ARS 2014

ABSTRACTS
of
4th Annual Research Session

Sabaragamuwa University of Sri Lanka

17th December 2014, Belihuloya, Sri Lanka

FOURTH ANNUAL RESEARCH SESSION

SABARAGAMUWA UNIVERSITY OF SRI LANKA

17TH DECEMBER 2014

ARS 2014

Abstracts of the 4th Annual Research Session, Sabaragamuwa University of Sri Lanka

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SABARAGAMUWA UNIVERSITY OF SRI LANKA

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Message from the Vice-Chancellor
Sabaragamuwa University of Sri Lanka

It is with utmost pleasure I write this testimonial welcoming you all to the 4th Annual Research Session of the Sabaragamuwa University of Sri Lanka (ARS 2014). The research session has now been established well, as an annual event of the Sabaragamuwa University calendar, and has certainly grown since its launching four years ago. Our main aim of organizing this event was to inculcate a productive research culture and promote scholarly discussion among the academics of our university, especially emphasizing on the applied research that can contribute to the nations' development and sustainability. Making our efforts one step ahead, the ARS 2014 has also invited best undergraduate researchers of the university to join in the academic discussion, also providing them an opportunity to present their findings. I am certainly looking forward to see the ARS 2014 being a productive session showcasing quality and applied research of our best researchers.

I am also pleased to inform you my colleague researchers, that the university has taken steps to increase our recurrent expenditure on research and development up to 10% of the annual budget in 2015. This expenditure, in terms of research grants, conference participation grants and publication grants in internationally peer-reviewed and indexed journals are promoted in the view of increasing the visibility of our university within the international academic arena, and thence with the hope of uplifting our international ranking.

I would also take this opportunity to express my sincere thanks to our honorable Chief Guest of the ARS 2014, Senior Prof. H.H.D.N.P. Opatha for accepting our invitation, as well as the Director and the staff of the Centre for Research and Knowledge Dissemination, the Chairman, the Coordinator and faculty representatives of organizing and editorial committees of the 4th Annual research Session, for their immense contribution to making this event a success. The Bank of Ceylon is greatly acknowledged for their continuous financial support to the university.

Finally my warm wishes are extended to all the speakers and poster presenters individually and to the research community of the Sabaragamuwa University as a whole, to enlighten this event as well as to make greater efforts in 2015 to enhance our research productivity.

Professor Chandana P. Udawatte
Vice-Chancellor
Sabaragamuwa University of Sri Lanka

Message from the Director,
Center for Research and Knowledge Dissemination,
Sabaragamuwa University of Sri Lanka

It is with immense pleasure that I write this message as the Director, Center for Research and Knowledge Dissemination on the occasion of the Fourth Annual Research Session at the Sabaragamuwa University of Sri Lanka. The University consists of five faculties; Agricultural Sciences, Applied Sciences, Geomatics, Management Studies and Social Sciences & Languages. Innovative findings of multidisciplinary research of five faculties will be presented on this extremely important occasion. Annual Research Session provides an excellent opportunity to staff members to share their knowledge and research experience. This research session will provide an excellent discussion forum on the future of academic and research activities.

The purpose of research is to inform action. Thus, your study should seek to contextualize its findings within the larger body of research. Research must always be high quality in order to produce knowledge that is applicable to national and international audience.

In conclusion, research is very vital to our everyday decision making. It arms you from wrong information and save time and money. It is important to your success as you take on life's challenges and career decisions making. But be careful though, because too much research without action on what you're learning is not good either.

I wish the deliberations of the research sessions will prove productive and intellectually stimulating and the outcomes will be extremely useful to national and international development.

Finally, I must thank everybody for their commitments to make the fruitful Research Session a success.

Professor Lal P. Vidhana Arachchi
Director
Center for Research and Knowledge Dissemination
Sabaragamuwa University of Sri Lanka

ARS 2014
Fourth Annual Research Session of the Sabaragamuwa University of Sri Lanka

It is indeed with a great pleasure we produce this message at a time we believe as an important phase in the research portfolio of the Sabaragamuwa University of Sri Lanka (SUSL). The Annual Research Session (ARS) has instigated four years ago in the SUSL, focusing mainly on the newly graduated post-graduates (PhD, MPhil, MSc) among the university academic staff, providing them an opportunity to showcase their research to the wider academic community with varied scientific interests. The annual research session has certainly shaped-up the research landscape of the university over the last few years, with the influence and stimulation from many respected senior researchers in the university, while there is plenty of room for further improvement.

This year, we are delighted to see nineteen members of the academic staff presenting their post-graduate studies conducted in and/or collaborated with eight different countries, making the ARS 2014 an international experience within the SUSL. This is depicted by the ARS logo we introduce from this year onwards, illustrating the global research being discussed under the roof of *"Aaadara Kanda"* symbolizing the unique environmental and academic setup in SUSL. The ARS 2014 is also enriched with a poster session by the best undergraduate research students identified by respective department heads and the bearer of the student of the year title at the 2013 general convocation. We are also happy to announce that the "Abstracts of the Fourth Annual Research Session, Sabaragamuwa University of Sri Lanka" is registered as an international standard publication, from this year onwards.

We are indebted to our chief guest Senior Prof. H.H.D.N.P. Opatha for gracing this occasion with his intellectual speech as well as the Vice-Chancellor and Director and the staff of the Centre for Research and Knowledge Dissemination for all the provisions they made. We would also like to make this an opportunity to express a huge 'thank you' to all who worked hand-in-hand to make this event a success. Although the utmost effort was taken to keep up to the promise of providing an innovative, informative and enjoyable experience, and a perfect way to give farewell to the year 2014 on an academic note, we sincerely apologies for any inconvenience caused in regard to the organizing of the ARS 2014.

Finally, we wish all the presenters as well as non-presenting researchers of SUSL all the success in your research endeavors, making 2015 a promising year to our research portfolio as a whole.

Dr. Sandun J. Perera, Chairman & Dr. Udeni Jayalal, Coordinator
ARS 2014 – Fourth Annual Research Session,
Sabaragamuwa University of Sri Lanka

ABSTRACTS

OF THE

FOURTH ANNUAL RESEARCH SESSION,

SABARAGAMUWA UNIVERSITY OF SRI LANKA

Abstracts of technical sessions of the ARS 2014 are organized as follows;

- Summary of the **Keynote Address** by Senior Professor H.H.D.N.P. Opatha – (pp.01–03)

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      Judges – Dr. Wasantha Ratnayake and Dr. W. Manoj Ariyaratne

Summary of the Keynote Speech

Selected Key Issues in Human Resource Management: Excellence in Morality, Green HRM, Work-Family Balance and Presenteeism

H.H.D.N.P. Opatha
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We are living in a society, in which frauds, corruptions, evil conflicts, assassinations, assaults, retaliations and even wars are present and unfortunately the plight has been getting increased. We have considerably employees or professionals who have <u>not</u> become good citizens of the country, who are persons of <u>immorality</u>, who are <u>not</u> special, giving from their hearts, making the world a better place for those whose lives they touch. HRM solution for this critical problem is to ensure **development of excellence in morality**.

Morality or Personal character is the totality of persistent moral qualities a person has. It is the degree to which a person has virtues (honesty, patience, tolerance, respect, humility, gratitude etc.) and vices (greed, jealousy, anger, hostility, reprobation, retaliation, stinginess etc.). Good character is morality or civility and bad character is immorality or incivility. Characteristics of Personal Character (Opatha, 2007; Opatha and Teong, 2014) are: It is personal; It is the aggregate of special qualities; It is about morality; It is about a person's engagement in right behaviour and use of right words and non-engagement in wrong behaviour and use of wrong words; It has a complex set of relatively persistent qualities; It is about real nature of a person-how he/she thinks and acts and his/her motive behind his/her actions; and It is the inward desire of a person to do what is right at any cost. Here 'Three Vs' exist. They are *Values, Virtues*, and *Vices*. Virtues are good habits; good attributes useful for you and others; do not hurt you and others; universally accepted moral principles and do not vary according to race, nationality, religion, culture or any other classification; absolutes; and essential for you. Values are what you appreciate; may hurt you or others because they (or some of them) are not appreciated or recognized; may not be universally accepted beliefs or ideals and may vary according to race, nationality, religion, culture or any other classification; relatives; and may not be essential for you. Vices are bad habits which are harmful for you and others. While virtues are to be nurtured within the person vices are to be removed from the person for the purpose of developing an excellent personal character. How to create and enhance excellence in morality within our employees?

