A 3-layer RDH method in encrypted domain for medical information security

Jayanta Mondal and Debabala Swain

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Abstract

Digitisation of sensitive images demands a lossless security mechanism and a sophisticated privacy preservation technique. Sensitive imagery, e.g., medical, forensic, military images, etc., needs special care during transmission as a little distortion can lead to catastrophic diagnosis mistake. With immense advancements, popularity, and success of service-oriented architecture (SOA), providing safe and secure online medical facility is one hard challenge for both research community and the industry. This paper proposes a 3-layer embedding mechanism enabled reversible data hiding (RDH) scheme with additional electronic patient record (EPR) hiding technique for encrypted medical images. LSB modification and LSB substitution technique are used for the embedding and EPR hiding. The experiments carried out on the medical test images on three levels of embedding and the experimental results show great potential in terms of security, embedding capacity, and recovered image quality.

Keywords

reversible data hiding, RDH, least significant bit, LSB, electronic patient record, EPR, encryption, data embedding

A comparative metabolomics study on anadromous clupeid Tenualosa ilisha for better understanding the influence of habitat on nutritional composition

Satabdi Ganguly [1], Tandrima Mitra [1], Arabinda Mahanty [1] [2], Sasmita Mohanty [3], Bimal P Mohanty [4]

Affiliations + expand

Abstract

Introduction: Fish inhabiting different aquatic habitats adapts to the environment by metabolomic readjustments. Understanding the combined activities of all the metabolic pathways (metabolome) helps in better understanding the complex interactions between gene and environment.

Objectives: The anadromous migratory Tenualosa ilisha is a high value food fish comprising the dominant fishery of the rivers Padma and Hooghly. The present study aimed at understanding the influence of the two habitats on the nutritional composition of hilsa.

Methods: Metabolite profiling was carried out by GC/MS. De novo assembly of hilsa liver transcriptome was generated under Illumina HiSeq platform and multivariate analysis was employed for correlation and comparison.

Results: GC/MS fingerprinting showed C16:0, C18:1, C20:5 and C22:6 to be the predominant fatty acids present in hilsa liver, which were also found to be significantly higher in Hooghly hilsa. Comparative transcriptome analysis revealed that the differentially expressed genes were mainly associated with 'lipid metabolism' and 'amino acid metabolism' pathways. Multivariate analysis between the metabolites amino acid, fatty acid and corresponding gene expression showed that few genes of amino acid metabolism (EZH1, ALAS2 and ALDH4A1) positively correlated with individual amino acids (lysine, glycine and glutamate) in Hooghly hilsa. Similarly, the key genes for LC-PUFA biosynthesis (ELOVL5, FADS2, CPT1) showed positive correlation with individual LC-PUFAs (C18:3, C20:4, C20:5, C22:6), indicating higher LC-PUFA biosynthesis potential in Hooghly hilsa.

Conclusion: Comparative metabolomic study in hilsa from the two different habitats showed that the habitats influence the nutritional composition as evidenced by high abundance of amino acids lysine, leucine and arginine and LC-PUFAs C18:3, C20:4, C20:5, C22:6 in Hooghly hilsa.

Keywords: Habitat; Hilsa; Liver; Metabolites; Metabolomics; Transcriptomics.

A Comparative Study of Task Scheduling Algorithm in Cloud Computing

Subhashree Mohapatra ✉, Chhabi Rani Panigrahi, Bibudhendu Pati & Manohar Mishra

Abstract

Nowadays, cloud computing plays an important role in both academia and industry. However, due to high demands from the clients and limited resources, it is required to transfer a few workloads to other data centers. This process helps to complete the applications submitted to the data centers even through more flexible and cheaper resources. As there are many tasks lined up at the server side and the resources are heterogeneous in nature, scheduling the tasks in multi-cloud environment is always a challenge. The loads should be processed in such a way that all the resources are used very efficiently. In this work, we have performed a comparative study on different task scheduling algorithms proposed in the literature in cloud computing.

Keywords

Scheduling   Cloud computing   Makespan

A Competitive Analysis on Digital Image Tamper Detection and Its Secure Recovery Techniques Using Watermarking

Monalisa Swain, Debabala Swain & Bijay Ku. Paikaray ✉

Conference paper | First Online: 24 March 2020

Abstract

Digital images play a vital role in human life. Hence, its protection from unauthorized access is a serious matter of concern. Even if the contents are modified then its detection and recovery must be defined. Nowadays, a number of methods are proposed to protect digital images based on digital watermarking. But all are not with similar capability in terms of security, authenticity, recovery. This paper represents the basics of digital watermarking techniques along with their competency and weakness for the detection of tampered images and their recovery process. A series of watermarking techniques with simulated results show their working efficiency with quantitative result analysis.

Keywords

Digital image   Tamper detection   Image recovery   Watermarking   Digital security

A comprehensive scientific overview of *Blepharispermum subsessile* DC. (Asteraceae), a conservation concern medicinal plant with promising pharmaceutical potential

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Blepharispermum subsessile DC., belonging to family Asteraceae, is known for its uses in the treatment of arthritis and related joint pain in folkloric medicine in different states of India. Additionally, ethnomedicinal uses of this plant include treatment of dysentery, diarrhoea, various ophthalmic problems, common cold, rhinitis, skin diseases, scabies, wound and gynaecological disorders. Most importantly, traditional use of *B. subsessile* to treat arthritis has been recently supported by scientific pharmacological studies including a clinical trial. However, overexploitation, unregulated trade and habitat destruction has put the *B. subsessile* under severe threat in their natural habitats of India in general and Odisha state of India in particular. To conserve the gene pool of this plant species along with other medicinal plants in their wild habitat (*in situ*) a medicinal plant conservation area (MPCA) has already been established in Odisha. Recently, attempt has also been made for development of tissue culture - mediated plant regeneration protocols aiming at its conservation by rehabilitation and *ex situ* means. In the present review, comprehensive and updated information on the distribution, botany, ethnomedicinal uses, phytochemistry and biological activities of *B. subsessile* has been summarized and focus has been given to the attempts made for conservation of this traditional medicinal plant species through conventional means as well as biotechnological intervention. Future research required for *B. subsessile* conservation and pharmaceutical utilization in fullest but in best sustainable manner has also been discussed.

Keywords: *Blepharispermum subsessile*, Conservation measures, Ethnomedicinal uses, *In vitro* propagation, Phytochemicals

IPC Code: Int. Cl.[20]: A61K 36/00

Blepharispermum subsessile DC. is a valuable folklore medicinal plant of India belonging to family Asteraceae. The word 'Blepharispermum' has been derived from Greek 'blepharis': eyelash and 'sperma': seed, referring to the shape of the seeds[1]. The plant is popular for its use in the treatment of rheumatism in traditional system of medicines[2]. Besides, it is also used in a number of other diseases[3-7]. *B. subsessile* is commonly known as '*Rasanajadi or Raasnaa or Rasna*' in different parts of India including Odisha[2,5,8-11]. India is a large country where many different regional languages are spoken. Thus, interestingly, it has been found that besides *B. subsessile* a number of medicinal plants have been referred and used as Raasnaa / Rasna (a ayurvedic drugs) in different parts of India which includes *Pluchea lanceolata* (Asteraceae) in North and West India; *Alpinia galaga* (Zingiberaceae) and *Alpinia calcarata* (Zingiberaceae) in South India including Kerala; *Vanda roxburghii* (Orchidaceae) in Eastern India including Odisha; *Dodonaea viscose* (Sapindaceae) in Andhra Pradesh and *Lepidagathis trinevis* (Acanthaceae) in Bihar[2]. However, in North as well as West part of India mostly *P. lanceolata* has been used as '*Raasnaa or Rasna*' and known as the accepted source plant[2,12,13] and *Alpinia galaga* has been considered as the main substitute plant[2]. On the other hand, recently it has been reported that *B. subsessile* showed better result compare to *P. lanceolata* for the treatment of *sandhivata* (osteoarthritis)[14,15].

B. subsessile is marketed in Odisha, Madhya Pradesh and Chattisgarh as Rasna or Rasnajadi or Raasnaa[2,9]. Being a shrub with medicinally important root the plant has been uprooted unsustainably in

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#Both SKN and SB are equal contributors so considered as joint first author.

