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*Laboratory of Advanced Science and Technology for Industry, University of Hyogo,

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Md. Tasnim Manzur Ankon*, Bangladesh University of Engineering and Technology (BUET); Muhammad Masroor Ali, Department of CSE, BUET

The amount of knowledge in the world wide web is increasing with the frequent addition of new features, like adaptation of multiple languages. Immense amount of content makes its utilization quite challenging for intelligent machines. Hence, structured formats or ontologies became significant. Ontologies require efficient extraction techniques, a topic that still needs much work. A way to improve the extraction technique is by concentrating multiple data sources into one single source. This paper introduces a way that can sub-merge knowledge repositories from multiple languages into a richer and easily accessible one. Using the knowledge base from English and French languages, machine-readable properties of individual entities are filtered through intelligent techniques and a precise knowledge source is generated. The results obtained by experimental implementation of the sub-merging technique are also presented in this paper to demonstrate the magnitude of enhancement.

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Saad Bin Ali Reza*, American International University-Bangladesh; Chowdhury Miftah Mahmood Sagir, American International University-Bangladesh; Shahriar Faridi, American International University-Bangladesh; Mrinmoy Roy, American International University-Bangladesh; Dr. Mohammad Nasir Uddin, American International University-Bangladesh (AIUB)

In this paper, 4-QAM architecture was developed where Optical-OFDM (O-OFDM) technique was used along with the incorporation of WDM, through which up to 40 channels were multiplexed each with 55 Gbps data speed. This paper investigates the system by evaluating the effect on OSNR, Error vector magnitude (EVM) and Power Loss in the network. It has been found from this architecture that sufficient power is received at the receiver side maintaining a low Bit error rate (BER), less than 10-3 according to IEEE standard. Through this endeavor, a PON with unprecedented capacity of 2.2 Tbps was created with a maximum transmission distance of 120km which is a very exceptional and noteworthy result for O-OFDM WDM PON, regarding both capacity and transmission distance.

#17 Action selection using priority for each task -Realization of effective processing by dynamical update of priority-.....41

Takuya Masaki*, Muroran Instiute of Technology; Kurashige Kentarou, Muroran Institute of Technology

In recent years, some research makes the robot treat multi-task. Importance for each task is used to do decision making and is usually changed according to the situation. We proposed method that does decision making according to a change of importance for each task. In this method, we defined priority as importance for task. The system updated priority per n action, the update frequency is fixed. But there is a risk that the system acts without calculating priority according to a situation because update frequency is fixed. In this paper, we solve a problem by dynamically changing update frequency of priority. To calculate priority according to a situation, we propose a method to decide update frequency for priority by using the process of calculating the priority. We carried out an experiment that set three tasks to the robot applied proposal technique. From experimental results, we confirmed the usefulness of proposal technique.

#59 Bengali Sign Language Recognition Using Dynamic Skin Calibration and Geometric Hashing.....47

Kazi Ehsan Aziz, Shahjalal University of Science and Technology; Ashzabin Wadud*, Shahjalal University of Science and Technology; Alauddin Bhuiyan U Melbourne; Sadia Sultana, Shahjalal University of Science and Technology; Md. Akter Hussain, Shahjalal University of Science and Technology

In this paper, we propose a method for Bengali Sign Language Recognition based on skin segmentation and geometric hashing. The skin area is obtained using a combination of dynamic color-based skin thresholding and mean shift segmentation of the original image. A novel feature extraction algorithm is introduced which tries to identify the hand by placing points at regular intervals along the perimeter of the hand blob. A novel dataset of 1147 images is also prepared for the task of training a hash table map with geometric co-ordinates of the feature points. The method is built to recognize static hand signs of 37 Bengali alphabets. Conducting tests on two sets of 37 signs, with varying the precision of feature points taken on each test, yielded an overall recognition rate of 51.35%.

ICIEV3-1 Imaging & Vision

September 2 (Saturday), 10:40-12:00, A208
Session chair: Mohammad Shamsul Arefin

#100 Medicine Recognition Using Text in Pill Image and Intrinsic Geometric Property.....N/A

Tanjina Piash Proma, Independent University, Bangladesh; Md. Zakir Hossan, Independent University, Bangladesh; M Ashraful Amin*, Independent University, Bangladesh

People of hazy or blurred vision or the elderly people finds it way too challenging just to identify the pills if they are out of the box or packet. And various pills of various shapes, size, texture, color comes with a diverse set of medicinal components which creates confusion among pills of same color and shape to identify based on a specific texture. Even if they configure the shape of the pill, the texts imprinted on the pill remains unknown to them. In this paper, the splitting processes of a dataset according to the shape, number of colors and the texts embossed on the pills, will be described. The shape information was extracted by calculation eccentricity, extent and narrowness of pill from pill image. Reference values of discriminating parameters are determined using 'RxIMAGE' database. Overall shape discrimination accuracy of the proposed system is 93.75%, number of color determination accuracy is 95.6% and text recognition accuracy is 81.32%.

#26 IPMC Based Data Glove for Object Identification.....52

Srijan Bhattacharya*, RCCIIT

Present research article presents a technique of object identification using data glove developed with Ionic Polymer Metal Composite (IPMC) as sensor.This technique givesanimpression of typeand shape for the object which is grasped using the data glove. The output voltage received from IPMC sensors are observed using Digital Storage Oscilloscope (DSO) andobject is identified with the difference in initial and final output voltage pattern. IPMCs are soft and flexible in nature as a result IPMC sensors used in the data glove comes closest in imitating the finger like motion.IPMC as a sensor is fabricated in the data glove between the intermediate and distal phalanges of the index finger as well as between distal and proximal phalanges. IPMC samples are then subjected to mechanical bending motion of a finger and corresponding voltage developed for actuation is recorded.

#31 Parametric Wiener Filter with Parameters Estimation on Image Power Spectrum Sparsity.....58

Naw Jacklin Nyunt*, Saitama University; Yosuke Sugiura, Saitama University; Tetsuya Shimamura, Signal Proc - Saitama University

This paper presents a method to estimate noise variance from the power spectrum of the observed noisy image and proposes an improved Wiener Filter called parametric Wiener filter. The best performance can be obtained with the best parameters of the parametric Wiener filter. However, in practice, it is impossible to know the best parameters because the best parameters are determined depending on the characteristics of the image. Thus, to obtain the estimated best parameters for the parametric Wiener filter, we propose a method of calculating a power spectrum sparsity of the observed noisy image. For the parametric Wiener filter, an image with a large power spectrum sparsity has larger parameters compared with the image with a small power spectrum sparsity. A parametric Wiener filter with the estimated parameters is used in practice. The experimental results shows that the proposed method provides better performance than that of the conventional method.

