate assessment for blood perfusion. The perfusion parametric imaging method proposed in this paper can be easily realized on low-cost diagnostic ultrasound equipment and has promise to be widely applied clinically. [C39]

"Evolution of a benthic imaging system from a towed camera to an automated habitat characterization system"

After two generations of development, we have an operational and practical digital imaging system that delivers high resolution overlapping still images to a computer system on the bridge of a commercial scallop fishing vessel for immediate viewing, storage, and onboard image processing. This non-invasive imaging system produces 100 nautical mile long optical transects of benthic taxa, communities, and associated substrate each day, and is intended to provide fisheries managers with accurate scallop population density estimates and habitat characterization within surveyed areas of the continental shelf. We call the instrument HabCam for habitat mapping camera system. Joint ship operations with NOAA vessels conducting annual scallop surveys has allowed for nearly direct comparison between estimates of scallop abundance by survey dredge and the HabCam imaging system. For 47 transects conducted jointly during 2007, dredge efficiency ranged from 10 to 80% with a mean of 40% (SD 23.9%) depending on area, substrate, tow direction relative to current, and mean distance between the dredge tow track and the HabCam imaging track. Integration of synoptically collected acoustical (675 kHz sidescan, 175 kHz synthetic aperture side scan and 300 kHz multibeam) and optical imaging has allowed for direct registration and comparison of sampling modalities, ground truthing of acoustical data, and extrapolation of information gained at small scale (1m) but high spatial resolution (1 mm) with optics to large scale (>200 m) acoustical data sets. What was initially developed as a scallop survey tool has become an instrument system capable of providing information on habitat characterization, estimates of megafauna abundance, biodiversity, and species richness. A project called the Northeast Bentho-pelagic Observatory (NEBO) is using HabCam to evaluate these ecological parameters at sentinel study sites along the northeast continental shelf repeatedly over several years with the intent- of documenting mechanistically how and why benthic community composition is changing over time. A key element in the development of HabCam as a tool for habitat characterization is the automated processing of images for color correction, segmentation of foreground targets from sediment and classification of targets to taxonomic category, and in many cases, to species. A test set of images has been developed consisting of about 30,000 images from each of six sites along the northeast continental shelf representing areas differentially impacted by physical, biological and chemical forcing. Each of these 180,000 images has been manually processed for species counts and sizes so as to provide a training set for automated approaches to target classification. All images and data are available on a public website (http://habcam.whoi.edu). [C40]

"Ultrasonic echo detection: Experiments using large beam angle transducers in narrow tubes"

When measuring level in wells or vessels using ultrasonic pulse-echo techniques, carefully positioned, narrow beam angle transducers are usually employed. When it comes to small cross sections, a sufficiently narrow beam transducer is hard to find. That is why the possibility of using large beam angle transducer had been investigated. Experiments were carried out, showing that in certain conditions, neither the beam angle, nor the transducer position is critical. [C41]

"The effects of sea clutter on the performance of HF Surface Wave Radar in ship detection"

This paper presents a study of the effects of sea clutter on the performance of HF surface wave radar (HFSWR), operating in the band between 3 and 5 MHz, in the detection of two classes of ships: large freighters with gross registered tonnage (GRT) in the order of several tens of thousands of tons and small vessels with a GRT of about 1000 tons. The radar returns from both large and small ships are estimated from the measured returns from the Canadian Coast Guard Ship (CCGS) Teleost, based on the differences of their radar cross section (RCS) estimated in [10]. The estimated returns are then extrapolated in range using the propagation attenuation calculated for the sea condition under which the measured returns were obtained. These extrapolated returns were compared with the sea echoes measured from the same radar to assess the detection capability of the radar. The conclusions of the study are that, in the detection of large ships, the radar performance is independent of sea state, but in the detection of small ships, the radar performance is dependent on sea state. It is shown that if a radar employing conventional linear beamforming methods is to maintain the detection capability for the small ships, then the aperture of the receive array cannot be reduced from its current value. [C42]

"Improving reliability of 'Total-Cosine-R-to-T' (TCRT) in patients with acute myocardial Infarction"

The parameter TCRT (total cosine R-to-T) calculated from ECG recording has been shown to have a remarkable prognostic value as a predictor of the outcomes of the coronary artery disease and the acute myocardial infarction (AMI) patients. The TCRT is conventionally calculated using an algorithm produced by Acar et al. (1999). In this study, the reliability of the healthy group (n=25) and the AMI group (n=45). Typical problems occurred in the detection of the maximum of the T vector (9% of patients), the bounding of the R wave (18%), a comprehensive segmentation (11%), and a decreased congruence between TCRT and the spatial QRS-T angle (33%). The results show that small improvements to the basic algorithm can decrease the number of failures up to 82% in AMI data. It is concluded that segmentation properties should be improved in the basic TCRT algorithm in order to maintain the diagnostic value of TCRT in different patient data. [C43]

"Lung uniformization for juxta-pleural nodule detection"

We propose a method for automatic lung juxta-pleural nodule detection in thorax CT images, to be used as a Computer Assisted Detection (CAD) tool by radiologists. It is based on the calculation and automatic analysis of local curvature on the lung surface as extracted from high-resolution CT scans, and exploits uniformization to a sphere (e.g. through conformal mapping) to allow a global view of the lung surface, with marking of high curvature regions which can be suspected of being pleural nodules. Schematically, the tool works as follows. First, lung binary masks are extracted from the image by 3D segmentation of the CT scan. On these masks, pleural nodules appear as small surface concavities of the mask surface. After patching the entrance of vessels into the parenchyma in the hilus pulmonis, the lung frontier Σ is a smooth genus-0 surface. This surface is triangulated and is then uniformized to a sphere Σ'. In this parameterization a suitable function Ψ of the mean and the Gaussian curvatures can be calculated over Σ. Function Ψ is displayed as a colour variation onto both Σ and Σ', so marking regions that represent high-curvature concavities. A threshold on Ψ is then applied and regions of interest (ROIs), containing little concavities with a low radius of curvature (such as pleural nodules), are detected. ROIs are then examined and classified; techniques such as spherical wavelets are available on the sphere, which will be used to distinguish between false and true positives, helping in diagnosing pleural nodules. [C44]

"Sensor Repositioning to Improve Undersea Sensor Field Coverage"

The growing demand for persistent underwater surveillance has led to a need to increase reliance on undersea distributed sensor networks for undersea target detection, classi fication and tracking. While tremendous progress has been made in the technology of small, relatively inexpensive sensors over the last decade, progress has lagged in the areas of sensor allocation and sensor management. How best to deploy and reposition sensors and small, unmanned vehicles (movable sensors) are important research questions that must be addressed to realize the intended use of these technologies. Realistic tactical sensor deployment scenarios do not provide the opportunity for a precise placement of sensors. Most likely, initial deployment will be

somewhat random (e.g., deployment of sensors from a moving vessel). Additionally, sensors might have to be repositioned due to random sensor failure, degradation, drift due to ocean current or other environmental effects. While it is possible, through the use of geometric probability, to estimate of the coverage of randomly distributed sensor fields, optimum field coverage can only be obtained through the use of deterministic sensor positioning procedures. However, the initial randomly distributed sensor field can be used as a starting point for the optimal sensor placement. The same can be said for networks in which sensors have drifted out of position, experienced failures, or have (through random movement or collision) aggregated into clumps. Sensor redeployment might also be necessary due to changes in mission objectives. For example, improved intelligence might necessitate the need to reconfigure the network in order to detect the target of interest. This paper addresses various issues relating to repositioning of sensors in order to improve the coverage of the distributed sensor network. In addition to more traditional assignment algorithms, which minimize the total (equivalently, average) cost for moving all sensors, we conside- r various cost-based assignment techniques that aim to minimize maximal displacement. We argue that for some scenarios, especially small to moderate networks of sensors with limited fuel supply, the minimization of the maximal displacement is preferable to the solution of the more traditional assignment algorithm. The latter often produces results with relatively large costs for at least some of its assignments. This leads to diminished effectiveness over time for the sensor field. Since fuel supply is limited for these unmanned vehicles, we consider assignment procedures that will not deplete the vehicles' resources during the maneuvering phase. Finally, we compare the performance of several algorithms used to minimize the maximal cost associated with repositioning a field of movable sensors. [C45]

"12B-1 Detectability of Small Blood Vessels Using High-Frequency Power Doppler Ultrasound"

Power Doppler imaging of physiological and pathological angiogenesis can be challenging given the presence of small blood vessels and slow flow velocities. Images can be plagued with false-positive color pixels or undetected vessels, thereby complicating the interpretation of vascularity metrics. This paper presents studies of blood vessel detectability using flow phantoms with various combinations of vessel size (160, 200, 250, 300, and 360 mum), flow velocity (4, 3, 2, 1, and 0.5 mm/s), and transducer frequency (30 and 40 MHz), while varying the wall filter cut-off velocity. Receiver operating characteristic (ROC) curves and areas under ROC curves indicate that good vessel detection performance can be achieved with a 40-MHz transducer for flow velocities ges 2 mm/s and with a 30-MHz transducer for flow velocities ges 1 mm/s. [C46]

"10C-5 Identification of Hepatocellular Carcinomas with Contrast Enhanced 40 MHz Ultrasound in Hepatitis B Virus X Protein Transgenic Mice"

Contrast-enhanced ultrasound (CEUS) imaging is a reliable noninvasive clinical method of detecting and characterizing hepatocellular carcinoma (HCC) lesions. In this study, high-frequency (40 MHz) CEUS imaging was applied to small animals. Specifically, high-frequency ultrasound liver imaging with albumin-shelled microbubbles was employed to characterize suspected HCC lesions that developed in five Hepatitis B virus X (HBx) transgenic mice at around 14 to 16 months of age. After injecting the contrast agent, the time-intensity curves (TICs) of suspected HCC lesions, vessels in suspected HCC lesions, and surrounding liver parenchyma tissues were measured for 30 minutes. In four of the five mice, the intensity of the TICs of the suspected HCC lesions was enhanced by a mean of 13.5 dB in the arterial phase (at around 10-30 seconds), with a rapid "washout" starting at the beginning of the portal phase. The peak intensity relative to the baseline also increased from 3.27 dB at 18 months to 23.74 dB at 22 months. On the other hand, the mean contrast between the suspected HCC lesion and the liver parenchyma increased by 6.6 dB, thus allowing clear detection of the HCC margin. Histopathology investigations confirmed the HCC development in these four mice. For the remaining mouse, the absence of the peak in the arterial phase was also consistent with the histopathology finding of dysplasia. These results demonstrated that high-frequency CEUS imaging is an effective preclinical tool for identifying HCC lesions in mice. [C47]

"Technologies for new in situ chemical sensors"

Many of the sampling methods used in oceanographic sciences today date back decades, if not centuries. Although there has been a marked change in how sampling for chemical oceanography is carried out it still relies on taking samples of seawater from a research vessel in most cases. Assessing processes on small timescales as well as transient events requires higher temporal and spatial resolution of measurements; long time series stations require high duration deployments of instruments. Both requirements can only be adequately satisfied by in situ sensors; for the physical parameters off the shelf instruments are available, in the field of chemical oceanography only a few parameters, such as oxygen, are covered by off the shelf instruments that meet the requirements of fast sampling and long deployment times. For most parameters adequate instrumentation only exists in the form of prototypes, if at all. More and more chemical in situ sensors are becoming available commercially but new chemical in situ sensors for a variety of measurands are needed to

gain new insights in how the oceans and the life in it work. The long term challenge is to develop in situ instruments that meet the same stringent precision and accuracy standards that are reached by careful laboratory analysis. In situ instrumentation, however, has to perform the measurements in the real world environment with variations in temperature, salinity, pH and under high ambient pressure. In the near future these standards are unlikely to be met by new in situ chemical sensors. However, even with lower precision and accuracy, chemical sensors with high temporal resolution can provide valuable insights in the dynamics of concentration changes of various measurands and guide the strategy for taking water samples for subsequent analysis in the lab. This paper gives an overview of several technologies that have been used for developments of chemical in situ sensors over the last Ave years and what potential thes- e technologies have for future sensors. The technologies covered are: optical absorption spectroscopy (e.g. for nitrate measurements from the low micromolar to high concentrations); Raman spectroscopy (demonstrated e.g. on polyaromatic hydrocarbons with detection limits (LOD) from ng l-1to mug l-1); microelectrodes (e.g., Cu(II), Pb(II) and Cd(II) with LOD in the pM range); optodes (e.g. for oceanic oxygen measurements with accuracy of 2 muM); in situ mass spectrometry (e.g. dissolved gases, volatile organic compounds (1-5 ppb LOD)) and microelectromechanical (MEMS) analysers (that could be used in situ to measure a variety of analytes with wet-chemical methods). The paper will also evaluate how it can be assured that measurements made with new in situ sensors are consistent with proven lab analysis. [C48]

"The application of sector scanning sonar and multibeam imaging sonar for underwater security"

The underwater domain presents a significant challenge to security. Although land and water surface threats may be mitigated by various conventional means, a reliable methodology of securing the underwater domain becomes increasingly important as threat delivery becomes more sophisticated. Threats to high value marine vessels, waterfront assets, ports and marine passageways may be covertly placed without sophisticated technology. Many means of threat delivery exist that are difficult to control with land and surface based countermeasures. For example, underwater swimmers, small underwater vehicles (manned and unmanned) and uncontrolled surface craft with apparently benign intentions may place a threat into a sensitive underwater area with immediate or future consequences. Once a threat is placed, it is extremely difficult to detect with conventional means such as divers or visual means (cameras, ROV's).Without a sophisticated and reliable technology to detect these threats, a complete security solution for underwater security is not possible. [C49]

"Full-Scale Measurements of High Speed Passenger Ferry Performance and Wake Signature"

Intensive field research tests were conducted with innovative high speed foil-assisted catamarans and air-entrainment/surface effect hull designs to provide wake wash and vessel performance data for development and validation of wake prediction models and to provide full-scale baseline data for advancing the hull designs. The trial data and models enable a detailed assessment of vessel performance in terms of operation efficiency and wake wash generation which are being extended to assess the potential shore impacts from candidate hull types in environmentally sensitive areas, such as Rich Passage in Puget Sound, and to the design of a new generation of low impact passenger vessel. In the past, wake and vessel optimization studies have focused on the use of small-scale laboratory studies and computational fluid dynamics modeling to develop data for design purposes. However, high speed vessels operating at super-critical speeds are particularly difficult to accommodate in most laboratories because of the need for large facilities both in terms of length, to accommodate a high speed tow carriage, but also in terms of width, to accommodate the development of the wake patterns which develop at super-critical Froude numbers. Also because of the scaling required in the laboratory, differences in wake energy and spectral signature between test conditions and hull variants may be within the level of detection of instrumentation. Computational modeling studies are also limited by a paucity of full-scale data for validation. Therefore, detailed trials were conducted at full scale with state of the art vessels as a precursor to advancing hull design. The wake measurements allow an examination of the relationships between vessel wake parameters (including maximum wake height and energy) and spectral shape as a function of distance from the vessel sailing line for a range of vessel operating conditions. Results from detailed trials of 3 state-of-the-art foil assisted catamarans- and 2 surface effect designs are presented and compared with measurements from conventional catamaran designs. [C50]

"Analysis of local observability for feature localization in a maritime environment using an omnidirectional camera"

Autonomous operation by a surface vehicle in a maritime setting requires that the surface vehicle detects non-water objects, including shoreline, hazards to navigation, and other moving vessels. In order to assess the utility of an omnidirectional camera for detecting and localizing non- water objects, we rigorously investigate observability of both stationary and moving features. For stationary features, we find that all but a small subset of the features are observable. For moving features, we show that an important class of feature and ASV

trajectories are not observable. [C51]

"Development of recognition software of heart to find the standard cross section on echocardiography"