The environmentally destructive nature of organizations' activities and outcomes (Shrivastava, 1994) has contributed to the current environmental issues globally. According to Rugman & Verbeke (1998), environmental issues are some of the most complex and significant managerial challenges of twenty-first century. Organizations are responsible for the environmental degradation (Alshuwaikhat & Abubakar, 2008; Haden et al., 2009). We have observed, heard or read in respect of natural disasters such as acid rains, red rains, Tsunamis, flooding, hurricanes, droughts etc., inhalation of poisonous air

and drinking contaminated water, health diseases owing to pollution, climate changes, global warming, and harms to animals and other natural creatures. HRM solution for this critical problem is to ensure **Greening**.

'Green' or 'Greening' has at least four meanings in the context of managing people at work (Opatha, 2013; Opatha and Arulrajah, 2014): (1) *Preservation of the natural environment*: all the things in the world which are neither caused nor controlled by human beings including land, forests, plants, animals, and other natural phenomena are referred to as the natural environment. To keep it in its original form and protect it from harm, loss, or negative change; (2) *Conservation of the natural environment*: to be very careful in the way of using it in order to let it last as long as possible, to use it at the minimum level so that future generations will be able to utilize it; (3) *Avoidance or minimization of environmental pollution*: to stop contaminating the water, air, atmosphere, etc. through unpleasant and poisonous substances and wastes. To guard against outcomes that will ultimately endanger the planet/earth where humans and non-humans are living; and (4) *Generation of gardens and looking-like natural places*: to create parks and places which have plants, trees, and grass. Thus, it is possible to argue that an employee who may be a manager or a non-manager is supposed to perform four roles for the purpose of becoming a *green employee*. They are preservationist, conservationist, non-polluter, and maker. How to create and enhance greening at organizational level and at employee level?

It has generally been observed that increase in the number of women in the work place, dual career families, single parent families and an aging population_have generated a greater need for employers and employees as well to balance work and family life. Divorces, committing suicides, and lack of fertility are visible. HRM solution for this critical problem is to ensure **Work-Family Balance**.

Work-family balance is defined as the degree to which you fulfill the demands coming from your employment and the family (Opatha, 2010). Also it can be defined as effectively managing the paid work and the other activities that are important to people. How to assist employees to create and enhance work-family balance? Some specific solutions include (1) *Flex-Time*: is a non-traditional work schedule in which employee works for a certain number of hours (usually eight) per day but for varying times of starting and ending the daily work; (2) *Compressed Workweeks*: is a non-traditional work schedule in which employee works for fewer days per week but more hours for each day of working; (3) *Part-Time Employment*: Any job requiring less than a full-time work schedule (less than 45 hours per week) is defined as part-time employment (22 hours and half an hour or 24 hours per week); (4) *Telecommuting*: Working at home through the use of microcomputers, networks and other communication technology such as fax machines.

There is a tendency of some employees who have a practice of reporting to work when they are ill and are not capable of operating to their usual level of productivity. Coming to work when sick may cause infecting others, namely co-employees and possibly customers or clients. Some employees have a tendency to work late or come into the office during their vacation. This phenomenon is labelled as **Presenteeism** the cost of which to both employer and employee can be significant.

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Storability of Big Onions (*Dambulla Red* Selection) Under Controlle Temperature and RH Conditions for Postharvest Waste Minimizatic

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Big onion is an important condiment in daily Sri Lankan diet with a constant der throughout the year. Only about 25% of the annual requirement of big onion is lc produced. About 30-50% postharvest losses are reported during storage under conditions due to sprouting and bulb rotting. This aggravates the problem of off-se shortage and reduces profits within the season. Objective of the study was to analyz practical feasibility of controlled environment systems to minimize existing postha losses and to assess the postharvest behavior of big onions stored under sel« optimum conditions in a pilot scale controlled environmental storage. Primary secondary data related to onion storage and marketing were gathered and analyz« get information on postharvest handling, storage environment and marketing sys Storage behavior of locally popular big onion cultivar, *Dambulla Red* selection at and 30°C and three RH conditions *viz.* 60%, 75% and 90% were studied using a lab-; locally fabricated environment control chambers. Both the temperature and RH ef were significant. 75% RH and temperature at 25 °C was found to be the best amon¿ tested conditions. To assess the postharvest behavior of big onions stored u; selected optimum conditions, the temperature and the RH was controlled and monit« inside a 1000kg capacity pilot-scale controlled environmental storage. It was abl maintain 25°C±2 temperature and 75±5 RH levels within the storage struc throughout the storage period using an air conditioning unit. After three months, : weight losses were due to rotting and sprouting. The percentage weight reduction du moisture evaporation and respiration was 19%. Power consumption throughout three month storage period to control the temperature and the RH was 483 kWh. It calculated that the profit margin was around Rs. 30,000 per one ton after three mor of storage of big onions. It is evident from results that the controlled storage conditi with slight technological improvements would be technically and economically feas for storage of big onions for local farmers.

Keywords: Big onion, bulb rot, controlled environment, *Dambulla* selection, Posthar losses, short-term storage

Development of Processed Bottled Mussel Product Using Local Mussel Species (*Perna* Spp.)

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Perna perna and *P. viridis* are commonly found edible mussel species around the margin of territorial sea in Sri Lanka. It is a seasonal seafood available only in few months per year, being experimentally cultured but not yet commercialized as a processed mussel product. In this research, three mussel products (t_1, t_2 and t_3) were developed based on various added citric acid amounts (3g, 4g and 5g). Then, the organoleptic properties of three products were investigated and nutritional properties and the shelf-life were determined for the best product. Mussels (*P. viridis*) harvesting was done in three consecutive days and the extracted mussel flesh was stored under -10°C. The processed product is having net weight of 115 g of cooked mussel and 85 ml of brine solution. Hot filling was done in all the time and stored in the room temperature. Semi trained 30 sensory panelist were used to determine the organoleptic qualities of the products, subjectively the best product was selected through Friedman non-parametric test. Only the color ($P=0.001$) and texture ($P=0.035$) sensory attributes showed significant difference ($P<0.05$). Sensory attributes such as appearance, odor ($P=0.093$), taste ($P=0.152$), after taste ($P=0.099$) and overall acceptability ($P=0.850$) did not show a significant difference between treatments. The product t_2 has received the all time highest sum of rank and considered as the best product. The selected best product (t_2) has six months of expected shelf-life and no quality defects were recorded until 20th week, while the product has 73.70% of moisture content, 16.65% crude-protein content and 2.60% crude-fat content.

Keywords: Citric acid, mussels, *Perna viridis,* shelf-life

Best Weaning Age in New Zealand White Rabbits Under Tropical Climatic Conditions

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The primary objective of this study was to gain a better insight into the behaviour productivity and welfare of rabbit does and kits to determine the best weaning age of New Zealand white rabbits under tropical climatic condition. Fifteen nulliparous rabbit does (3.17 ± 0.17 kg) of the New Zealand White breed were divided in to three treatment groups corresponding to the different weaning ages of kits and designated as T1= weaning at 21 days; T2= weaning at 35 days and T3 = weaning at 49 days. The does were re-mated for three consecutive parities. Data on behaviour, White blood cell (WBC) count and Neutrophil to Lymphocyte (N:L) ratio were analyzed to detect the level of stress. Body weight and other production parameters (litter size in consecutive weeks gestation length and mortality rate of kits in consecutive weeks) were also analyzed to detect the overall productivity of kits and does. According to the behaviour study, T2 kits and does was the lowest affected group following weaning. Both WBC count and NL ratio of T1 does were significantly (P < 0.05) increased following weaning while T1 kits exhibited the highest (P < 0.05) NL ratio following weaning. Though, the growth rate was reached to positive during the the resting period in all three parities of 35 days weaned does, it was persisted as negative even after weaning in the second and third parities in 49 days weaned does. However, the production parameters of the doe were not significantly affected. At the age of 60 days, T1 kits started to explore a novel environment quicker than the other two groups (P < 0.05). The highest latency was observed in T3 kits (P < 0.05) in first sniffing of a novel object. Significantly (P < 0.05) longest time duration was taken by T3 kits to reach and sniff a newly introduced kit in an aggression test. It could be concluded that the lowest affected group by weaning was the does and kits weaned at 35 days. Therefore, 35 days weaning can be recommended for New Zealand White rabbits under tropical climatic condition.

