บทความที่น่าสนใจประจำเดือนธันวาคม 2557

สาขาวิทยาศาสตร์และเทคโนโลยี

1	Title:	Estimating determinism rates to detect patterns in geospatial datasets
	Author:	Ricardo Araújo Rios, Lael Parrott, Holger Lange, Rodrigo Fernandes de Mello
	Journal:	Remote Sensing of Environment, Volume 156, January 2015, Pages 11–20
	Abstract:	The analysis of temporal geospatial data has provided important insights into global vegetation dynamics, particularly the interaction among different variables such as precipitation and vegetation indices. Nevertheless, this analysis is not a straightforward task due to the complex relationships among different systems driving the dynamics of the observed variables. Aiming at automatically extracting information from temporal geospatial data, we propose a new approach to detect stochastic and deterministic patterns embedded into time series and illustrate its effectiveness through an analysis of global geospatial precipitation and vegetation data captured over a 14 year period. By knowing such patterns, we can find similarities in the behavior of different systems even if these systems are characterized by different dynamics. In addition, we developed a novel determinism measure to evaluate the relative contribution of stochastic and deterministic patterns in a time series. Analyses showed that this measure permitted the detection of regions on the global map where the radiation absorbed by the vegetation and the incidence of rain occur with similar patterns of stochasticity. The methods developed in this study are generally applicable to any spatiotemporal data set and may be of particular interest for the analysis of the vast amount of remotely sensed geospatial data currently being collected routinely as part of national and international monitoring programs.
	Database:	ScienceDirect

2	Title:	The need for a common basis for defining light-use efficiency: Implications for productivity estimation
	Author:	Anatoly A. Gitelson, John A. Gamon
	Journal:	Remote Sensing of Environment, Volume 156, January 2015, Pages 196–201
	Abstract:	A primary focus of this short communication is to show how the operational definition of light use efficiency (LUE) influences the results and interpretation of the LUE model. Our study was motivated by the observation that multiple LUE definitions are reported in the literature. The temporal behavior of three operational definitions of LUE, based on (i) incident radiation, (ii) total absorbed radiation and (iii) radiation absorbed by photosynthetically active/green vegetation was examined for two contrasting crops (soybean and maize) having different physiologies, leaf structures and canopy architectures. Over the course of a growing season, the behavior of these three contrasting LUE definitions was strikingly dissimilar, and the degree of dissimilarity varied with contrasting crops (corn and soybean). This demonstrates that LUE model behavior would vary strongly with the LUE definition used, with

	resulting implications both for the estimated seasonal productivity, and for the interpretation of the underlying mechanism. Based on these findings, we recommend a standard definition of the LUE model based on radiation absorbed by green vegetation. We also discuss the practical and theoretical implications of using this simple conceptual model on a dynamic biological system.
Database:	ScienceDirect

3	Title:	L-band ALOS PALSAR for biomass estimation of Matang Mangroves, Malaysia
	Author:	O. Hamdan, H. Khali Aziz, I. Mohd Hasmadi
	Journal:	Remote Sensing of Environment, Volume 155, December 2014, Pages 69–78
	Abstract:	This study has been carried out to evaluate the relationship between Advanced Land Observing Satellite (ALOS) Phased Array L-band SAR (PALSAR) backscattering coefficients and the aboveground biomass (AGB) of a managed mangrove forest in Malaysia. Matang Mangrove Forest Reserve known as Matang Mangroves was selected as the study area. It covers about 41,000 ha of mangrove forest and is the largest single mangrove ecosystem in Peninsular Malaysia. A mosaic of L-band PALSAR fine beam dual (FBD) with 25 m pixel spacing data for the year 2010 was provided by the Japan Aerospace Exploration Agency's (JAXA) within the framework of the ALOS Kyoto and Carbon (K&C) Initiative. A total of 320 sampling plots that were collected in 2010 and 2011 were used in the study. The calculated plot-based AGB were correlated to the pixels/backscatter of PALSAR data. The best correlation function (i.e. from HV backscatter) was used to estimate and determine the aboveground biomass of the Matang Mangroves. The study found that the estimated AGB in Matang Mangroves ranged between 2.98 and 378.32 ± 33.90 Mg ha− 1 with an average of 99.40 ± 33.90 Mg ha− 1 and a total AGB of about 4.25 million Mg. The HV backscatter started to saturate at an AGB of 100 Mg ha− 1 and the errors associated with the estimation occurred largely when the AGB exceeded 150 Mg ha− 1. The study also found that the manipulation of polarisation was useful in discriminating succession levels of mangroves.
	Database:	ScienceDirect