We have developed an algorithm to find standard cross sections (the long-axis view and the short-axis view) of the heart from successive echograms. We first divided an echogram into small spatial regions and detected the typical motion of the mitral valve by analyzing the brightness variation and correlation coefficient among the regions. We have obtained 95% accuracy in the position of the valve through time series echogram of 25 normal volunteers. The recognized valve was visualized as a mark on the video stream. Furthermore, combining this technique with an optical flow method, we elucidated the region velocity of the wall motion of the left ventricle after centering the valve on echogram. By analyzing symmetry among region velocity, we have confirmed to distinguish between the long- and the short-axis view of heart. This algorithm is applicable to instruction software to find standard cross section of the heart as an assistant of echocardiography. We are going to apply to more subjects who have heart disease and to contribute automatic diagnosis in the future. [C52]

"A powerful tool to quantitatively detect tiny amounts of 4He in a deuterium rich background for fusion research"

The detection of tiny amounts of 4He in a deuterium rich atmosphere (as well as of 3He in a tritium background) is of great relevance in fusion research. One of the main concerns in a d-t fusion experiment is to prevent significant accumulation of 4He ashes in the core plasma, since this would result in a dilution of the d-t fuel and in a consequent reduction of the fusion power output. In order to control the impurity concentration in the core plasma and to sustain the fuel density, several active pumping methods for 4He (and other impurities) have been proposed, such as divertors or pump limiters. A quantitative analysis of the exhausts of such devices can provide a useful evaluation of the effectiveness of different methods and configurations, by comparing the related 4He content. Helium leak detection is a further major problem in fusion research. Vacuum tightness of the large torus vessel is indeed a rigorous requirement, in order to minimize the impurity content of the plasma. However, due to the strong deuterium release by the wall of the vacuum vessel, a conventional helium leak detector would not be able to discriminate a small amount of leaked 4He in such a high deuterium background. Determination of tritium activity by 3He in-growth method also requires a mass spectrometric analysis system capable to detect small changes of 3He content in a tritium background. A new method has been developed at ENEA Frascati, allowing quantitative detection of extremely small amounts of Helium isotopes (and other inert gases) in a deuterium rich atmosphere using a conventional (i.e. normal resolution) quadrupole mass spectrometer. This is accomplished by means of two non-evaporable getter (NEG) pumps, the first one operating at high temperature (300 divide 450degC) and the second one at room temperature, which effectively and quickly remove to a high degree all active components in the original gas mixture, with particular regard to hydrogen isotopes. Obviously, noble gas-es are preserved. The results of extensive tests carried out with such a facility are reported. A high-resolution quadrupole mass spectrometer was used during tests with 4He-D2 mixtures, just to provide evidence for the absence of deuterium in the final gaseous mixture. The minimum detectable peak ratio 4He/D2 has been found to be less than 10-6. [C53]

"Leak Location & Sealing using Platelet TechnologyTM"

Platelet TechnologyTMis a unique and innovative method of sealing and locating leaks in pressurised pipelines; and is adapted from the human body's own leak sealing method whereby platelets in the blood stream initiate the mechanism for sealing cuts and wounds. The technology involves the remote injection of discrete particles known as "PlateletsR" into a pipeline which are carried to the leak site due to the flow. When they reach the vicinity of the leak fluid forces entrain them into the leak and hold them against the pipe wall thus facilitating a seal, this also marks the position of the leak for subsequent detection since each PlateletTMcarries a traceable tagging device. The technology has been used successfully on a number of offshore operations since the first field deployment in September 2004, when PlateletsRwere used to seal a subsea water injection line leak on BP's Foinaven field. As a result of the operation the line pressure increased by 20 bar which resulted in a significant increase in production. BP had originally intended to reply upon the PlateletTMseal for a period of 6-9 months until a planned shutdown in the spring of 2005, but in eventuality they continued production with the PlateletTMin place for a period in excess of 19 months. Platelet TechnologyTMis a very versatile pipeline integrity solution. Plateletsreg can be used to seal leaks in small bore subsea umbilicals operating at 500 bar but are equally able to seal leaks in large overland pipelines operating at just above atmospheric pressure. This is because Plateletsreg are not an off-the-shelf product and are designed and manufactured specifically for each operation through application of an advanced engineering process which includes analytical and numerical modelling, pressure vessel and flow loop testing and material compatibility analysis. By following this process a PlateletTMmaterial an--d geometry can be selected with properties which are optimised for the application in

question. This does not mean however that Brinker are not able to respond quickly to unexpected leaks which occur. In emergency situations, by using the knowledge obtained from previous operations, this engineering process can be fast-tracked to provide the client with the best possible solution within the timeframe available. An example of this was an emergency response operation carried out for Shell in August 2005 where a solution was delivered, and a difficult offshore leak sealed, within 5 days from the initial call. In addition to Platelet TechnologyTMBrinker have recently applied their pipeline integrity expertise to develop TelepathTM. TelepathTMis a non-invasive tool which, through a combination of analytical and numerical modelling, enables leaks in subsea umbilicals to be accurately located. This technique was recently put to use when, on behalf of Norsk Hydro, Brinker successfully located a leak in the umbilical system which supports the Ormen Lange Field. The umbilical system is approximately 120 km long and Brinker were able, through the application of TelepathTM, to accurately locate a leak 30 km from the shore. This paper will present a general overview of Platelet TechnologyTMand its application in deep waters and will also focus on the recent successful field use of Telepathtrade on behalf of Norsk Hydro. [C54]

"In vivo Detection of Lesion and Hemorrhage in Mouse Brain using Noninvasive Photoacoustic Imaging"

Photoacoustic imaging (PAI) is a noninvasive imaging procedure that uses laser light to visualize internal organs, blood vessels, and other tissues with great clarity. The main advantage of it, compared to existing optical imaging techniques, is that PAI overcomes the overwhelming scattering of light in biological tissues by utilizing ultrasonic wave to translate the signal, thus can provide higher spatial resolution. Moreover, the 532-nm laser light used in the experiments is predominantly absorbed by hemoglobin in blood. Therefore, the PAI can be used as a sensitive blood detector. The 532-nm laser light with the repetition rate of 15 Hz and the pulse width of 10 ns used as the excitated source. A needle hydrophone was used to capture signal. The orthogonal mode was adapted to excitated and received the photoacoustic signals. A custom-built tank was coupled the photoacoustic signals between the hydrophone and the mouse head. Here we present a clearly vascular distribution of mouse cerebral cortex surface with the skip and skull intact in vivo. Furthermore, a trauma lesion on the mouse cerebral cortex is accurately mapped with our system. The hemorrhage around the lesion region also is visualized by PAI images. Photoacoustic technique with its unique characteristic can provide satisfactory imaging quality on the brain of small animals. Experimental results demonstrate that PAI can supply information regarding the changes in morphologic and physiology of brain. This noninvasive PAI holds promise for applications in detecting cerebrovascular disease. [C55]

"Directional Local Contrast Based Blood Vessel Detection in Retinal Images"

In this paper, we proposed a novel algorithm to detect blood vessels on retinal images. By using directional local contrast as its detection feature, our algorithm is highly sensitive, fast and accurate. The algorithm only needs integral computing with very simple parameter adjustments and highly suitable for parallelization. It is much more robust to illumination conditions than intensity based counterparts and equally effective for large and small blood vessel detections. Traditional blood vessel mapping solutions focused on detecting the most number of blood vessel pixels at the cost of least number of falsely identified background pixels. This performance criterion works for well illuminated images with sharp boundary, but it does not address two major concerns. The first is that it favors detection of large blood vessels, and the second is that for darker images (due to poor illumination or pigment colors) it can be very difficult to generate hand traced maps. To overcome these problems, we propose using central lines of the blood vessels as a new performance measure for blood vessel mapping. The new performance measure is easy to evaluate, and it complements the existing performance measure. Experiment results on two public retinal image databases show that our algorithm outperforms two well known existing algorithms in terms of speeds and accuracy. [C56]

"In Vivo Cerebral Artery Microangiography in Rat and Mouse Using Synchrotron Radiation Imaging System"

Microangiography with spatial resolution in the micrometer range was carried out to depict vascular responses of the cerebral artery and arterioles in rats and mice using a real-time imaging system and a third generation synchrotron radiation source at SPring-8. An X-ray direct-conversion type detector with 6-mum spatial resolution was developed for real-time biomedical imaging. The X-ray image is converted directly into an electrical signal in the photoconductive layer without image blurring. In synchrotron radiation radiography, a long source-to-object distance and a small source spot can produce high-resolution images. Microangiographic images were obtained without image blurring and were stored in a digital frame memory system with a 1024 x 1024-pixel, 10-bit format. In imaging experiments, vasoconstriction and vasodilatation of small cerebral arteries were visualized in response to hypercapnia, hemorrhagic hypotension, and vasoactive agents after iodine contrast agent injection into the carotid artery. [C57]

"Blood Vessel Extraction Based on Mumford Shah Model and Skeletonization"

Locating blood vessels in a retinal image has found wide applications in medical image for diagnosis of diseases. However, due to the presence of noise and uneven distributed image intensity, this is still a challenging task. In this paper, we introduce a new method based on the features that the blood vessel must be a thin concave connected region. Based on Mumford-Shah (MS) model and skeletonization method, the proposed method is able to extract many small branches of vessels. Experimental results show that the proposed method outperforms existing methods and able to yield good results in real world data sets [C58]

"Oil spill detection system-results from field trials"

The OSD system was thoroughly tested at a field trial carried out in October 2004 off the West Coast of Norway nearby the Troll field. The Norwegian Clean Seas Association for Operating Companies (NOFO) especially arranged the trial for this purpose. 6 small releases of oil equivalents were discharged, and they could be detected and followed by the system during various wind and wave conditions. Images providing an average of the back-scattered intensity from various parts of the sea surface were shown to be useful for the system operator. Continuous surveillance of local areas is particularly helpful during the hours of darkness. Later, the data were reprocessed with a new and completely automatic oil detection algorithm using methods of image segmentation and object classification and the oil was automatically detected. This algorithm is implemented in the real-time system and tested out in field trials carried out in June 2005. After the successful trials in June 2005 NOFO has bought five OSD systems. During the field trials arranged in May 2006, the Oil Spill Detection System was mounted on three different oil recovery vessels and the trials were located off the West Coast of Norway near the Frigg field. The object of this trial was for the oil detection radar, which is only one element in an oil recovery operation, to gain further operative experience in various conditions. The preliminary results of the field trials are presented in this article. Future trials should preferably include testing during weather conditions with higher wind speeds and waves [C59]

"Advances in High-Frequency Active Sonars for Countering Asymmetric Threats in Littoral Waters"

Sea mines and fast in-shore attack craft pose threats to maritime force vessels operating in littoral waters. Three advances in high-frequency (HF) active sonars that can be used to counter these threats are reviewed. First, a tomographic sonar is able to reconstruct the acoustic image of a sea mine by processing multi-aspect projection data acquired with a wideband monostatic sonar circumnavigating the mine at a safe standoff distance. Second, a single-snapshot adaptive beamforming algorithm can be applied to a wideband, small-aperture sector-scan sonar to enhance its azimuthal resolution, which improves the detection and localization of mines and underwater obstacles. Third, a HF active sonar is able to detect, localize and track automatically a small fast surface craft in a shallow water cluttered environment based on the evolution of the craft wake observed in the sonar image sequence [C60]

"Study on the error in the dynamic spectrum method relative with the pathlength factor as a function of wavelength"

Utilizing near-infrared spectroscopy for non-invasive blood component concentration sensing has been a focusing topic in biomedical optics applications. The ease of use, low cost and portability of these methods is a clear advantage over the invasive blood component concentration sensing which is the main sensing method in the clinic application. However, there is no report about any successful non-invasive blood components (except the artery blood oxygen saturation) concentration detection techniques that can meet the requirements of clinic application. One of the most key difficulties is the influence of the individual discrepancy. Dynamic spectrum (DS) is a new measure method of non-invasive blood components concentration sensing presented recently. It can eliminate the individual discrepancy of the tissues except the pulsatile component of the artery blood (PCAB) theoretically. This indicates a brand new way to measure the blood components concentration and a potential to provide absolute quantitation of hemodynamic variables. One of the systematic errors in the calculation of the component changes from NIRS data of the dynamic spectrum is the absolute magnitudes and relative differences in pathlength factors as a function of wavelength. Monte Carlo simulations are used in this paper to examine the importance and mitigation methods of this error while the photoelectric pulse wave is detected on the finger tip. We found wavelength selection to be important variables in minimizing such errors, and replacing the average pathlength factor with the subsection pathlength factor appropriately could reduce the error to a small fraction (10%) [C61]

"On the Small Vessel Detection in High Resolution Retinal Images"

In this paper, we proposed a new scheme for detection of small blood vessels in retinal images. A novel filter

called Gabor variance filter and a modified histogram equalization technique are developed to enhance the contrast between vessels and background. Vessel segmentation is then performed on the enhanced map using thresholding and branch pruning based on the vessel structures. The experiments on high resolution images showed the desirable results with performance of 84.75% true positive rate and 0.15% false positive rate [C62]

"Computer-Aided Diagnosis Scheme for Detection of Unruptured Intracranial Aneurysms in MR Angiography"

The detection of unruptured intracranial aneurysms is a major subject in magnetic resonance angiography (MRA) images. However, it is difficult for radiologists to detect small aneurysms on the maximum intensity projection (MIP) images, because adjacent vessels overlap with the aneurysm. The purpose of this study was to develop an automated computerized detection of aneurysms in order to assist radiologists' interpretation as a "second opinion." The vessels were first segmented from background by use of gray-level thresholding and region growing technique. The gradient concentrate (GC) filter was then applied to the segmented vessels for enhancement of aneurysm. The initial aneurysm candidate was identified in the GC image with a gray level threshold. For removal of false positives (FPs), we determined three features, i.e., size, sphericity, and mean value of GC image in each of the candidate regions. Finally, the rule-based schemes with these features and quadratic discriminant analysis were applied for distinction between aneurysms and FPs. The sensitivity of our method for detection of aneurysms was 100% (7/7) with 1.85 FPs per patient. With our computerized scheme, all aneurysms were detected correctly with low FP rates, and would be useful in assisting radiologists for identifying correct aneurysms and for reducing the interpretation time [C63]

"The Quantitative Assessment of Gd-DTPA in Contrast Enhanced Magnetic Resonance Angiography"

Recently, the use of MRI contrast agents has been proven to be substantially improved sensitivity and specificity in many clinical applications. CE-MRA has higher blood signal based on the T1 and T2-shortening property of contrast agents, so that even the small vessels can be visualized. The use of contrast agents can improve lesion detection and characterization. The routinely used dose of contrast agents in the routine MRI examinations only relies on the weight of the subject. The purpose of this study is to obtain the clinically optimal dose for 3D-TOF (time-of-flight) pulse sequences for CE-MRA examinations. In the phantom study, ten test tubes were filled with saline mixed with different dose of Gd-DTPA. It is found that the optimal dose of Gd-DTPA for saline phantom by using 3D-TOF pulse sequences is 20 mM. Also, there has no differences of optimal doses between Omniscan and Magnivist contrast agents Gd-DTPA. The results show that consistent high quality CE-MRA images might be obtained by using 0.25M Gd-DTPA (half of the routine dose) with 3~4 cc/sec injection rate for all clinical cases. The benefits of this study might be to minimize dose and potential toxicity. Additionally, the decrease of the cost of contrast agents might be achieved. It is expected to provide the recommended dose of Gd-DTPA for contrast enhanced MRA in clinical routine diagnosis [C64]

"High Resolution Radar Imaging of the Sea Surface"

Applications are reviewed of high resolution radar sea surface imagery to remote sensing, wide area surveillance, target detection and tracking. The limitations imposed by sea surface motion on SAR imaging are discussed and illustrated, along with methods to exploit the motion such as along track interferometry. Ships on the sea are subject to roll, pitch and yaw motions, which defocus SAR imagery; analysis and signal processing to characterise and overcome the difficulties are described. Real aperture images of the sea are shown to contain detailed information on the propagation of surface waves, which may be used in algorithms to detect anomalies such as small surface vessel; these are also described and demonstrated [C65]