Keywords: Behaviour, New Zealand white rabbit, tropical conditions, weaning

Distribution of Dung Beetles (Coleoptera; Scarabaeidae; Scarabaeinae) of Sri Lanka Across Bio-climatic Zones

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Establishing the taxonomic status and geographical distribution of a given taxa is useful in many aspects including conservation decision making, especially if that taxa is a known ecological indicator. Dung beetles (Coleoptera; Scarabaeidae; Scarabaeinae) are a diverse and abundant group of insects in both tropical and warm temperate ecosystems. They are an excellent focal taxa and a good indicator for measuring and documenting biodiversity and community structure as well as quantifying anthropogenic disturbance to habitats in the tropics. The present study attempted to identify the dung beetle fauna of Sri Lanka, while resolving their taxonomy and understanding their current distribution with respect to the environmental attributes. Established bioclimatic zones of the country with known environmental variations were used to evaluate the role of environmental variables in determining the distribution of Scarabaeinae. Results showed that certain species clearly exhibited unique distributional relations with the zones they occupy. The study also contributed in updating the taxonomic status of the above taxa, collating the existing taxonomic literature dating back to several decades. The study revealed that Sri Lanka harbours not less than 82 species representing the sub family Scarabaeinae and at least 20 species representing the subfamily Aphodiiane. Some species were absent in previously recorded regions while several records include potential new species to Sri Lanka. The results of this study intend to facilitate the ecological and conservation applications for these ecologically significant, but lesser known taxa.

Keywords: Bio-climatic zones, dung beetles, Sri Lanka

New Lichen Species from South Korea

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South Korea has a high floristic richness including a variety of taxonomic groups where all most all the flowering plants are well documented. Among the other floristic groups, lichens are a highly specialized and ubiquitous group as they have the ability to adapt to extreme environmental conditions, which enabled them to become pioneers of vegetation. However, little work has been done on lichens in South Korea about one decade ago, and thus the knowledge with regard to taxonomy, diversity and distribution of lichens in South Korea was rather incomplete. As taxonomical and other applications of lichens have gained more attention during last decade, the documentation and analyzing of such data has become more important. In recent years, several researchers have made a significant contribution to the taxonomy, classification, and systematics of Korean lichens based on the lichen collection deposited in Korean Lichen Research Institute (KoLRI). According to their investigations, more than hundred species were added to the Korean lichen flora and about 20 species for the Worlds lichens. As there are many more lichens deposited in KoLRI from different regions from South Korea and from North Korea, the flora project has initiated to document all of these lichens. Few lichen families including Cladoniaceae, Parmeliaceae, Physciaceae and Lobariaceae were selected at the initial stage of this project. The identification and documentation of families Cladoniaceae, Parmeliaceae, and Lobariaceae were completed during 2012 and 2013. According to the results, 53 species were identified in 3 genera for the family Cladoniaceae. Amongst them, 14 species were recorded for the first time in South Korea. Similarly, 90 species in 23 genera were found in the family Parmeliaceae, which includes 3 and 29 species new to science and South Korea respectively. In the family Lobariaceae, 23 species were found in 3 genera. Another parallel work conducted by the same research group on microlichens were able to find out *c.* 15 species new to science and *c.* 50 species new to South Korea. These results indicated that, the existence of many lichen taxa that have not yet been studied sufficiently. Therefore, further investigations are needed to complete the documentation of floristic status of the lichen flora in South Korea.

Keywords: Korea, lichen, new species, Parmeliaceae

Time to Revisit Biodiversity Hotspots Biogeographically: A Case from South-Eastern Africa

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Although being a successful mechanism of channeling conservation funds to where they are most needed, "Biodiversity hotspots" are still demarcated by their intuitive boundaries, based on floristic endemism. Such delimitations are seldom been tested with actual biogeographical patterns of animals, the main reason being the scarcity of animal distribution data in most such hotspots. Renewed interest on documenting biodiversity during the past decades has made the distribution data available for some taxa in some areas to facilitate rather fine scale numerical biogeographic analyses, as in the case of the Maputaland-Pondoland-Albany (MPA) biodiversity hotspot in south-eastern Africa. The present study explores the zoogeography of the MPA hotspot, while analytically refining its' delimitation and identifying "hottest spots" of animal endemism (i.e. cross taxon overlap patterns of centers of endemism; COEs) within and around it. Endemic vertebrate distributions in south-eastern Africa were used to set eco-geographic units (OGUs) for numerical biogeographic analyses. Clustering of OGUs through both the phenetic (hierarchical clustering using the unweighted pair-group method with arithmetic averages) and parsimony (parsimony analyses of endemicity) approaches, as well as geographical mapping of endemism measures were conducted for all groups of vertebrates and selected invertebrate taxa. The results reveal the MPA also as a hotspot for animal endemism, though originally defined as such on account of its exceptional floristic endemism. Furthermore, the results indicate a greater Maputaland-Pondoland-Albany (GAMP) region of animal endemism, encompassing a multitude of COEs; Maputaland, Natal, Pondoland, Albany, and the Drakensberg and Mpumalanga escarpments, highlighting high levels of narrow endemism in the herpetofauna, land snails, velvet worms and some groups of beetles. While the "hottest spots" identified here constitute local conservation priorities within the larger GMPA region of global conservation significance, a preliminary spatial analysis of the representation of protected areas in relation to them shows a mismatch, emphasizing the need for a systematic conservation planning assessment for the region. The study highlights the importance of numerical biogeographic methodologies in conservation, in addition to their uses in the theoretical biogeography.

Keywords: biodiversity hotspots, Biogeography, conservation, southern African

Development of a Soil Hydraulic Parameter Estimator

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The water and energy fluxes at the land-atmosphere interface depend heavily on the s moisture content, which imposes a significant control on evaporation, infiltration a runoff. Nonetheless, temporal soil moisture evolution is not easy to measure or monit at large scales due to its spatial variability, which is largely driven by the local variati in soil properties and the vegetation cover. As a consequence, soil moisture dynamics a generally estimated using land surface models, with model physics based on lo resolution soil property maps, which may include significant errors due to their spat scale. Consequently, in order for the model to perform reliably, there is a need for mo accurate and detailed soil parameter data sets than are currently available. The wo that will be presented focused on developing an estimator for retrieving soil hydraul properties of the soil profile using the near-surface soil moisture observations ma from SMOS (Soil Moisture and Ocean Salinity) over the Murrumbidgee Catchme starting first with synthetic data for some individual points and working up to the larg demonstration area with actual observations. PSO (Particle Swarm Optimization) w used to retrieve optimal soil hydraulic parameters, which were first validated agai field and laboratory observations under the point scale. The methodology was th applied to an area of 40km by 40km, the approximate spatial resolution of a SMOS pix to obtain the 'best-fit' values for soil hydraulic properties at the SMOS scale. Howev instead of using a single value for the area covered by the pixel, a downscaled prod (DISPATCH) at 1km by 1km was utilized.

Keywords: DISPATCH, JULES, PSO, soil hydraulic parameters

Evolution of Cadastral System in Sri Lanka

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There is no unique or universally accepted cadastral system. The evolutions of cadastral systems around the world vary considerably and depend heavily on each country's social, political, and economic histories. The evolutionary process of cadastral system in Sri Lanka is largely guided by varying land policy objectives adopted by different regimes in its history. This work reviews this evolutionary process of cadastral system by focusing on four prominent historical stages: the ancient Sinhalese kingdom (before 1505), the period of Portuguese rule (1505–1658), the period of Dutch rule (1658–1796) and the period of British rule (1796–1948).

Keywords: Cadastral survey, cadastral system, land registration, Sri Lanka

Automatic Reconstruction of Urban Objects from Mobile Laser Scanning Data

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Up-to-date three dimensional urban models are increasingly important in various urb
application areas, such as urban planning, virtual tourism, or navigation systems. Ma
of these applications are often demanded on modelling of buildings, enriched wi
facade information, and single trees. Mobile Laser Scanning (MLS) is recently recogniz
as a promising technique for cost effective capturing of highly dense point clou
allowing for fast reconstruction of these urban objects. These point clouds are hard
free from the occlusions and noises; and they consist of numerous objects with varial
point densities and incomplete structures. Therefore, novel strategies on the processi
of mobile laser scanning point clouds, in terms of the extraction and modelling of salie
facade structures and trees, are of vital importance. The present study proposes t
new methods for the reconstruction of building facades and the extraction of trees fr
MLS point clouds. The first method aims at the reconstruction of building facades w
explicit semantic information such as windows, doors and balconies. The init
classification has been performed using a local height histogram analysis, together w
a planar growing method. The points, classified as object, are segmented into pla
surfaces corresponding to the façade objects. In the modelling process, a new conc
based on shape knowledge to model these objects by minimizing occlusion effects
introduced. It is assumed that each façade object can be defined using primitive shap
Based on the extracted boundary points, the shape of object is described by applying
douglas-peucker algorithm. The advantage of this process is that it offers an ability
only to model correct geometric shape but also to remove occlusion effects from the fi
model. The repetitive patterns and similarities are exploited to rectify geometrical a
topological inaccuracies of the reconstructed models. The second method aims
extraction of individual trees. An innovative shape based approach is developed
transfer the knowledge about trees to machine language. In here, the usage of princi
direction for identifying stems is introduced. The output of the algorithm is segmen
individual trees that can be used to derive accurate information about the size a
locations of each individual tree. The reliability of each method is verified against th
different data sets obtained from different MLS systems. The results of both methods
quantitatively evaluated using a set of measures. The completeness, correctness, a
quality of reconstructed objects are all over 90%, which proves the robustness of
shape-based method. Therefore, the results of the three test scenes show that b
methods are acceptable, and can be used with more complex urban scenes
heterogeneous quality. In addition, they provide flexible frameworks, in which m
extensions may be envisioned.

