Foreword and Editorial

International Journal of Bio-Science and Bio-Technology

We are very happy to publish this issue of an International Journal of Bio-Science and Bio-Technology by Science and Engineering Research Support Society.

This issue contains 20 articles. Achieving such a high quality of papers would have been impossible without the huge work that was undertaken by the Editorial Board members and External Reviewers. We take this opportunity to thank them for their great support and cooperation.

The paper “A Study on the Design and Implementation of Facial Recognition Application System” states that face recognition systems gain flexibility and cost efficiency while being integrated into a wireless network. This paper describes a study on the implementation of facial recognition application system using wireless devices. The facial recognition system transmits the pictures photographed by wireless terminals or smart phones and recognizes/authenticates the faces. This system can be applied to several areas such as indolence management, access management and attendance management. The previous facial recognition systems are mostly based on the wire system but our system uses mobile terminals or smart phones.

In Paper “Channel Analysis Based on Received Signal Strength in Wireless Body Sensor Network Systems”, in wireless body sensor network (WBSN) environments, diverse factors can affect channel environments. For example, the condition of the channel can be changed due to sensor mobility resulting from movements of the experimenter. In addition, the placement of the sensors can change the channel. This paper analyzed the impact of different sensor placements and body movements on the channel environment by measuring the received signal strength indication (RSSI) and the packet delivery rate (PDR). Diverse experiments were conducted with real sensor devices in an office environment. The sensors were placed on the subject’s stomach, back, and ankle, and data were obtained while the subject stood, walked, and ran.

The paper “Size Properties of Mangoes using Image Analysis” aimed to develop an efficient algorithm for detecting and sorting mango. Using the acquired image, the features of the mango were extracted and used to identify the class of the mango. The extracted features of the mango are perimeter, area, roundness, and percent defect. The roundness and percent defect were used to identify whether the mango’s quality was export, local or reject. The area was used to determine the size of the mango. An optimal threshold was used in segmentation and boundary tracing was used to determine the perimeter. This study becomes significant and may contribute to the perspective of new knowledge on image clustering model.

Paper “A Comparison of Optimal Biomarker Combinations for Benign-Cancer and Normal-Cancer Distinguishment in Ovarian Cancer Screening” compares the performance of the combination of biomarkers to distinguish benign tumor from cancer and normal from
cancer, from 21 urine biomarkers. Samples consist of 79 healthy women, 119 patients with benign tumor, and 137 patients with ovarian cancer. The concentrations of the 21 biomarkers were extracted using Luminex-PRA. The area under the curve (AUC) of ROC was evaluated to determine the optimum marker combination showing the best performance.

The Authors of “Mobile Assessment System for Shoulder Joint Rehabilitation: System Development and Preliminary Study” proposes the mobile assessment system for shoulder joint rehabilitation. To monitor the patient’s condition during the rehabilitation process, it is necessary to assess the initial condition and monitor the progress before and after the treatment. For the assessment, the shoulder joint angle in certain positions needs to be measured. The proposed system measures and assesses the patient’s joint angles in four different positions using smart sensors embedded in the smartphones such as the accelerometer and the gyroscope.

The paper “Short-Term Impact Analysis of a Clinical Information System Adoption on Relieving Menstrual Distress in Women” examines the short-term impact analysis of a clinical information system adoption on relieving menstrual distress in women. Data were collected from 130 women who took health examination in Y health promotion center from May 13 to June 14, 2013.

The paper “Feature Selection based Least Square Twin Support Vector Machine for Diagnosis of Heart Disease” states that it is evident from various researches that disease diagnosis using machine learning methods has been increasing rapidly. In this research work, feature selection based Least Square Twin Support Vector Machine (LSTSVM), which is a machine learning method, is used for diagnosis of heart diseases. In this approach F-score is used to calculate the weight of each feature and then features are selected according to their weight. The higher weight is assigned to the feature having high F-score. Grid search approach is also utilized to select the best value of classifier's parameters in order to enhance its performance. The heart-statlog disease dataset is used in this study, which is taken from the UCI repository. The performance of proposed model with different feature sets has been evaluated for different training-test datasets.