A Cost Efficient Service Broker Policy for Data Center Allocation in IaaS Cloud Model

Sasmita Parida ✉ & Bibudhendu Pati

Abstract

Cloud computing provides distributed computing resources such as servers, storage and applications to the end users through data centers. The data centers are geographically located at different locations. The client applications or requests being serviced by cloud service providers on "pay per use". So, different pricing models are adapted to compute the cost and revenue of the data centers. The cost of VM is computed depending on its placement in the data centers through broker policies. So, the broker policies have a significant role in evaluating the cost of the VM which directly impacts on revenue of the service provider. In the computing competition, the VM cost should be minimized by which service demand will be maximized. Moreover, the response time and processing time of the data centers need to be minimized to posses commendatory Quality of Service. In this work, we propose a new service broker policy to minimize the total cost. The total cost considers the VM cost and the data transfer cost. The proposed mechanism also reduces the response time and data processing time of the data centers. The proposed policy is simulated in Cloud Analyst. We examine the performance of the proposed mechanism with ten different scenarios. Finally, we compare performance results with respect to VM cost, data transfer cost, total cost, processing time and response time of data centers with the existing policies and observe better than these.

Title: A new unsupervised method for boundary perception and word-like segmentation of sequence

Authors: Arko Banerjee; Arun K. Pujari; Bibudhendu Pati; Chhabi Rani Panigrahi

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Abstract: In cognitive science research on natural language processing, motor learning and visual perception, perceiving boundary points and segmenting a continuous string or sequence is one of the fundamental problems. Boundary perception can also be viewed as a machine learning problem; supervised or unsupervised learning. In supervised learning approach for determining boundary points for segmentation of a sequence, it is necessary to have some pre-segmented training examples. In unsupervised mode, the learning is accomplished without any training data hence, the frequency of occurence of symbols within the sequence is normally used as the cue. Most of earlier algorithms use this cue while scanning the sequence in forward direction. In this paper we propose a novel approach of extracting the possible boundary points by using bi-directional scanning of the sequence. We show here that such an extension from unidirectional to bi-directional is not trivial and requires judicious consideration of datastructure and algorithm. We here propose a new algorithm which traverses the sequence unidirectionally but extracts the information bi-directionally. Our method yields better segmentation which is demonstrated by rigorous experimentation on several datasets.

A Real-Time Smart Waste Management Based on Cognitive IoT Framework

Sujit Bebortta, Nikhil Kumar Rajput, Bibudhendu Pati & Dilip Senapati ✉

Abstract

The ability of the Internet of things (IoT) to incorporate anything and everything has induced and it is revolutionary applications in spheres of smart healthcare, smart living, smart cities, smart governance, and many more. A more general illustration for the IoT-based administration is the smart waste monitoring and management scheme for the smart cities. The smart waste management comprises of certain information and communication technologies (ICT) which support the tracking and management of the garbage bins. In this paper, we present a strategy for the garbage bin detection problem based on the thresholding scheme and also present a real-time waste management algorithm for the dynamic selection

An Efficient Approach for Running Multimedia Applications Using Mobile Cloud Computing

Rajesh Kumar Verma ✉, Chhabi Rani Panigrahi, Bibudhendu Pati & Joy Lal Sarkar

Abstract

Multimedia applications are resource-intensive applications and processing them using the mobile devices is a challenging task because of the limited resources of the mobile devices. To solve this issue, in this work, a robust architecture has been proposed where different multimedia applications are processed using mobile cloud computing (MCC) which is also based on multi-cloud environment, in order to run the applications in an efficient manner. Also, we have stated the future roadmap which aims at coming up with a scalable architecture which will provide near real-time experience of multimedia applications to the user community.

Keywords

Mobile cloud computing   Offloading   Multimedia

An Extensive Study on Medical Image Security with ROI Preservation: Techniques, Evaluations, and Future Directions

Bijay Ku. Paikaray, Prachee Dewangan ✉, Debabala Swain & Sujata Chakravarty

Abstract

In the current era of digitization, the worldwide healthcare service is a common practice; it enables the remote healthcare service with proper digits: diagnosis and medication. The main thread for the about service is the security confidentiality and integrity of personal information of a patient. Many techniques are followed for privacy preservation in image information with descriptive aspects; however, more such strategies need to analyze and devolve for better accuracy and performance. This paper has given a broad overview of deferment techniques, their performance, and some future directions for ROI preservation in medical images.

Keywords

Medical image   Data hiding   ROI   RONI   Privacy preservation

Anti-arthritic effect of Sulforaphane (SFN) in FCA-induced arthritic rats by suppressing pro-inflammatory cytokines and tissue regeneration

Author: SANGEETA MOHANTY, ABHISEK PAL, TRIPTI SHARMA, SHIKHA SINGH, V BADIREENATH KONKIMALLA, SUDAM CHANDRA SI

Abstract: Sulforaphane (SFN), is an innately occurring isothiocyanate, mostly observed in cruciferous vegetables like broccoli is well-studied for its anti-cancer activity and anti-inflammatory studies. However, its anti-inflammatory property in a rheumatoid arthritis (RA) condition is not reported to date. The present investigation is a first report on comprehensive evaluation of anti-arthritic activity of SFN in FCA-induced arthritic rats. Here, the levels of immuno modulatory cytokines (TNF-a, IL-6, INF-?, IL-10); oxidative stress biomarkers (GSH, SOD, Catalase) supported by hematology, histopathology and radiological studies were assessed.The modulation of inflammatory mediators also evidently supported by docking studies. Treatment with high dose of SFN (5mg/kg) significantly decreases the production of signaling molecules like TNF-a, IL-6, INF-? which subsequently enhances the production of anti-inflammatory cytokinesis IL-10 in FCA induced arthritic rats ($p < 0.01$). Histopathological studies reviled a significant reduction in synovial inflammatory in-filtration with synovial lining hyperplasia in SFN treated animals. Taken together, these findings suggest that SFN has a beneficial effect on chronic inflammatory disorders.

Application of artificial neural network (ANN) model for prediction and optimization of coronarin D content in *Hedychium coronarium*

Asit Ray [a], Tarun Halder [b], Sudipta Jena [a], Ambika Sahoo [a], Biswajit Ghosh [b], Sujata Mohanty [c], Namita Mahapatra [d], Sanghamitra Nayak [a] 🙎 ✉

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Abstract

The pharmacological properties of *Hedychium coronarium* Koen. is due to the presence of its active constituent Coronarin D. Coronarin D has been found to possess a myriad of therapeutic activities ranging from antimicrobial to anticancer. Coronarin D content in *H. coronarium* greatly differs in different habitat. In this study, an artificial neural network (ANN) based model was developed to investigate the influence of abiotic factors (climate and soil) and predict a suitable region for cultivation of *H. coronarium* with high content of coronarin D. The experimental dataset of 50 was generated by collecting *H. coronarium* rhizomes from 50 different geographical locations distributed in five different states of India. For each location, 18 input parameters were considered including soil nutrients (micronutrients and macronutrients) and climatic factors. Datasets were randomly partitioned with 72 %, 14 % and 14 % for training, validation and testing dataset, respectively. HPTLC analysis revealed coronarin D content to vary from 0.136 to 0.687 mg/100 mg dry wt among 50 *H. coronarium* rhizomes. Results showed that the multilayer perceptron (MLP) neural network with single hidden layer containing 5 neurons namely 18-5-1 structure could predict the coronarin D content accurately with a correlation coefficient (R^2) of 0.891 and root mean square error (RMSE) of 0.06. Sensitivity analysis revealed the effect of altitude, manganese and zinc on predicted coronarin D content to be slightly higher compared to other factors. The developed ANN model will assume a great significance in the prediction of the proper regions/site for optimum coronarin D yield in *H. coronarium*.