"Detecting false vessel recognitions in retinal fundus analysis"

Automatic tracking of blood vessels in images of retinal fundus is an important and non-invasive procedure for the diagnosis of many diseases. Tracking techniques often present a high rate of false positives. This paper presents six methods to discriminate false detections from true positives, each based on a different model of the vessel. They describe a candidate vessel in terms of its average geometric and grayscale properties considered along the full trajectory of the vessel itself. The rationale is that false vessels are caused by the small scale of the tracking algorithm necessary during the tracking phase. Once tracking has been completed, we can gather information from the full vessel trajectory and solve ambiguities that cannot be fixed during tracking. We apply Fisher linear discriminant analysis to these features to get the desired discrimination. Results on 28 images show satisfactory rejection of false positives and better results when using more complex models [C66]

"Automated Classification of Cerebral Arteries in MRA Images and Its Application to Maximum

Intensity Projection"

Detection of unruptured aneurysms is a major task in magnetic resonance angiography (MRA). However, it is difficult for radiologists to detect small aneurysms on the maximum intensity projection (MIP) images because adjacent vessels may overlap with the aneurysms. Therefore, we proposed a method for making a new MIP image, the SelMIP image, with the interested vessels only, as opposed to all vessels, by manually selecting a cerebral artery from a list of cerebral arteries recognized automatically. By using our new SelMIP viewing technique, the selected vessel regions can also be observed from various directions and would further facilitate the radiologists in detecting small aneurysms. For automated classification of cerebral arteries, two 3D images, a target image and a reference image, are compared. Image registration is performed using the global matching and feature correspondence techniques. Segmentation of vessels in the target image is performed using the thresholding and region growing techniques. The segmented vessel regions were classified into eight cerebral arteries by calculating the Euclidean distance between a voxel in the target image and each of the voxels in the labeled eight vessel regions in the reference image. In applying the automated cerebral arteries recognization algorithm to thirteen MRA studies, results of 10 MRA studies were evaluated as clinically acceptable. Our new viewing technique would be useful in assisting radiologists for detection of aneurysms and for reducing the interpretation time [C67]

"Water Flow Based Vessel Detection in Retinal Images"

First Page of the Article [C68]

"A Vessel Detection Method Using ASAR AP Data"

First Page of the Article [C69]

"A New Approach to Automated Retinal Vessel Segmentation Using Multiscale Analysis"

Computer based analysis for automated segmentation of blood vessels in retinal images help eye care specialists screen larger populations for vessel abnormalities. However, automated retinal segmentation is complicated by the fact that the width of retinal vessels can vary from very large to very small, and that the local contrast of vessels is unstable, especially in unhealthy ocular fundus. We propose a novel method that takes these facts into account. Our method includes a multiscale analytical scheme using Gabor filters and scale production, and a threshold probing technique utilizing the features of retinal vessel network. Our method is good for detecting large and small vessels concurrently. It also offers an efficient way to denoise and enhance the responses of line filters, allowing the detection of vessels with low local contrast [C70]

"2F-5 Optimization of Blood-Brain Barrier Opening in Mice using Focused Ultrasound"

Most neurologically potent drugs cannot be delivered to the brain because of its distinct vasculature: the blood-brain barrier (BBB). Focused ultrasound (FUS) has been shown to produce reversible and localized BBB opening when applied in the presence of microbubbles [Hynynen, K, 2001]. In this study, the dependence of microbubble concentration and vessel type distribution in the targeted brain region on FUS-induced BBB opening was investigated. A therapeutic FUS transducer (1.525 MHz) was confocally combined with a 7.5 MHz diagnostic transducer that allowed for consistent, high precision targeting. To induce BBB opening, eight mice were intravenously injected with microbubbles (Optison; 25-50 muL). The brains were then sonicated (pressure amplitudes: 0.5-1.1 MPa; burst length: 20 ms; duty cycle: 20%; duration: 2-4 times for 30 s per shot with a 30 s delay between shots) through their intact skull and skin. The mice were then injected intraperitoneally (IP) with a gadolinium-based MRI contrast agent (Omniscan; 0.5 ml) and scanned with high-resolution T1-weighted MR imaging (9.4 Tesla; in-plane resolution: 75 mum). The threshold of BBB opening with an injection of 50 muL of Optison was found to be between 0.53 and 0.67 MPa with the area of BBB opening increasing linearly with peak rarefractional pressure. Further reducing the amount of Optison injected to 25 muL decreased the area of BBB opening by approximately a factor of three. High-resolution MRI was able to determine the influence of vessel density and size within the beam on the BBB opening. Using the optimized sonication parameters to induce consistent BBB opening (pressure: 0.8 MPa; Optison: 25 muL) the path of the MRI contrast agent diffusion throughout the BBB-opened region was tracked over the course of two hours. The posterior cerebral artery, because of its larger vessel size (and, therefore, higher Optison concentration interacting with the FUS beam), depicted a greater pixel intensity increase on the T1- -weighted MR image at the sonicated region compared to the non-sonicated (control) and homogeneous brain tissue regions. These findings demonstrated the importance of microbubble concentration and vessel characteristics on opening the BBB in the mice. Finally, the use of the optimized parameters for opening at the threshold minimizing probability of irreversible damage, together with slow-diffusion MRI imaging, allowed for temporal analysis of the BBB opening, revealing not only detection of the opening, but also its permeability properties [C71]

"Illicit Vessel Identification In Inland Waters using SAR Image"

First Page of the Article [C72]

"Magnetic field measurements of limpet mines attached to a ship's steel hull"

With the increased threat of terrorist attacks against docked naval and commercial vessels, the use of magnetically attached limpet mines or explosives is of major concern. Detecting limpet mines, or verification of their absence, using magnetic field sensors could be a quick and inexpensive method to determine if a vessel is under attack. Before the design of such a magnetic detection system can begin, the mines' field strength must first be quantified. The field distribution in the proximity of a small, medium, and large limpet mine was measured initially in a magnetically clean laboratory environment. The experiment was then repeated with the mines attached to the steel hull of a destroyer, while measuring the resultant field strengths on the opposite side of the hull. These data can be used in the design of limpet mine detection systems. [C73]

"Electromagnetic interactions between a high frequency surface wave and a ship"

In this paper, we assess the capability of a HFSW radar to detect a small fast boat moving behind a ship, the dimensions of which are comparable to the wavelength. We show that, in the HF band, the scattered field in the shadow region of the large ship is significant enough to induce strong coupling between the two vessels. This results in fluctuations in the values of the RCS of the small boat of about 12 dB. [C74]

"ARGDYP: an Adaptive Region Growing and DYnamic Programming Algorithm for Stenosis Detection in MRI"

First Page of the Article [C75]

"Background suppression based-on wavelet transformation to detect infrared target"

Target detection and location in infrared clutter background is very important to infrared search and track system. Especially for small target detection in infrared image in background of sea and sky, there are no geometric and structure character to use. When targets such as ship and naval vessel sailing at long distance, they always appear around the sea-level line, and it is mixed with cloud and sea-wave clutter. It is difficult to segment and locate precisely. Background suppression based-on wavelet transformation is proposed in the paper. Wavelet decomposition makes it possible to analyze a signal both in time and frequency domains. In the paper infrared sea and key background images are processed. For their SNR is low and background is complex, using wavelet transformation decomposes an original image and extract approximate feature to reconstruct an image, which mainly includes background information. A new image would be obtained using background image subtracted from original image. There are mainly target and noise points left in the new image. By setting proper threshold, the target can be detected perfectly. At last, experiment results are given and show the method is practical. [C76]

"Task-based evaluation of diffraction-enhanced imaging"

Herein we present a quantitative analysis of diffraction enhanced imaging (DEI) by evaluating object detectability. DEI is an X-ray imaging method that simultaneously produces absorption and refraction images of an object. In recent years, it has become widely accepted that task-based measures of image quality, such as the detectability of subtle image features, are the ultimate test of image quality. It is widely believed that the DEI refraction images measures soft tissue more sensitively than the DEI absorption image. In this paper, we use a modern task-based approach to evaluate this assertion. Specifically, we use the log-likelihood ration test to devise a statistically optimal detector, usually refer to as "ideal observer", and use the area under the receiver operating characteristic (ROC) curve as a detectability metric. Using this method, we study the detectability of a blood vessel in lung tissue at 18 keV. We find that the refraction image is better than the absorption image if the blood vessel is smaller than 0.4 cm, but that the absorption image is better for blood vessels larger than 0.4 cm. In future work, we will consider whether it is generally true that small objects are more detectable by refraction imaging while large objects are more detectable by absorption imaging. [C77]

"Detection of trabeculae and papillary muscles in cardiac MR images"

With the improvement of the quality of MR imagery, more and more details become visible. Only 5-10 years ago cardiac images of the heart were still so unsharp that finer details of the heart like the papillary muscles and the trabeculae were hardly visible and it was simply impossible to determine their outlines with any measure of

accuracy. With the improved image quality it becomes feasible to extract information about these small structures. Studying the operation of these tiny muscles can be very useful for further analysis of the heart function and diagnosis of heart diseases. Until now very little literature existed on the study of these structures using cardiac MR, so with this publication we are riding the front of the wave. We conducted two pilot studies to investigate the feasibility of detection of papillary muscles in the left ventricular blood volume and to obtain a measure of the trabeculation of the right ventricle. The latter was also investigated as a diagnostic criterion for arrhythmogenic right ventricular dysplasia (ARVD) [C78]

"Mechanical Design of the NSTX High-k Scattering Diagnostic"

The NSTX high-k scattering diagnostic measures small-scale density fluctuations by the heterodyne detection of waves scattered from a millimeter wave probe beam at 280 GHz and lambda=1.07 mm. To enable this measurement, major alterations were made to the NSTX vacuum vessel and neutral beam armor. Close collaboration between the PPPL physics and engineering staff resulted in a flexible system with steerable launch and detection optics that can position the scattering volume either near the magnetic axis (rhoap.1) or near the edge (rhoap.8). 150 feet of carefully aligned corrugated waveguide was installed for injection of the probe beam and collection of the scattered signal into the detection electronics [C79]

"Automated Microaneurysm Segmentation and Detection using Generalized Eigenvectors"

Diabetic retinopathy is a major cause of blindness and microaneurysms are the first clinically observable manifestations of diabetic retinopathy. Regular screening and timely intervention can halt or reverse the progression of this disease. This paper describes an approach that is based on the generalized eigenvectors of affinity matrix to extract microaneurysms from digital retinal images. Microaneurysms are in the low intensity regions and detection is complicated by their small sizes, the presence of retinal vessels, and their similarity to another type of retinal abnormality-haemorrhages. In order to accurately detect microaneurysms, the affinity matrix is defined to suppress larger structures such as blood vessels, haemorrhages, etc and to create uniform affinity distribution for pixels belonging to microaneurysms. The generalized eigenvector solution seeks to find the optimal segmentation for microaneurysms and provides indication to the possible locations of microaneurysms. We differentiate the true microaneurysms by studying their feature characteristics. Experiments on 70 retinal sub-images of diabetic patients indicate that we are able to achieve 93% accuracy in the detection of microaneurysms. [C80]

"Remora, a new concept for AUVs in mine warfare"

Requirements for AUVs' operation in mine warfare generally lead to two different specifications: one would ask for a long endurance and therefore large vehicle with high value sonars, navigation systems, obstacle avoidance system and additional environmental sensors. This AUV is designed for discrete survey of large areas and for automatic detection and classification of mine like objects. The other one would be for a very small and cheap vehicle (eventually expendable) dedicated to short identification or neutralization operations and with a low level of autonomy and navigation accuracy. A common solution is to design something in between but then adding the drawbacks of the two approaches. Another concept is to do the first operation with a large vehicle and then deploy a smaller one when the support vessel is getting closer. Time delay and risk are the main disadvantages in that case. The Remora concept is to use the large AUV for detection and classification and as the carrying vessel of the small one. Once a mine like object is detected and classified by the large AUV's sonar, the small AUV is then deployed for identification. [C81]

"Signatures of vessels in ENVISAT AP-mode imagery"

A series of ENVISAT AP mode data has been collected over the Nome field off the coast of central Norway. An oil production vessel has been imaged with different ASAR beams and polarisations to study how its signature changes with varying imaging parameters. Cross-polarised data gives better contrast for automated detection compared to co-polarised data, when the incidence angle is small. [C82]

"Multi-view learning for bronchovascular pair detection"

In many important image classification problems, acquiring class labels for training instances is costly, while gathering large quantities of unlabelled data is cheap. A semiautomated system for the classification of bronchovascular pairs based on co-training in high resolution computed tomography (HRCT) images is presented. A bronchovascular pair is formed between a bronchus and a vessel. The identification of such structures provides valuable diagnostic information in patients with suspected airway diseases. Co-training is a semi-supervised multi-view learning algorithm where classifiers trained with a small number of labelled examples are improved by augmenting the small training set with a large pool of unseen examples. We incorporate active

learning where the user labels examples on which the two views disagree. The two views in our system are based on spatial relations and ERS, a gradient based feature set. In addition, the optimal parameters required in the pre-processing step before feature extraction and recognition was automatically chosen. The system was co-trained on 41 unlabelled HRCT scans selected from 26 patient studies. It was successfully evaluated on 26 other HRCT scans manually labelled in consultation with radiologists. [C83]

"Limitations of dual frequency measurements for embolus classification"

Transcranial Doppler (TCD) ultrasound is a sensitive technique for detection of micro-emboli in the cerebral circulation. Such emboli may be solid, liquid or gaseous, and their backscatter properties, and likely clinical significance, depend both on their size and especially their composition. It is often difficult to distinguish between signals from small and innocuous gaseous emboli and those from large and potentially dangerous solid emboli. A useful technique in this respect is one in which the 'measured embolus to blood ratios' (MEBRs) are found at two different frequencies. A potential problem of this technique is that it is not possible to match exactly the ultrasonic beam shapes at the two frequencies, so that differences in MEBRs are not purely a result of the acoustical properties of the embolus. A commercial ultrasound transducer (DWL) designed for dual frequency measurements at 2 MHz and 2.5 MHz was studied. Experimental measurements were made of beam shapes at the two frequencies after they had passed through samples of human temporal bone. A simple mathematical model was developed to determine the uncertainties in measurement of relative MEBRs in the middle cerebral artery at the two frequencies, assuming a realistic range of vessel-beam configurations. Even if all other aspects of the measurement process were perfect, the results predict that errors due to slight differences in beam shapes at 2.0 MHz and 2.5 MHz would cause 15-30% of solid emboli to be classed as gaseous. [C84]

"Enhanced dynamic FDG-PET tumor detection with constrained temporal filtering"

Residual FDG activity in normal tissues, such as blood vessels and the liver, as well as the spilled in background activity can impair the detection of small or modestly tracer-avid tumors in FDG-PET cancer imaging. In order to maximize tumor visualization but minimize background and artifacts, an efficient new method, adapted from the constrained temporal filtering processing widely used for signal detection, is extended to the application of dynamic FDG-PET processing. Comparing with the well-known Patlak analysis and spectral analysis (SA), the proposed method can objectively remove the partial volume effect superimposed onto the TAC as well as the residual blood activities and result in the pixel-by-pixel estimations of the influx constant as the output of the filter. Since the constrained temporal filter is designed to preserve the power of tumor signal, therefore, it is likely to offer a desirable noise canceling result, while make no or minimum distortion on tumor signatures. In contrast, Patlak analysis may fail to classify tumor and normal structures when the tumor is severely interfered by background activity. In this case the tumor present approximately similar time activity curve as that of normal tissue at the later stage of acquisition. The signal-to-noise ratio (SNR) and the contrast-to-noise ratio (CNR) are served as the figure of merit for performance evaluation. Our digital phantom study demonstrates that the proposed method outperforms Patlak and SA methods. With microPET two mouse studies are also dynamically acquired on the 6th day and the 12th day, respectively, after the cancer cell implantation. The proposed method is applied to process the earlier acquired images and the resulting findings are confirmed with the later acquisitions. The results show that the new method can enhance the tumor-to-background ratio at an early stage and is promising for improving lesion detectability. [C85]