Paper “Machine Intelligence can guide Pet Dog Health Pre-Diagnosis for Casual Owner: A Neural Network Approach” developed a health pre-dagnosis system with ART2 neural network for Pet dog health monitoring. This system is for the pet owner who does not have deep knowledge on the pet diseases nor computer technology. The standardized database of symptoms/diseases associations is constructed from textbooks and the user simply gives the most unusual symptom that is found from the dog and then the communication between the user and the system refines and expands the input symptoms through queries. Then an unsupervised ART2 learning system checks the similarity between input and stored diseases with confidence and generates three most probable diseases as output. The system has incremental learning ability and learning by experience ability thus appropriately changes the database over time even without user’s database update. In spite of the fact that the system is ad-hoc in nature, the system’s performance is verified by veterinarian as adequate and it can stimulate the owner’s attention on the dog’s abnormality in time such that appropriate professional treatment is given in its early stage.

The paper “Experimental Study on Spray and Combustion Characteristics of Biodiesel Blends” was conducted on experimental analysis of spray and combustion characteristics of
six different biodiesels in a constant chamber using a common-rail injection system. The processes of atomization and flame developments were visualized by using a high digital camera under two different injection pressures. The pressure changes were measured by a piezometer pressure sensor, and combustion processes were analyzed by computing heat release rates.

In the paper “Effect of Hen Egg White on Microbial Adhesion and Biofilm Growth of Biomaterial Associated Infection Causing Pathogens”, microbial biofilms on biomaterial implant surfaces or devices are troublesome, since biofilm organisms are protected by matrix of exopolymeric substances, impenetrable for most antibiotics and immune cells. It is established that bacterial adhesion to surface is required for colonisation and subsequent biofilm formation. The adherent state is important for bacterial survival and development of infection. Therefore, prevention of bacterial adhesion and biofilm growth on implant surfaces should ultimately prevent the occurrence of infection. Egg white was considered to play an important role in resistance against bacteria for developing embryo mainly during early incubation. Utilization of egg white as a coating to prevent bacterial adhesion and biofilm growth on biomaterials implants is novel.

The Authors of “Basigin/CD147 Promotes the Activation of Signal Transduction Mediated by MyD88 and TRIF” states that Basigin/EMMPRIN/CD147 has been reported to be associated with inflammatory diseases and cancers. Detailed insight into this multifunctional protein in the context of cellular functions may provide a key to its pathophysiological role in many diseases. Here, Authors investigated the potential role of basigin in activation of the NF-κB and AP-1 signaling cascades associated with the MyD88 and TRIF adaptor proteins. MyD88- and TRIF-dependent activation of NF-κB signaling pathway was inhibited by basigin-specific antibody and siRNA. In addition, induction of TRIF-dependent, but MyD88-independent, AP-1 activation was inhibited by basigin-specific siRNA.

Paper “A Summary and Recommendation System based on Bio-Text Analysis” discusses that Text mining is a technique to find meaningful information from unstructured text data. In this paper, the study is processed about the structure of the summary system centered around the keyword of bio-related text by using various a part of speech DB such as concept word, relationship word, and conjunctions. Also, it compares one or more documents, find the concept of common. To allow more accurate summary, it updates the DB continuously by forming the ontology about concept of common. This system can be used to recommend the books and other papers through extracted keywords.

The paper “Biomass Production and Carbon Sequestration by Pongamia pinnata (Linn) Pierre in Tropical Environment” states that the significance of role of biomass of tree species in carbon sequestration has long been recognized. In the present paper, attempts have been made to work out biomass accumulation and carbon sequestration by Pongamia pinnata (Linn) Pierre raised on coal mine overburden of Northern Coal Field Limited, Singrauli (India), adopting non harvest technique. The age of plantation varied from 2 to 18 years. The correlation between basal area vs volume, dbh vs volume and basal area vs total biomass was found to be significant. In terms of vertical and horizontal growth, Pongamia pinnata proved as an efficient species. The net biomass production and carbon sequestration of Pongamia pinnata showed increasing trend with the age of plantations.
In the paper “Design and Implementation of Standard DICOM Interface Module”, DICOM (Digital Imaging and Communications in Medicine) which is standard of PACS (Picture Archiving Communication System) is set up as draft international standard for the purpose of collection and exchange the data and image among main medical display equipments. Medical display equipments is normally utilized as connected feature with surgery monitoring devices like endoscope, X-ray camera. However, most of medical surgery monitoring devices are not adaptable for DICOM, thus it is difficult to connect data thru PACS. Authors suggest the connection methodology for PACS and medical surgery monitoring devices by implementation of HL7 interface which can share the medical information with DICOM. The standard DICOM interface module suggested in this thesis creates DICOM IOD (Information Object Definition) information class according to the checkup information received by HIS (Hospital Information System) and also creates standard DICOM format after blending with surgery monitoring data.