Assimilation and Integration of Buddha Consciousness in the Cult of Lord Jagannātha

Sasmita Kar ✉

Abstract

Since time immemorial, Lord Jagannātha has been regarded as the principal deity of Odisha. The land of Odisha (former Kaliṅga) was a meeting place of the Hindus, Buddhists and Jainas. The Buddhists, Jainas, Vaiṣṇavas, the worshippers of Gaṇpati and others came to Purī and found the presence of their own lord in Jagannātha. However, of all religious creeds, Buddhism played an important role in the socio-cultural history of Odisha. During the period of emperor Aśoka, the Śabaras (a tribal people) of Odisha were converted to Buddhism. Buddhist pillars were built in Purī, and Buddhist symbols were carved into it. Later on, the Śabaras started worshipping the Triratna as the three principal deities of the Jagannātha temple. In course of time, the three deities of the temple, viz. Jagannātha, Baḷabhadra and Subhadrā, have been accepted by the people of Odisha as the symbols of Buddha, Dharma and Sangha, respectively. As stated by Donaldson (Iconography of the Buddhist sculpture of Orissa, Abhinav Publications, Buldana, 2001), the eighteenth century Buddhist works such as "Jñānasidhi" and "Prajñodaya-Viniścaya-Siddhi," the Buddha was named as Lord Jagannātha. By the twelfth century A.D., there had already developed a new culture in Odisha with Jagannātha as the center and the Lord came to be conceived as Ādi Buddha and Buddha as the ninth incarnation of Viṣṇu-Jagannātha. The place of Purī has been regarded as a place of Tāntric worship and Jagannātha as the Lord of the Tāntric cult. The Gundichā temple (where the Lord resided for 10 days during the Car festival) has been regarded as a Buddha Vihāra. The Buddhist principle of nonviolence and universal brotherhood found its best expression in the Jagannātha cult.

Base editing in crops: current advances, limitations and future implications

Rukmini Mishra [1], Raj Kumar Joshi [2], Kaijun Zhao [1]

Affiliations + expand

Abstract

Targeted mutagenesis via genome-editing technologies holds great promise in developing improved crop varieties to meet future demands. Point mutations or single nucleotide polymorphisms often determine important agronomic traits of crops. Genome-editing-based single-base changes could generate elite trait variants in crop plants which help in accelerating crop improvement. Among the genome-editing technologies, base editing has emerged as a novel and efficient genome-editing approach which enables direct and irreversible conversion of one target base into another in a programmable manner. A base editor is a fusion of catalytically inactive CRISPR-Cas9 domain (Cas9 variants) and cytosine or adenosine deaminase domain that introduces desired point mutations in the target region enabling precise editing of genomes. In the present review, we have summarized the development of different base-editing platforms. Then, we have focussed on the current advances and the potential applications of this precise technology in crop improvement. The review also sheds light on the limitations associated with this technology. Finally, the future perspectives of this emerging technology towards crop improvement have been highlighted.

Keywords: CRISPR/Cas9; adenine; base editors; crop improvement; cytidine; genome editing.

Letters in Applied NanoBioScience

Original Review Article   **Open Access Journal**

Biosensor for detection of bacteria with probiotic potential and food pathogens

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ABSTRACT

The exploration for novel nano-sensors has enhanced significantly representing an incredible alternative for the development, speedy, and inexpensive bio-sensing strategy. Due to their low detection volumes, reduction of detection time, high specificity and user- friendly applicability, nano-bio sensors have raised the interest of the scientific community. Nanomaterials are now being used to develop biosensors thatexhibit superior sensitivity and uniqueness with applicability in research investigations, food contamination detection, detection of potential probiotic bacteria, etc. Detection of food contamination is of major significance and concern in areas like healthcare, agriculture, beverage, and fermentation industries. Distinctive biosensing technologies have already been developed for instant monitoring of microbes, food contaminants depending upon the application of nanomaterial. A wide range of nanomaterials, for example, gold nanostructured materials, carbon Copper and silicon nanotubes, GeO_2/SiO_2 matrix, nanoparticles, nanowires, TiO_2 nanowire, nano-electrode, and nanostructured material arrays are performing an essential role in the bio-sensing application in food pathogen detection and probiotic bacteria detection.Nanosensors merges the principles of information technology and molecular biology proves essential in facilitating immediate detection of foodborne pathogens, contaminants, hence reducing the health risk and medical costs related to foodborne illness.This chapter aims to encompass the types of emerging nanosensors based on different detection technology, their commercial applications, recent advancement in food contamination detection and their future prospects.
Keywords: Biosensors; Applications; Food pathogen; Probiotics; Detection; Future prospects.

1. INTRODUCTION

Food safety is a paramount worldwide public health concern with global trade implications [1]. Foodborne diseases linked with pathogens, toxins, or other food contaminants are mushrooming severe health threats in the world [2]. Food adulteration directs to a sickness that is caused by the existence of microorganisms, proteins, toxins, or chemicals in foodstuffs [3].The presence of bacteria in food is one of the most important of transmitting methods of a pathogen into the human body. Serious foodborne contaminations and intoxications are much more of apprehension to the food manufacturing industries today. It is necessary to recognize, categorize, and trace food and water pathogens and their toxins to improve the quality and safety of foods [4].

According to the current approximation is that the 30 main food pathogens report for nearly 9 million individuals becoming ill, in addition around 57,000 hospitalizations and nearly 1400 deaths every year in the US with a predictable monetary outlay of around $78 billion per annum [5]. It was estimated that foodborne illness in India could reach 130 million by 2030. The associated cost of food contaminated illness plays a vital function in regulating foodstuff security policy. Recent investigation form, several authors agreed on which food pathogens and their toxins are highly expensive, and in particular, incidences result in early fatality [6]. According to the University of Florida informed that the hospitalization and fatality identified to be caused by food pathogens costs the United States approximately $14.6 billion. More than 200 known diseases are transmitted by contaminated food. During the year 2009-2010, around 1,600 foodborne illness

outbreaks, ensuing in 30,000 cases of sickness and nearly 25 deaths were reported by the public health department in the US.

The primary cause of infection was Norovirus estimating for 42% of an epidemic; followed by *Salmonella*, with almost 32% of contagion. In the year 2013, the CDC's foodstuff intoxicating coverage classification recognized around 20,000 associated infections, 4,200 hospitalizations, and nearly 80 deaths along with the around 50 million inhabitant's illness [7].

Centers for Disease Control, reports two chief sources of foodborne sickness firstly some known thirty-one foodborne pathogens and secondly, the unspecified agents, specific microbes, some chemicals or other materials has been identified to be in food which are capable of triggering disease are not proven and causative agents yet not identified. Though the United States holds the world's safest food supply status, still it receives 48millions of cases of foodborne illness each year, i.e., one in every six American individual gets infected due to contaminated food; as a result, 1,28000 hospitalization and 3000 deaths. With every passing year, the global burden of foodborne disease raised, children below 5year are at maximum risk, and almost thirty percent of all death from foodborne diseases was identified in case of children.

To identify the food pathogens using morphological and biochemical techniques are very problematic and inefficient [8]. On the other hand, biosensors have exposed wonderful assure to triumph over these restrictions and are being insistently studied to give quick, consistent, and delicate recognition technology for such bids. Different biological identification prerequisites are deliberate to better the selectivity and facilitate incorporation over

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Characterization of endophytic bacteria *Enterobacter cloacae* MG00145 isolated from *Ocimum sanctum* with Indole Acetic Acid (IAA) production and plant growth promoting capabilities against selected crops

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ABSTRACT

The present study is based on morphological, biochemical characterization and 16 s rRNA gene sequencing of an endophytic bacterium OS03 isolated from the stem of *Ocimum sanctum* and identified as *Enterobacter cloacae* (Accession no. MG00145). The isolate is a short gram −ve rod able to tolerate 9% of NaCl and can grow at 54 °C, under osmotic stress (40−45% PEG 6000) in the medium. The study focused on the characterization of Indole Acetic Acid (IAA) production under *in vitro* condition. Isolate OS03 showed better production of IAA at pH 7 (17.807 μg/ml) and 37 °C (17.934 μg/ml). The production of IAA increased when the L-tryptophan medium was supplemented with Sucrose (0.5%) and Calcium nitrate (0.1%) as carbon and nitrogen sources, respectively. IAA production was further confirmed by thin-layer chromatography (Rf 0.75 cm) as well as by FTIR and H^{1}NMR analysis. The selected strain OS03 significantly enhanced the growth of four crop plant viz. *Oryza sativa* (rice), *Arachis hypogaea* (groundnut), *Vigna mungo* (black gram) and *Brassica rapa* var. Toria (toria) in terms of germination index, shoot and root biomass of seedling and seed vigour index in comparison to control.