"Fisheries habitat survey with a small low cost AUV"

Summary form only given. The AUV Xanthos was deployed in spring 2003 to demonstrate how the capabilities of autonomous underwater vehicles may be applied to the preservation and study of fisheries resources. Xanthos carries a low-light camera, LED illumination, and side scan sonar. The vehicle's small size and robustness permit the use of a vessel of opportunity (a fishing trawler) to examine fisheries habitat. Surveys were conducted in protected zones and heavily fished areas, and the results compared. [C86]

"Proceedings of the 25th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (IEEE Cat. No.03CH37439)"

First Page of the Article [C87]

"Segmentation of vessels in retinal images by shortest path histogramming"

The analysis of ocular fundus images is important for the detection of disease, tracking changes in the retina over time, and 3D retinal reconstruction. Blood vessel analysis plays a major role in such processing. We propose to use a shortest path analysis to identify blood vessels in retinal images. Ideally, the shortest path between every pair of pixels (where speed through a pixel is proportional to the gray level) would be found, and

then a counter incremented for every pixel on the path. Once all pixel paths through a pixel have been counted, the highest counts should correspond to vessel pixels. However, this has exponential complexity in the number of pixels. Thus, not all pixel pairs can be analyzed. We investigate here the selection of a small subset of pixels to seed the process, and propose two methods: (1) the curl method, and (2) the ID degree 2 polynomial method. [C88]

"Wavelet analysis based detection algorithm for infrared image small target in background of sea and sky"

An automatic target detection algorithm is developed for infrared image small target in complicate background of sea and sky. Wavelet multiresolution edge detection algorithm is adopted to detect the sea-level line from coarse to fine. A strip can be decided accordingly as the potential area where the naval vessel targets in infrared images usually appear. He realized target detection by defining an energy called mutual wavelet energy combination (MWEC). The detection is completed by marking the position where the energy is assumed the maximum and calculating size of the target by comparing the dissimilarity between a couple of windows. Experiment results indicate that the method can detect and locate small targets precisely in an infrared image with high detection probability. [C89]

"Ultrasonic detection of cerebral emboli"

It is now known that the majority of strokes are caused by emboli from distal sites blocking vessels in the brain, rather than by local haemorrhagic or occlusive processes. The discovery that emboli of various types can be detected using Doppler ultrasound as they are carried through the major cerebral arteries has led to a new field of study, which has considerable potential both in research and clinical settings. The basic principle of detection is extremely simple: if an embolus backscatters more power than the surrounding blood in which it is moving, then the transitory increase in power can be detected and measured. Questions that arise from this principle surround the circumstances under which such power increases can be detected, and whether the size and composition of the embolus can be inferred from such measurements. The detectability of an embolus is determined by many factors including its size and composition, the ultrasound frequency, the size of the Doppler sample volume, the embolus trajectory and its interaction with the ultrasound beam. In general even relatively small gas bubbles will be detected, but some larger solid emboli may be missed. With regard to size and composition, several techniques have been suggested as being useful for characterising composition, and whilst in general considerable progress has been made in this direction there are still many challenges in distinguishing between large particulate emboli and small gaseous emboli. Unfortunately the sizing of emboli remains a distant goal. [C90]

"M-line processing for real-time investigation of large artery mechanics"

This paper describes the application of an integrated ultrasound (US) system to real-time detection of both blood velocity profile and wall displacements in human arteries. The system simultaneously processes the echo-signals generated from the walls as well as from red blood cells. Wall velocity is detected through the modified autocorrelation algorithm, while the blood velocity profile is obtained through spectral analysis. The system was preliminarily tested in the common carotid arteries of a small group of volunteers. In each case, blood flow behaviour was first checked by detecting the velocity profile inside the vessel. The most appropriate transducer position for vessel wall interrogation was rapidly found by observing in real-time both the velocity profile and the displacements of anterior and posterior walls, which are automatically tracked by the system. The diameter distension was measured in 24 subjects (15 normal volunteers and 9 patients with major risk factors for atherosclerosis). The average distension turned out to be in the range 0.11-1.02 mm, with a typical standard deviation within measurement epochs of 26 μm. [C91]

"Detection of simulated microemboli using a diffraction grating ultrasound probe and spectral energy criteria"

A new high frequency diffraction grating ultrasound probe was used to detect simulated microemboli under physiological (venous) flow conditions across different particle concentrations and velocities. Signal processing algorithms developed use spectral energy criteria and statistically determined decision criteria for the quantification of the detected particles [C92]

"Ship detection and tracking using HF surface wave radar"

The Canadian Department of National Defence (DND) conducted a joint trial involving multiple sensors in the detection and tracking of ships in the Grand Banks of Canada in March 2000, including the HF surface wave

radar (HFSWR) system at Cape Race, Newfoundland. One objective of the trial was to evaluate the detection and tracking capabilities of the HFSWR system. Three co-operative ships were used: a Canadian Navy patrol frigate named Ville de Quebec and two small fishing vessels named Anne S. Pierce and Arctic Pride. We present some results of the detection and tracking of these co-operative ships using the HFSWR. The radar had difficulties tracking ships near Bragg lines, i.e., the first-order sea echoes of the radar. A revised algorithm is also presented to detect ships near Bragg lines. [C93]

"Artery skeleton extraction using topographic and connected component labeling"

In this paper, we propose a method for the detection and extraction of coronary artery skeletons (centerlines) based on the morphological processing of the topographic features of coronary angiogram images. Initially, the angiogram is pre-processed for noise reduction and artery enhancement through directional morphological filtering by reconstruction. The topographic features of the resulting image are detected based on first and second-order image derivatives which characterize the local differential image structure. Using an artery model of a smooth elongated object with an approximately Gaussian smoothed semi-elliptical profile, the candidate skeleton areas are detected as sets of points consisting of ridges, saddle points and peaks. False skeleton areas, produced due to the noise sensitivity of the differentiation filters, have small size and are eliminated by connected component labeling (CCL). CCL may cause the elimination of a few true skeletons which are recovered by the morphological operation of binary reconstruction. Experimental results on clinical coronary angiograms are presented and discussed indicating the robust performance of the proposed method [C94]

"Mitigation of platform generated magnetic noise impressed on a magnetic sensor mounted in an autonomous underwater vehicle"

The detection and localization of targets of interest in the very shallow water areas and especially in the surf zone are much more difficult problems than in the deep ocean. To overcome these problems, it is necessary to augment existing fleet sensor capability with additional technology. Furthermore in keeping with Navy policy, it is desirable to remove the diver from harms way. A potential solution is to utilize a small autonomous underwater vehicle (AUV) instrumented with both a buried target sonar and the real time tracking gradiometer (RTG). This paper describes the procedures required to successfully place a magnetic gradient sensor array on an AUV. The first step was to magnetically characterize the AUV. This was accomplished by passing the AUV by a stationary RTG and then by externally mounting that RTG at several locations on the AUV which was then placed in simulated at-sea motion on a nonmagnetic three-axis motion table. Analysis of the data revealed that the favored location of a magnetic sensor is near the nose of the vessel and that the initial degradation, in this location, caused by the presence of the powered AUV was 30 dB above sensor noise. The degradation was caused primarily by the vehicle's electrical systems. Initial measurements also revealed the presence of several ferromagnetic components that should be replaced with nonmagnetic equivalents when practical. A detailed plan of magnetic noise mitigation is also presented. It involves several steps for implementation, including the substitution of nonferrous components for ferrous, maximizing the separation between the sensor and magnetic field sources, minimizing current loops and using auxiliary current and magnetic field sensors capable of generating noise-canceling signals [C95]

"Real-time simulation of deformable objects: tools and application"

Presents algorithms for animating deformable objects in real time. We focus on computing the deformation of an object subject to external forces and detecting collisions among deformable and rigid objects. The targeted application domain is surgical training. This application relies more on visual realism than exact, patient-specific deformation, but requires that computations be performed in real time. This is in contrast with pre-operative surgical planning, where computations may be done offline but must provide accurate results. To achieve real-time performance, the proposed algorithms take advantage of the fact that most deformations are local, human-body tissues are well damped, and motions of surgical instruments are relatively slow. They have been integrated into a virtual reality system for simulating the suturing of small blood vessels (microsurgery) [C96]

"Brain arteries movement detection with gated gradient echo sequence: standardization, registration and subtraction of serial magnetic resonance images"

In order to make evident pulsing brain artery movements associated with heart activity, intramodality MR registration and subtraction has to be used to detect small differences between serial MR brain images. A new voxel-based rigid-body registration algorithm, including: (1) a standardization of grey levels procedure by means of similarity measure optimisation, (2) a new full 2-D convolution cubic interpolation zooming procedure, (3) a low computational cost multi-scale iterative procedure, that uses the zoomed versions of images to be registered, is proposed. It allows up to 1/8 pixel accuracy. [C97]

"Small-field angiographic imaging of tumor blood vessels using synchrotron radiation"

Microangiography with about 10 μm resolution has been carried out for depicting angiogenic vessels in a rabbit model of cancer using a high-resolution detector and a third generation synchrotron radiation source at SPring-8. In synchrotron radiation radiography, a long source-to-object distance and a small source spot can produce high-resolution images. VX2 carcinoma had been transplanted in a rabbit auricle. By using this imaging system, small tumor blood vessels with diameters of 20-30 μm in an immature vascular network produced by angiogenesis were visualized after contrast material injection to the auricular artery. [C98]

"(Automatic) target detection in synthetic aperture radar imagery via terrain recognition"

Surveillance of large areas of the Earth's surface is often undertaken with low resolution synthetic aperture radar (SAR) imagery from either a satellite or a plane. There is a need to process these images with automatic target detection (ATD) algorithms. Typically the targets being searched for are vehicles or small vessels, which occupy only a few resolution cells. Simple thresholding is usually inadequate for detection due to the high amount of noise in the images. Often the background has a discernible texture, and one form of detection is to search for anomalies in the texture caused by the presence of the target pixels. To perform this task a texture model must be able to model a variety of textures at run time, and also model these textures well enough to detect anomalies. We accomplish this with our multiscale nonparametric Markov random field (MRF) texture model [C99]

"Detection of small man-made objects in sector scan imagery using neural networks"

This paper presents a neural network based system to detect small man-made objects in sequences of sector scan sonar images. The detection of such objects is considered out to ranges of 150 metres using a forward-looking sonar system mounted on a vessel. After an initial cleaning operation performed by compensating for the motion of the vessel, the imagery was segmented to extract objects for analysis. A set of 31 features extracted from each object was examined. These features consisted of basic object size and contrast features, shape moment-based features, moment invariants, and features extracted from the second-order histogram of each object. The best set of 15 features was then selected using sequential forward selection and sequential backward selection. These features were then used to train a neural network to detect man-made objects in the image sequences. The detector achieved a 97% accuracy at a mean false positive rate of 9 per frame [C100]

"Quantitative 3D ultrasound imaging using an automated image tracking technique"

A new method for acquiring dimensionally accurate 3D ultrasound data from multiple 2D image planes is proposed and tested. This is based on the use of a modified linear phased array comprising a central `Imaging' array that acquires multiple 2D slices as the transducer is passed through the tissue of interest. Small, perpendicularly oriented, `Tracking arrays' are integrally mounted on each end of the Imaging transducer. As the transducer is translated in an elevational direction, the images obtained by the Tracking arrays remain largely coplanar. The motion between successive Tracking images is determined using image matching based on the Minimum Sum of Absolute Differences (MSAD) criterion. Initial testing of a prototype 8 MHz array indicates that linear dimensional accuracy of approximately 5% is attainable. The applicability of the approach towards a low cost, rapid screening method for detecting stenosis in the carotid artery has been tested. Accurate estimates of stenosis, referenced to data acquired by Magnetic Resonance Angiography (MRA) or X-Ray angiography, were obtained in an average of 12 minutes as compared to approximately 45-50 minutes for conventional full duplex 2D/Color ultrasound scans [C101]

"Transcutaneous measurement of frequency dispersion in the regional pulse wave velocity"

The pulse wave velocity (PWV) is the propagation speed of the pulsation along the artery due to the heartbeat; its measurement is being reported to estimate the elasticity of the arterial wall for noninvasive diagnosis of arteriosclerosis. It is important for advanced diagnosis, to determine the PWV for each frequency and for each instance in time during the cardiac cycle. Using a phased tracking method developed, the movement of the arterial wall is accurately tracked and small velocity signals at multiple points in the human carotid artery along a linear-type probe are all simultaneously measured with sub-micrometer accuracy. By applying a spatial autoregressive modeling to the measured signals after using the Hilbert transform, the regional PWV of each frequency component was determined at the beginning of the ejection period, TE, and at the beginning of the ventricular diastole, TD. The novel detection of the PWV offers potential for quantitative diagnosis of atherosclerosis [C102]

"Detection of ultrasound contrast agents in perfused myocardium"

Ultrasound (US) imaging is used routinely for assessment of cardiac function. While movement of the valves and the myocardium are well visualized one of the main prospects of using ultrasound for the measurements of cardiac function, myocardial perfusion, has not been achieved. The technique of “Second Harmonic Imaging” is now employed in clinical US imaging systems, allowing better visualization of tissue by measuring its non-linear response. Meanwhile, Contrast Agents (CA) are used to enhance the visualization of the ventricular cavities and large vessels. Since the bubbles (i.e. CA) also respond non-linearly to US-their visualization in tissue by this technique is not good enough. The objective of this study is to detect minute amounts of contrast agents in small vessels, by studying their response to pressure waves-and enhance the difference versus the response of tissue [C103]

"A pressurized gas Cherenkov detector"

We report the performance of a pressurized gas Cherenkov detector with small effective material tested by pion beams at KEK. With its small material (9.1% r.l.), the detector is suitable for particle identification placed at the upstream of electromagnetic calorimeters. The radiator is sulfur hexafluoride, SF6(2.0 MPa), contained in a cylindrical aluminum vessel, 2 m long, 10 cm in diameter, and 2 mm thick. A flat elliptical mirror (45 degrees) was tested for transporting Cherenkov photons to photomultiplier tubes for the tracks in the central region. The measured transmission of ultra-pure sulfur hexafluoride is 72% (200 nm) and 97% (300 nm) per 1 m path at 2.0 MPa. Using the pion beams (0.76-4.0 GeV/c), the number of photoelectrons were measured for different incident positions, angles and momenta. Thresholds of pion momentum were measured as a function of pressures (0.5-1.66 MPa), front which the refractive indexes of SF6were derived at different pressures. The lowest threshold momentum measured was 0.73 GeV/c at 1.66 MPa, corresponding to the refractive index (n-1) of 18.1Ч10-3 [C104]

"A laminar flow model for 3D time-of-flight MR angiography"

A theoretical flow model for laminar flow has been developed by Chen and Hedges (1997). A theoretical flow model for plug flow previously developed by using the Bloch equation was used by Parker et al. (1991) in their paper about MOTSA technique. Both models assume constant flow through a tube of constant circular cross section. However, the plug flow model is used to simulate the signal from the center portion of the flow, which has almost unique flow velocity; while the laminar flow model is used to simulate the average signal from the whole cross section, which has a distribution of flow velocities. For detection of small vessels of width close to the voxel width, the laminar model is more appropriate. Phantom and human subject studies validate the use of laminar flow model for cross-sectional average signal for small vessels [C105]

"A basic study on a miniaturized probe mounted on a puncturing needle"

We have developed a miniaturized ultrasonic probe mounted on an 18-G puncturing needle and applied it to the detection of a flow in a small vessel using a correlation technique. The flow in a small vessel was clearly distinguishable from other regions in correlation images, whereas discrimination was difficult in a conventional B-mode image [C106]

"Mastering beam losses and ageing issues at the ESRF"

The ESRF accelerators have been in full routine operation for more than four years. The source delivers nearly 5600 hours of X-ray beam to 40 beam lines simultaneously, which in turn perform about 700 experiments (or 70.000 hours of experimental work) per year. To maintain free access in the experimental hall only public dose rates are allowed. However, with the installation of small aperture vacuum vessels in straight sections a dramatic increase of bremsstrahlung outside the corresponding optic hutches was experienced. Hence, thorough studies to understand and master beam losses have been undertaken. This required the development of a beam loss detection system and the adoption of the strategy of using scrapers for beam collimating. In addition, great care is taken to detect the first traces of ageing of equipment (for example due to irradiation) and therefore avoid, as far as possible, failures. It is indeed true to say that the more failures there are, the more the beam losses and the more the dose level! [C107]

"Detection of finger-tip blood vessel pulsation using CoSiB thin amorphous wire CMOS-IC SI sensor"

First Page of the Article [C108]

"Reliability evaluation of emboli detection using a statistical approach"

Cerebral emboli detection is a problem of considerable practical importance for monitoring vascular pathologies.