#66 Robot-Human Handover Based on Motion Prediction of Human.....64

Wataru Sakata*, Kobe University; Futoshi Kobayashi, Robotics & Mechatronics - Kobe University; Hiroyuki Nakamoto, Kobe University

This paper deals with a robot-human handover with the hand/arm robot. Handing over objects to humans is an important motion for assistant robots. In the robot-human handover, the robot has to predict the human motion and make a motion for hand over without disturbing human's works. Therefore, we propose a handover motion for the hand/arm robot according to the predicted human motion. The robot measures the position of human hand by the RealSense Camera and predicts destination of human hand. Then, the robot moves above the position of the predicted human hand.

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September 2 (Saturday), 10:40-12:00, A206
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#54 Kinematics of Knee Muscles Influencing by Aging Effects as Parametric Index to OA.....68

Md. Tawhidul Khan*, Saga University; A. Nakagaki, Saga University; S. Ide, Saga University

Osteoarthritis (OA), a severe knee disease, is caused by the damage of articular cartilage at the end of anatomical structures conjugated to knee joint. It disables people of all ages. Its prevalence is predicted to increase as a result of increasing ages. Integrity analysis of knee joint involves detail study of its total analytical parts. Therefore, present paper focused to the aging effects on major lower limb muscles related to knee kinematics. As vastus medialis, vastus lateralis, rectus femoris and medial head of gastrocnemius muscles are major concerned in knee flexor-extensor motions, the kinematic relations of these four lower limb muscles in aging were experimentally compared and documented.

#117 Extremely Simple Fuzzy Classifier for Intelligent Multimodal Media Processing.....72

Atsushi Inoue, Eastern Washington University

Fuzzy classifiers are known to be simple yet efficient and effective in various intelligent media processing. We introduce an extremely simple one that has been deployed in the intelligent multimodal media processing for education assessment. While this paper mainly introduces its computational model such as classification and learning (initial identification and reinforcement), this fuzzy classifier is robust against severe imbalancement of sample data distribution for learning and is consistent between fuzzy sets and probability distributions (as the normalized form of histograms). We presented an intelligent recognition of student engagement in classrooms as its application.

#24 Alignment of 3-D Scanning Data for Polygonal Mesh based on Modified Triangulation.....78

Masud An Nur Islam Fahim, Khulna University of Engineering & Technology; Sakib Mostafa*, Khulna University of Engineering & Technology; Jarin Tasnim, Khulna University of Engineering and Technology; A. B. M. Aowlad Hossain, Khulna University of Engineering & Technology

Alignment of 3-D scanning data is important in holography, gesture based gaming, statuette modelling, tomography and so on. All of this sector are advancing day by day on the basis of computational geometry. One of the most complex open problems in the sector of combinatorial and computational geometry is to deal with convex hull. This type of problem commonly arises in the several cases like meshing, 3D data alignment etc. For generating 3D model first, we have to compute the triangulation step. In this study, a divide and conquer based way of triangulation is presented. Furthermore, detecting the point of interest in the vornoi region as well as discarding of other points is also an important feature of the study. The outcome of the study shows effective reconstruction with legit triangulation, less computation time for determining convex hull and a smoothed polygon through proper edge flipping.

#16 Particle Filter Based Moving Object Tracking with Adaptive Observation Model.....83

A.F.M. Shahab Uddin*, Islamic University

In this research, we've tried to develop a method with background subtraction, distance measurement and color histogram with particle filter, to track any single moving object. In visual moving object tracking, the appearance of both objects and the surrounding scenes may experience enormous variations due to changes in the scale and viewing angles, or partial occlusions. Also the objects and the backgrounds may have confusing color. These challenges may weaken the effectiveness of a dedicated target observation model when based on color feature. Background subtraction helps, to eliminate unnecessary regions, to track even when the target object and the background has similar color and thereby reduces the number of particles as well as the execution time and cost. Moreover we use distance measurement information, to make the tracker successful, when there are several objects with similar color. Experimental results have been presented to show the effectiveness of our proposed system.

ICIEV1-2 Medical Health & Technology

September 2 (Saturday), 15:20-16:40, A202
Session chair: Atsushi Inoue

Muhibul Bhuyan*, Southeast University; Md. Sumon Ali, Southeast University

This paper reports on the design and implementation of an automatic and low cost blood flow controlling device based on microcontroller through smart phone. It is able to assist the medical personnel to monitor and control the blood flow rate to the patients using mobile phone. The heart of the controlling part is the microcontroller unit in co-ordination with the flow sensors, stepper motor and Bluetooth module. The flow sensor is attached to the neck of the blood bag to count the actual number of drops of blood per minute. Its output signal is amplified and fed to the microcontroller's input pin to continuously check whether the blood flow rate is equal to the given set-value or not. If any mismatch is detected then the microcontroller rotates the stepper motor to adjust the blood flow rate with the set-value. The designed device is implemented and tested to evaluate its real time performance. From the test data, the average experimental accuracy of the system is found over 99%.

Balemir URAGUN*, Monash University

This study aims for the clustered data representation from recognized-patterns using the feedforward neural networks (ANN); a group of clustered data can be typified with a group of recognized patterns or called master template. This master template consists of the different numbers of clustered data and to be used by a suitable ANN for the clustered data representation. It is an objective fact that through a standard ANN processes of (a) data-oriented parameter selection, (b) identification of the appropriate number of processing layers with the best performance, learning method and training algorithms, and finally (c) development of the clustered data representation. Initially, a Supervised-Feedforward ANN was selected from the literature, based on applications similar to those in this study. Here, the appropriately optimized ANN architecture was tested with a variety of types of training algorithms, and the most useful training algorithm for this specific application was determined.

Mohammad Bashar, Independent University, Bangladesh; Rayhan Sardar Tipu, Independent University, Bangladesh; Aunnoy K Mutasim, Independent University, Bangladesh; M Ashraful Amin*, Independent University, Bangladesh

EEG (electroencephalography) signals are highly susceptible to noise. Mixture of artifacts like EOG (electrooculography) and EMG (electromyography) with the EEG signals are inevitable. In this paper, we present our findings of the effects of EMG artifacts on EEG signals to categorize videos. The experiments suggest that for video category classification using EEG, signals with EMG artifacts have more discriminating capacity.