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1. Introduction

Bacterial and fungal endophytes are beneficially associated to plant tissues and/or plant organs which include roots, branches, seeds, leaves, flowers and so forth and may-be isolated after disinfecting the surfaces of these plants (Figueiredo et al., 2009). Endophytes promote plant growth and development through two mechanisms, i.e. directly by promoting the plant growth by producing phytohormones, siderophores, phosphate solubilisation etc. and indirectly by protecting the host plant by increasing host natural resistance (Yu et al., 2016). Bacterial endophytes offer several benefits to the host plant, chiefly promoting plant growth and protecting the host from a wide number of pathogens and are able to communicate under diverse environmental conditions with the host plant more proficiently than the rhizospheric bacteria (Coutinho et al., 2015). Indole-3-acetic acid (IAA) is the most common physiologically active plant hormone among auxins, which regulates various aspects of plant growth and development (Spaepen and Vanderleyden, 2011). IAA is produced in seeds, young leaves etc. by decarboxyllation and deammination of L-tryptophan (Sachdev et al., 2009). It has a profound influence on crops by enhancing the

nutrient uptake by the production of longer roots and increasing the number of lateral root hairs (Mohite, 2013). Medicinal and aromatic plant species are explored to a large extent for the presence of endophytes, for production of different secondary metabolites (Alvin et al., 2014). Endophytes isolated from different medicinal plants are studied and/or exploited for their bioactive properties with an aim for the discovery of new drugs but these endophytes are less exploited as plant growth-promoting microorganisms. However, literature stresses on isolation and exploration of fungal endophytes to a large extent in comparison to bacterial endophytes. *Ocimum sanctum* commonly known as Tulsi is a widely grown sacred plant of India, rich in therapeutic properties of family Lamiaceae. Hence, the present study was aimed for isolation of endophytic bacteria from *Ocimum sanctum* and characterization of these bacteria for plant growth-promoting activities with respect to IAA production.

2. Materials and methods

2.1. Media and chemicals used

Nutrient broth, Nutrient agar, Salkowski reagent (1 ml of 0.5 M FeCl$_3$ in 50 ml of 35% HClO$_4$), Sodium hypochlorite, L-Tryptophan,

Control of congestion and traffic light using intelligent approaches in smart city

Mamata Rath, Bibudhendu Pati, Chhabi Rani Panigrahi and Sheng-Lung Peng

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Abstract

Traffic congestion control and smart traffic regulation are a great challenge for the engineers of smart applications in smart urban areas. Regardless of many smart applications such difficulties have not yet completely been overcome because of assortment of unpredicted traffic situations in various areas. Selecting correct parameters for decision taking in highly mobile traffic situation is always a problem. The current article focuses on different modern traffic systems with congestion control and traffic management in smart city and explains how various challenges are met with improved mechanism. The proposed approach for smart control of congestion and traffic light in this research article provides clear vision of the traffic situation and further guides distinct mechanisms to avoid congestion so that the traffic flows without problem.

Keywords

EMC²: an emergency management system using mobile cloud computing

V. Ramasamy, B. Gomathy, Joy Lal Sarkar ✉, Chhabi Rani Panigrahi, Bibudhendu Pati, Abhishek Majumder

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Abstract

A natural or unexpected man-made emergency may occur at any time and which affects the economy as well as human life of the country. The most important task in an emergency is to collect the essential information about the emergency places and do a proper analysis to take effective action. In those situations, mobile gadgets are very much helpful to collect the information in a significant way. The mobile devices have certain limitations such as less battery power, lack of Internet connectivity for data transmission or less computational resources. So the energy hungry applications can be offloaded to the cloud to reduce the workload of the mobile devices. To overcome these problems, the authors propose an emergency management system named as EMC^2, which follows peer-to-peer communication using Bluetooth technology. EMC^2 first detects the available mobile devices present in a network using mobile probing service (MPS) and then it chooses the suitable mobile device among them using mobile ranking service (MRS). EMC^2 also determines the best network resources while roaming in heterogeneous access networks (HANs). The experimental results of authors– proposed EMC^2 approach shows the increased performance and out-performs in terms of receiving time as compared to the baseline algorithm.

Engineering drought tolerance in plants through CRISPR/Cas genome editing

Raj Kumar Joshi, Suhas Sutar Bharat & Rukmini Mishra ✉

Abstract

Drought stress is primarily responsible for heavy yield losses and productivity in major crops and possesses the greatest threat to the global food security. While conventional and molecular breeding approaches along with genetic engineering techniques have been instrumental in developing drought-tolerant crop varieties, these methods are cumbersome, time consuming and the genetically modified varieties are not widely accepted due to regulatory concerns. Plant breeders are now increasingly centring towards the recently available genome-editing tools for improvement of agriculturally important traits. The advent of multiple sequence-specific nucleases has facilitated precise gene modification towards development of novel climate ready crop variants. Amongst the available genome-editing platforms, the clustered regularly interspaced short palindromic repeat-Cas (CRISPR/Cas) system has emerged as a revolutionary tool for its simplicity, adaptability, flexibility and wide applicability. In this review, we focus on understanding the molecular mechanism of drought response in plants and the application of CRISPR/Cas genome-editing system towards improved tolerance to drought stress.

Guest Editorial
Special Issue for JCSSE 2019

Jou-Ming Chang, Kosin Chamnongthai, Bibudhendu Pati

The 16th International Joint Conference on Computer Science and Software Engineering (JCSSE 2019) held on July 10-12, 2019 at Amari Pattaya, Chonburi, Thailand. The conference brought together researchers, scientists and engineers from around the world to present their novel accomplishments, innovations and future directions in computer science and software engineering along with their applications. It offered a great occasion to share research experiences and to discuss potential new trends in computer science and software engineering.

With pleasure, we present this special issue of Journal of Internet Technology (JIT), devoted to JCSSE 2019. We invite some outstanding accepted papers in their extended versions and widely open for other submissions to this special issue. Each paper submitted to this special issue was rigorously reviewed by at least two reviewers in the corresponding research areas. Finally, we have five papers for this special issue. A summary of the papers is outlined below.

The first paper entitled "Clustering of Domestic Locations in Layers for the Purpose of Breakout Prevention of Diseases" is contributed by Varin Chouvatut, Ekkarat Boonchieng, and Waraporn Boonchieng. In this paper, the authors use the hierarchically spatial clustering approach with two layers of clustering to cluster geographical coordinates in terms of latitudes and longitudes and compare each cluster's density in order to prevent mosquito-born diseases. A modified method with an additional strict constraint of k-means and k-nearest neighbors were proposed. Though additional constraint to k-means clustering in the first layer will cause some of the coordinates to un-cluster, all coordinates will be clustered again to a second layer. The experimental results show that the clustering results from the proposed method of clustering or grouping regions of households under a certain given constraint in clustering works very well and the obtained clusters can cover all target locations while the strictly required constraint can still meet.

The second paper entitled "An Improved Cellular Automata-Based Classifier with Soft Decision" is contributed by Pattapon Wanna and Sartra Wongthanavasu. In this paper, the authors propose a new classifier, called Cellular Automata-Based Classifier with Soft Decision (CAS) to deal with nonconforming patterns in a binary Cellular Automata-based Classifier. It improves the classification performance by augmenting a Soft-Decision step. This Soft-Decision step uses the pruning method to create a soft decision table, which efficiently serves for filtering useless data. By testing ten datasets consisting of conforming and nonconforming patterns, CAS provides the promising results.

The third paper entitled "Appearance Based Gaze Estimation Using Eye Region Landmarks and Math Approach" is contributed by Shichao Cheng, Bocheng Zhang, Jianjun Li, Zheng Tang, and Korhan Cengiz. In this paper, the authors propose a new and effective formula for drawing more accurate gaze directions which simplifies the task of 3D gaze direction estimation. In the context of individual gaze estimation independent of people, the proposed method is superior to existing model fitting and appearance-based methods.

The fourth paper entitled "Online Handwritten Verification Algorithms Based on DTW and SVM" is contributed by Kuo-Kun Tseng, Xiao-Xiao An, and Charles Chen. In this paper, the authors present a new algorithm for online hand-written signature verification problem based on DTW (Dynamic Time Warping) and SVM (Support Vector Machine). Unlike previous method of acquiring characteristic parameters of signature, the proposed algorithm computes the similarities between the test signature and reference signatures using DTW, gets the feature vector of test signature, and then classifies it into one of the two classes (genuine or forgery) by the SVM classifier. The experimental results show that the propose algorithm outperforms the existing methods.