The paper “Stabilizing Biotechnology of Double Matrix Capsule Containing Lactobacillus Bacteria in Healthy Food Industry” develop the double matrix capsulation biotechnology in order to increase the conservativeness and stability of lactobacillus bacteria, to be deliciously flavored and give it visually differential effect in healthy food industries, were described. In order to eat easy for wellbeing life science, as the first capsulation with o/w (oil-in-water) emulsifying system, our study group was especially made to soft and moisture cream using 5wt% of sucrose ester emulsifier as the first capsule containing lactobacillus bacteria.

Paper “Measuring Similarity by Prediction Class between Biomedical Datasets via Fuzzy Unordered Rule Induction” states that the need of similarity measures in life science is ever paramount given the modern biotechnology in producing and storing biomedical datasets in large amounts. This paper presents a novel scheme in measuring similarity of two datasets by prediction class, namely SPC. SPC offers an alternative approach to traditionally used ones such as pairwise correlations which assume every attribute carries equal importance. The unique advantage of SPC is the use of a machine learning model called Fuzzy Unordered Rule Induction to infer the similarity between two datasets based on their common attributes and their degrees of relevance pertaining to a predicted class. The method is demonstrated by a case of comparing lung cancer dataset and heart disease dataset.

The Authors of “Biomarker Discovery and Data Visualization Tool for Ovarian Cancer Screening” states that with the increase in various clinical applications of medical knowledge, a large amount of bio-data have been generated. In this paper, Authors report on an integrated software tool developed to enable the easy analysis of such bio-data for diagnostic medical testing without the deep use of statistics-related knowledge or tools. Specifically, this system provides an analysis tool for biomarker discovery by applying data mining techniques. It also provides a tool to visualize data, thus enabling a human analyst to easily analyze data, aided by the system. The biomarker data used in this system were generated by using the Luminex equipment, but data generated by other equipment can be used, too. The main modules include marker selection, data visualization and marker evaluation, which have been developed on the basis of the MATLAP. This system is tailored to the early diagnosis of ovarian cancer.

The paper “Study on Performance and Exhaust Gas Characteristics of Directly Injected CNG Engine” states that there are two types of fuel supply method in CNG vehicles. One is premixed ignition and the other is gas-jet ignition. In premixed ignition, the fuel is introduced
with intake air so that homogeneous air-fuel mixture may form. The ignitability of this method depends on the global equivalence ratio. In gas-jet ignition, CNG is introduced directly into the engine combustion chamber. The overall mixture is stratified by retarded fuel injection. In this study, a visualization technique was employed to obtain fundamental properties regarding overall mixture formation and combustion characteristics of direct injected CNG fuel inside a constant volume chamber and engine. For gas-jet visualization, Schlieren high speed imaging is used with the effects of ambient pressure and impingement wall on mixture formation being investigated.

In the paper “Medical Image Processing: A Challenging Analysis”, medical image processing is a multifaceted field at the intersection of computer science, electrical engineering, physics, mathematics and medicine. Medical Image processing has developed versatile computational and mathematical methods for solving problems pertaining to medical images and their use for biomedical research and clinical care. The prominent and important motive of Medical Image Processing is to extract clinically relevant information or knowledge from medical images. MIP focuses on the computational analysis of the images, not their acquisition. The methods can be grouped categorized as: image segmentation, image registration, image-based physiological modeling. Research in Medical Image Processing (MIP) is mainly driven by a technology oriented point of view. MIP research should always be able to give an answer to the question of what is the potential benefit of a solved MIP problem or a newly developed MIP-based system supporting a diagnostic or therapeutic process, in terms of outcome criteria like, e.g., Quality Adjusted Life Years (QALYs) for the patient or cost savings in health care. This paper presents the concept and the strategy of how the Most Relevant MIP problems (MRMIP) shall be identified and assessed in the context of improving evaluation of MIP solutions.

The paper “Estimating Static Postural for the Stabilizing Reformation on the Bio Parameter Detector Combination System” was designed the bio parameter detector combination system of static posture for reformation by the stability. Authors used a model of bio-sensor combination system on the basis of the static state in the standing posture. To evaluate the condition (Vision, Vestibular, Somatosensory and CNS), they compared the horizontal movement of average derived from the estimated eye open state in the body moving before ($\alpha - \mu_{\text{BENO}}$) to horizontal movement of average derived from the estimated eye close state in the body moving before ($\alpha - \mu_{\text{BENC}}$).

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