Asami Yonekura*, Mie University; Hiroharu Kawanaka, Mie University; V. B. Surya Prasath, University of Missouri-Columbia; Bruce J. Aronow, Cincinnati Children's Hospital Medical Center; Haruhiko Takase, Mie University

Recently, many feature extraction methods for histopathology images have been reported for automatic quantitative analysis. One of the severe brain tumors is the Glioma and histopathological tissue images can provide unique insights into identifying and grading disease stages. However, the number of tissue samples to be examined is enormous, and is a burden to pathologists because of tedious manual evaluation traditionally required for efficient evaluation. In this study, we consider feature extraction and disease stage classification for brain tumor histopathology images using automatic image analysis methods. In particular, we utilized an automatic feature extraction and labeling for histopathology imagery data given by TCGA and checked the classification accuracy of disease stages in GBM tissue images using deep CNN. Experimental results indicate promise in automatic disease stage classification and high level of accuracy were obtained for tested image data.

ICIEV2-2 Imaging & Vision

September 2 (Saturday), 15:20-16:40, A203
Session chair: Takahiro Takeda, Takenori Obo

[Special Session: CIHSA: Computational Intelligence for Health-care Systems and Applications]

#91 Neuro-Fuzzy Model with Subtractive Clustering Optimization for Arm Gesture Recognition by Angular Representation of Kinect Data.....111

Atif Ahmed, University Malaya; Chu Kiong Loo, University of Malaya; Takenori Obo*, Tokyo Polytechnic University

This paper presents a simple and robust framework based on Neuro-Fuzzy System (NFS) for identification of human arm gestures using skeletal data from Kinect sensor . The proposed framework consists of three phases. The Data collection phase, where Kinect sensor captures joint positions in 3D space. These 3D joint position are transformed into Angular representation to reduce the number of dimensions and limits the distribution of data points. The training phase, where the NFS is trained using the transformed joints data. Third phase is the recognition phase, where proposed framework classifies any given arm gesture as one of the trained gestures, in real time. The presented framework is very robust and can be extended to full-body human gesture recognition with minimal changes. Proposed framework can be used in various Human Computer Interaction (HCI) and Human Robot Interaction (HRI) based applications.

[Special Session: CIHSA: Computational Intelligence for Health-care Systems and Applications]

#98 Fast human skeleton optimization for posture recognition.....N/A

Wei Quan*, Tokyo Metropolitan university

As the development of artificial intelligence, posture recognition has become one of the most popular research area in the field of image processing. Nevertheless, most methods for posture recognition only concerned about the supervised learning, and they played limited role in some case that has few training samples. Based on this truth, we proposed a human posture optimal method that deals with the human posture by kinematics acknowledgment, and the experiment shows that it performed an ideal result in real case.

[Special Session: CIHSA: Computational Intelligence for Health-care Systems and Applications]

#90 A Writing Pressure Analysis Method for Evaluation of Trail Making Test using Smart Device.....117

Takuya Mabuchi, Tokyo Metropolitan University; Naoyuki Kubota, Tokyo Metropolitan University; Takahiro Takeda*, Daiichi Institute of Technology; Atsushi Manji, Saitama Misato Sougou Rehabilitation Hopitan; Tadamitsu Matsuda, Uekusa Gakuen University

This paper describes a diagnosis support system for Trail Making Test (TMT). The system imitates paper based TMT by using a tablet PC and smart pencil that can take writing pressure. Any line between two symbols is separated to finding phase and moving phase, and time, length and pressure of these phases are corrected to evaluate patient's higher brain dysfunctions level. In experiment, we corrected TMT data form 6 healthy volunteers and 10 patients. Results shows difference between healthy volunteers and patients.

[Special Session: CIHSA: Computational Intelligence for Health-care Systems and Applications]

#81 Motion Analysis for Unilateral Spatial Neglect in Computational System Rehabilitation.....123

Takenori Obo*, Tokyo Polytechnic University ; Kota Adachi, Tokyo Polytechnic University; Naoyuki Kubota, Tokyo Metropolitan University

This paper presents a rehabilitation support system for Unilateral Spatial Neglect (USN). The number of patients of brain damage is increasing. USN is a neuropsychological condition in which a deficit in attention to and awareness of one side of space is observed. This is one of higher brain dysfunction after damage to one hemisphere of the brain is sustained. It is defined by the inability for a person to perceive stimuli on one side of the body or environment that is not due to a lack of sensation. In this paper, we explain the developed rehabilitation support system based on the concept of computational system rehabilitation, and show an experimental example to discuss the applicability.

ICIEV3-2 Imaging & Vision

September 2 (Saturday), 15:20-16:40, A208
Session chair: Teijiro Isokawa

ICIEV4-2 Imaging & Vision

September 2 (Saturday), 15:20-16:40, A206
Session chair: Gerald Schaefer

#42 A Descriptive Conceptual Framework to Measure Distance of Pupil using Pixel value.....N/A

A.F.M. Saifuddin Saif, American International University - Bangladesh ; Md. Shahadat Hossain*, American International University - Bangladesh; Khandaker Tabin Hasan , American International University - Bangladesh

Bio-metrics information is crucial for everyone. Irish is one of the important features for biometrics. As a result, pupil can be same importance as Irish has. Pupil distance is a new bio-metric feature with optimized weight. We can use edge detection and pixel distance which are very effective features to optimize the weight. In this paper, we have proposed two conceptual frameworks to calculate pupil distance. we assume that it will make a unique distance for everyone. we will use edge detection for the first framework to find out the needed edge on eyes and we have shown the equation to calculate the pupil distance using pixel value. For the second one, we will use pixel distance to calculate the distance of pupils. As we are going to measure the pupil distance using image processing, it will be the unique and safest information for every human being according to our equation.Therefore, we can use it as biometrics information.