The last paper entitled "Structure Fault-tolerance of the Augmented Cube" is contributed by Shuangxiang Kan, Jianxi Fan, Baolei Cheng, Xi Wang, and Jingya Zhou. Connectivity is one of the most important indicators used to evaluate a network's fault tolerance performance. Structure and substructure connectivity are the two novel generalizations of the connectivity, which provide a new way to evaluate fault-tolerant ability of a network. In this paper, the structure connectivity and substructure connectivity of the augmented cube AQ_n for faulty structures being $K_{1,M}$ (a star with M leaves), P_L (a path with L vertices), or C_n (a cycle with N vertices) is investigated, where $1 \leq$

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hBOSOS: An Ensemble of Butterfly Optimization Algorithm and Symbiosis Organisms Search for Global Optimization

Sushmita Sharma, Apu Kumar Saha, V Ramasamy, Joy Lal Sarkar & Chhabi Rani Panigrahi

Abstract

The present study proposes a hybrid metaheuristic algorithm, viz. hBOSOS with the help of two popular metaheuristics, viz. BOA and SOS. The global search ability of BOA and the local search ability of SOS are combined here to make the proposed algorithm robust and efficient. The proposed algorithm is tested with 26 classical benchmark functions and also to compare, several metaheuristics are taken from the literature. From the comparison, it can be observed that the hBOSOS is superior to the other compared algorithms.

Keywords

Metaheuristics   Hybrid algorithms   BOA   SOS

Lessons for Women Group Enterprises Management from One Tambon One Product Rural Development Programme in Thailand

Jyotirmayee Acharya
Professor, Department of Gender Studies
Rama Devi Women's University, Bhubaneswar, Odisha, India

Abstract

An examination of the literature on One Tambon One Product rural economic management programme performances of Thailand shows the unequal impact between men and women with women group-based enterprises bears the major brunt. In the wake of OTOP neo-liberalist policy break-through of Thai government rural economic restructuring was instrumental for revitalising livelihood diversities and reinforcing community-based enterprises management. The present research is based on case study analysis and narrative method of field inquiry in Saraburi Province to draw evidence from women group-based agriculture and nonfarm enterprises' experience and insights on achievements and challenges they faced. One major issue emerges from the research—need for a holistic approach to comprehend how the process of product champion competitions has contrasted the meaning of grassroots women's collectivism, network and flow and exhibits a heightened sense of accountability in developing possible policy strategies with a feminist institutional framework to transform the intangible benefits and scale up women's entrepreneurial capabilities.

Keywords: *Rural economic management, OTOP policy Thailand, women-group-enterprises, a feminist institutional framework*

Introduction

The relationship between One *Tambon* One Product (OTOP) policy practices and community-based rural enterprises (CBREs) management performance has debated been long among the researchers. OTOP project was introduced as a key policy innovation in the year 2001 for reinforcing CBREs development in Thailand. The dependency economic system, Asian financial crisis in 1997, imbalanced growth and wealth distribution, urban-rural divide, political unrest and the major flood in 2011 have occurred as critical socio-economic problems of the country. In such a geopolitical environment, Thaks in Shinawatra, the Prime Minister of Thailand, launched a seriesof neo-liberalist poverty alleviation strategiessince February 2001and OTOP project for CBREs management is one of them. The general strategy of the OTOP movement is about how local communities can optimize their resources to diversify rural livelihood system through specialized agriculture, micro and small enterprises (MSEs) and cottage industries to create new business opportunities of high international standard unique to their wisdom and the culture. The spirit is to combat poverty and be self-reliant of the

MAAS: A mobile cloud assisted architecture for handling emergency situations

Joy Lal Sarkar ✉, Chhabi Rani Panigrahi, Bibudhendu Pati, Apu Kumar Saha, Abhishek Majumder

Summary

Recent advancements in the area of Mobile Cloud Computing (MCC) have significantly contributed towards assisting mankind to handle varied types of emergency situations that may arise as a result of different natural calamities like earthquakes, floods, fire, etc, which may cause huge damage to public property and result in loss of wealth of the nation. In this work, we have proposed a mobile cloud assisted architecture that supports the multicloud and hybrid-cloud environments, together with Cloud Probing Service (CPS) and Cloud Ranking Service (CRS). The proposed algorithm consumes data from the sensor nodes and offloads the data to the most suitable cloud. A three-layered architecture has been proposed, and the anchor points facilitate in the creation of the interface between the different layers. The simulation results indicate that the proposed mobile cloud assisted architecture for handling emergency situations (MAAS) approach performs better than the baseline algorithms.

ମହାତ୍ମା ଗାନ୍ଧୀ ଓ ନାରୀ ଜାଗରଣ

– ସଂଘମିତ୍ରା ଭଂଜ

ଭାରତର ମୁକ୍ତି ଏବଂ ସ୍ୱରାଜ ସ୍ଥାପନା କ୍ଷେତ୍ରରେ ଭାରତୀୟ ନାରୀ ଜାତିର ତ୍ୟାଗ, ଉହ୍ସର୍ଗ ଏବଂ ନୈତିକ ମାନଦଣ୍ଡର ଭୂମିକାକୁ ଭୂୟୋଦର୍ଶୀ ଜନନାୟକ ଗାନ୍ଧୀଜୀ ମହତ୍ତ୍ୱ ପ୍ରଦାନ କରିଥିଲେ। ସେ ଭାରତୀୟ ମହାଜାତିର ପୁନରୁତ୍ଥାନ ତଥା ଜାତୀୟ ଅଭ୍ୟୁଦୟ ନିମନ୍ତେ ନାରୀ ସଂପ୍ରଦାୟର ସକ୍ରିୟ ଅଂଶ ଗ୍ରହଣର ଆଶୁ ପ୍ରୟୋଜନୀୟତା ଅନୁଭବ କରିଥିଲେ। ନାରୀ ଜାଗରଣ ଥିଲା ମହାତ୍ମାଙ୍କ ରଚନାତ୍ମକ କାର୍ଯ୍ୟକ୍ରମ ଅନ୍ତର୍ଗତ ଏକ ବଳିଷ୍ଠ ସଂସ୍କାରଧର୍ମୀ ଆସ୍ଥା। ଦକ୍ଷିଣ ଆଫ୍ରିକାରେ ନାରୀ ଜାଗରଣ ବିଚାରଟି ପରବର୍ତ୍ତୀ ସମୟରେ ତାଙ୍କ ସତ୍ୟାଗ୍ରହର ପ୍ରମୁଖ ଅଂଶ ହୋଇଥିଲା। ସେଠାରେ ବହୁ ମହିଳା ତାଙ୍କ ସହିତ ସତ୍ୟାଗ୍ରହ କରି କାରାବରଣ କରିଥିଲେ, ଏପରିକି ଜେଲ୍ ଭିତରେ ପ୍ରାଣତ୍ୟାଗ ମଧ କରିଥିଲେ।

"ଯତ୍ର ନାର୍ଯ୍ୟସ୍ତ ପୂଜ୍ୟନ୍ତେ ରମନ୍ତେ ତତ୍ର ଦେବତା
ଯତ୍ରେତାସ୍ତୁ ନ ପୂଜ୍ୟନ୍ତେ ସର୍ବାସ୍ତତ୍ରାଫଲାଃ କ୍ରିୟାଃ" [୧]

ଯେଉଁ ଦେଶରେ ଏହି ପବିତ୍ର ବାଣୀ ଉଦ୍‌ଘୋଷିତ ହୋଇଥିଲା, ସେହି ଦେଶରେ ବିଶ୍ୱ ବରେଣ୍ୟ ଜନନାୟକ ଗାନ୍ଧୀଜୀ ନାରୀ ଶକ୍ତିକୁ ସତ୍ୟାଗ୍ରହ, ସମାଜ ସଂଗଠନ ଓ ସମାଜ ସେବାରେ ପ୍ରୟୋଗ କରିଥିଲେ। 'ଅହିଂସା' ରୂପୀ ଅନନ୍ତ ପ୍ରେମ ଭିତରେ ଅସହ୍ୟ ଯନ୍ତ୍ରଣା ସହ୍ୟକରିବାର ଅଭୁତ ସାମର୍ଥ୍ୟକୁ କେବଳ ନାରୀ ପକ୍ଷରେ ସମ୍ଭବପର ବୋଲି ସେ ମନେ କରୁଥିଲେ। ମହାତ୍ମାଙ୍କ ମତରେ– "ନାରୀ– ନରର ଠିକ୍ ପାଖେ ପାଖେ ଜନନୀ ଭାବରେ, ସୃଷ୍ଟିକାରିଣୀ ଭାବରେ ଏବଂ ନାରର ପଥ ପ୍ରଦର୍ଶିକା ଭାବରେ ତା'ର ଗୌରବମୟ ଆସନ ଗ୍ରହଣ କରିବ। ଶାନ୍ତିର ଅମୃତ ପାଇଁ ତୃଷିତ ଯୁଦ୍ଧରତ ପୃଥିବୀକୁ ଶାନ୍ତିର କଳାଶିକ୍ଷା ଦେବାପାଇଁ ସେ ଯେ ଉଦ୍ଦିଷ୍ଟ"। [୨]

Sanghamitra Bhanja
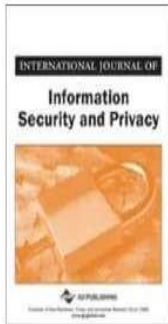
Manifold Surveillance Issues in Wireless Network and the Secured Protocol ⊗

Mamata Rath, Bibudhendu Pati, Binod Kumar Pattanayak

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Abstract

With rapid growth of internet users and frequently emerging communication technology, the issues of using web as a worldwide platform and the requirement to design the smart applications to coordinate, discuss, register, and outline gradually emerges. Information transmission through a wireless network involves the radio signals, the arrangement of information packets, and the network topology. As each segment is correlated to each other, it is very essential to employ security mechanism in these components and real security control must be connected on them. Thus, security plays a critical factor in wireless network. This article highlights security issues in current wireless networks such as mobile ad-hoc network and IoT-supported networks and it also proposes a security-based S-RAID protocol design for security control in cluster based wireless networks. Simulation results show proficiency and better transmission rate of the proposal when it was compared with other similar approaches.