Keywords: Building facades, MLS, primitive shapes, reconstruction, urban trees

Fuzzy Markov Random Fields for Optical and Microwave Remote Sensing Image Analysis: Super Resolution Mapping and Multisource Image Classification

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Major remote sensing applications in Engineering, geographical, geophysical, meteorological and surveillance studies, yield image data from different sensor platforms (ex-Multispectral, Hyperspectral and SAR sensors) for information extraction. With the intense developments in remote sensing image analysis in the past few decades, a wide variety of image processing techniques are also available for such objectives. Among these techniques, developments in the field of Markov Random Fields (MRF) and Fuzzy logic have taken strong interests in remote sensing image segmentation and restoration due to its consistency, capabilities to adapt to single and multisource imagery, resolving uncertainties, contextual framework and producing super resolution maps (SRM). In the history of MRF and fuzzy techniques, there has not been a single setup to make them work in tandem to utilize both the advantages. This work proposes a novel fuzzy parameter integrated MRF models for optical as well as SAR remote sensing images analysis. Mainly the study discusses in detail the application of fuzzy MRF model for SRM and multisource image classification (MIC). For the SRM task, it employs Worldview-2 and Advanced Visible and Near-Infrared Radiometer-2 (AVNIR-2) images. Subsequently, time series AVNIR-2 images and Advanced Land Observation Satellite (ALOS) phased array type L-band SAR (PALSAR) intensity images with autoregressive texture measures were employed for the multisource feature extraction and restoration task. The study details the formulation of both these framework from Bayesian classification mechanisms. Other than these model formulations for SRM and MIC, the experiments bring in several novel modifications to the fuzzy pixel membership grades determination, energy minimization using simulated annealing and the initial class labelling. For the pixel membership grade estimation, this work proposes spectral angle based class fractional values and the fuzzy c-means portioning. Simulated annealing based optimization was tested using logarithmic and power law combined annealing schemes. Initial class allocation was conducted in two different approaches, where for the SRM it was a random mixture while for the multisource restoration, it was based on the maximum class fraction. As a whole, this study is an in depth discusses about the conventional MRF models and the fuzzy integrated MRF models for single source and multisource image feature extraction.

Keywords: Fuzzy parameters, markov random fields, multi-source image classification, super resolution mapping, synthetic aperture radar

The Dynamic Essential Modeling of Organization: Toward the Case Legal Domain

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Construction of ontology model and allocation of space for re-engineering is wi
in different domains with broader perspective with the support of Inf
Communication Technology spanning from information gathering to hi
technologically advanced computational activities. Judicial system is one of the
systems with more actor interactions and which lead more interoperable iss
complex situation in the judicial system rises with hard and fast courts pro
complicated acts in judicial system, and more actor interactions, either wil
unwillingly re-visit the old cases, number of pending cases, and the work lo;
judge. The Dynamic Essential Modeling of Organization (DEMO) is a methodolo
the "construction" and "operation" flow of an organization. As an example cas
subdivided into many events such; tendering, payment, binding, submitt
approval called as transactions in DEMO. Each transaction results product anc
product is produced with series of coordinating acts (viz. request, promise, state
especially communication in between actors involving particular transaction.
domain most of the products are immaterial like decision making and servi
ontology framework for case filing is built up with four basic models; actic
process and construction respectively. Action model was constructed by appl
rules (using World Ontology Specification Language) for actions to the actors i
in the system. The series of coordinating steps and causal & conditional relat
while case is being filed was developed with process model which c
coordination and production activities. By identifying the types (viz. object, cl;
and ontological law state model was constructed. Construction model was de
with above stated models including actor roles, info source, transactions and us;
This work has showed promising solution for interoperability within differer
along with processes, and the DEMO technique takes to the new dimension of
modeling, (re)designing and (re)engineering for future considerations.

Keywords: conceptualization, DEMO, framework, ontology

Student Centered Learning: An Interactive Short-Message-Service-Based Mobile Learning Environment

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With the advent of mobile technology, integrating an open-source secure mobile learning environment, coupled with a Short Messaging Service (SMS) into a learning management system (LMS) has been a challenging task in mobile learning platforms during the past few years. Although there are number of paid services available over the web that facilitates sending SMSs via an LMS. Conversely, a major limitation in two-way texting is sending back a part of received data with the reply message. Nevertheless, the extensive text message is increased the message payload size and it will grounds to convert a standard text message into a concatenated message automatically. Sending bulk concatenated messages in the mobile learning environment is a major drawback when considering the cost per messages. However, SMS is not secure to be used to transport sensitive data, because confidentiality and integrity is not available in the SMS. Hence, the assurance cannot be given for its current security mechanism for protection from modification, eavesdropping and man-in-the-middle attacks. The main goal of this research is to address the LMS integrated open-source and secure mobile learning environment with short messaging system which facilitate two-way communication with data concealment and extensive message compression mechanism with cryptographic protection. Initially, a database is integrated into the Moodle LMS that holds usernames, passwords and enrolment keys for the courses, message information such as recipient's phone number, message body, user data header (UDH) etc. Authenticated students can perform learning activities such as group discussions, online quizzes and assignments in the mobile learning environment using their mobile devices. Authenticated teachers can create text messages using a mobile device connected to the Internet. The text message is inserted into the LMS integrated database and SMS Daemon periodically checks and sends it out through the SMS gateway to the recipients. If the message is extensive than 160 characters, it is compressed and given cryptographic protection by the system prior to inserting into the database. The recipients who handle mobile devices decompress such compressed message into an original form of texts to view them. The UDH associated port addressing technique with SMS is used to conceal and exchange data relevant to a particular course unit concealed in the message body itself. Statistical results indicate that the students' preference in studying with a group while using mobile technologies for their academic activities, system relevance and interoperability of the two-way text messaging with data concealment and educational impact on improving the learning environment in cost effective manner by the proposed system.

Keywords: LMS, message compression, mobile learning, SMS, UDH

Plagiarism Detection in Web Based Learning Management Systems

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At present, the problem of plagiarism is being increased by widespread use of o
documents, the Internet and e-learning systems. It has been identified as one of the
crucial issues to be addressed to maintain the quality and effectiveness of
learning/teaching process especially in higher and university education sector. In o
to tackle this problem there should be free, efficient and reliable methods to identif
plagiarized versions of documents among the corpus stored in the large document h
in web based learning management systems. The main problem which is address
this research is detecting the plagiarized versions of documents among the subm
tutorials, assignments and other documents by the students in such systems. Her
propose a novel framework called MAPDetect for detecting plagiarism of such ki
corpus which covers all the inherent tendencies of the plagiarizer than tradit
mechanisms. The core of this framework consists several metrics by providing
evidences in different types of plagiarism such as verbatim copying, paraphrasing
collusion, structural changes of the content and change of formatting. Algorithms o
document representation are used to calculate the word level correlation amon
documents and it is more related to the surface level document similarity analysis
syntactic and semantic analysis in the deep structure of a document are used to d
paraphrasing and collusion. Structural formatting of a document gives other an
evidence on plagiarism also is emphatically considered. Authorship verification fro
field of intrinsic plagiarism detection is also used in the proposed framework. A mo
architecture is used for this framework to implement the plagiarism dete
techniques with preprocessing sub systems. Real document sets submitted by univ
students are used to test the improved surface level detection of the framework
deep level detection is tested with a manually created corpus. The result
exploratory experiments on proposed algorithms of each module gives pron
results. It demonstrates that the integration of several metrics on different areas
significant evidence to discriminate the plagiarized documents more accurately. I
context the user is provided a great opportunity to obtain more evidence to pro
identification of the plagiarized segments of the documents.