#86 IHEMHA: Interactive Healthcare System Design with Emotion Computing and Medical History Analysis.....149

Md. Rifat Ullah, East West University; Md. Ataur Rahman Bhuiyan, East West University; Amit Kumar Das*, East West University

The medical healthcare industry has become the emerging areas of research and realizes the need for an interactive healthcare system. Existing healthcare focusses on logical reasons but ignores the medical history and family health data. In this paper, we propose a healthcare system named Interactive Healthcare with Emotion and Medical History Analysis which pays attention to users biological information with emotional state, medical history, and family health data. We use wearable devices which can monitor and collect users health data. EQ radio technology is developed to recognize the emotional state. Medical history and prescription are obtained from computer synchronization and e-prescription. Family health data are gathered from cloud synchronization of the user. We adopt cloud computing for big data analysis. Some machine learning algorithm is used for data analysis to provide prediction report with other functionalities. Those features will improve the healthcare technology.

ICIEV1-3 Electronics

September 2 (Saturday), 16:40-18:00, A202
Session chair: Md. Tawhidul Khan

#69 Photovoltaic performance analysis of electrophoretically deposited ZnO-based dye-sensitized solar cells developed using variations of mechanical compressions along with post annealing.....157

Nayeem Ansari*, Nagoya Institute of Technology; Kato Shinya, Nagoya Institute of Technology; Naoki Kishi, Nagoya Institute of Technology; Soga Tetsuo, Nagoya Institute of Technology

In this study, short-circuit current density (JSC) and power conversion efficiency were analyzed for dye-sensitized solar cells (DSSCs) which were prepared by electrophoretic deposition (EPD) of zinc oxide (ZnO) nanoparticles on fluorine-doped tin oxide (FTO) glass substrates under mechanical compression and post-annealing. The JSC 12.98 mA/cm2 and power conversion efficiency 3.82% were obtained at 42 MPa mechanical pressure and 400°C post-annealing temperature. In this investigation, photoanodes were annealed at different temperatures to study the effect of the post-annealing temperature on the performance of DSSCs. The performances of the cells were analyzed by i-v, UV-Vis-NIR, and scanning electron microscopy (SEM) image. The photovoltaic performance was found to be improved with the application of mechanical compression and post-annealing temperature compared with the DSSCs without having these post surface treatments.

#27 Coadsorption study of Pb and Sb on Cu(001) by low energy electron diffraction.....161

Md Kabiruzzaman*, Kyushu University, Japan; Rezwan Ahmed, Kyushu University; Takeshi Nakagawa, Kyushu University; Seigi Mizuno, Kyushu University

Room temperature coadsorption of Pb and Sb on Cu(001) has been studied by low energy electron diffraction (LEED). A p(4×4) structure has been obtained by Pb and Sb at coverages of ~0.25 and ~0.125, respectively. This coverage combination is similar to the Pb and Bi study on Cu(001) [1].This phase is confirmed by clear LEED patterns up to 250 eV. Above this energy some points of p(4×4) phase has been disappeared and only c(4×4) points remain. Based on LEED theory, using computer simulation and similarity of the coverage combination with Pb and Bi study, here a surface alloy model has been proposed and determined. The best-fit structure of the model and its consistency with the experimental results has been discussed in detail.

#29 Blue Glasses Increase Your Alertness: Effects of Colored Glasses on Psychomotor Performance.....166

Junichiro Hayano*, Nagoya City University Graduate School of Medical Sciences; Yutaka Yoshida, Nagoya City University Graduate School of Medical Sciences; Emi Yuda, Nagoya City University Graduate School of Medical Sciences

Exposure to blue wavelength light has been reported to increase arousal level. In this study, we examined if wearing blue glasses has similar effects. We performed psychomotor vigilance tests before and after 30-min wearing of blue, green, orange, pink, and clear glasses on different days in 20 normal subjects. The level of vigilance measured as reaction time improved after wearing blue glasses, while no significant effect was observed with the other colored or clear glasses. This study indicates that 30-min wearing of blue glasses improves psychomotor vigilance after that and suggests that rather than the absolute intensity of the blue wavelength light, the relative content is the determinant for increasing arousal level.

#28 Food Texture Evaluation Using Tooth-shaped Sensor and Statistic Model.....170

Hiroyuki Nakamoto*, Kobe University; Ninomae Souda, Kobe University; Daisuke Nishikubo, Kobe University; Futoshi Kobayashi, Kobe University

Food texture is an essential factor in mastication and contributes to our physical and psychological healths. To evaluate the food texture, a food texture sensor and a food texture evaluation method are proposed. The food texture sensor has two sensing elements; magnetic resistance elements and an inductor. The food texture sensor measures time-series force and vibration by the two elements. The feature quantities are extracted from the time-series data and determine the coefficients of the logistic regression model. The response variables of the logistic model are the existence or non-existence of food texture answered in sensory evaluations. The experimental results showed that the logistic regression model has a possibility to evaluate food textures of even unknown foods.

ICIEV2-3 Imaging & Vision

September 2 (Saturday), 16:40-18:00, A203
Session chair: Takahiro Takeda, Takenori Obo

[Special Session: CIHSA: Computational Intelligence for Health-care Systems and Applications]

#84 On Ultrasound Measurement System Estimating Diameters of Fallopian Tube Models.....174

Naotake Kamiura*, U Hyogo; Takayuki YUMOTO, U of Hyogo; Teijiro Isokawa, University of Hyogo; Yutaka Hata, University of Hyogo

In this paper, a method of calculating inner and outer diameters of fallopian tubes is presented, provided that silicone rubber tubes are models for fallopian tubes. It is based on the ultrasound measurement using a single probe of which the nominal frequency is 5 MHz, and assumes that ultrasound waves emanating from the probe are reflected at the top outer surface, surfaces between water and silicone rubber, and bottom outer surface of the tube. It obtains envelope curves associated with the reflected waves, by applying Hilbert transformation to the waves. It next estimates top four maximal values on the envelope curves to acquire time points when the wave reflections occur. The inner and outer diameters of the tubes are easily estimated by substituting the above time points in simple formulas. Experimental results reveal that the proposed method can achieve substantial accuracy in estimating inner and outer diameters of the target tubes.

#18 Cost-Effective Camera Pose Estimation for Basketball Analysis Using Radon Transform.....180

Yuto Idaka, Tokyo Metropolitan University; Koya Yasuda, Tokyo Metropolitan University; Yihsin Ho, Tokyo Metropolitan University; Norio Tagawa*, Tokyo Metropolitan University

We are planing to develop an analyzing system of a basketball game. Hand-held video cameras are assumed to be used, by which multi-viewpoint image sequences are captured. To obtain 3-D trajectories of a ball and players with solving occlusions, a camera pose has to be accurately known. In this study, we propose a method for measuring a camera pose by detecting orthogonal two vanishing points. In the method, the lines on a court are detected with low computing amount by the Radon transform. Our method is verified through real image experiments.