4	Title:	Motion Adaptive Patch-Based Low-Rank Approach for Compressed Sensing Cardiac Cine MRI
	Author:	Yoon, H. ; Kim, K.S. ; Kim, D. ; Bresler, Y. ; Ye, J.C.
	Journal:	IEEE Transactions on Medical Imaging, Volume:33 , Issue: 11, Nov. 2014, pages 2069 - 2085
	Abstract:	One of the technical challenges in cine magnetic resonance imaging (MRI) is to reduce the acquisition time to enable the high spatio-temporal resolution imaging of a cardiac volume within a short scan time. Recently, compressed sensing approaches have been investigated extensively for highly accelerated cine MRI by exploiting transform domain sparsity using linear transforms such as wavelets, and Fourier. However, in cardiac cine imaging, the cardiac volume changes significantly between

		frames, and there often exist abrupt pixel value changes along time. In order to effectively sparsify such temporal variations, it is necessary to exploit temporal redundancy along motion trajectories. This paper introduces a novel patch-based reconstruction method to exploit geometric similarities in the spatio-temporal domain. In particular, we use a low rank constraint for similar patches along motion, based on the observation that rank structures are relatively less sensitive to global intensity changes, but make it easier to capture moving edges. A Nash equilibrium formulation with relaxation is employed to guarantee convergence. Experimental results show that the proposed algorithm clearly reconstructs important anatomical structures in cardiac cine image and provides improved image quality compared to existing state-of-the-art methods such as k-t FOCUSS, k-t SLR, and MASTeR.
	Database:	IEEE/IET Electronic Library (IEL)

5	Title:	Local Phase Tensor Features for 3-D Ultrasound to Statistical Shape+Pose Spine Model Registration
	Author:	Hacihaliloglu, I. ; Rasoulian, A. ; Rohling, R.N. ; Abolmaesumi, P.
	Journal:	IEEE Transactions on Medical Imaging, Volume:33 , Issue: 11, Nov. 2014, pages 2167 - 2179
	Abstract:	Most conventional spine interventions are performed under X-ray fluoroscopy guidance. In recent years, there has been a growing interest to develop nonionizing imaging alternatives to guide these procedures. Ultrasound guidance has emerged as a leading alternative. However, a challenging problem is automatic identification of the spinal anatomy in ultrasound data. In this paper, we propose a local phase-based bone feature enhancement technique that can robustly identify the spine surface in ultrasound images. The local phase information is obtained using a gradient energy tensor filter. This information is used to construct local phase tensors in ultrasound images, which highlight the spine surface. We show that our proposed approach results in a more distinct enhancement of the bone surfaces compared to recently proposed techniques based on monogenic scale-space filters and logarithmic Gabor filters. We also demonstrate that registration accuracy of a statistical shape+pose model of the spine to 3-D ultrasound images can be significantly improved, using the proposed method, compared to those obtained using monogenic scale-space filters and logarithmic Gabor filters.
	Database:	IEEE/IET Electronic Library (IEL)

6	Title:	Waveform Aliasing in Satellite Radar Altimetry
	Author:	Smith, W.H.F. ; Scharroo, R.
	Journal:	IEEE Transactions on Geoscience and Remote Sensing, Volume:53 , Issue: 4, April 2015, pages 1671 - 1682
	Abstract:	The full deramp pulse compression scheme employed by satellite radar altimeters digitizes each radar echo at a sampling rate matched to the chirp bandwidth. Echo power is undersampled by a factor of 2 when the power samples are simply obtained by squaring the magnitude of the echo samples, without

	first resampling, as is done in all altimeters to date. This results in inadequate sampling of the leading edge of the waveform if the significant wave height (SWH) is low. For a typical Ku-band altimeter with a chirp bandwidth of 320 MHz, simple squaring should be inadequate over ocean surfaces with SWH less than 2 m, that is, half of the ocean. Simply zero-padding the digital samples prior to range Fourier transform alleviates the problem introduced by magnitude squaring. Data from the CryoSat altimeter are used to demonstrate this remedy, and it is found that this reduces the variance in estimated range by 10% and in SWH by 20%. These improvements are confined to a range of SWH values between 1 and 4 m. Zero-padding also seems to have some small impact on values estimated over very flat surfaces (SWH 1 m), although theory suggests that better resolution of such surfaces would require a bandwidth exceeding 320 MHz. The 500-MHz bandwidth of the Ka-band altimeter on the Satellite with ARGOS and AltiKa mission should encounter these difficulties at smaller SWH values. Onboard range tracking and automatic gain control loops in future altimeters might be improved if zero-padding were employed during onboard waveform processing.
Database:	IEEE/IET Electronic Library (IEL)