If in most practical in vivo or in vitro experiments, big-size emboli detection seems comfortable, small-size emboli detection remains a challenge. The aim of this paper is to evaluate the performances of micro-emboli detections using statistical tools. The authors first introduce for this purpose a specific decision information through Autoregressive (AR) modeling. To overcome the problem of empirical detection threshold choice and quantify the reliability of the emboli detection, the chosen decision information makes it possible to link the threshold with the probability of false alarm (PFA). The authors then extend this approach to classical detection methods based on nonparametric analysis in order to perform comparisons, by using computer simulation of embolic signal. It is shown that reliable detection is not possible by the classical approaches when the Embolus-to-Blood Ratio (EBR) is lower than 10 dB since in this case the PFA is by far above 10%, whereas the authors' approach can detect small-size emboli with EBR as low as 5 dB since the PFA is then below 5%. In vivo measurements are finally performed in order to validate the authors' approach [C109]

"Ultrasound contrast agents: clinical applications"

Ultrasound contrast agents (USCAs) are now becoming commercially available. During the past decade, both tolerance and efficacy of microbubble USCAs increased in conjunction with the ultrasound instrumentation. Specific contrast image sequences have been developed to take advantage of the specific microbubble ultrasonic properties. USCAs are well tolerated and do not exhibit allergic reactions or renal toxicity. USCAs increase the Doppler signal intensity from vessels of deep location, small caliber, or in case of reduced and/or slow blood flow. They improve the detection of vessels with limited access due to anatomic limitations. Under certain circumstances they can alter the texture to provide tissue perfusion information. In peripheral artery disease, USCAs help identify subocclusive lesions and grade stenoses. In transcranial Doppler, they reduce the technical failure rate. In renal Doppler ultrasonography, they improve the detection and recording of the renal arteries. USCA increase the role of color Doppler sonography as the primary modality in the screening of renovascular hypertension. Contrast-enhanced color Doppler US provides additional information from cortical blood supply. In liver USCAs improve the visualization of the blood flow. In liver transplants, they improve the detection of anastomotic vessel occlusive disorders. Some studies also investigated the potentials of USCA in detecting and characterizing liver, renal, breast and prostate tumors. Quantification of USCA effect is a preliminary step towards functional imaging [C110]

"High resolution true velocity mapping with a 50 MHz pulsed wave Doppler system for dermatology"

Besides morphological imaging blood flow imaging in the skin is of growing interest in dermatology. However, high resolution and sensitive detection techniques have to be applied in order to account for the small vessel diameters and the low flow velocities in the microcirculatory system of the skin. We propose a method for true velocity mapping with high spatial and high velocity resolution to consider the complex vessel structure with different flow directions. With our approach we combine a high resolution strategy for the estimation of the axial velocity and a procedure for transversal flow detection based on the weighting of the echo signal by the point spread function (PSF) of the imaging system are combined. Results from simulations and flow phantom measurements are presented [C111]

"A method for detecting echoes from microbubble contrast agents based on time-variance"

Most ultrasound contrast agents, which are injected into the blood stream, use encapsulated microbubbles as acoustical scatterers in order to increase the reflectivity of the blood. The fact that the acoustic properties of microbubbles and those of scatterers in tissue differ significantly offers various possibilities to develop contrast agent specific imaging techniques. These new imaging modes may overcome the limitations of Doppler modes concerning their axial resolution and their sensitivity to motion artifacts and, therefore, improve the visualization of small vessels and the assessment of perfusion. Insonification can change the acoustic properties of bubbles, e.g., by breaking the shells and thus accelerating shrinkage and diffusion processes. Time-Variance Imaging (TVI), the new imaging mode the authors propose, detects these alterations by processing the echo signals resulting from sequences of broadband transmit pulses. TVI provides high resolution images which show the distribution of microbubbles [C112]

"Topology supported finite element method analysis of catheter/guidewire navigation in reconstructed coronary arteries"

Reports on a real-time finite element method (FEM) for the analysis of catheter and guidewire navigation in coronary arteries. A three-dimensional model of the coronary arterial tree is reconstructed from a professional model using Coordinate Measuring Machine (CMM) probing and the coronary anatomy is represented as a topologic hierarchy structure. Each segment of the vessel is associated only with its relative segments; i.e.

parents and children. By doing so, the boundary checking of the catheter/guidewire in/outside the vessel is performed upon an optimized group of a small number segments and, therefore, has dramatically reduced the time for contact detection and subsequently the computation for catheter navigation. This approach has been applied to the authors' interventional cardiology simulator development [C113]

"High resolution 3D flow mapping in tumors"

Tumor biologists indicate that angiogenesis is required for tumor growth beyond about 1 mm3. Furthermore, regions of increased and decreased vascular density are each on the order of 500 µm. Therefore, it is for tumors whose size is on the order of 1 mm3 that the authors would like to detect this increased vascular density, and a resolution of at least 500 µm is critical. In a small clinical study the authors were able to detect localized vasculature in all malignant masses of diameter 1 cm3or greater, with associated vessels of a size 300 µm or greater. In order to detect very low velocity blood flow in vessels of diameter less than 300 µm, the authors evaluate the feasibility of both nominal 50 MHz color flow mapping without contrast, and 7 MHz color flow mapping with contrast agent. The authors tested these strategies with LNCaP athymic mice, a human prostate tumor model. In a very high frequency study, they detected low velocity flow in vessels as small as 50 µm within and surrounding the tumor. In a 7 MHz contrast study, vessels less than 200 µm were not detected with color flow without a contrast agent. With a contrast agent, the dense vasculature within and surrounding the tumors was detected, however, individual vessels can not be resolved. These tumor models are a new tool to evaluate imaging systems, with both development and morphology being similar to human tumors. The authors have detected both high speed flow in A-V shunts and low velocity flow in these tumor models. Here, they establish the feasibility of 7 MHz contrast assisted imaging for detection of smaller vessels, with the goal of detecting angiogenesis in its earliest stages (i.e. for a 1 mm 3tumor) [C114]

"Detecting small blood vessels in color flow imaging: a statistical approach"

Small blood vessels can be hard to detect with ultrasound imaging, because the blood-to-tissue signal ratio is low and the tissue component is strong. In this paper a model for the Doppler signal and a likelihood test for blood detection are presented. A maximum likelihood estimator for the blood Doppler frequency is presented and shown to be unbiased, while the commonly used autocorrelation estimate is biased for small velocities. A Neyman-Pearson probability test can be performed if the clutter spectrum and the blood Doppler frequency are known. Using a measured tissue signal and a modeled blood signal with narrow bandwidth, a theoretical minimum detectable blood velocity was found. Using a signal sampled from 8 pulses (a packet size of 8), a PRF of 250 Hz, a blood-to-tissue ratio of -40 dB and a tissue-to-noise ratio of 60 dB, the low velocity limit was found to be 4.3 mm/s for 6 MHz ultrasound. With a smaller packet size, the low velocity limit was higher, and for a packet size less than 4 the blood signal was not detectable [C115]

"Dynamic spectral analysis of arterial Doppler blood flow signals using time-frequency representations"

Doppler signals from a disturbed arterial blood flow are very likely to be nonstationary for they usually have a time-varying frequency structure caused by a complicated flow pattern. Therefore conventional Fourier analysis based methods are unsuitable for this application. This paper introduces the application of joint time-frequency analysis (TFA) to estimate the frequency dynamics of arterial Doppler blood flow signals and to detect the presence of small stenoses of the artery. The short time Fourier transform (STFT), Wigner distribution (WD), and Choi-Williams distribution (CWD) were investigated. The results of synthetic signal analysis show that the STFT, WD and CWD follow the transient changes of frequency well, and the STFT and CWD also behave well for multicomponent signals. Doppler spectra were obtained by means of the FFT, STFT, WD, and CWD for different flow rates and positions along a simulated blood vessel for stenoses ranging from 2% to 25% cross sectional area reduction (CSAR) using a blood analogue. The results indicate that all of these methods are to some extent capable of detecting stenoses as small as 2% CSAR by identifying the existence of negative frequency components in the spectra, and the CWD appears at this stage to be superior to the STFT and WD [C116]

"Inspection experience in determining fabrication flaws in a reactor pressure vessel using SAFT-UT"

Pacific Northwest National Laboratory has examined U.S. reactor pressure vessel material in order to measure the density and size of fabrication flaws. The Pressure Vessel Research User Facility (PVRUF) vessel at Oak Ridge National Laboratory was inspected using the Synthetic Aperture Focusing Technique for Ultrasonic Testing field data acquisition system. An inspection methodology was developed specifically for recording small fabrication flaws. This methodology was used to detect and characterize 2500 indications in the PVRUF vessel. Rules were developed and applied to the detection process. The characterization steps have been documented.

The spatial dependence of the indication density shows the greater concentration of fabrication flaws in the weld metal and heat affected zone compared to the base metal [C117]

"A high frequency continuous-wave Doppler ultrasound system for detection of blood flow in the microcirculation"

Basic ultrasound physics and several clinical and experimental observations suggest that high frequency Doppler ultrasound (HFD) operating in the frequency range 20 to 100 MHz holds the promise of a real-time, non-invasive, depth-resolving technique capable of detecting blood flow in the microcirculation with suitable spatial and temporal resolutions. This paper describes a directional, continuous-wave, high frequency Doppler ultrasound (CW HFD) system which we have developed and optimised for use in an investigation to quantify HFD's abilities. The system electronics operates over the frequency range 1 to 200 MHz and has a dynamic range of 100 dB and a noise floor of 10 nV. Using a string phantom and a sensitive 40 MHz transducer we show that HFD can detect and measure velocities of the order of 1 mm/s, the velocity of blood in a capillary. Also, using in vivo measurements we demonstrate that HFD is sensitive to the detection of blood flow in small vessels [C118]

"A study on the feasibility of using power level for detection of turbulence and vessel differentiation in Doppler power imaging"

Power Doppler imaging was used in this study to detect flow turbulence and the effect of flow shear on blood cell aggregation. Porcine RBC saline suspensions of different hematocrits were circulated in a steady flow loop containing a 318" ID tube. A mesh screen, formed by gold-plated needles was installed in the tube to generate now disturbance. It has previously been shown that flow disturbance can increase ultrasonic echogenicity and Doppler power. In this study, images were taken with a power Doppler scanner and analyzed with a digital frame grabber to investigate the influence of the turbulence on Doppler power at different hematocrits, flow speeds and positions relative to the mesh screen. The increase of intensity of the Doppler images indicates increase of Doppler power and can aid in detecting the flow disturbance behind arterial stenosis. A second study, on porcine whole blood was undertaken in a steady flow loop containing 3/16" ID tube with an additional reservoir and shunt in the loop so that the inflow and outflow speed can be varied. Doppler power imaging showed a difference of intensity between inflow and outflow as the flow (or shear) rate was changed This difference could help in discriminating small arteries and veins [C119]

"A hierarchical neural network architecture that learns target context: applications to digital mammography"

An important problem in image analysis is finding small objects in large images. The problem is challenging because: 1) searching a large image is computationally expensive; and 2) small targets (on the order of a few pixels in size) have relatively few distinctive features which enable them to be distinguished from non-targets. To overcome these challenges the authors have developed a hierarchical neural network architecture which combines multiresolution pyramid processing with neural networks. Here the authors discuss the application of their hierarchical neural network architecture to the problem of detecting microcalcifications in digital mammograms. Microcalcifications are cues for breast tumors. 30% to 50% of breast carcinomas have microcalcifications visible in mammograms while 60% to 80% of all breast tumors eventually show microcalcifications via histology. Similar to the building/ATR problem, microcalcifications are generally very small point-like objects (<10 pixels in mammograms) which are hard to detect. Radiologists must often exploit other information in the imagery (e.g. location of blood vessels, ducts, etc.) in order to detect these microcalcifications. Here the authors examine how well their hierarchical neural network architecture learns and exploits contextual information in mammograms [C120]

"Harmonic power mode Doppler using microbubble contrast agents: an improved method for small vessel flow imaging"

By virtue of their ability to enhance the weak echoes received from flow in small blood vessels, ultrasound contrast agents render flow in a lower level of the circulation detectable to colour Doppler imaging. We combine contrast imaging with power Doppler, which is a more appropriate colour mode for contrast enhanced Doppler imaging. We demonstrate that the combination of harmonic Doppler and the enhancement of the Doppler signal by the contrast agent produces an in vivo gain of more than 30 dB in the signal-to-clutter ratio. Harmonic power Doppler imaging demonstrates flow in the cortex of the kidney to within 2 mm of the capsule, even in the presence of respiratory motion. Histological correlation of the Doppler images with sections of the cortical vasculature suggest that flow is detected in interlobular arterioles of mean diameter 44 μm. We conclude that the new method holds promise for the clinical detection of small vessel flow in moving solid tissue [C121]

"Contour extraction from HVEM image of microvessel using active contour models"

Reports research results on contour extraction from high voltage electron microscope (HVEM) images of thick cross section montages of small blood vessels. The previous work on this subject which was based on the conventional edge detection operations combined with edge linking, has proven inadequate to describe the inner structural compartments of microvessels. Here an active contour model (commonly referred to as “Snakes”) has been applied to advance the previous work. Active contour models have proven themselves to be a powerful and flexible paradigm for many problems in image understanding, especially in contour extraction from medical images. With the developed energy functions, the active contour is attracted towards the edges under the action of internal forces (describing some elasticity properties of the contour), image forces and external forces by means of minimization of the energy functions. Based on this active model, an effective algorithm is implemented as a powerful tool for 2D contour extraction in the authors' problem for the first time. The results thus obtained turn out to be encouraging [C122]

"Commissioning and performance of the Advanced Light Source"

The Advanced Light Source (ALS) at the Lawrence Berkeley Laboratory is the first of the lower energy (1 to 2 GeV) third-generation synchrotron radiation facilities to come into operation. Designed with very small electron beam emittances, to operate with long insertion devices to produce very high brightness beams of synchrotron radiation in the VUV and soft X-ray regions of the spectrum, these facilities are complementary to the higher energy (6 to 9 GeV) facilities designed for harder X-radiation. From the earliest periods of their design it was recognized that the performance of the required low-emittance lattices would be dominated by nonlinear particle dynamics caused by the strong lattice sextupoles required for chromatic correction, the effects of undulators and wigglers, and the requirement for very narrow-gap vacuum vessels. Commissioning of the ALS storage ring began early in 1993. In this paper we will briefly review the main characteristics of the storage ring design, describe our commissioning experiences, and review the present performance and performance limitations of the facility [C123]