MULTITOUR: A multiple itinerary tourists recommendation engine

Joy Lal Sarkar [a], Abhishek Majumder [a] ✉ , Chhabi Rani Panigrahi [b], Sudipta Roy [c]

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Abstract

The importance of tourism in today's world is immense as it is a big source of revenue and employment generation for a country. Tourists face a variety of challenges during planning of their itinerary as well as in the selection of appropriate tour packages which consist of multiple itineraries in terms of their interests and different constraints. In order to overcome these challenges, in this work we propose an algorithm called MULTITOUR, for recommending multiple itineraries based on the tourist's interest, popularity of itineraries and the cost associated with these itineraries which is derived from real-life travel sequences of tourist using the geo-tagged photos. The MULTITOUR algorithm can be further extended when a tourist wishes to visit unfamiliar places. Using the Flickr dataset, we have derived the similar user characteristics for recommending the multiple itineraries. The experimental results indicate that the MULTITOUR algorithm out-performs in terms of tour Precision, Recall, F1-Score, accuracy, tour popularity, interest of the tourist and the number of itineraries recommended as compared to the baseline algorithms.

Navigating the Synthesis of Quinoline Hybrid Molecules as Promising Anticancer Agents

Dr. Pravati Panda ✉, Dr. Subhendu Chakroborty ✉

Graphical Abstract

The emergence of drug resistance and low specificity with side effects are the significant challenges in pharmaceutical sectors for control of cancer nowadays. Quinoline and its derivatives have demonstrated as significant building blocks for locating new promising anticancer agents. Consequently, quinoline moiety with the addition of suitable congeners would offer a strategy for the development of potential drug candidates. This review summarizes the recent advances of quinoline hybrids and their anticancer activities.
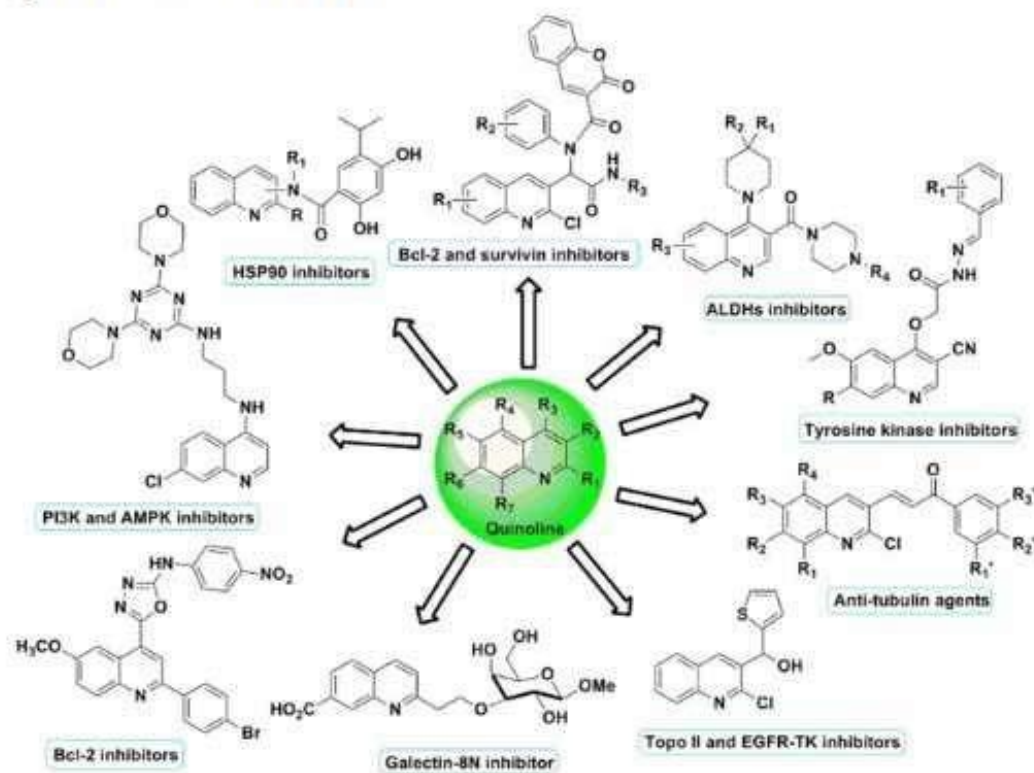
Abstract

The emergence of drug resistance and low specificity with side effects are the significant challenges in pharmaceutical sectors for control of cancer nowadays. Notwithstanding, this is an imperative prerequisite to develop novel anticancer agents through mainstream medicinal chemistry approaches. The intriguing quinoline and its derivatives have demonstrated as significant building blocks for the locating of new promising anticancer agents. Consequently, quinoline moiety with the addition of suitable congeners would offer a strategy for the development of potential drug candidates. This present review article summarizes the recent advances (2018-2020) of quinoline hybrids and their anticancer activity. The mechanism action and plausible structure-activity relationship have discussed.

Nutrigenomics and fish

Authors: Bimal Prasanna Mohanty ✉, Satabdi Ganguly, Arabinda Mahanty, Tandrima Mitra, Sasmita Mohanty | AUTHORS INFO & AFFILIATIONS

Abstract

The interaction of nutrients, environment, and genome determines the general physiological functioning and health of an organism. The branch of science which aims to understand these interactions is known as "Nutrigenomics." Aquaculture and fisheries are the fast-growing food production systems and have an important role to play in achieving food and nutritional security. However, like other food production sectors, it also faces numerous challenges. Understanding the nutritional requirements and need-based dietary manipulation are perhaps the most effective and sustainable way of dealing with these challenges. In this review, we discuss the concept of nutrigenomics as a subset of multi-omics technology and highlight some studies encompassing nutrigenomics studies, with a specific focus on its application in fish nutrition. How these emerging techniques are applied in understanding various aspects of fish physiology as influenced by nutrition including nutritional supplements and various environmental factors like habitat, stress (temperature), and environmental contaminants have also been discussed.

Offer Based Auction Mechanism for Virtual Machine Allocation in Cloud Environment

Sasmita Parida ✉, Bibudhendu Pati, Suvendu Chandan Nayak & Chhabi Rani Panigrahi

Abstract

Nowadays, the cloud service providers provide different resources for computation such as CPU power, memory to a wide range of users by virtual machines (VM). The VMs vary according to their capacity of resources, where each has a limited number of resources with a different price. For this, it is very much required to allocate the available resources efficiently among the requested users, So that there should be the minimization of the cost of resources and maximization of profit from the resources. Therefore, resource allocation is one of the most challenging issues in cloud computing and fog computing. Presently, in cloud computing VMs are allocated with a fixed price mechanism which is not minimizing the cost. In this paper, to solve such problems, we purposed a hybrid combinatorial auction-based approach for allocation of VMs. Here, we calculate the cost with maximum resource utilization which is beneficiary to users on demand.