#10 Empirical Bayes Estimation of Tissue Scatterer Distribution from Ultrasonic Echo.....186

Atsumi Ubukata, Tokyo Metropolitan University; jing zhu, Tokyo Metropolitan University; Yihsin Ho, Tokyo Metropolitan University; Norio Tagawa*, Tokyo Metropolitan University

In ultrasonic medical imaging, in addition to the boundaries of organs, blood vessels, etc., speckle patterns generated as interference of echoes from small scatterers in living tissue are often observed. Speckle pattern has information on the tissue properties and can be efficiently used as local position information for measuring tissue motions, for example. On the other hand, these are the main factor for lowering the image resolution. In this study, we aim to improve the resolution of ultrasonic imaging by restoring the scatterer distribution within the tissues from the echo. Statistics calculated from the restored scatterer distribution are expected to contribute to the construction of new indicators for tissue properties diagnosis.

#15 Behavior Analysis of RBM for Estimating Latent Factor Vectors from Rating Matrix.....192

Hiroki Shibata*, Tokyo Metropolitan University; Yasufumi Takama, Tokyo Metropolitan University

this paper analyzes the behavior of Restricted Boltzmann Machine (RBM) when it is applied to estimate latent factor vectors from rating matrix. Recently some RBM models are applied to predict ratings for recommendation systems. However, some papers also pointed out that RBM-based recommender systems could not achieve a clear improvement compared with conventional methods like Singular Value Decomposition (SVD) despite using more advanced and higher-cost statistical model. While the reason of low performance should be revealed by analyzing RBM's behavior, detailed analysis has not yet been investigated. This paper proposes alternative implementation of RBM-based collaborative filtering and analyzes its behavior. Experimental results with artificial datasets shows that it retrieves completely original latent vectors in some cases.

ICIEV3-3 Imaging & Vision

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Session chair: Yasuhiko Morimoto

#50 Recognition of Overlapped Objects using RGB-D Sensor.....198

Mitsuhiro Yukitoh*, University of Hyogo; Masakazu Morimoto, University of Hyogo

To realize a practical object recognition system, we employ RGB-D sensor to treat overlapped objects. In this paper, we focus on recognition of partially overlapped breads. Appearance of upper side breads often deforms its shape in captured images, which degrades recognition accuracy. On the other hand, lower side object is partially hidden by other breads, so we cannot achieve whole appearance in captured images. In the proposed method, in order to improve the recognition accuracy of overlapped objects, we adjust or complement the shape of breads by consulting depth information achieved by depth sensors. Some experimental results show that by adjusting overlapped object shape and by complementing hidden area, we can improve recognition accuracy of overlapping objects.

#33 Gesture Recognition based on Spatiotemporal Histogram of Oriented Gradient Variation.....202

Seiji Kojima*, Mie University; Wataru Ohyama, Mie University; Tetsushi Wakabayashi, Mie University

A fine-grained gesture recognition method based on spatiotemporal representation for cooking activities is proposed. Cooking is one of common housework activity in daily life. Supporting cooking using video-based gesture recognition can contribute to improve our quality of life. A cooking gesture recognition method which employs a spatiotemporal representation for both appearance of a cooker and surrounding kitchen utensils. Our proposed method employs Spatio-Temporal extension of Histogram of Oriented Gradient Variation (ST-HOGV) which can represent not only appearance and temporal change of independent objects but locations of these objects. Performance evaluation experiment using ACE dataset shows that recognition accuracy of 76.4% is obtained and the KSCGR evaluation score achieves 73.5%.While the proposed method does not require any a priori knowledge, the performance is comparative other gesture recognition method with a priori knowledge.

#35 Segmented Face Image Verification for Age-Invariant Face Recognition.....206

Yuta Somada*, Mie University; Wataru Ohyama, Mie University; Tetsushi Wakabayashi, Mie University

Face recognition has several problems to improve its performance. In particular, aging causes facial appearance variation so that it is the most difficult problem to handle. We propose a face recognition method that is robust against aging. The proposed mthod employs segmentation verification of frontal face images that consists of the following three steps. (1) Face image segmentation generates three regional subimages from the input face image. (2) A matching score is calculated using gradient features from a pair consisting of the input image and a registered image for each of the three generated subimages and original (whole face) image. We obtain four matching scores. (3) The verifying classifier evaluates the matching score vector and predicts the a posteriori probability that two matching images belong to the same person. The results of an experimental evaluation with the FGNET datasets clarify the effectiveness of the proposed method for age invariant face recognition.

#124 A Study on Dementia Detection Method with Stroke Data using Anomaly Detection.....210

Koya Kawanishi*, Mie University; Hiroharu Kawanaka, Mie University; Haruhiko Takase, Mie University; Shinji Tsuruoka, Mie University

Increasing the number of elderly persons who have dementia, this is one of the severe social problems in Japan. According to the report published by the Ministry of Health, Labor and Welfare, the number of elderly persons with dementia will be around five million in 2015. This report indicates that early detection and prevention of dementia is essential. From viewpoints of early detection of dementia, the most problem is the limitation of test contents and the difficulty of taking a dementia check test on a daily basis. To solve these problems, the authors focus on drawing test using a tablet terminal to develop a dementia detection system, which can be adapted to various drawing contents including digits, characters, and pictures for increasing of dementia screening opportunity. It is, however, difficult to collect sufficient data to build the system because there are many subtypes of dementia. From this background, this position paper discusses an unsupervised anomaly detection method using healthy data only, and also aim to propose a system that gives the probability of being dementia (or other sicknesses) based on the differences from the data of healthy cases. As the first step of this study, we discuss the possibility of a dementia detection method using Variational Autoencoder.