"Assessment of vessel complexity in knowledge-based coronary border detection"

First Page of the Article [C124]

"Artificial oil pollution detection and wave observation in the sea adjacent to Japan by ERS-1 SAR images"

In 1991 and 1992 the authors made experiments to detect an artificial oil slick areas and ocean waves by use of the C-band SAR of ERS-1. Artificial slick areas were produced by spilling oleyl alcohol from a small vessel in the Pacific Ocean about 100 km off the coasts of Cape Omaezaki in 1991 and Peninsula Kii in 1992. Sea truth data was gathered from a small vessel. The sea surface conditions were also observed by X-band, VV-polarization real aperture SLAR of CRL synchronously. The SAR images were processed by NASDA. The authors succeeded in clearly finding the artificially polluted areas as dark patches. The damping of the scattered powers was nearly 4 dB for the wind speed condition below 11 m/s [C125]

"A Sheath Breach Detector For Use In Fixed In-vessel Instrumentation Assemblies"

First Page of the Article [C126]

"An Unbiased Technique For Automatic Estimation Of Vessel Contours In Angiograms"

First Page of the Article [C127]

"Adaptive simultaneous coronary border detection: a method for accurate analysis of small diameter vessels"

Accurate automated identification of coronary borders is difficult to achieve in vessels smaller than 1 mm. In diameter using existing techniques. The authors new approach uses a two-stage automated adaption of edge operator parameters to match the local lumen diameter. In the first stage, approximate lumen diameters are detected using a half-resolution simultaneous coronary border detection algorithm. At each point along the vessel, the approximate diameter is used to select an optimal edge operator for the second full-resolution border detection stage. The method was tested in a set of 72 segments of 9 angiographic phantom vessels with diameters ranging from 0.46 mm to 4.14 mm. Performance of the adaptive method was compared to performance of a conventional coronary border detection, method. Adaptive simultaneous coronary border

detection significantly reduced diameter estimation errors in comparison to conventional border detection ($p<0.001$). Adaptive coronary border detection substantially improves border detection accuracy in small diameter phantom vessels [C128]

"Edge detection in quantitative coronary arteriography (QCA): the impact of image zoom on edge positioning, accuracy, precision and discrimination"

In geometric QCA, the edge detection (ED) overestimates vessels in the small diameter range (SR, <1.5 mm) due to imaging limitations. Subsequent diameter correction enforces accurate but imprecise corrected diameters. To improve the starting conditions for further analysis the authors used 1-6-fold zoom in phantoms and measured each diameter 240 times by automated ED with optimized weighting of the first and second derivative and subsequent isocenter calibration. The positioning of the second derivative is zoom dependent. In derivative weighting ED, zoom shifts the edges over the entire range toward the vessel center, while in first derivative based ED this occurs only in SR. Zoom improves the accuracy but deteriorates precision of the native measurements. Based on discrimination as the optimality criterion, 3-4-fold zoom is optimal. By applying optimal zoom, precision after diameter correction was doubled [C129]

"Inflow MR angiography: phantom studies of simulated plaques and aneurysms"

The reduction of simulated plaques in a steady state and pulsatile flow phantom using inflow MR (magnetic resonance) angiography is evaluated. It was found that inflow MR angiography can detect subcritical plaques of 0.25 mm to 4.00 mm sizes with either steady state or pulsatile flow. Detected lesions appeared up to 50% larger than the actual size in the simulated plaque study. The results of the aneurysm study were not as positive. Aneurysms were much more difficult to detect due to signal void in the aneurysms. In some cases where the aneurysms were small, the aneurysm could not be detected. The angle of positive identification is important for the detection of lesions. This is even more important in the case of aneurysms, because vessels normally have high signals and can obscure even large lesions at some angle [C130]

"Vasculature Detection In Angiograms Using Active Contours"

First Page of the Article [C131]

"Networking for highly distributed and mobile C3I systems using short wavelength, agile-beam communications technologies"

Communications for highly distributed and mobile military command, control, communications, and intelligence (C3I) systems, such as constellations of sensor satellites or formations of aircraft, tactical vehicles, or naval vessels, pose unique challenges with regard to network management, low probability of intercept, and robustness. Short wavelength, agile-beam transmitters and spatially resolving multichannel receiver technologies provide viable options for meeting these communications challenges. These technologies include open-loop direct detection optical communications or millimeter-wave technologies. An example of such communications is developed and characterized for a hypothetical constellation of small surveillance satellites. This is followed by a discussion of how the approach might be applied to other C3I nodes having less regular motion [C132]

"Edge detection for coronary angiograms: error correction and impact of derivatives"

The quantification of stenosed coronary arteries is influenced by several disturbances at image generation and by the contour detection itself. These factors are described, quantified, and, if possible, corrected to achieve an improved accuracy in measuring vessel diameters. The X-ray device causes a geometric distortion (pincushion effect). It is directed both radially and irregularly. Several correction methods have been applied to X-ray phantoms in order to increase the accuracy of measurement. The phantom study serves as a validation of the coronary analysis system and its correction methods. The accuracy of measurement was increased using image zoom and the correction of image distortion and pointspreading. With the help of the applied corrections the relative error in the range of small vessels was reduced from 77.2% down to 3.2% [C133]

СПИСОК ЛИТЕРАТУРЫ

C1. Wei Pi. An effective quality improvement approach for low quality finger vein image. / Wei Pi, Jinook Shin,

Dongsun Park. // 2010 International Conference On Electronics and Information Engineering (ICEIE). - Kyoto, 1-3 Aug. 2010. - Vol. 1. - P. V1-424-V1-427-424.

C2. Hinow M. Determination of gas leakage rate of gis-test systems by measurement of pressure and temperature. / Hinow M., Pietsch R., Graber L., Voigt M. // Conference Record of the 2010 IEEE International Symposium on Electrical Insulation (ISEI). - San Diego, CA, 6-9 June 2010. - P. 1-5.

C3. Youssef D. New feature-based detection of blood vessels and exudates in color fundus images. / Youssef D., Solouma N., El-dib A., Mabrouk M., Youssef A.-B. // 2010 2nd International Conference on Image Processing Theory Tools and Applications (IPTA). - Paris, 7-10 July 2010. - P. 294-299.

C4. Ren Yan-hua. A 3D segmentation method of lung parenchyma based on CT image sequences. / Ren Yan-hua, Sun Xi-wen, Nie Sheng-dong. // 2010 International Conference on Information Networking and Automation (ICINA). - Kunming, 18-19 Oct. 2010. - Vol. 2. - P. V2-332-V2-336-332.

C5. Lo K.W. Underwater acoustic sensor localization using a broadband sound source in uniform linear motion. / Lo K.W., Ferguson B.G. // OCEANS 2010 IEEE-Sydney. - Sydney, NSW, 24-27 May 2010. - P. 1-7.

C6. Suh J.W. Serial nonrigid vascular registration using weighted normalized mutual information. / Suh J.W., Scheinost D., Qian X., Sinusas A.J., Breuer C.K., Papademetris X. // 2010 IEEE International Symposium on Biomedical Imaging: From Nano to Macro. - Rotterdam, 14-17 April 2010. - P. 25-28.

C7. Vakoc B.J. In vivo imaging of microvasculature using optical coherence tomography. / Vakoc B.J., Lanning R.M., Tyrrell J.A., Padera T.P., Bartlett L.A., Stylianopoulos T., Munn L.L., Tearney G.J., Fukumura D., Jain R.K., Bouma B.E. // 2010 IEEE Photonics Society Winter Topicals Meeting Series (WTM). - Majorca, 11-13 Jan. 2010. - P. 59-60.

C8. Chetty K. Passive bistatic WiMAX radar for marine surveillance. / Chetty K., Woodbridge K., Hui Guo, Smith G.E. // 2010 IEEE Radar Conference. - Washington, DC, 10-14 May 2010. - P. 188-193.

C9. Wong D.W.K. Method of detecting kink-bearing vessels in a retinal fundus image. / Wong D.W.K., Jiang Liu, Joo Hwee Lim, Ngan Meng Tan, Zhuo Zhang, Huiqi Li, Shijian Lu, Tien Yin Wong. // 2010 the 5th IEEE Conference on Industrial Electronics and Applications (ICIEA). - Taichung, 15-17 June 2010. - P. 1690-1694.

C10. Ying Huajun. Automated localization of macula-fovea area on retina images using blood vessel network topology. / Ying Huajun, Liu Jyh-Charn. // 2010 IEEE International Conference on Acoustics Speech and Signal Processing (ICASSP). - Dallas, TX, USA, 14-19 March 2010. - P. 650-653.

C11. Fillinger Laurent. Towards a passive acoustic underwater system for protecting harbours against intruders. / Fillinger Laurent, de Theije Pascal, Zampolli Mario, Sutin Alexander, Salloum Hady, Sedunov Nikolay, Sedunov Alexander. // 2010 International Waterside Security Conference (WSS). - Carrara, Italy, 3-5 Nov. 2010. - P. 1-7.

C12. Bruno Michael. Concurrent use of satellite imaging and passive acoustics for maritime domain awareness. / Bruno Michael, Chung Kil Woo, Salloum Hady, Sedunov Alexander, Sedunov Nikolay, Sutin Alexander, Graber Hans, Mallas Paul. // 2010 International Waterside Security Conference (WSS). - Carrara, Italy, 3-5 Nov. 2010. - P. 1-8.

C13. Kruger Wolfgang. Robust layer-based boat detection and multi-target-tracking in maritime environments. / Kruger Wolfgang, Orlov Zigmund. // 2010 International Waterside Security Conference (WSS). - Carrara, Italy, 3-5 Nov. 2010. - P. 1-7.

C14. Percival Aaron M. CUwPS: An integrated system for the detection, localization, and classification of underwater threats. / Percival Aaron M., Crowe D. Vance, Crawford Anna. // 2010 International Waterside Security Conference (WSS). - Carrara, Italy, 3-5 Nov. 2010. - P. 1-7.

C15. Muller Rolf. Net based waterside security applications: From small solutions to maritime security networks. / Muller Rolf, Brook Chris. // 2010 International Waterside Security Conference (WSS). - Carrara, Italy, 3-5 Nov. 2010. - P. 1-6.

C16. Wang Xing-ce. The study of pre-processing method of brain vessel segmentation based on parameterized statistical model. / Wang Xing-ce, Xu Feng, Leng Chang, Zhou Ming-quan, Wu Zhong-ke, Liu

Xin-yu. // 2010 IEEE Fifth International Conference on Bio-Inspired Computing: Theories and Applications (BIC-TA). - Changsha, 23-26 Sept. 2010. - P. 90-94.

C17. Namin S.T. Automated detection and classification of pulmonary nodules in 3D thoracic CT images. / Namin S.T., Moghaddam H.A., Jafari R., Esmaeil-Zadeh M., Gity M. // 2010 IEEE International Conference on Systems Man and Cybernetics (SMC). - Istanbul, 10-13 Oct. 2010. - P. 3774-3779.

C18. Vesecky J.F. A system trade model for the monitoring of coastal vessels using HF surface wave radar and ship automatic identification systems (AIS). / Vesecky J.F., Laws K.E., Paduan J.D. // 2010 IEEE International Geoscience and Remote Sensing Symposium (IGARSS). - Honolulu, HI, 25-30 July 2010. - P. 3414-3417.

C19. Ayob N.M.N. Detection of small gas bubble using ultrasonic transmission-mode tomography system. / Ayob N.M.N., Rahiman M.H.F., Zakaria Z., Yaacob S., Rahim R.A. // 2010 IEEE Symposium on Industrial Electronics & Applications (ISIEA). - Penang, 3-5 Oct. 2010. - P. 165-170.

C20. Sorensen E. Passive acoustic sensing for detection of small vessels. / Sorensen E., Ou H.H., Zurk L.M., Siderius M. // OCEANS 2010. - Seattle, WA, 20-23 Sept. 2010. - P. 1-8.

C21. Xiao-Ming Li. Utilization of ASAR wave mode data for shipping safety. / Xiao-Ming Li, Lehner S. // OCEANS 2009-EUROPE. - Bremen, 11-14 May 2009. - P. 1-5.

C22. Jeong-Joo Seo. Automatic Segmentation of Hepatic Vessels in Abdominal MDCT Image. / Jeong-Joo Seo, Jong-Won Park. // 2009. ICCIT '09. Fourth International Conference on Computer Sciences and Convergence Information Technology. - Seoul, 24-26 Nov. 2009. - P. 420-424.

C23. Polygerinos P. A fibre-optic catheter-tip force sensor with MRI compatibility: A feasibility study. / Polygerinos P., Schaeffter T., Seneviratne L., Althoefer K. // 2009. EMBC 2009. Annual International Conference of the IEEE Engineering in Medicine and Biology Society. - Minneapolis, MN, 3-6 Sept. 2009. - P. 1501-1054.

C24. Demir S. Image processing and machine learning for diagnostic analysis of microcirculation. / Demir S., Mirshahi N., Tiba M.H., Draucker G., Ward K., Hobson R., Najarian K. // 2009. CME. ICME International Conference on Complex Medical Engineering. - Tempe, AZ, 9-11 April 2009. - P. 1-5.

C25. Yichang Tsai. GIS-enabled maritime awareness system (GMAS). / Yichang Tsai, Zhaozheng Hu, Siplon P. // 2009. HST '09. IEEE Conference on Technologies for Homeland Security. - Boston, MA, 11-12 May 2009. - P. 584-590.

C26. Savrukhin P.V. Identification of the small-scale x-ray perturbations during magnetic reconnection in the T-10 tokamak plasma. / Savrukhin P.V., Sushkov A.V., Trukhin V.M., Popova E.V., Sarichev D.V. // 2009. ICOPS 2009. IEEE International Conference on Plasma Science-Abstracts. - San Diego, CA, 1-5 June 2009. - P. 1.

C27. Costley R.D. Acoustic detection of motor vessel signals in very shallow water. / Costley R.D., Williams J.E., Muir T.G. // MTS/IEEE Biloxi-Marine Technology for Our Future: Global and Local Challenges OCEANS 2009. - Biloxi, MS, 26-29 Oct. 2009. - P. 1-4.

C28. Provost J. Non-invasive localization and quantification of graded ischemia using Electromechanical Wave Imaging in vivo. / Provost J., Wei-Ning Lee, Fujikura K., Konofagou E.E. // 2009 IEEE International Ultrasonics Symposium (IUS). - Rome, 20-23 Sept. 2009. - P. 475-478.

C29. Congxian Jia. 3D elasticity imaging on an open-chest dog heart. / Congxian Jia, Kolias T.J., Rubin J.M., Ping Yan, Sinusas A.J., Dione D.P., Duncan J.S., Qifeng Wei, Thiele K., Lingyun Huang, Sheng-Wen Huang, O'Donnell M. // 2009 IEEE International Ultrasonics Symposium (IUS). - Rome, 20-23 Sept. 2009. - P. 155-158.

C30. Martins C.I.O. Evaluation of retinal vessel segmentation methods for microaneurysms detection. / Martins C.I.O., Medeiros F.N.S., Veras R.M.S., Bezerra F.N., Cesar R.M. // 2009 16th IEEE International Conference on Image Processing (ICIP). - Cairo, 7-10 Nov. 2009. - P. 3365-3368.

C31. Wong D.W.K. Enhancement of optic cup detection from ARGALI using key points. / Wong D.W.K., Tan N.M., Liu J., Tan Z., Tang Y., Zhang Z., Lim J.H., Ng W.J., Li H., Lu S., Wong T.Y. // 2009. ICBPE '09. International Conference on Biomedical and Pharmaceutical Engineering. - Singapore, 2-4 Dec. 2009. - P. 1-5.