Keywords

Auction theory   Virtual machine (VM)   Combinatorial auction mechanism

Cloud computing   Resource allocation

Phytoassessment of *in situ* weed diversity for their chromium distribution pattern and accumulation indices of abundant weeds at South Kaliapani chromite mining area with their phytoremediation prospective

Monalisa Mohanty [a b] & ✉, Hemanta Kumar Patra [c] ✉

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Abstract

Release of huge quantities of toxic hexavalent chromium (Cr^{6+}) owing to its widespread use in several industrial and mining activities is a major environmental concern in 21st century. The present *in situ* vegetation analysis at three study sites gives insight on Cr hyperaccumulation potentiality which evaluates the phytoremediation ability of abundant native weeds growing in and around the Cr contaminated effluent discharge site at South Kaliapani chromite mine area, Odisha, India. Moreover, the study measure the relative bioconcentration of chromium in different plant parts with analysis of uptake related phytoremediation indices viz. Bioconcentration factor (BCF), Transportation index (Ti), Translocation factor (TF) and Metal Extraction Ratio (MER) to assess hyperaccumulation potentiality. Vegetation study near mine effluent discharge site (Site-1) reported maximum abundance for *Diectomis fastigiata* (8.25) followed by *Vernonia cinerea* (7.6) with Ti values 56 and 657 respectively. In site-2 (uncultivated barren land near site-1), *Croton sparsiflorus* showed maximum abundance (6.7) followed by *Tephrosia purpurea* (5.8) with Ti values 95.2 and 87.8 respectively whereas *Kyllinga monocephala* reported maximum abundance (6.1) followed by *Fern sps.* (5.9) with Ti values 62.4 and 81.1 respectively in site-3 (a swampy land flooded with chemically treated mine waste effluent). The highest Cr concentrations was recorded in roots of *Diectomis fastigiata* (2371 mg/kg dry matter) and shoot of *Vernonia cinerea* (5500mg/kg dry matter) indicating their Cr phytoremediation potential. Moreover, the study provides the early indicative tools for detecting native Cr hyperaccumulators growing in an *in situ* environment with an *in situ* phytoremediation perspective.

Population genetic structure and diversity analysis in economically important *Pandanus odorifer* (Forssk.) Kuntze accessions employing ISSR and SSR markers

Noohi Nasim [a] [1], I.Sriram Sandeep [a] [1], Ambika Sahoo [a], Suryasnata Das [a], Manoj Kumar Panda [b], Laxmikanta Acharya [a], V.V. RamaRao [c], Sanghamitra Nayak [a], Sujata Mohanty [d] ☒

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Abstract

Pandanus odorifer (Forssk.) Kuntze commonly known as Kewda is an economically important essential oil bearing plant belonging to the family Pandanaceae. Kewda flower distillation industry in Ganjam district (Odisha) accounts for nearly 90 % of the production of commercially important Kewda perfumes in the country and 50 % of that of the world. Economically, it is an important natural bioresource for the perfumery industry due to the exquisite fragrance it possesses. Besides the extensive use of Kewda male flowers for perfume production, other parts of the plant are also used in fibre, food, pharmaceuticals and handcraft industries. Hence, the plant contributes to be the livelihood of the local people of Ganjam district by providing an alternative source of income for the poor coastal villagers. Reports on the molecular characterization of Kewda germplasm using molecular markers are scanty. Molecular marker based assessment of

Privacy Preservation in ROI of Medical Images Using LSB Manipulation

Madhusmita Das, Debabala Swain ✉ & Bijay Ku. Paikaray

Abstract

In the current era of digitization, the medical images are getting transmitted over the communication channel for diagnosis. During this process, it can be modified accidentally or intentionally. This occurs because of the insecure Internet network, which ultimately affects the sent image information. Thus, it results in wrong diagnostic decisions. Here, the basic purpose is to secure image transmission, without changing the sensitive areas of images that carry medical information. One of the possible watermarking methods to avoid erroneous diagnosis and checking the reliability of the received medical image is region-based analysis using ROI. The ROI of medical image is irregularly figured which contains important information. This paper tries to analyze these issues and attempts to overcome such problems by recovering secure medical images.

Keywords

Medical image   Region-based analysis   ROI   LSB manipulation   Data hiding
Zero distortion

Proteomic and transcriptomic changes in rat liver following oral feeding of formaldehyde

Bimal Prasanna Mohanty [1], Arabinda Mahanty [2], Tandrima Mitra [3], Sasmita Mohanty [4], Ajit Kumar Naik [5], Subas Chandra Parija [5]

Affiliations + expand

Abstract

Formaldehyde (FA), a ubiquitous volatile organic compound present in a wide range of resources, is a hazardous chemical and human carcinogen. Contamination of FA in food, especially perishable commodities like fish and meat, is a major source of exposure, although it is not recommended for use in food and food products owing to its carcinogenicity. Effects of oral feeding of FA have been studied by evaluating general health, haematology and clinical chemistry in rat. Recent studies have shown that FA exposure leads to detrimental cardiovascular effects. It regulates vascular tensions through nitric oxide-cGMP signalling pathway and ion channels in rats. Although FA is an established carcinogen, molecular studies on carcinogenic potential with dose dependency are meagre. In this context, the present study was undertaken to investigate the toxicogenomic and proteomic alterations in liver of rats fed FA through drinking water. By proteomic analysis, 621 proteins/protein-subunits showed differential abundance (proteome data available via ProteomeXchange with identifier PXD010534), whereas 536 differentially-expressed-genes were identified by transcriptome analysis (data available via Sequence Read Archive with identifier SRR7974113). Gene ontology analysis showed that binding, catalysis, signal transduction were affected in formaldehyde-fed rats. Pathway analysis revealed that formaldehyde-exposure activated PI3K-AKT pathway that leads to inhibition of caspase activity thereby assisting cells to survive against apoptosis. Decreased abundance/down-regulation of ANGPT, eNOS, STAT3 proteins/transcripts and increased abundance of EDN1 indicated decrease in angiogenesis and vasodilatation that restricted hepatic cells from becoming tumorigenic; thus, indicating FA could be less toxic and non-tumorigenic at low concentrations.

Keywords: Formaldehyde exposure; Proteomic changes; Rat liver; Toxicity; Transcriptomic changes.

Quantitative and chemical fingerprint analysis for quality control of *Zingiber zerumbet* based on HPTLC combined with chemometric methods

Biswabhusan Dash, Asit Ray, Ambika Sahoo, Sudipta Jena, Subhashree Singh, Basudeba Kar, ...show all

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Abstract

A simple, reliable high-performance thin-layer chromatography (HPTLC) method was developed for chemical fingerprinting of *Zingiber zerumbet* and quantitative estimation of zerumbone. Thirty-six batches of *Z. zerumbet* were collected from five eco-regions of eastern India. Zerumbone content varied from 52.4 to 214.6 mg/g (dry weight) in methanolic extract of *Z. zerumbet* rhizomes. Zerumbone content was in the following order: moist deciduous forests of the lower Gangetic plains > Brahmaputra valley evergreen forest > Odisha semi-evergreen forests > Sundarbans freshwater swamp forests > moist deciduous forest of the eastern highlands. Relative Standard Deviation (RSD) of the relative peak areas (RPA) and relative retention times (RRT) of eight characteristic peaks in repeatability and stability test were <3%, and the fingerprinting method was confirmed to be suitable for *Z. zerumbet* rhizomes. Chemometric approaches like hierarchical cluster analysis (HCA) and principal component analysis (PCA) were employed to classify *Z. zerumbet* samples based upon their eco-region. Consistent results were achieved showing *Z. zerumbet* samples could be effectively grouped according to their eco-region. The PCA loading plots identified three probable chemical markers, which might be useful in discriminating the samples. This combinative approach could be used for quality assessment of *Z. zerumbet* and for the formulations containing zerumbone.

Q Keywords: Chromatographic fingerprinting | hierarchical clustering analysis | principal component analysis | zerumbone | Zingiber zerumbet

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Role of Energy Crops to Meet the Rural Energy Needs: An Overview

Pratyush Kumar Das, Bidyut Prava Das & Patitapaban Dash ✉

Chapter | First Online: 12 October 2019

Abstract

The dwindling energy resources are essential for our daily activities and socio-economic development. The excessive use of energy resources at national and international levels creates a burning problem of energy crisis. In rural sectors, multiple constraints limit the generation and availability of energy. To remove the rural sector energy crisis, it is essential to reduce the burden on the use of conventional sources of energy and to find out new avenues for the generation of non-conventional, renewable sources of energy. The people of the rural area have a feeble economic condition and many of them are from the marginal sections of the society, lying below the poverty line. The generation of renewable sources of energy like biofuel using biomass of energy crops as feedstock is possibly a viable concept in this context. The perennial, non-edible plants having high cellulose contents and requiring least pre-treatment are possibly the best option to be selected as energy crops under rural energy generation system. The biofuels like bioethanol and biodiesel produced from the biomass of energy crops have the potential to provide environmental security as these are low emitter of greenhouse gases (GHGs) like CO_2. The low cost bioenergy produced from the energy crops could be affordable for the rural people to use it as a source of energy input. The most supportive measure in this context is the expansion of research and development activities on production and consumption of biofuels at the global level. The success of this rural energy generation programme depends upon the acceptance and interest developed among the rural people to consume this energy to meet their requirements. This could further help in stabilizing the economic conditions of the people residing in the rural sectors. The current chapter mainly deals with utilization of energy crops as an alternative renewable resource to fossil fuels. Energy production processes from energy crops have been discussed along with their role to meet energy needs at the rural level. Current global statistics on energy production from the energy crops have been extensively reviewed. Further work on this aspect is essential to improve the energy demanding scenario of the rural sector and to strengthen the global economy.