Keywords: Authorship attribution, document fingerprinting, document similarity,
natural language processing, plagiarism detection

Unobserved Roles of Government and Non-Government Organizations in Rural Tourism Development: A Case Study of Rural Sri Lanka

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Tourism has been recognized as a strategic tool in regenerating rural livelihood and local development while conserving natural and cultural resources. Since rural communities lack in capacity and political advocacy, the role of governmental and nongovernmental organizations (NGOs) becomes inevitable in the rural development process. However, unrealistic condition of Sustainable Rural Tourism Development (SRTD) perceives questionable incorporation and interventions of government agencies and NGOs. Inductive investigation on the role of government and NGOs in SRTD inclined qualitative case study method. This was operationalized through semi structured personal interviews, focus group discussion and direct observations took place from July 2012 and July 2013 in Sri Lanka in addition to review of published and unpublished documents and artefacts. In-depth descriptive and triangulated analysis of naturalistic interpretation of different sources elucidates multiple realities on intervention of government and NGOs in rural tourism development. This illuminates that rural tourism development undergoes unsystematic and unstable government and NGOs intervention in Sri Lanka. Different government agencies embody fragmented and diluted role in rural tourism development according to their hierarchy and task orientation. NGOs' roles and functions have been underrated and narrowed down only to irregular financial assistances. Sound cooperation and integration of government agencies, NGOs and other stakeholders in implementing rural tourism development revitalize SRTD process.

Keywords: Cooperative rural tourism development, government agencies and NGOs, rural capacity building, rural developmental dilemma, sustainable rural tourism

Eco-Tourism Practices in Sri Lankan Eco Resorts:
A Supplier Perspective Analysis

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Ecotourism is potentially the best growing segment in the international market. Ma
hoteliers in Sri Lanka promote the sustainable use of this concept as a new mar
oriented concept. Being a good business opportunity and the fastest growing segme
Sri Lankan tourism is changing its outlook to sustain this new product. Since Sri Lank
rich with much cultural and natural diversity, it has the potential to develop the e
tourism concept as an alternative form of tourism better than other destinations for
benefit of the Sri Lankan economy and community. However, arrivals of eco tourist
Sri Lanka have been less than 1% over the last decade It proves that the Sri Lankan e
tourism market is not enjoying the benefits of the cultural and environmentally frie
areas to earn more foreign exchange, get employment, further regional developm
(infrastructure, superstructure) and increase the living standard of the commu
Therefore, it is essential to identify how the eco resort hoteliers' understand
practice the eco-tourism concept. These findings help to check whether the practi
ecotourism in Sri Lankan eco resorts have an impact on the declining eco tourist arri
This study examines the way eco resort hoteliers comprehend the meaning of the
tourism concept in Sri Lanka. A comprehensive case study research approach was
to conduct this research. Interpretive paradigm and the social constructio
philosophical stand of the researcher provided the opportunity to explore or descr
phenomenon in context using a variety of data sources. The target population for
study was self-declared eco resorts. Samples were selected purposively. In the san
managerial level staff was selected to conduct in-depth interviews to explore
meaning of the term of eco resort. Primary data was collected through in-d
interviews in this research with the support of observation method. Analysis of in-d
interviews and observations showed that the practice of the eco resort concept has
misused by the hoteliers in Sri Lanka. They have been unable to classify the eco tol
and identify the market and customer segment clearly. They have constructe
meaning of the eco-tourism concept in a different manner neglecting some compo
of the eco-tourism concept which deviates from the international standards. Whe
principal guests are dissatisfied, there is a possibility of long term dropping e
business. Attaching the "eco-tourism" label to poorly planned programs have pro
the local population with little besides social tension and environmental degrad
while leaving the genuine eco tourist dissatisfied and cheated.

Keywords: Eco resort, Eco tourism, international standards

The Impact of Uneven Access to Water on Income Divergence, Poverty and the Technical Efficiency of Paddy Farms in Sri Lanka

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This study examined the consequences of uneven access to irrigation water on divergence of income, rural poverty and technical efficiency of paddy farms in major irrigation schemes in the dry zone of Sri Lanka. The empirical study was carried out on a sample of 420 upstream and downstream farmer households covering three major irrigation schemes under different water stress. The technical and allocative efficiency of paddy farming under different water stress were estimated by stochastic frontier production function incorporating the technical efficiency effect model. The censored regression model was applied to identify the determinants of technical efficiency. The Gini decomposition approach was applied to measure inequalities and headcount ratio and the poverty gap index and Sen's poverty index were applied for poverty measurements. The study found that uneven distribution of irrigation water within the schemes and between the schemes had a significant impact on income variation, poverty and the technical efficiency of selected paddy farms. The downstream and high- water risk farms appeared more technically inefficient than did the upstream and low-water risk farmers mainly due to variation of water availability throughout year. Among the estimated coefficients of frontier functions, the water availability index recorded a significant impact on productivity and input elasticity of paddy farms. Among the determinants of efficiency estimates considered, the water management-related variables appear to have a more significant impact on technical efficiency of farmers than did socio-economic variables. The headcount ratio and poverty gap index in the downstream region were almost double those of the upstream region. Further, income and assets accumulation inequality across upstream and downstream were significantly high. Finally the study proposed that participatory water management policies are more appropriate than market oriented policies to overcome water disparities within the schemes in Sri Lanka.

Keywords: Disparity, efficiency, inequality, irrigation, management, poverty

An Assessment of Green Purchase Intention among Management Undergraduates in Sri Lankan State Universities: A Pilot Study

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Environmental awareness among consumers has become the major topic which ini
the scholars and researchers to focalize the research on green purchase intentio
behavior. In this context, this empirical work piloted the study on assessment of
purchase intention among management undergraduates in Sri Lankan State Univer
Due to that, management undergraduates from university of Jaffna have been sele
the respondents for the pilot study, which give initial path way to continue the
among management undergraduates in Sri Lankan State Universities. Speciall
study aims to identify the factors influencing on green purchase intention and dev
validate the conceptual model of green purchase intention based on identified fac
the Sri Lankan view point through the exploratory factor analysis. In this stand
proposed model in this study is an original and unique, it is based on esta
theories and models in line with green consumerism. It provides a well-sup
explanation for green purchase intention and behavior as the new paradigm in th
consumerism.

Keywords: Exploratory factor analysis, green purchase intention, mana
undergraduates

Stock Price Reaction to Announcements of Right Issues and Debenture Issues: Evidence from Colombo Stock Exchange

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This study investigates the stock market reaction for right issues and debenture issues of Colombo Stock Exchange (CSE) during the period of 2005 to 2011, using alternative return generating models. During the sample period, 138 right issue announcements and 30 debenture issue announcements were reported, from which only 96 right issue and 20 debenture issue announcements were qualified for the sample. The study employees Event Study Methodology to investigate the ex-ante and ex-post market reactions, for the two types of security announcements while predicting abnormal returns, based on three alternative normal returns modeling methods. Namely Mean Adjusted Model, Market Adjusted Model, and Capital Asset Pricing Model. Results of all models show positive market reaction during the 30 days prior to the announcement and react negatively from 2 days after the announcements for right issues, but for debenture issues market reacts negatively during the period prior to the issues and continues to do the same during the post event period. Although the magnitude and significance of abnormal return generating through three alternatives methods differ, the pattern of the abnormal returns of all models are similar. Cross sectional regression analysis reveals a significant positive influence of issue size on abnormal returns of issuing firm and significant negative impact of pre offer leverage ratio on abnormal returns of the issuing firm. Thus, as far as the speed of the price adjustment is concerned it seems that the CSE is not efficient.

Keywords: Abnormal returns, debenture issue, event study, right issue

Determinants of Grave Crime: A Case Study from Kalutara Prison

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Crime is harmful for any society. The cost and effects of crime touch just about ev
to some degree. The types of cost and effects related to crime widely vary. In ad
some costs are short-term while the others last a lifetime. The ultimate cost is the
lives. Increasing crime rate is a big challenge and major barrier for the developme
country like Sri Lanka. It causes an increase in various kinds of social, econo
cultural problems. In this type of a situation, it is necessary and important to f
possible influential demographic and socio economic factors that may have cont
to committing a grave crime. The main objective of the study is to identify the p
influential demographic and socio-economic factors of grave crime relative to
crime. Primary data was mainly used during the study through a questionnai
hundred and forty six prisoners from Kalutara prison were selected using a s
random sampling method based on their gender. Binary logistic regression mo
used to identify the determinants while using dependent variable as grave cri
and minor offenses (0). This study revealed that prisoners' mothers' education,
drugs and mode of the relationship with the parents are most significant factor
breaking and theft is the most frequent grave criminal activity in Sri Lanka, and
ranked one in reporting the gravest personal crimes.