C32. Vesecky J.F. Using HF surface wave radar and the ship Automatic Identification System (AIS) to monitor coastal vessels. / Vesecky J.F., Laws K.E., Paduan J.D. // IGARSS 2009 Geoscience and Remote Sensing Symposium,2009 IEEE International. - Cape Town, 12-17 July 2009. - Vol. 3. - P. III-761-III-764-761.

C33. Akbari Hamed. Hyperspectral imaging and diagnosis of intestinal ischemia. / Akbari Hamed, Kosugi Yukio, Kojima Kazuyuki, Tanaka Naofumi. // 2008. EMBS 2008. 30th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. - Vancouver, BC, 20-25 Aug. 2008. - P. 1238-1241.

C34. Umetani Keiji. Microangiography system for investigation of metabolic syndrome in rat model using synchrotron radiation. / Umetani Keiji, Fukushima Kazuhito, Sugimura Kazuro. // 2008. EMBS 2008. 30th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. - Vancouver, BC, 20-25 Aug. 2008. - P. 2693-2696.

C35. Yedidya T. Tracking of Blood Vessels in Retinal Images Using Kalman Filter. / Yedidya T., Hartley R. // 2008. DICTA '08.Digital Image Computing: Techniques and Applications. - Canberra, ACT, 1-3 Dec. 2008. - P. 52-58.

C36. Noyel G. Filtering, segmentation and region classification by hyperspectral mathematical morphology of DCE-MRI series for angiogenesis imaging. / Noyel G., Angulo J., Jeulin D., Balvay D., Cuenod C.-A. // 2008. ISBI 2008. 5th IEEE International Symposium on Biomedical Imaging: From Nano to Macro. - Paris, 14-17 May 2008. - P. 1517-1520.

C37. Kaftan J.N. Locally adaptive fuzzy pulmonary vessel segmentation in contrast enhanced CT data. / Kaftan J.N., Bakai A., Dasc M., Aach T. // 2008. ISBI 2008. 5th IEEE International Symposium on Biomedical Imaging: From Nano to Macro. - Paris, 14-17 May 2008. - P. 101-104.

C38. Chang S.H. Small retinal vessel extraction using modified Canny edge detection. / Chang S.H., Leiguang Gong, Maoqing Li, Xiaoying Hu, Jingwen Yan. // 2008. ICALIP 2008. International Conference on Audio, Language and Image Processing. - Shanghai, 7-9 July 2008. - P. 1255-1259.

C39. Xiaolin Gu. Parametric imaging of blood perfusion with low-cost diagnostic ultrasound equipment. / Xiaolin Gu, Hui Zhong, Mingxi Wan, Xiaowen Hu, Dan Lv, Liang Shen, Xiaomei Zhang. // 2008. IUS 2008. IEEE Ultrasonics Symposium. - Beijing, 2-5 Nov. 2008. - P. 1338-1341.

C40. Taylor R. Evolution of a benthic imaging system from a towed camera to an automated habitat characterization system. / Taylor R., Vine N., York A., Lerner S., Hart D., Howland J., Prasad L., Mayer L., Gallager S. // OCEANS 2008. - Quebec City, QC, 15-18 Sept. 2008. - P. 1-7.

C41. Buchman A. Ultrasonic echo detection: Experiments using large beam angle transducers in narrow tubes. / Buchman A., Lungu S., Oniga S., Tisan A. // 2008. ISSE '08. 31st International Spring Seminar on Electronics Technology. - Budapest, 7-11 May 2008. - P. 111-116.

C42. Leong H. The effects of sea clutter on the performance of HF Surface Wave Radar in ship detection. / Leong H., Ponsford A. // 2008. RADAR 08. IEEE Radar Conference. - Rome, 26-30 May 2008. - P. 1-6.

C43. Karsikas M. Improving reliability of 'Total-Cosine-R-to-T' (TCRT) in patients with acute myocardial Infarction. / Karsikas M., Huikuri H., Seppanen T. // 2008 Computers in Cardiology. - Bologna, 14-17 Sept. 2008. - P. 373-376.

C44. De Nunzio Giorgio. Lung uniformization for juxta-pleural nodule detection. / De Nunzio Giorgio, Massafra Andrea, Martina Luigi, Cataldo Rosella, Maglio Silvio, Quarta Maurizio, Retico Alessandra, Bolanos Lourdes. // 2008. NSS '08. IEEE Nuclear Science Symposium Conference Record. - Dresden, Germany, 19-25 Oct. 2008. - P. 4429-4432.

C45. Kone Z. Sensor Repositioning to Improve Undersea Sensor Field Coverage. / Kone Z., Rowe E.G., Wettergren T.A. // OCEANS 2007. - Vancouver, BC, Sept. 29 2007-Oct. 4 2007. - P. 1-6.

C46. Pinter S.Z. 12B-1 Detectability of Small Blood Vessels Using High-Frequency Power Doppler Ultrasound. / Pinter S.Z., Lacefield J.C. // 2007. IEEE Ultrasonics Symposium. - New York, NY, 28-31 Oct. 2007. - P. 1085-1088.

C47. Ai-Ho Liao. 10C-5 Identification of Hepatocellular Carcinomas with Contrast Enhanced 40 MHz

Ultrasound in Hepatitis B Virus X Protein Transgenic Mice. / Ai-Ho Liao, Ya-Chien Cheng, Shiou-Hwei Yeh, Pai-Chi Li. // 2007. IEEE Ultrasonics Symposium. - New York, NY, 28-31 Oct. 2007. - P. 896-899.

C48. Prien R. Technologies for new in situ chemical sensors. OCEANS 2007-Europe. - Aberdeen, 18-21 June 2007. - P. 1-6.

C49. Gross P. The application of sector scanning sonar and multibeam imaging sonar for underwater security. / Gross P., Andrew P. // OCEANS 2007. - Vancouver, BC, Sept. 29 2007-Oct. 4 2007. - P. 1-7.

C50. Osborne P.D. Full-Scale Measurements of High Speed Passenger Ferry Performance and Wake Signature. / Osborne P.D., Hericks D.B., Cote J.M. // OCEANS 2007. - Vancouver, BC, Sept. 29 2007-Oct. 4 2007. - P. 1-10.

C51. Bin Xu. Analysis of local observability for feature localization in a maritime environment using an omnidirectional camera. / Bin Xu, Stilwell D.J., Gadre A.S., Kurdila A. // 2007. IROS 2007. IEEE/RSJ International Conference on Intelligent Robots and Systems. - San Diego, CA, Oct. 29 2007-Nov. 2 2007. - P. 3666-3671.

C52. Masuda K. Development of recognition software of heart to find the standard cross section on echocardiography. / Masuda K., Matsuura H., Imai T., Inoue H. // 2007. EMBS 2007. 29th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. - Lyon, 22-26 Aug. 2007. - P. 351-354.

C53. Frattolillo A. A powerful tool to quantitatively detect tiny amounts of 4He in a deuterium rich background for fusion research. / Frattolillo A., De Ninno A. // 2007. SOFE 2007. 2007 IEEE 22nd Symposium on Fusion Engineering. - Albuquerque, NM, 17-21 June 2007. - P. 1-4.

C54. Evans K.D. Leak Location & Sealing using Platelet TechnologyTM. / Evans K.D., Ryan N.J., McEwan I.K. // OCEANS 2007-Europe. - Aberdeen, 18-21 June 2007. - P. 1-4.

C55. Sihua Yang. In vivo Detection of Lesion and Hemorrhage in Mouse Brain using Noninvasive Photoacoustic Imaging. / Sihua Yang, Da Xing, Diwu Yang, Yeqi Lao, Lvming Zeng, Liangzhong Xiang. // 2007. CME 2007. IEEE/ICME International Conference on Complex Medical Engineering. - Beijing, 23-27 May 2007. - P. 1014-1017.

C56. Ming Zhang. Directional Local Contrast Based Blood Vessel Detection in Retinal Images. / Ming Zhang, Jyh-Charn Liu. // 2007. ICIP 2007. IEEE International Conference on Image Processing. - San Antonio, TX, Sept. 16 2007-Oct. 19 2007. - Vol. 4. - P. IV-317 - IV - 320-317.

C57. Umetani K. In Vivo Cerebral Artery Microangiography in Rat and Mouse Using Synchrotron Radiation Imaging System. / Umetani K., Kidoguchi K., Morishita A., Oizumi X.-S., Tamaki M., Yamashita H., Sakurai T., Kondoh T. // 2007. EMBS 2007. 29th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. - Lyon, 22-26 Aug. 2007. - P. 3926-3929.

C58. Lam B.S.Y. Blood Vessel Extraction Based on Mumford Shah Model and Skeletonization. / Lam B.S.Y., Hong Yan. // 2006 International Conference on Machine Learning and Cybernetics. - Dalian, China, 13-16 Aug. 2006. - P. 4227-4232.

C59. Noest E. Oil spill detection system-results from field trials. / Noest E., Egset C.N. // OCEANS 2006. - Boston, MA, 18-21 Sept. 2006. - P. 1-6.

C60. Ferguson B.G. Advances in High-Frequency Active Sonars for Countering Asymmetric Threats in Littoral Waters. / Ferguson B.G., Lo K.W., Wyber R.J. // OCEANS 2006. - Boston, MA, 18-21 Sept. 2006. - P. 1-6.

C61. Wang Y. Study on the error in the dynamic spectrum method relative with the pathlength factor as a function of wavelength. / Wang Y., Li G., Lin L., Liu Y.L., Li X.X. // 2005. IEEE-EMBS 2005. 27th Annual International Conference of the Engineering in Medicine and Biology Society. - Shanghai, 17-18 Jan. 2006. - P. 6679-6682.

C62. Ming Zhang. On the Small Vessel Detection in High Resolution Retinal Images. / Ming Zhang, Di Wu, Jyh-Charn Liu. // 2005. IEEE-EMBS 2005. 27th Annual International Conference of the Engineering in Medicine and Biology Society. - Shanghai, 17-18 Jan. 2006. - P. 3177-3179.

C63. Uchiyama Y. Computer-Aided Diagnosis Scheme for Detection of Unruptured Intracranial Aneurysms in MR Angiography. / Uchiyama Y., Ando H., Yokoyama R., Hara T., Fujita H., Iwama T. // 2005. IEEE-EMBS 2005. 27th Annual International Conference of the Engineering in Medicine and Biology Society. - Shanghai, 17-18 Jan. 2006. - P. 3031-3034.

C64. Hsiao C.-C. The Quantitative Assessment of Gd-DTPA in Contrast Enhanced Magnetic Resonance Angiography. / Hsiao C.-C., Jao J.-C., Ting Y.-N., Pan H.-B., Lai S.-T., Chen P.-C. // 2005. IEEE-EMBS 2005. 27th Annual International Conference of the Engineering in Medicine and Biology Society. - Shanghai, 17-18 Jan. 2006. - P. 1385-1387.

C65. Ward Keith. High Resolution Radar Imaging of the Sea Surface. / Ward Keith, Tough Robert. // 2006. The Institution of Engineering and Technology Seminar on High Resolution Imaging and Target Classification. - London, 21-21 Nov. 2006. - P. 39-52.

C66. Giani A. Detecting false vessel recognitions in retinal fundus analysis. / Giani A., Grisan E., De Luca M., Ruggeri A. // 2006. EMBS 06. 28th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. - New York, NY, Aug. 30 2006-Sept. 3 2006. - P. 4449-4452.

C67. Uchiyama Y. Automated Classification of Cerebral Arteries in MRA Images and Its Application to Maximum Intensity Projection. / Uchiyama Y., Yamauchi M., Ando H., Yokoyama R., Hara T., Fujita H., Iwama T., Hoshi H. // 2006. EMBS 06. 28th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. - New York, NY, Aug. 30 2006-Sept. 3 2006. - P. 4865-4868.

C68. Liu X.U. Water Flow Based Vessel Detection in Retinal Images. / Liu X.U., Nixon M.S. // 2006. VIE 2006. IET International Conference on Visual Information Engineering. - Bangalore, India, 26-28 Sept. 2006. - P. 345-350.

C69. Tian S. A Vessel Detection Method Using ASAR AP Data. / Tian S., Wang C., Zhang H. // 2006. IGARSS 2006. IEEE International Conference on Geoscience and Remote Sensing Symposium. - Denver, CO, USA, July 31 2006-Aug. 4 2006. - P. 3164-3166.

C70. Qin Li. A New Approach to Automated Retinal Vessel Segmentation Using Multiscale Analysis. / Qin Li, You J., Lei Zhang, Zhang D., Bhattacharya P. // 2006. ICPR 2006. 18th International Conference on Pattern Recognition. - Hong Kong, 2006. - Vol. 4. - P. 77-80.

C71. Choi J.J. 2F-5 Optimization of Blood-Brain Barrier Opening in Mice using Focused Ultrasound. / Choi J.J., Small S.A., Konofagou E.E. // 2006. IEEE Ultrasonics Symposium. - Vancouver, BC, 2-6 Oct. 2006. - P. 540-543.

C72. Zhang F. Illicit Vessel Identification In Inland Waters using SAR Image. / Zhang F., Wu B., Zhang L., Huang H., Tian Y. // 2006. IGARSS 2006. IEEE International Conference on Geoscience and Remote Sensing Symposium. - Denver, CO, USA, July 31 2006-Aug. 4 2006. - P. 3144-3147.

C73. Linck J.E. Magnetic field measurements of limpet mines attached to a ship's steel hull. / Linck J.E., Holmes J.J., Gardner J.C. // 2005. Proceedings of MTS/IEEE OCEANS. 2005. - P. 601-606.

C74. Guinvarc'h R. Electromagnetic interactions between a high frequency surface wave and a ship. / Guinvarc'h R., Durand R. // 2005 IEEE International Radar Conference. 9-12 May 2005. - P. 474-477.

C75. Jing Jiang. ARGDYP: an Adaptive Region Growing and DYnamic Programming Algorithm for Stenosis Detection in MRI. / Jing Jiang, Ming Dong, Haacke E.M. // 2005. Proceedings. (ICASSP '05). IEEE International Conference on Acoustics, Speech, and Signal Processing. March 18-23, 2005. - Vol. 2. - P. 465-468.

C76. Yu-Qiu Sun. Background suppression based-on wavelet transformation to detect infrared target. / Yu-Qiu Sun, Jin-Wen Tian, Jian Liu. // 2005. Proceedings of 2005 International Conference on Machine Learning and Cybernetics. - Guangzhou, China, 18-21 Aug. 2005. - Vol. 8. - P. 4611-4615.

C77. Brankov J.G. Task-based evaluation of diffraction-enhanced imaging. / Brankov J.G., Saiz-Herranz A., Wernick M.N. // 2005 IEEE Nuclear Science Symposium Conference Record. 23-29 Oct. 2005. - Vol. 3. - P. 3

C78. Spreeuwers L.J. Detection of trabeculae and papillary muscles in cardiac MR images. / Spreeuwers L.J., Bangma S.J., Meerwaldt R.J.H.W., Vonken E.J., Breeuwer M. // 2005 Computers in Cardiology. - Lyon, 25-28

Sept. 2005. - P. 415-418.

C79. R. Feder. Mechanical Design of the NSTX High-k Scattering Diagnostic. / R. Feder, E. Mazzucato, T. Munsat, H. Park, D.R. Smith, R. Ellis, G. Labik, C. Priniski. // Twenty-First IEEE/NPS Symposium on Fusion Engineering 2005. - Knoxville, TN, Sept. 2005. - P. 1-4.

C80. Pallawala P.M.D. Automated Microaneurysm Segmentation and Detection using Generalized Eigenvectors. / Pallawala P.M.D., Wynne Hsu, Mong Li Lee, Say Song Goh. // 2005. WACV/MOTIONS '05 Volume 1. Seventh IEEE Workshops on Application of Computer Vision. - Breckenridge, CO, 5-7 Jan. 2005. - Vol. 1. - P. 322-327.

C81. Dabe F. Remora, a new concept for AUVs in mine warfare. OCEANS '04. MTTS/IEEE TECHNO-OCEAN '04. 9-12 Nov. 2004. - Vol. 2. - P. 851-855.