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Title:	A Physics-Based Unmixing Method to Estimate Subpixel Temperatures on Mixed Pixels
Author:	Cubero-Castan, M. ; Chanussot, J. ; Achard, V. ; Briottet, X. ; Shimoni, M.
Journal:	IEEE Transactions on Geoscience and Remote Sensing, Volume:53 , Issue: 4, April 2015, pages 1894 - 1906
Abstract:	This paper presents a new algorithm for the analysis of linear spectral mixtures in the thermal infrared domain, with the goal to jointly estimate the abundance and the subpixel temperature in a mixed pixel, i.e., to estimate the relative proportion and the temperature of each material composing the mixed pixel. This novel approach is a two-step procedure. First, it estimates the emissivity and the temperature over pure pixels using the standard temperature and emissivity separation (TES) algorithm. Second, it estimates the abundance and the subpixel temperature using a new unmixing physics-based model, called Thermal Remote sensing Unmixing for Subpixel Temperature (TRUST). This model is based on an estimator of the subpixel temperature obtained by linearizing the black body law around the mean temperature of each material. The abundance is then retrieved by minimizing the reconstruction error with the estimation of the subpixel temperatures. The TRUST method is benchmarked on simulated scenes against the fully constrained least squares unmixing applied on the radiance and on the estimation of surface emissivity using the TES algorithm. The TRUST method shows better results on pure and mixed pixels composed of two materials. TRUST also shows promising results when applied on thermal hyperspectral data acquired with the Thermal Airborne Spectrographic Imager during the Detection in Urban scenario using Combined Airborne imaging Sensors campaign and estimates coherent localization of mixed-pixel areas.
Database:	IEEE/IET Electronic Library (IEL)

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Title:	Paddy-Rice Monitoring Using TanDEM-X
Author:	Rossi, C. ; Erten, E.
Journal:	IEEE Transactions on Geoscience and Remote Sensing, Volume:53 , Issue: 2, Feb. 2015, pages 900 - 910
Abstract:	This paper evaluates the potential of spaceborne bistatic interferometric synthetic aperture radar images for the monitoring of biophysical variables in wetlands, with a special interest on paddy rice. The assessment is made during the rice cultivation period, from transplanting to harvesting time (May to October) for fields around Gala lake (Turkey), one of the largest and most productive paddy rice planting area in the country. Detailed ground truth measurements describing biophysical parameters are collected in a dedicated campaign. A stack of 16 dual-pol TanDEM-X images is used for the generation of 32 digital elevation models (DEMs) over the studied area. The quality of the data allows the use of the interferometric phase as a state variable capable to estimate crop heights for almost all the growing stages. The early vegetative rice stage, which is characterized by flooded fields, cannot be represented by the interferometric phase due to a low signal-to-noise ratio but can be easily detected by amplitude and interferometric coherence thresholding. A study on the impact of the polarization in the signal backscatter is also performed. An analysis of the differences between HH and VV DEMs shows the varying signal penetration for the two polarizations at different growing stages. The validation with reference data demonstrates the capability to establish a direct relationship between interferometric phase and rice growth. The very high coherence of TanDEM-X data yields elevation estimates with root-mean-square error in a decimetric level, supporting temporal change analysis on a field-by-field basis.
Database:	IEEE/IET Electronic Library (IEL)

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Title:	A hybrid method for optimization of the adaptive Goldstein filter
Author:	Mi Jiang, Xiaoli Ding, Xin Tian, Rakesh Malhotra, Weixue Kong
Journal:	ISPRS Journal of Photogrammetry and Remote Sensing, Volume 98, December 2014, Pages 29–43
Abstract:	The Goldstein filter is a well-known filter for interferometric filtering in the frequency domain. The main parameter of this filter, alpha, is set as a power of the filtering function. Depending on it, considered areas are strongly or weakly filtered. Several variants have been developed to adaptively determine alpha using different indicators such as the coherence, and phase standard deviation. The common objective of these methods is to prevent areas with low noise from being over filtered while simultaneously allowing stronger filtering over areas with high noise. However, the estimators of these indicators are biased in the real world and the optimal model to accurately determine the functional relationship between the indicators and alpha is also not clear. As a result, the filter always under- or over-filters and is rarely correct. The study presented in this paper aims to achieve accurate alpha

	estimation by correcting the biased estimator using homogeneous pixel selection and bootstrapping algorithms, and by developing an optimal nonlinear model to determine alpha. In addition, an iteration is also merged into the filtering procedure to suppress the high noise over incoherent areas. The experimental results from synthetic and real data show that the new filter works well under a variety of conditions and offers better and more reliable performance when compared to existing approaches.
Database:	ScienceDirect

10	Title:	Domain adaptation for land use classification: A spatio-temporal knowledge reusing method
	Author:	Yilun Liu, Xia Li
	Journal:	ISPRS Journal of Photogrammetry and Remote Sensing, Volume 98, December 2014, Pages 133–144
	Abstract:	Land use classification requires a significant amount of labeled data, which may be difficult and time consuming to obtain. On the other hand, without a sufficient number of training samples, conventional classifiers are unable to produce satisfactory classification results. This paper aims to overcome this issue by proposing a new model, TrCbrBoost, which uses old domain data to successfully train a classifier for mapping the land use types of target domain when new labeled data are unavailable. TrCbrBoost adopts a fuzzy CBR (Case Based Reasoning) model to estimate the land use probabilities for the target (new) domain, which are subsequently used to estimate the classifier performance. Source (old) domain samples are used to train the classifiers of a revised TrAdaBoost algorithm in which the weight of each sample is adjusted according to the classifier's performance. This method is tested using time-series SPOT images for land use classification. Our experimental results indicate that TrCbrBoost is more effective than traditional classification models, provided that sufficient amount of old domain data is available. Under these conditions, the proposed method is 9.19% more accurate.
	Database:	ScienceDirect