Explication

Sanskrit Language: A Window For The World

Dr. Sanghamitra Bhanja
Department of Odia
Rama Devi Women's University

Introduction

A window usually means "an opening in wall or roof of a building, ship, carriage etc. to to admit light or air and afford view of which is outside or inside." Sanskrit Language acts as a window to view India's history, culture, society, literature, science, philosophy, astronomy etc. to the world; and many intellectuals in the world copied or followed up Sanskrit to get knowledge in various fields of education.

Sanskrit Language and the rich cultural milieu which has come down to the present times can be considered the most valuable heritage of India. *Freidrich Maxmuller* the most celebrated Indologist in the whole of the western world has once said "If I were to look over the whole world to find out the country most richly endowed with all the wealth power and beauty that nature can bestow in some parts a very paradise on earth - I should point to India. If I were asked to under what sky the human mind has most fully developed some of its choicest gifts, has most deeply pondered on the greatest problems of life, and has found solution to some of them which well deserve the attention even of those who have studied Plato and Kant - I should point to India. And if I were to ask myself from what literature we were in Europe - again I should point to India."

Security Issues in IoT and their Countermeasures in Smart City Applications

Debabrata Singh ✉, Bibudhendu Pati, Chhabi Rani Panigrahi & Shrabanee Swagatika

Abstract

Smart city can be taken as the biggest implementation of Internet of things (IoT) applications. Smart city technologies promote cloud-based and IoT-based services in which real-world user interfaces use smart phones, sensors, RFIDs, etc. The IoT ecosystems cannot properly communicate between them. So it needs a bridge between them to fill the global common approach. Implementation of this can be done with the help of information and communication technologies (ICT) which may result in enhancing quality, interconnection, and the performance of various urban services. It highlights the need for cloud computing and IoT technologies and both have a major impact on how we build and deploy smart applications for it. There are still numerous difficulties that remain with regard to its deployment due to its varying requirements. In this paper, authors tried to converge the two domains that are cloud computing and IoT for smart city application deployment and also present the identified security threat types and their countermeasures in the context of smart city.

Keywords

IoT   Cloud computing   ICT   Smart city   Cyberattacks   Security

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Review

Synthetic microfibers: Pollution toxicity and remediation

Rojalin Priyadarshini Singh, Sunanda Mishra, Alok Prasad Das*

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HIGHLIGHTS

- Domestic laundering is playing a key role in synthetic microfibers pollution.
- These micropollutants have been reported as a major source of marine microplastics.
- Microfibers have been detected in the body of aquatic and terrestrial organisms with lethal effects.
- Extensive research and community awareness will be successful in making public conscious of this problem.

GRAPHICAL ABSTRACT
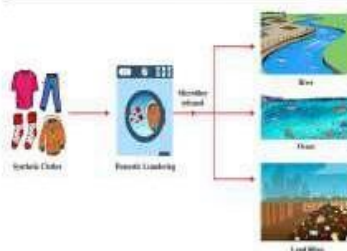
ARTICLE INFO

ABSTRACT

The ever-increasing use of domestic washing machine by urban population is playing a major role in synthetic microfibers (SMFs) pollution via entering the ecosystem. Although many of the sources of fragmented plastic pollution in oceanic environments have been well known, urban areas are playing a major contributor due to huge populations. Thousands of scientific investigations are now reporting the adverse effect of these micro pollutants on aquatic and terrestrial environment, food chain and human health. Microfiber particles along with washing machine grey waters are emitted into urban drainage adjoining the lakes and river which ultimately mix in ocean water and after emission these tiny particles dispersed though out the ocean water by currents due to their low density. Environmental pollution cause by domestic laundering processes of synthetic clothes has been reported as the major cause of primary microplastics in the marine system. While community awareness and improved education will be successful in making public conscious of this problem, there needs to be more research on global scale to mitigate the ecological consequences of microfiber pollution by urban habitats through environmental friendly approach. This paper focuses to improve the understanding of urban population influence on microfiber pollution, their ecological toxicity to aquatic organism and humans, detection and characterization techniques with an emphasis on future research for prevention and control of microfiber pollution.

Contents

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Synthetic microfibers: Source, transport and their remediation

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ABSTRACT

The remarkable gathering of synthetic fabric pollutants in aquatic and particularly marineenvironment is one of the key reasons that are creating stress on global ecosystems. Extensive use of synthetic outfits in the modern urban population results in increased synthetic microfibers (SMFs) generation in the environment. Domestic washing of synthetics textiles are contributing up to 35 % of the microfiber pollution in the atmosphere. Thesepollutantstogether with washing machine effluents are discharged and scattered though out the aquatic environment.Numerous scientific studies are now reporting the detrimentalimpacts of these contaminants on the aquatic food web and human health. Management of these synthetic fabric pollutants is highly essential due to their high rate of emission and ubiquitous occurrence in the nature. These microfibers after their release into domestic drainages enter the oceans via waste water treatment plant (WWTP) and river streams. Micro fiber fleeces are required to be tackled throughout the whole textile lifecycle, starting from textile industry to consumer use, collaborative approaches should be developed to prevent the pollution at source.In future organized advancements are highly desirable including evaluation and management of microfiber release at sources which will reduce the emissions into the environment. This paper provides a general idea of the sources, transmission routes, hazardous effects of microfibers, regulation and remediation strategies to deal with this aquatic pollutants, environment and precise management measures that are available for remediation of microfiber pollution.

1. Introduction

Synthetic microfibers are tiny plastic threads of various textiles including clothes, tyres, fishing net, cigarette butts, floor mats, tie and lace, having diameter less than 5 mm widely distributed in the environment [1]. These pollutants are creating an apprehension because of their considerable involvement to environmental microplastics pollutant. These are used to form fabrics, ropes, household plastic bottles and many more products which are playing a fundamental role in the human life. Synthetic microfibers are reported in all matrices of the environment including air, soil, river, lake and ocean; thus becoming a global issue as anthropogenic waste [2]. Thegradually increasing deposition of these non-biodegradable fiber in marine environment is now considered as a lethal pollutant [1–3]. The presence of microfibers, their size, concentration and composition reported in many seawatersamples in recent scientific studies are listed in Table 1.The latest and disquietingcause of marine pollution has been newlyreported and characterized in micro plastic fragments released from domestic sewage polluted by synthetic clothes from domestic washing machine [80,88, 89]. Due to many advantages of synthetic fiber, the production and

consumption of clothes have enormously been increased by the metropolitan cities over past two three decades [2]. These synthetic fibers (SF) have dominated the natural fibersand captured the apparel industries in the global market due to its strength, softness, stain resistant and most vital cost factor. We all wear various synthetic clothes such as, jackets, yoga pants, socks, underwear and blankets every day without thinking about their disposal.From the universal production of fabric, 60 % of synthetic fibers are produced, natural fabric accounts for about 30 % and 10 % accounts for other materials. From the total synthetic fabric production, only polyester accounts more than 50 % of the worldwide fiber market. It is estimated that, polyester is a dominant synthetic fiber in global fiber market and its production rate has been augmented terrifically from 5 Mts in 1980 to 50 Mts in 2017 [3].Asian countries produceapproximately 80–85 % of the total global production of synthetic fiber, in which China alone contributes 70 % of the whole [2]. A commercial report released by Global apparel fiber consumption survey (2017) estimates that, synthetic clothes consumption has been increased approximately 65 % worldwide. The production and consumption of synthetic fibers are two principal features of the synthetic microfiber pollution in the world. It is reported that approximately 20–35 % of