ICIEV1-4 Electronics

September 3 (Sunday), 10:40-12:00, A202
Session chair: Hiroharu Kawanaka

Khaled Mohammed Saifuddin*, Khulna University of Engineering and Technology; Kazi Fahid Reza, Khulna University of Engineering and Technology; Masud An Nur Islam Fahim, Khulna University of Engineering & Technology; Sk. Shariful Alam, Khulna University of Engineering and Technolog

Cognitive Radio (CR) is a potential solution for radio spectrum limitation problem. It is a promising technology for the ever-developing wireless networks in order to efficiently utilize the limited spectrum resources. It is also a mean to satisfy the rapidly increasing demand for wireless applications and services. But the security from malicious users is an important issue. In this paper a method is proposed to create and detect a primary user emulation (PUE) attack in cognitive radio networks. CR network comes with the great advantage of opportunistic and efficient use of limited spectrum resources. In CR, primary users should have priority over secondary users. Primary user emulation attacks on cognitive radio networks pose a serious threat to the deployment of this. First the position of the transmitter is to be detected to identify an attacker and then effective countermeasures have to be developed. Here we create a PUE attack by adding two incumbents in the scenario in NetSim.

Hugo França*, EPFL; Milad Ataei, EPFL; Alexis Boegli, EPFL; Pierre-André Farine, EPFL

This paper presents a successive approximation analog-to-digital converter (SAR ADC), which uses an operating scheme that relaxes significantly the requirements for the sampling switches. The method consists on running the ADC with an eight times faster clock and executing the analog data processing on 1/8th of the available time. During 7/8ths of the conversion period, the ADC is tracking the input signal. This technique highly diminishes the constraints for the on and off resistances of the sampling switches, and is particularly suited for low-speed SAR ADCs, which are used in wearable technology for acquiring bioelectrical signals such as electroencephalograms. We have implemented a 10-bit ADC in a 0.18µm CMOS process, applying this operating method, and achieving an ENOB of 9.6-bit at approximately the Nyquist frequency. It consumes 100nW from a 1.2V supply, and has a figure-of-merit of 320fJ/conv.

ICIEV2-4 Informatics

September 3 (Sunday), 10:40-12:00, A203
Session chair: Takenori Obo

#76 Towards Developing a Learning Tool for Children with Autism.....222

Muhammad Nazrul Islam*, Military Institute of Sceince and Technology (MIST)

Autism or Autism Spectrum Disorder (ASD) characterizes a vast range of developmental disabilities associated with social interaction, communication and behavior. Though basic education is a must for everyone, but teaching autism community through traditional approach is still quite complex. Similarly, ICT based learning software that has been developed for autistic kids are also facing the interaction (e.g., how autistic kids may interact with the learning software or devices) challenges. Therefore, the aim of this paper is to introduce a cost-effective, portable and user-friendly interactive learning tool to provide autistic children with basic academics. The tool consist a pressure sensing keypad to provide an easy and flexible means of interaction for autistic kids. The tool is also evaluated in a laboratory environment to assess its effectiveness and usability.

#107 Developing a Method for Detecting Serial and Parallel Components in Programs.....228

Md. Amdadul Haque, CUET, Chittagong; Rezaul Karim, University of Chittagong (CU); Mohammad Shamsul Arefin*, CUET, Chittagong; Yasuhiko Morimoto, Hiroshima University

In this paper, we propose a system that guides programmers to find serial and parallel components in programs. The system takes C and Java codes those may contain serial and parallel components as inputs and detects serial and parallel components in the programs. Our system first identifies the function blocks by parsing the programs based on regular expression pattern matching. Then the developed system constructs dependency graph. In dependency graphs, blocks are treated as nodes and edges are the interaction between nodes. In this paper, we consider four kinds of dependencies such as flow dependency, ante dependency, output dependency and control dependency. From the dependency graph we compute topological order to find the serial parallel execution sequence of the functions or blocks. We perform several experiments and found that our system can detect serial and parallel components from the programs efficiently.

ICIEV3-4 Imaging & Vision

September 3 (Sunday), 10:40-12:00, A208
Session chair: Takahiro Takeda

#6 Automatic tracking method for multiple honeybees using backward-play movies.....235

Toshifumi Kimura*, University of Hyogo

In recent studies, researchers can easily record the behaviors of animals by digital video cameras. However, it is a laborious and time-consuming manual task for them to extract useful behavioral data from these videos. We already proposed a tracking method for unmarked multiple bees in a flat arena, named "K-Track" algorithm. The algorithm can successfully identify and track nearly 90% of interaction cases of targets. In this study, we proposed an improved method for the algorithm by tracking results using backward movies. If the tracking results differed between the forward and backward, one of them had probably resulted from correct tracking. Therefore, by comparing the forward and backward trajectories of the same interaction, we assumed that there is the potential for an increase in tracking accuracy. In the experiments, K-Track using backward movies successfully tracked four out of five situations that was failed by original K-Track.

#30 Histopathological Breast Image Classification by Convolutional Neural Network.....N/A

Abdullah Nahid*, Macquarie University; Yinan Kong, Macquarie University

Cancer disease investigation has relied heavily on histopathological image analysis. Different mathematical tools and techniques are available for cancer image analysis to classified the images into the Benign and Malignant classes. However state-of-the-art Convolutional Neural Network techniques have shown a remarkable performance in image processing area specially in the image classification. In this paper we have utilized Convolutional Neural Network techniques for classifying a set of Histopathological images into Benign and Malignant classes, which can save doctors' times and help the doctor to take reliable decision about the cancer.

#57 A Method for Calculating the Resonant Frequency of Meander Line Dipole Antenna by Using Antenna's Geometrical Parameters.....239

Md. Rahman*, Rajshahi University of Engineering & Technology; Ajay Sarkar, Rajshahi University of Engineering and Technology, Bangladesh

This paper presents the method for calculating the resonant frequency of MLD antenna in the UHF frequency range. Two types of meander line antennas have been designed for passive RFID tag antennas. Two methods have been proposed to calculate the resonant frequency of a MLD antenna by calculating its inductance. One proposed by T. Endo and another proposed in this paper and the proposed method contributes 90% as closely as desired. The antenna characteristics mainly depend upon the number of meander line,vertical length, the separation of the twist arms, wire radius, physical length and wire length of the antenna. The capacitance and inductance introduced after squeezing the dipole antenna. The capacitance and inductance of the antenna are also a function of the antenna's dimension. The resonant characteristics have been found by calculating its inductance are compared to the result from simulation software FEKO. The result showed a good agreement with the simulation.