Keywords: Crime, determinant, prisoner

The Effect of Water Quality on Sediment Formation in Carbonated Soft Drinks

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Sediment formation of carbonated soft drinks during storage is the major problem faced by the soft drinks industry. Since past decades food scientists pay more attention to realize the reasons behind the sedimentation. Therefore, major objective of this research was to study the effect of water quality on sediment formation in carbonated soft drinks. Carbonated soft drinks were prepared at different Calcium ion levels containing water. For different Calcium ion levels containing soft drinks preparation standard 28745 ppm solution was prepared by 28.75 g of $CaCO_3$ was dissolved in distilled water with 10 ml of 5M HCl solution top up to 1l. By using standard Calcium ion solution 0, 25, 50, 75, 100, 125, 150, 175 and 200 ppm X type carbonated soft drinks were prepared. Every once a week, carbonated soft drink quality was evaluated. There was no significant difference at different Calcium ion levels containing carbonated soft drinks. Brix, pH, and Titrable acidity were evaluated periodically and there was no significant different. Sediments were analyzed by using AAS and FT-IR spectrometry. There was high concentration of Calcium (8.8 gkg^{-1}) and Iron (3.6 gkg^{-1}) as metals when compare with specification for potable water. Sulphate and alcohol types were also present in sedimentation. In FT-IR analysis there was strong peak at 1100 cm^{-1} which is corresponding to the sulphate and there was a peak at 1385 cm^{-1} which is corresponding to the alcohols. The resulting IR spectrum of the sediment samples confirmed that the sediment structure contains organic portion and an inorganic portion. Results clearly revealed that, Calcium and Iron are important to the sediment formation process. Without iron there is no sediment formation. Sediments contain high amounts of Calcium and Iron. In water treatment process Calcium hydroxide and Ferrous sulphate is used and residual Calcium and Iron from water treatment process is responsible for the sediment formation in carbonation soft drinks. Thus, an alternative water treatment method is suggested for carbonated soft drinks.

Keywords: Carbonated soft drink, FT-IR, sediments

Mineral Sand Contribution of Mahaweli River Towards Placer Deposits North East Sri Lanka

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The North-East coast of Sri Lanka contains two economically important placer
mineral deposits (Pulmuddai and Verugal). Both deposits are situated ~ 5km away
Mahaweli River mouth. Identification of sources and depositional areas of sedime
important in order to understand the evolution and current behavior of sedim
systems. However, no any study has attempted to find the source of these de
Hence, the major objective of this study was to identify the possible se
contribution of Mahaweli River for these deposits. Associated textural features s
mean grain size and sorting index of deposits were identified using textural a
while mineralogical examinations were used to determine the provenance of d
Panning and microscopic examinations were used to identify heavy minerals an
volumetric percentages. Particle size distribution of heavy minerals was detecte
sieve analysis and the obtained data were analyzed using GRADISTAT ™ 4.0 so
The obtained results reveal that, mean grain size and sorting index value (SI\
higher in Verugal deposit. However, total heavy mineral weight of 500g sam
comparatively high in Pulmuddai deposit. Ilmanite (65%–70%), rutile and
(10%–15%) are the dominant heavy minerals in Pulmuddai deposit while
(50%–55%), zircon and garnet (10%–20%) are the dominant in Verugal
Provenance investigation showed that the average composition of heavy mir
Mahaweli River, Verugal River, and Verugal deposit have similar mine
assemblages. However, average mineralogical variation of Pulmuddai dep
dissimilar with Mahaweli River. It can be concluded that the Mahaweli River
major source of Verugal deposit while it was not the major source of Pulmuddai
Both deposits are replenished by northeast monsoon and the long shore
occurring in this period further confirms these results.

Keywords: Heavy minerals, Mahaweli River, placer deposits

Isolation and Characterization of Bio-Active Compounds in *Walidda antidysenterica*

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The systemic drug discovery and development has established a significant success in the treatment and management of human diseases where the currently accepted modern medicine is known to have its roots in traditional medicine and therapy. Sri Lanka has a proud history of traditional medicine where many endemic plants are been used. *Walidda antidysenterica* is one such endemic plant which is widely used in traditional medicine and is known to have valuable therapeutic effects. Our studies have provided evidences for the value of this plant to discover new lead compounds against different pathogenic microbes. The present study explores the potential use of *W. antidysenterica* leaves as a source of antibacterial agent. The crude methanolic extracts of *W. antidysenterica* plant materials were subjected to an antibacterial assay against Methicillin sensitive *Staphylococcus aureus* (ATCC 25923), Methicillin resistant *S. aureus* (Bench) and *Escherichia coli* (ATCC 25922) out of which the highest inhibitions were exhibited by the leaves with zones of 22.9mm and 23.6mm against Methicillin sensitive *S. aureus* and Methicillin resistant *Staphylococcus* respectively. The crude chloroform extract of the leaves were then fractionated by column chromatography using chloroform:hexane (8:2) as the eluting solvent system. The resulting six fractions were analyzed by thin layer chromatography and two of them were identified as pure fractions. The fractions were subjected to an antibacterial assay against Methicillin sensitive *S. aureus* (ATCC 25923) and Methicillin resistant *S. aureus* (Bench) out of which the two pure fractions showed satisfactory inhibitions of 31.3mm, 30.4mm and 16.8mm, 15.7mm against Methicillin sensitive *S. aureus* and Methicillin resistant *Staphylococcus* respectively. Our results provide adequate evidences for the presence of antibacterial activity in *W. antidysenterica* leaves which will help to discover new lead compounds in the development of novel and effective antibiotics.

Keywords: Methicillin resistant, Methicillin sensitive, *Staphylococcus aureus*, *Walidda antidysenterica*

Antioxidant and Anti-diabetic Properties of Kithul (*Caryota urens*) Fl

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Starch extracted from pith of *Caryota urens* L (Family: Arecaceae) palm is kno "Kithul flour" and is claimed to have health benefits according to folklore and ayu Antioxidants are believed to possess numerous health benefits. However, as yet, benefits of *C. urens* flour have not been scientifically investigated. Antioxidant pro of *C. urens* flour were tested using different *in vitro* assays namely, 2,2-azino ethylbenzothiazoline-6-sulfonic acid (ABTS*), ferric reducing antioxidant oxygen radical absorbance capacity and ferrous ion chelating assays. Total Polyp Content (TPC) and Total Flavonoid Content (TFC) were also evaluated. Anti-d properties were estimated using alpha amylase and alpha glucosidase enzyme inh assays. Dried methanolic extracts of both boiled and raw samples were use assays. *C. urens* starch granules were also observed microscopically. Results of th showed that *C. urens* flour possess free radical scavenging activity (raw 22.02 and boiled 39.06 ± 8.93 µg trolox equivalent (TE)/ g flour), electron donating re power (raw 103.01 ± 35.34 and boiled 360.27 ± 114.01 µg TE/g flour), oxygen absorbance capacity (raw 22.95± 7.10 and boiled 1923.64 ± 577.11 mg TE/1g flo metal ion chelating capacity (raw 27.68 ± 5.23 and boiled 143.12 ± 40.28 µ equivalents /g flour) exhibiting its antioxidant potential. TPC (raw 97.24 ± 35 boiled 512.99 ± 189.62 µg GAE/g flour) and TFC (raw 1.65 ± 0.47 and boiled 6.6 µg quercertin equivalents/g flour) which are said to be contributed to anti activities were also found. In addition, boiled flour which is generally consum food has shown higher antioxidant activity. *C. urens* flour does not contain mark diabetic properties. Starch granules seem to be round to oval shape and little si potato starch granules. It is evident from results that *C. urens* flour has m antioxidant property which may associate with its traditional health claims.

Keywords: Antioxidants, free radicals, *in vitro* assay

Captive Breeding of *Channa striata* (Snakehead), an Indigenous Fish Species in Sri Lanka

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Snakehead *Channa striata* is a popular food fish species in Sri Lanka whose alarming rate of capturing signifies quick depletion of natural stocks, hence highlighting the need of prompt actions for stock enhancement. Even though captive breeding plays a pivotal role in this regard, no studies were successful and least is known about their breeding in Sri Lanka. Our study was therefore aimed at captive breeding of this valuable species by ecological breeding and/or induced breeding. Wild caught adult snake-head were acclimatized for one month after separating sexes. During the whole period they did not accept any formulated feed. They were then subjected to four different ecological conditions simulating the natural breeding conditions, yet no success was observed in breeding. This may be attributed to improper conditions or seasonality of breeding. The later was more supported, as no rains were recorded and males did not show gonad maturation as confirmed by dissection, showing the first record of seasonality of breeding. In the second experiment, induced breeding was done using 0.5 ml/kg dose of ovulin® for females and 0.25 ml/kg for males. In three consecutive trials, two had successful spawning while the last had hatching success as well. Embryonic and larval development were also studied and we reported rapid embryonic growth, drastic colour changes during larval stages, cannibalism and no adaptability to given artificial feed by larvae. They thrived well with live-feeds. In conclusion, for the first time we show that *C. striata* can be successfully induced for breeding under captivity.