C82. Olsen R.B. Signatures of vessels in ENVISAT AP-mode imagery. / Olsen R.B., Arnesen T.N., Eldhuset K. // 2004. IGARSS '04. Proceedings. 2004 IEEE International Geoscience and Remote Sensing Symposium. 20-24 Sept. 2004. - Vol. 6. - P. 3895-3897.

C83. Prasad M. Multi-view learning for bronchovascular pair detection. / Prasad M., Sowmya A. // 2004. Proceedings of the 2004 Intelligent Sensors, Sensor Networks and Information Processing Conference. 14-17 Dec. 2004. - P. 587-592.

C84. Evans D.H. Limitations of dual frequency measurements for embolus classification. 2004 IEEE Ultrasonics Symposium. 23-27 Aug. 2004. - Vol. 1. - P. 457-460.

C85. Chen J. Enhanced dynamic FDG-PET tumor detection with constrained temporal filtering. / Chen J., Yu X., Tohme M., Park R. // 2003 IEEE Nuclear Science Symposium Conference Record. 19-25 Oct. 2003. - Vol. 4. - P. 2604-2608.

C86. Damus R. Fisheries habitat survey with a small low cost AUV. / Damus R., Desset S., Morash J., Chryssostomidis C. // OCEANS 2003. Proceedings. - San Diego, CA, USA, 2003. - Vol. 1. - P. 176 Vol.1.

C87. {no data available}. Proceedings of the 25th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (IEEE Cat. No.03CH37439). 2003. Proceedings of the 25th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. 17-21 Sept. 2003. - Vol. 2. - {no data available}.

C88. Henderson T.C. Segmentation of vessels in retinal images by shortest path histogramming. / Henderson T.C., Choikim G. // 2003. Proceedings. Seventh International Symposium on Signal Processing and Its Applications. 1-4 July 2003. - Vol. 1. - P. 685-688.

C89. Wei Ying. Wavelet analysis based detection algorithm for infrared image small target in background of sea and sky. / Wei Ying, Shi Zelin, Yu Haibin. // 2003. ISPA 2003. Proceedings of the 3rd International Symposium on Image and Signal Processing and Analysis. 18-20 Sept. 2003. - Vol. 1. - P. 23-28.

C90. Evans D.H. Ultrasonic detection of cerebral emboli. 2003 IEEE Symposium on Ultrasonics. 5-8 Oct. 2003. - Vol. 1. - P. 316-326.

C91. Morganti T. M-line processing for real-time investigation of large artery mechanics. / Morganti T., Ricci S., Guidi F., Della Valle A., Tortoli P., Vittone F., Kozakova M., Palombo C. // 2003 IEEE Symposium on Ultrasonics. 5-8 Oct. 2003. - Vol. 2. - P. 1590-1593.

C92. Ballakur S.G. Detection of simulated microemboli using a diffraction grating ultrasound probe and spectral energy criteria. / Ballakur S.G., Blebea J., Hazard S.W., Zickler R., Weiss W.J. // 2002. Proceedings of the IEEE 28th Annual Northeast Bioengineering Conference. - Philadelphia, PA, 2002. - P. 163-164.

C93. Leong H. Ship detection and tracking using HF surface wave radar. / Leong H., Helleur C., Rey M. // RADAR 2002. 15-17 Oct. 2002. - P. 61-65.

C94. Maglaveras N. Artery skeleton extraction using topographic and connected component labeling. / Maglaveras N., Haris K., Efstratiadis S.N., Gourassas J., Louridas G. // Computers in Cardiology 2001. - Rotterdam, 2001. - P. 17-20.

C95. Allen G.I. Mitigation of platform generated magnetic noise impressed on a magnetic sensor mounted in an autonomous underwater vehicle. / Allen G.I., Matthews R., Wynn M. // 2001. MTS/IEEE Conference and Exhibition OCEANS. - Honolulu, HI, 2001. - Vol. 1. - P. 63-71.

C96. Brown J. Real-time simulation of deformable objects: tools and application. / Brown J., Sorkin S., Bruyns C., Latombe J.-C., Montgomery K., Stephanides M. // 2001. The Fourteenth Conference on Computer Animation. Proceedings Computer Animation. - Seoul, 2001. - P. 228-258.

C97. Ionescu R. Brain arteries movement detection with gated gradient echo sequence: standardization, registration and subtraction of serial magnetic resonance images. / Ionescu R., Alarcon C., Langevin F. // 2001. Proceedings of the 23rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society. 2001. - Vol. 3. - P. 2334-2337.

C98. Umetani K. Small-field angiographic imaging of tumor blood vessels using synchrotron radiation. / Umetani K., Yamashita T., Maehara N., Imai S., Kajihara Y. // 2001. Proceedings of the 23rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society. 2001. - Vol. 3. - P. 2371-2374.

C99. Paget R. (Automatic) target detection in synthetic aperture radar imagery via terrain recognition. / Paget R., Homer J., Crisp D. // 2001. Proceedings. 2001 International Conference on Image Processing. - Thessaloniki, 2001. - Vol. 3. - P. 54-57.

C100. Perry S.W. Detection of small man-made objects in sector scan imagery using neural networks. / Perry S.W., Ling Guan. // 2001. MTS/IEEE Conference and Exhibition OCEANS. - Honolulu, HI, 2001. - Vol. 4. - P. 2108-2114.

C101. Hossack J. Quantitative 3D ultrasound imaging using an automated image tracking technique. / Hossack J., Sumanaweera T.S., Napel S. // 2000 IEEE Ultrasonics Symposium. - San Juan, Oct 2000. - Vol. 2. - P. 1593-1596.

C102. Kanai H. Transcutaneous measurement of frequency dispersion in the regional pulse wave velocity. / Kanai H., Umezawa A., Koiwa Y. // 2000 IEEE Ultrasonics Symposium. - San Juan, Oct 2000. - Vol. 2. - P. 1281-1284.

C103. Adam D. Detection of ultrasound contrast agents in perfused myocardium. / Adam D., Burla E. // Computers in Cardiology 2000. - Cambridge, MA, 2000. - P. 25-27.

C104. Chiuomi S. A pressurized gas Cherenkov detector. / Chiuomi S., Hisayasu K., Kurihara Y., Maeda K., Nakano E., Ohahima T., Sakaue H., Saito S., Takahashi T., Teramoto Y., Uno S. // 2000 IEEE Nuclear Science Symposium Conference Record. - Lyon, 2000. - Vol. 2. - P. 11/32.

C105. Chen D. A laminar flow model for 3D time-of-flight MR angiography. / Chen D., Hedges L.K., Yu C.X. // 2000. Proceedings of the 22nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society. - Chicago, IL, 2000. - Vol. 3. - P. 2167-2170.

C106. Kudo N. A basic study on a miniaturized probe mounted on a puncturing needle. / Kudo N., Ikeda T., Yamamoto K. // 1999. Proceedings of the First Joint [Engineering in Medicine and Biology, 1999. 21st Annual Conf. and the 1999 Annual Fall Meeting of the Biomedical Engineering Soc.] BMES/EMBS Conference. - Atlanta, GA, Oct 1999. - Vol. 2. - P. 1057 vol.2.

C107. Filhol J.M. Mastering beam losses and ageing issues at the ESRF. / Filhol J.M., Hardy L., Weinrich U. // 1999. Proceedings of the 1999 Particle Accelerator Conference. - New York, NY, 1999. - Vol. 4. - P. 2331-2333.

C108. Kusumoto D. Detection of finger-tip blood vessel pulsation using CoSiB thin amorphous wire CMOS-IC SI sensor. / Kusumoto D., Shen L.P., Naruse Y., Mohri K., Uchiyama T. // 1999. Digest of INTERMAG 99. 1999 IEEE International Magnetics Conference. 18-21 May 1999. - P. BQ06.

C109. Kouame D. Reliability evaluation of emboli detection using a statistical approach. / Kouame D., Girault J.-M., Ouahabi A., Patat F. // 1999. Proceedings. 1999 IEEE Ultrasonics Symposium. - Caesars Tahoe, NV, 1999. - Vol. 2. - P. 1601-1604.

C110. Correas J.M. Ultrasound contrast agents: clinical applications. / Correas J.M., Helenon O., Cherkaoui M., Moreau J.F. // 1998 IEEE Ultrasonics Symposium, 1998. Proceedings. - Sendai, 1998. - Vol. 2. - P. 1773-1778.

C111. Vogt M. High resolution true velocity mapping with a 50 MHz pulsed wave Doppler system for dermatology. / Vogt M., Ermert H. // 1998 IEEE Ultrasonics Symposium, 1998. Proceedings. - Sendai, 1998. - Vol. 2. - P. 1529-1532.

C112. Wilkening W.G. A method for detecting echoes from microbubble contrast agents based on time-variance. / Wilkening W.G., Lazenby J., Ermert H. // 1998 IEEE Ultrasonics Symposium, 1998. Proceedings. - Sendai, 1998. - Vol. 2. - P. 1823-1826.

C113. Wang Y.P. Topology supported finite element method analysis of catheter/guidewire navigation in reconstructed coronary arteries. / Wang Y.P., Chui C.K., Cai Y.Y., Mak K.H. // Computers in Cardiology 1997. - Lund, 7-10 Sep 1997. - P. 529-532.

C114. Kruse D. High resolution 3D flow mapping in tumors. / Kruse D., Chomas J., Salerno M., El-Fallah A., Ferrara K. // 1997 IEEE Ultrasonics Symposium, 1997. Proceedings. - Toronto, Ont., 5-8 Oct 1997. - Vol. 2. - P. 1211-1214.

C115. Heimdal A. Detecting small blood vessels in color flow imaging: a statistical approach. / Heimdal A., Torp H. // 1997 IEEE Ultrasonics Symposium, 1997. Proceedings. - Toronto, Ont., 5-8 Oct 1997. - Vol. 2. - P. 1219-1222.

C116. Long X. Dynamic spectral analysis of arterial Doppler blood flow signals using time-frequency representations. / Long X., Lee J.W., Roberts V.C. // 1996. Bridging Disciplines for Biomedicine. Proceedings of the 18th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. - Amsterdam, 31 Oct-3 Nov 1996. - Vol. 2. - P. 873-874.

C117. Schuster G.J. Inspection experience in determining fabrication flaws in a reactor pressure vessel using SAFT-UT. / Schuster G.J., Doctor S.R., Taylor T.T. // 1996 IEEE Ultrasonics Symposium, 1996. Proceedings. - San Antonio, TX, 3-6 Nov 1996. - Vol. 2. - P. 1033-1038.

C118. Christopher D.A. A high frequency continuous-wave Doppler ultrasound system for detection of blood flow in the microcirculation. / Christopher D.A., Burns P.N., Armstrong J., Foster F.S. // 1995 IEEE Ultrasonics Symposium, 1995. Proceedings. - Seattle, WA, 7-10 Nov 1995. - Vol. 2. - P. 1493-1496.

C119. Shih-Jeh Wu. A study on the feasibility of using power level for detection of turbulence and vessel differentiation in Doppler power imaging. / Shih-Jeh Wu, Reyner J., Shung K.K., Routh H.F. // 1995 IEEE Ultrasonics Symposium, 1995. Proceedings. - Seattle, WA, 7-10 Nov 1995. - Vol. 2. - P. 1527-1530.

C120. Sajda P. A hierarchical neural network architecture that learns target context: applications to digital mammography. / Sajda P., Spence C., Pearson J. // International Conference on Image Processing, 1995. Proceedings. - Washington, DC, 23-26 Oct 1995. - Vol. 3. - P. 149-151.

C121. Burns P.N. Harmonic power mode Doppler using microbubble contrast agents: an improved method for small vessel flow imaging. / Burns P.N., Powers J.E., Simpson D.H., Brezina A., Kolin A., Chin C.T., Uhlendorf V., Fritzsch T. // 1994 IEEE Ultrasonics Symposium, 1994. Proceedings. - Cannes, 1-4 Nov 1994. - Vol. 3. - P. 1547-1550.

C122. Xiao M. Contour extraction from HVEM image of microvessel using active contour models. / Xiao M., Shi Y.Q., Kristol D., Horn L., Englet P. // Proceedings of the 1994 20th Annual Northeast Bioengineering Conference, 1994. - Springfield, MA, 17-18 Mar 1994. - P. 1-2.

C123. Jackson A. Commissioning and performance of the Advanced Light Source. Proceedings of the 1993 Particle Accelerator Conference, 1993. - Washington, DC, 17-20 May 1993. - P. 1432-1435.

C124. Tadikonda S.K. Assessment of vessel complexity in knowledge-based coronary border detection. / Tadikonda S.K., Sonka M., Xiangmin Zhang, Collins S.M. // 1993. Proceedings of the 15th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. 1993. - P. 598-599.

C125. Kobayashi T. Artificial oil pollution detection and wave observation in the sea adjacent to Japan by

ERS-1 SAR images. / Kobayashi T., Okamoto K., Masuko H., Nakamura K., Horie H., Kumagai H., Simada M. // International Geoscience and Remote Sensing Symposium, 1993. IGARSS '93. Better Understanding of Earth Environment. - Tokyo, 18-21 Aug 1993. - P. 946-948.

C126. Lynch J.E. A Sheath Breach Detector For Use In Fixed In-vessel Instrumentation Assemblies. / Lynch J.E., Playfoot K.C. // 1993 IEEE Conference Record. Nuclear Science Symposium and Medical Imaging Conference, 1993. 31 Oct-6 Nov 1993. - P. 936-938.

C127. Figueiredo M.A.T. An Unbiased Technique For Automatic Estimation Of Vessel Contours In Angiograms. / Figueiredo M.A.T., Leitao J.M.N. // 1993 IEEE Conference Record. Nuclear Science Symposium and Medical Imaging Conference, 1993. 31 Oct-6 Nov 1993. - P. 1251-1254.

C128. Sonka M. Adaptive simultaneous coronary border detection: a method for accurate analysis of small diameter vessels. / Sonka M., Reddy G.K., Winniford M.D., Collins S.M. // Proceedings. Computers in Cardiology 1993. - London, 5-8 Sep 1993. - P. 109-112.

C129. Linderer T. Edge detection in quantitative coronary arteriography (QCA): the impact of image zoom on edge positioning, accuracy, precision and discrimination. / Linderer T., Wunderlich W., Backs B., Noering J., Schroeder R. // Computers in Cardiology 1992. Proceedings. - Durham, NC, 11-14 Oct 1992. - P. 99-102.

C130. Kim H.K. Inflow MR angiography: phantom studies of simulated plaques and aneurysms. / Kim H.K., Singh M., Colletti P.M., Boswell W. // Conference Record of the 1992 IEEE Nuclear Science Symposium and Medical Imaging Conference, 1992. - Orlando, FL, 25-31 Oct 1992. - P. 1310-1311.

C131. Hyche M.E. Vasculature Detection In Angiograms Using Active Contours. / Hyche M.E., Ezquerra N.F., Lawton D. // Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 1991. Vol.13: 1991. 31 Oct-3 Nov 1991. - P. 1054-1055.

C132. Rothrock R.L. Networking for highly distributed and mobile C3I systems using short wavelength, agile-beam communications technologies. / Rothrock R.L., Burns W.S., Dittmer P.M. // IEEE Military Communications Conference, 1991. MILCOM '91, Conference Record, 'Military Communications in a Changing World'. - McLean, VA, 4-7 Nov 1991. - P. 736-739.

C133. Beier J. Edge detection for coronary angiograms: error correction and impact of derivatives. / Beier J., Oswald H., Fleck E. // Proceedings. Computers in Cardiology 1991. - Venice, 23-26 Sep 1991. - P. 513-516.

© В.И. Карнышев, 2011
Тематический реферативный сборник сгенерирован в атоматическом режиме
с использованием специализированного программного модуля (ПИО ТУСУР)