#23 A New Chaos Based Medical Image Encryption Scheme.....245

Sakib Mostafa*, Khulna University of Engineering & Technology; Masud An Nur Islam Fahim, Khulna University of Engineering & Technology; A. B. M. Aowlad Hossain, Khulna University of Engineering & Technology

Image encryption has great importance in transmitting images securely for numerous applications taking the advantages of modern communication networks. Due to the era of modern technology medicine sector has updated in dramatic way such as the concept of telemedicine, more specifically the tele radiology services, has raised a great deal of concerns in the security of medical images transmitted over open networks. In order to meet the necessary challenge, a new chaos based encryption scheme is proposed with emphasis on stronger security with variable control parameter facility in a simplistic way. Thorough experimental tests are carried out and the obtained results have shown satisfactory performance which means proposed scheme provides an effective way for online secure medical image transmission over public networks.

ICIEV1-5 Electronics

September 3 (Sunday), 15:20-16:40, A202
Session chair: Teijiro Isokawa

#85 Graphene Based Circular Patch Terahertz Antenna Using Novel Substrate Materials.....251

Sakibul Azam*, University of Chittagong; Md. Abdul Kaium Khan, University of Chittagong; Towqir Ahmed Shaem, University of Chittagong; Abdullah Zowad Khan, University of Chittagong

Graphene, a staggering material with amazing electrical properties is a unique solution for the implementation of Terahertz antenna. Graphene based patch antennas are gaining interest in the field of communication for its reduced size in micrometer range operating in the THz band. The selection of substrate material acts as a major performance controller as it regulates the resonant properties of the graphene patch antenna. A graphene based circular patch antenna is designed here for operating in the frequency range of 6.8-7.2 THz. We applied polyimide, quartz, silicon dioxide and silicon nitride as substrate materials and evaluated the performance of the patch antenna for individual substrate materials based on return loss, voltage standing wave ratio (VSWR), 3D and 2D radiation pattern with gain as output. The result shows that using polyimide as substrate material results in excellent performance with a gain of 16.7 dB as compared to other substrate materials.

#77 Design And Development of A Wide Band Monopole Blade Antenna for Aircraft Navigation and Communication.....257

Nazmus Saaquib, Military Institute of Science And Technology; Tonmoy Sarker*, Military Institute of Science And Technology; Naimur Rahman, Military Institute of Science And Technology; Ludmila Emdad Khan, Military Institute of Science And Technology; Pran Kanai Saha, BUET

In this work an UHF blade antenna working within range 835 MHz to 962 MHz has been designed and constructed. Parasite element is introduced which shows an improved impedance matching and radiation pattern. The designed antenna is simulated by using the 'CST Microwave Studio' software in ideal environment and also simulated by mounting the antenna onto an aircraft CAD model. The radiation pattern and VSWR of the constructed antenna are measured. The measured results have been compared with that of the simulated results. The comparison shows that the simulated radiation pattern and the measured pattern are almost identical.

#21 An Approach to Forecast Medicine Requirement for a Geographic Area at a Specific Time Period from Historical Medical Data of Bangladesh.....N/A

Mohaimen- Noor*, American International University- Bangladesh; Kawser Rushee, American Inernational University-Bangladesh; Victor Rozario, American International University-Bangladesh; Faria Nawshin, American International University-Bangladesh; Khandaker Tabin Hasan , American International University - Bangladesh

Our research focuses on predictive capability of medicine productivity for a particular disease at a particular time for a particular place in Bangladesh based on historical medical data of Bangladesh. The prediction model learns from the historical data and from the knowledge it can predict the diseases in terms of a specific time and location. After predicting the diseases, the model finds out the medicines required for that disease along with the required dose. The total required amount is achieved by combining all the amounts of that particular medicine. The outcome of this research will help the Pharmaceutical companies to allocate their budget for different medicines and maintain their supply chain management procedures properly. Such a research can result in the betterment of human kind by ensuring availability of necessary medicines in need.

ICIEV2-5 Informatics

September 3 (Sunday), 15:20-16:40, A203
Session chair: Takahiro Takeda

#44 Addressed Query Gossip Resource Discovery Protocol for Mobile P2P Networks and Its Performance in Diverse Mobility Models.....N/A

Ohm Sornil*, National Institute of Development Administration

P2P resource discovery protocols perform poorly over mobile ad hoc network mainly due to the frequent network dynamics. Peer-to-Peer search techniques including structured and unstructured can be employed over MANETs. Empirical studies indicate that searching in such resultant networks are not efficient and effective due to peer discovery, connectivity and mobility issues. We propose Addressed Query Gossip Resource Discovery algorithm, a light weight resource discovery designed to suit the mobility requirements of ad hoc networks to optimize the search performance while at the same time minimize the extra usage of mobile and network resources. Mobility models represent the movements of mobile nodes. Such models are used to represent how the location, velocity and acceleration change over time. We conduct performance analyses of the proposed protocol and widely used unstructured search techniques over MANET under 2 realistic mobility models.

#113 Developing a Framework for Recommending TV Shows.....262

Chondrima Chowdhury, Department of CSE, CUET; Mohammad Shamsul Arefin*, CUET, Chittagong; Yasuhiko Morimoto, Hiroshima University

Recommendation systems have been actively researched for the last decade and have gained much attention in both research and industry communities. As a result, nowadays we can find recommendations about news, books, movies, products, locations and so on. However, recommendation techniques for TV shows have not been actively researched despite its importance. Although there are some recommendation systems for TV shows, most of them consider western TV shows and there is no recommendation system that considers TV shows in Bengali and Hindi. However, around 1500 million people around the globe are interested about Bengali and Hindi TV shows. Considering this fact, in this paper, we develop a recommendation system that can recommend Bengali and Hindi TV shows along with English TV shows. We have performed several experiments to show the effectiveness of our framework and found that it can recommend efficient recommendation of TV shows to the users.

ICIEV3-5 Imaging & Vision

September 3 (Sunday), 15:20-16:40, A208
Session chair: Iakov Korovin, Gerald Schaefer

ICIEV1-6 Medical Health & Technology

September 3 (Sunday), 16:40-18:00, A202
Session chair: Mohammad Shamsul Arefin

#67 Analysis of classification results for the nursing-care text evaluation using convolutional neural networks.....286

Manabu Nii*, University of Hyogo; Yuya Tsuchida, University of Hyogo; Yusuke Kato, University of Hyogo; Atsuko Uchinuno, University of Hyogo; Reiko Sakashita, University of Hyogo

In this paper, a convolutional neural network (CNN) based classification method is proposed. We have studied nursing-care text classification for improving nursing-care quality. In our former works, several types of feature definitions were proposed and examined by some classification models. In this paper, a CNN is used for classification of nursing-care texts and then we analyze the trained CNN for extracting important part for decision of classification. First, each nursing-care text is represented as a concatenated word vectors. Then, every nursing-care text is classified using CNN-based classification methods. Next, we examined the structure of the trained CNN for extracting important parts of the nursing-care texts. From our experimental results, the proposed CNN-based method obtained better performance than our former works. And also the results suggest that the extracted part of each nursing-care text has importance for deciding its quality of nursing.