Keywords: *Channa striata*, ecological breeding, induced breeding, ovulin

The Factors Affecting the Most Common Injury Pattern in the National Amateur Boxing Pool, Sri Lanka

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This study determines the causative factors for one of the most common in
patterns resulting from amateur boxing players in Sri Lankan National Ama
Boxing Pool. Boxing is identified as a major combat sport. Therefore, as a bo
player, there is a great risk of being injured during training and competitions. On
severe injury occurs, the physical and the mental condition of a player get affe
gradually and it becomes worse for them. Recently in January 2014, the in
selection trial for Commonwealth Games in 2014 was cancelled due to se
injuries occurred during competitions for most elite players. Therefore, the pr
injury management has become a crucial point in such combative sports. Here, a
mode survey research method is utilized to investigate the factors affecting on
most common injury patterns resulting from players in Sri Lankan National ama
boxing pool. Whole population (n=40) was analyzed including both males
females through research intended questionnaires and semi-structured inter
with the focused group. Coding techniques were used to analyze qualitative
while analyzing the quantitative data according to specified statistical met
Results indicate that chronic injury pattern called "Boxer's Knuckle" is the
common injury pattern for both male and female amateur boxing players in Na
Pool. Further, the player's weight class, inappropriate medical screening, u
inappropriate protective gloves, unbalanced diet and inadequate hydration, la
physical conditioning and barriers in training environment have been identifi
the factors affecting on this particular injury pattern.

Keywords: Amateur boxing, *Boxer's knuckle,* injury

A Study on Fundamental Motor Skill Levels of Primary School Students in Horana Education Zone

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The purpose of this study was to examine fundamental motor skills (FMS) of locomotor category (run, vertical jump, leap and dodge) and object control category (catch, overhand throw, two-hand side-arm strike and kick) among 300 selected primary school students in Horana educational zone. It has been documented that children who do not master FMS are more likely to experience failure in motor domain and less likely to participate in sports and games during childhood and adolescences. Here, FMS were assessed using "research-made-test", prepared using the classroom manual for teachers by Victorian Department of Education, adapted to fit with the Sri Lankan context. A sample survey method was employed as the research design. The Data was descriptively analyzed using MINITAB 14 and Microsoft-Office software. Poor levels were recorded from 49.7% students for locomotor skills and 55.7% students for object control skills. The majority of students for run (46.7%), dodge Skill (49.7%), overhand throw (50.7%) and two-hand side-arm strike (53.7%) were in normal level. Nevertheless a majority of students showed poor level skills for vertical jump (46%), leap (58.7%), catch (47.3) and kick (46.7%). There were only few students performing at the mastery level of FMS (Vertical Jump-10%, Dodge-2.7%, Catch-1.6%, Overhand throw-1.3% and 1%). The mean value of boys for run, vertical jump, leap, catch, over hand throw, two-hand side-arm strike and kick were higher than the girls mean value for same skills. These findings emphasize the need to improve structured opportunities that facilitate children's acquisition of FMS and the proper early development of FMS at the primary school level.

Keywords: Fundamental motor skills, locomotor skills, object control skills

Collaboration Modeling Framework for Legal Workflow Manageme

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Effectiveness of the legal sector is highly relying on the coordination of collat workflow activities to cope with highly dynamic and complex information exe among the diverse array of participants. In the context of ever increasing numbet legal cases and roles offering different legal services, majority of complexit performance issues in legal service collaborations could readily be overcon promising benefits by introducing Workflow Management Systems into legal do well. This research work is a partial contribution of an attempt to get estab framework that could facilitate the legal collaboration modeling in such a w; provide a useful input for the creation of legal workflow specifications for se legal workflow management systems. In the proposed framework, a set of p transaction patterns are developed in line with UN/CEFACT's recommendat generic business collaboration modeling with the objective of accommoda demanding legal sector requirements. The two main contributions of this resear are a collaboration modeling framework and a draft modeling of an applicat based on the proposal. The application of the modeling framework has possibility of streamlining the legal collaboration processes and then to form domain knowledge while bridging the communication gap between technical a experts.

Keywords: Collaboration modeling, legal workflow specification, transaction workflow management system

Adoption of ISO 9001:2008 Quality Management System as an Effective Marketing and Managerial Tool

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Increasing global competition and customer knowledge have made quality management an indispensable factor for organizations to deliver customer-perceived value while obtaining organizational excellence. Hence, adopting ISO Quality Management System (QMS) as a marketing and managerial tool would be undoubtedly a strategic decision of any organization to retain delighted customers. Although the cost of adopting ISO 9001 QMS is significantly high, organizations tend to adopt it, as it provides an assortment of marketing and management benefits on top of all the costs of quality. However, not all organizations adopting ISO 9001 QMS succeed in achieving their objectives. Therefore, in view of investigating this issue, this descripto-explanatory survey was designed in two sections; the internal survey and the customer survey which was carried out at Ceylon Cold Stores PLC (with reference to ice-cream value chain) and in three "Grama Niladhari"(Village Officer) divisions, respectively. The results of the study reveal that the key marketing ex-ante requirement of ISO 9001 QMS was the pressure from customers whereas the key managerial ex-ante requirement was standardizing the ice-cream production process. The identified factors that explained the most of the variability of needs were; "internal processes", "marketing" and "motivation and communication". The study further disclosed that there was no significant evolution between the ex-ante and ex-post requirements. The identified main managerial benefit by adopting ISO 9001 QMS was ensuring continual improvement of organization's overall performance, whereas the key marketing benefit was delivering superior customer value. The results of Customer Value Audit disclosed that Elephant House and brand B offered a superior customer value whereas brand C and D offered inferior customer value. The customer value model divulged that the most influential socio-economic factors on customer-perceived value were; gender, monthly income of the family and the locality. The conjoint analysis revealed that the most influential product attributes on customer-perceived value were; price, brand name, taste and availability. The outcome of this study would be useful in planning marketing strategies and in policy making process.

Keywords: Customer-perceived value, ISO 9001, managerial tool, marketing, quality management system

Wavelet Based Satellite Image Segmentation

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VHSR (Very High Spatial Resolution) satellite data provide amazing details of t
surface. For the better analysis of VHSR satellite data, image classification is t
important step. Problems are arising when classifying the VHSR satellite image
spectral pattern recognition methods (pixel based classification) because
variability increases in land cover units and to the weakness of spectral re
Segment based classification is an alternative approach to solve the problems
satellite image classification. Once the image is accurately segmented accordir
land use, then each segment can be labeled into land cover classes or themes
cost of the commercial softwares which provide the facility to accurate segmer
very high. The research uses texture to identify the different segments of th
Analysis of texture requires the identification of proper attributes or featu
differentiate the textures in the image for segmentation. Haralic introduced
textural features from the GLCM (Gray Level Co-occurrence Matrix) that can diff
the textures of the image. Special attention is paid to the use of WCM (Wa
occurrence Matrix) to calculate several textural features instead of using GLCM
of using WCM is to reduce the computation burden of the original GLCM com
The proposed computation will be based on Haar wavelet transform bec
resulting wavelet bands are strongly correlated with the orientation elemen
GLCM computation. Derived textural measures from WCM, such as contrast
cluster shade, cluster prominence are used to make the segmentation band
averaging, filtering, thresholding, and Skeletonizing steps are applied to ge
segmented line. Proposed technique for wavelet based texture segmentation o
images is programmed in MATLAB environment and successfully verifie
simulated images, biomedical images and selected satellite images. The accur
segmented results is highly dependent on the selected textural mea
combinations of them, the radius of the circular averaging filter and the
threshold. The level of segmentation depends on the size of the moving window

Keywords: GLCM, MATLAB, Segmentation, Texture, VHSR, WCM

The Impact of Emotional Intelligence on Emotional Labour with Special Reference to Ceylon Electricity Board, Uva Province

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Emotional Intelligence is fast becoming a legitimate area of academic research, which can be defined as the ability to identify and understand one's own emotions and those of others. There are many areas of organizational concern that may be beneficially influenced by the concept of Emotional Intelligence. Emotional Labour is one such area, and it has grown as a legitimate concern for organizational participants involved in the practice of using emotions for organizational purposes. These emotional practices connect with the concepts of Deep Acting: the regulation of felt emotions and Surface Acting: the regulation of observable expressions of emotions, as main notions of Emotional Labour used to manage emotions in the workplace. Surface Acting is considered as an issue for service organizations when an entire organization communicates within itself and to the outside world. The purpose of this study is to determine the impact of emotional intelligence on surface acting of employees with special reference to Ceylon Electricity Board (CEB), Uva Provincial office. Goleman's four essential elements of emotional intelligence: Self-Awareness, Self-Management, Social-Awareness and Social-Management were utilized to develop this study. The population of this study was 128 employees, who represents four departments of CEB work setting and the sample was selected by using simple random sampling method. By using survey strategy self-administrated questionnaire was distributed among the sample of 50 employees. SPSS 17.0 was used to analyze the data using Multiple Regression Analysis. Findings reveled that emotional intelligence has a negative impact on surface acting behavior of employees in CEB work setting. These findings lead to a discussion of a series of implications for the practitioners in the field of human resource development.