#123 Automated estimation of mTS score in hand joint X-ray image using machine learning.....292

Atsuki Tashita*, University of Hyogo; Kento Morita, University of Hyogo; Manabu Nii, University of Hyogo; Natsuko Nakagawa, Hyogo Prefectural Kakogawa Medical Center; Syoji Kobashi, University of Hyogo

Rheumatoid arthritis (RA) damages joints, and the destructed and/or deformed joint causes the pain and reduces the joint function. The prognosis can be improved by early treatment, but it requires accurate evaluation of the degree of RA progression to apply appropriate treatment. The modified total sharp (mTS) score in hand or foot X-ray image has been used to quantitatively evaluate the RA progression evaluation. However, the mTS score measurement takes huge labor and it is very time consuming method because a physician should evaluate progression grade for all hand joints, and the evaluation is subjective. This paper proposes an automated finger joint detection and mTS score estimation method using support vector machine. The experiment in 45 RA patients shows that the proposed method succeeded in detecting the finger joint and estimating the mTS score. As the number of learning data increases, the proposed method can estimate the mTS score with higher accuracy.

#68 Tongue movement classification in chewing and swallowing using electromyography.....297

Manabu Nii*, University of Hyogo; Shota Okajima, University of Hyogo; Reiko Sakashita, University of Hyogo; Misao Hamada, Social Welfare Corporation Lavita; Syoji Kobashi, University of Hyogo

Nurses who engaged in elderly care would like to assess their ability of chewing and swallowing because deterioration of the ability of chewing and swallowing will cause pulmonary aspiration. Currently, nurses can not assess the chewing and swallowing ability quantitatively. In this paper, to quantitatively assess the ability of chewing and swallowing, electromyography (EMG) signals around the lower jaw and the neck are obtained by some electrodes when the subject persons vocalize some Japanese pronunciations. Then, the obtained EMG signals are classified by some machine learning methods. k-nearest neighbor methods show better classification results for the obtained EMG signals.

ICIEV2-6 Informatics

September 3 (Sunday), 16:40-18:00, A203
Session chair: Naotake Kamiura

#46 Predicting Stock Movement using Sentiment Analysis of Twitter Feed.....303

Pranjal Chakraborty*, BRAC University; Ummay Sani Pria, BRAC University; Rashad Al Hasan Rony, BRAC University; Mahbub Alam Majumdar, BRAC University

Collecting data from social networking sites is a popular way of opinion mining. These opinions show the sentimental state of a large number of people. In this paper, we have shown how much we can predict stock movement from twitter's tweets sentiment analysis. Our work is done on one year's (2016) data of tweets that contained 'stock market', 'stocktwit', 'AAPL' keywords. 'AAPL' related tweets were used to see if these tweets can predict the company's stock indices whereas 'stock market', 'stocktwit' related tweets for predicting the stock market movement of US. Since we are predicting the stock values, we used Boosted Regression Tree model for this purpose.

#79 Audio Zero Watermarking for MP3 Based on Low Frequency Energy.....309

Kexin Wang*, Xi'an Jiaotong University; Chen Li, Xi'an Jiaotong University; Lihua Tian, Xi'an Jiaotong University

In this paper, a robust zero-watermarking algorithm for MP3 compressed domain is proposed. The algorithm generates zero watermarking according to low frequency energy in MP3 frames. The low frequency energy is calculated using MDCT coefficients during MP3 encoding process. It is proved that low frequency energy has great robustness to many attacks. Besides, since the algorithm is proposed in MP3 compressed domain, the zero watermarking is generated during MP3 encoding process. And the watermarking can be extracted while decoding MP3 audio file without extra extraction process. Therefore, the proposed algorithm is more efficient compared with many traditional algorithms. The results of the experiments show that the proposed algorithm is robust against common attacks, especially MP3 compression and recompression attacks. In addition, the algorithm can avoid the conflict between imperceptibility and robustness for using zero-watermarking technology.

ICIEV3-6 Imaging & Vision

September 3 (Sunday), 16:40-18:00, A208
Session chair: Iakov Korovin, Gerald Schaefer

Poster

September 2-3, 15:00-15:40
Session chair: Iakov Korovin, Gerald Schaefer

#22 Determining Specialized Doctors that Need to have in Specific Region of Bangladesh by Making Temporal Relations between Region and Diseases.....N/A

Faria Nawshin*, American International University-Bangladesh; Victor Rozario, American International University-Bangladesh; Kawser Rushee, American Inernational University-Bangladesh; Mohaimen- Noor, American International University- Bangladesh; Khandaker Tabin Hasan , American International University - Bangladesh

This research in the domain of medical science along with computer science knowledge aiming at reducing death rate of Bangladesh to substantial quantity. Many people die either for not properly diagnosed of diseases or for not having proper treatment which is not expected. Obviously, proper treatment can be given to patients when we allocate doctors of that specific specialization in the nearby locality of patients. This paper serves this purpose and determines how to allocate specialized doctors to definite region and in definite time based on the number of patients suffering mostly from which diseases. The more accurately we predict the future deceases considering temporal relations of regions and diseases the more precisely we determine the specialization of doctors that need to be allocated in the whole country.

#102 A study on the continuous increase of subthreshold MOSFETs in analog circuits.....N/A

Sanjina Ershad*, Military institute of science and technology

As data storage devices, MOSFETs have been used for a long time. But the data storage mainly involves the digital characteristics and so the analog specially high frequency appliances have been neglected for long and BJT have been the analog designer's choice. With the miniaturization and low power devices on demand, the analog designers have been tiled towards mosfet and more models are being developed in subthreshold regime. As a result, analog characteristics specially transient frequency, maximum oscillation frequency, bandwidth of the voltage gain are of great importance. This study is an effort to understand these analog behaviours in perspective of new models developed at subthreshold regime.

Additional Papers