Keywords: Self-awareness, self-management, social-awareness, social management, surface acting behavior

Time Varying Estimate of Beta (Systematic Risk): Evidenc Colombo Stock Exchange

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This study investigates the time varying behavior of betas (Systematic risl Stock Exchange (CSE). The study used the trading data of 55 stocks listec period of 9 years for the analysis from 2005 to 2013. This study estimates betas using two different approaches; recursive regression and rolling regr two different approaches are employed in order to estimate and analy varying betas of 55 stocks under full period and three sub periods as 2005- 2010, and 2011–2013. The empirical finding of this study provides a cleaɪ time varying nature of 55 betas and indicates increasing and decreasing bet; also found that beta values varied across the techniques used to estimate th finding suggests that, similar to some other evidences in developed an markets, betas are not stable and demonstrate time varying nature in the Co: Exchange. The findings imply that the assumption of beta constancy is i Capital Assets Pricing Model and the users of this model in estimating the sys in CSE will not get the anticipated results.

Keywords: beta, Capital assets pricing model, recursive regression, rolling re;

Study on Customer Based Brand Equity of Munchee Tikiri Marie with Special Reference to Colombo Area

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Customer Based Brand Equity (CBBE) is one of the important concept in Brand Management as well as in academic research. CBBE is defined as the differential effect that the brand knowledge has on consumer response to the marketing of that brand and it is recognized as the most valuable intangible asset for the firm. Developing and managing CBBE for a brand is considered as a critical issue for most firms especially when there is an intense competition. Having number of brands and flavors causes to create intense competition in the Marie market. CBBE has become as an important concept to win this competition and to become as the dominant Marie brand in consumers' mind. Literature suggests that four factors: Brand Awareness, Brand Association, Perceived Quality and Brand Loyalty, effect to create CBBE for certain brand. With this literature background, this research paper focuses to identify the impact of those four factors on CBBE by adopting Aaker's brand equity model. Quantitative research approach was adopted for the study and mothers who were in Colombo area who had children aged between 6–10 years were selected as the population for the study. Convenience sampling technique was used to extract 100 respondents as the sample. Survey method was used as the research strategy and a self-administered standard structured questionnaire was distributed among respondents to collect data for the study. SPSS 16.0 is used to analysis the collected data. Hypothesis were tested by using Multiple Regression Analysis and results showed that only Brand Loyalty has a significant positive impact on CBBE while Brand Awareness, Brand Association and Perceived Quality do not significantly effect on CBBE of Munchee Tikiri Marie. Findings of this study provide implications for brand managers to manage Munchee Tikiri Marie brand and contribute to the existing body of knowledge.

Keywords: Brand association, brand awareness, brand loyalty, customer based brand equity, perceived quality

Factors Influencing the Customer Acceptance of Internet Bank Reference to Employees of the Sabaragamuwa Universi

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The banking industry has undergone a dramatic change since internet penet the concept of internet banking. Internet banking is defined as an intern through which customers can use different kinds of banking services. Alm Lankan banks have introduced differentiated internet banking products. How a small proportion of the Sri Lankan banking population has shown their int acceptance on internet banking. The Household Income and Expenditure Surv conducted by the Department of Census and Statistics, Sri Lanka has also pro still a majority of population is out of the use of internet banking facilities a they have the knowledge and awareness. The purpose of this study is to exp determinants which influence the acceptance of internet banking services employees of Sabaragamuwa University of Sri Lanka. The study was primarily b primary data, and cluster sampling was applied on the population of employe respondents were selected randomly from each of the cluster according researcher's convenience. A structured questionnaire was distributed and on questionnaires were taken. The binary logistic regression analysis techniqu applied to analyze the data. Based on the logistic regression analysis, it is identifi the factors such as the ease of use, perceived usefulness, employment status a availability of internet access as significantly influential to the acceptance of ir banking in different magnitudes. The clerical and allied grades have recorded the h acceptance while the minor workers were in the least acceptance levels. The aca and academic supportive staffs have approximately an equal level of tenden acceptance when comparing the minor workers. When the customers' perce towards the usefulness or ease of use of internet banking increases; the acceptan also shown an accordant increase. The result shows that the tendency of acceptai internet banking is relatively increasing with the higher accessibility of int Furthermore, the qualitative analysis revealed that the fear of web-based theft a lack of understanding are some main concerns for lower levels of accepting in banking.

Keywords: Banking services, customer, internet awareness, internet banking

The Exploitation of Patriotism: Analysis of the Play 'Thicker than Blood' by Delon Weerasinghe

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This study attempts to critically interpret the drama 'Thicker than Blood' by Delon Weerasinghe in the context of patriotism. The notion of patriotism was largely expressed through fundamentalism and ethnocentric nationalism in the post-colonial context. In Sri Lanka the racial violence that ensued for over three decades gave birth to the epoch of terrorism and was at times saturated with misconceptions of patriotism. Over three decades the racial violence of 1958 and 1983 was engulfed in war till the military defeat of the Liberation Tigers of Tamil Elam (LTTE) in 2009. Yet it is still questionable, though the military defeat of the LTTE has been concluded, whether the threat of racism has been defeated at an ideological level and whether Sri Lanka as a society is ready to embrace an era of secular values. It is within this context that the concept of exploitation of patriotism is represented in this study by taking into the above drama into critical analysis. This study uses the critical theory adapted by Frankfurt School Thoughts to analyze the thematic content of the drama and to examine the possibility within patriotic feeling to be universal, unconditional and secular. The study explores the sphere of universal patriotism and how the play presents the process of exploitation of the said value through using the symbol of a soldier while paying attention to how the ruling class exploits the group mentality for nationalism in order to affirm their own power and status.

Keywords: Delon Weerasinghe, ethnocentrism, nationalism patriotism, 'Ticker than Blood'

Analysis of the Depiction of Teachings of Buddhism in Two Japanese Short Stories

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The aim of this study is to analyze the depiction of teachings of Buddhism in t
Japanese short stories: (a) Akutagawa Ryunosuke's "Kumo No Ito" and (b) Miyaza
Kenji's "Chumon No Oi Ryoriten". Theses short stories are based on topics that a
relevant to the teachings of Buddhism. So that, this analysis was conducted in order
identify how such Buddhist teachings are depicted in aforementioned short stori
Primary and secondary data collecting methods were used to identify and describe su
teachings of Buddhism in detail. Several Buddhist monks were interviewed in order
collect the primary data, while the secondary data were gathered from boo
newspapers, magazines and the Web. The analysis leads to the conclusion that the abo
mentioned short stories were written by the authors, considering the teachings
Theravada Buddhism such as 'Karma', reincarnation, dependent origination a
uncertainty of Life, etc.

Keywords: Analysis, depiction, short stories, teachings, Theravada Buddhism

Analysis of Spatial Distribution and Potential Risk of Dengue Disease in Vavuniya Secretarial Division by Using Information Technology

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This study attempted to analyze the spatial distribution and potential risk areas for dengue disease prevalence in Vavuniya secretarial division by using information technologies. The data was collected from the Medical office of Health in Vavuniya secretarial division, meteorological department and through a structured interview. Geographical Information System, Remote Sensing, time series and binary analysis were used in the study for analyses. The results showed the spatial distribution of dengue, while those potential risk areas were identified and mapped with a three level scale, as high risk, moderate risk and low risk areas. The temporal pattern of the prevalence of dengue disease in Vavuniya from 2001-2013 shows an increasing trend towards the future. Climatic factors and some socio economic factors are found to be strongly responsible for dengue distribution.

Keywords: Dengue fever, geographic information system, information technology, remote sensing

AUTHOR INDEX