

Online Seminar AgFReM Research Consortium in ISM

Special Lecture on Statistics with R

March 16(Tue) - 17 (Wed), 2021

Day I

Date	March 16, 2021				
10:50~ 11:00	Seminar Introduction	Prof. Yoshimoto	ISM	Japan	
11:00 12:30	Regression application to survival data by using R	Dr. Kamo	Sapporo Medical Univ.	Japan	
12:30~ 13:00	Break				
13:00~ 13:30					
13:30 14:00	TBA	Dr. Monin	Ministry of Agri. Forestry & Fisheries	Cambodia	
14:00 14:30	Ecotourism Practice in Community based Home-stay Tourism in the Gandaki Province of Nepal	Mr. Khatiwada	Tribhuvan Univ.	Nepal	
14:30 16:00	Spatial Regression Analysis with R	Dr. Murakami	ISM	Japan	
16:00 16:30	Break				
16:30 17:00					
17:00 17:30	Development of sustainable forest management tools for Mediterranean forests and woodlands: The progress of 10-year joint research between Institute of Statistical Mathematics and University of Évora	Dr. Ribeiro	Univ. of Évora	Portugal	

Day II

Date	March 17, 2021			
11:00~ 12:30	Enhancement of the large area growing stock volume estimation using point cloud data generated from publicly available digital stereo imagery	Dr. Obata	Univ. of Tennessee	USA
12:30~ 13:00	Break			
13:00~ 13:30				
13:30 14:00				
14:00 14:30	Impact of industrial tree plantations on smallholder livestock farmers and their livelihoods in Laos	Dr. Phimmavong	National Univ. of Laos	Laos
14:30 16:00	Regression model with nuisance trend for longitudinal data with R	Prof. Tonda	Hiroshima Prefectural Univ.	Japan
16:00 16:30	Break			
16:30 17:00				
17:00 17:30	A remote sensing approach for diagnosing forest degradation	Prof. Lin	National Chiayi Univ.	Taiwan
17:30 17:40	Closing Remarks	Prof. Yoshimoto	ISM	Japan

March 16(Tue), 2021

11:00 ~ 12: 30

Regression application to survival data by using R

Ken-ichi Kamo (Sapporo Medical University)

Survival analysis is a branch of statistics which deals with death in biological organisms and failure in mechanical systems. More generally, survival analysis involves the modeling of time to event data; in this context, death or failure is considered an "event" in the survival analysis literature. In this presentation, the way for handling survival analysis is lectured by using R software. The lecture starts from the basic step Kaplan-Meier method to the regression approach Cox proportional hazard model. At last, we use the example data, that is, tree-pulling data in Japan and execute the survival analysis.

13:30 ~ 14:00

TBA

Von Monin (Ministry of Agriculture Forestry and Fisheries, Cambodia)

14:00 ~ 14:30

Ecotourism Practice in Community based Home-stay Tourism in the Gandaki Province of Nepal

Shreekanta Sharma Khatiwada (Tribhuvan Univ.)

Community based home-stay tourism (CBHST) has been promoted by the provincial government of Gandaki in recent years for the socioeconomic benefit to the local people. However, the degree of involvement of local people in community based home-stay tourism varies between different localities and districts of the province, depending on the natural and cultural attractions with hospitality practices in the host communities. Hence, this study discusses the local participation, benefit sharing and their practice to preserve the culture and nature based tourism products of their localities. The study explored the involvement of local people in home-stay tourism by analyzing the data collected by face to face interview with the targeted home-stay operators and members of the home-stay management committee on the basis of purposive sampling. The study revealed that local people are actively involving to operate and benefit sharing in CBHST. Community has taken the collective initiation to preserve the cultural and natural heritages as tourism products in their locality. The conclusion of this study is that CBHST is the appropriate ecotourism model for local involvement to promote rural tourism based on their local skill, knowledge and resources. Another take away from this study is to consider the concerns of local people through the lens of background knowledge of tourism and hospitality, management practice, tourism activities when designing programs to promote home-stay tourism.

14:30 ~ 16:00

Spatial Regression Analysis with R

Daisuke Murakami (ISM)

This section provides a short lecture on (geo)spatial regression analysis using R. I first give an overview of statistics for spatial data. Then, I demonstrate spatial regression analysis in two examples. The first illustrates a spatial additive modeling to investigate the determinants of residential land price. The second example illustrates a spatial (and spatiotemporal) autoregressive modeling focusing on COVID-19.

17:00 ~ 17:30

Development of sustainable forest management tools for Mediterranean forests and woodlands: The progress of 10-year joint research between Institute of Statistical Mathematics and University of Évora

Nuno de Almeida Ribeiro (Univ. of Évora)

In the present work it is presented the progress of 10-year joint research between Institute of Statistical Mathematics and University of Évora in the development of sustainable forest management tools for Mediterranean forests and woodlands based in mathematic modelling of forest dynamics using 3D spatial approach, spatial risk dynamic assessment of forest fire and soil erosion and optimization models for sustainable cork production through management of stand structure and density in a time frame of 100-years.

March 17(Wed), 2021

11:00 ~ 12: 30

Enhancement of the large area growing stock volume estimation using point cloud data generated from publicly available digital stereo imagery

Shingo Obata (Univ. of Tennessee)

National forest inventories provide estimates of forest area parameters and growing stock volume for each county and municipality. Remote sensing data has been proven to be a source of auxiliary data that can increase the precision of estimates when used to stratify the field sampling plot data. Landsat is the most common remote sensing dataset for stratification, while its contribution to the improvement of the precision of growing stock volume was limited due to the indifference of the surface reflectance values among dense vegetation. Recent research has shown that point cloud data acquired from ALS has better capability to improve the precision of the growing stock volume. However, collecting statewide point cloud data from ALS is expensive for most countries. Point cloud generated from stereo-photogrammetry by semi-global matching technique is recently used as a substitute for ALS. This research aims to establish a post-stratification estimation model of growing stock volume using a point cloud dataset generated from stereo-photogrammetry. Our study area is Tennessee and Virginia, located in the Southeastern USA. Forest Inventory and Analysis (FIA) data is selected as a field measurement dataset. Point cloud dataset is generated from the stereo-imagery acquired by the National Agriculture Imagery Program (NAIP). As a reference dataset, we acquire and process the 3-D Elevation Program (3DEP) point cloud dataset. For each FIA plot location, point clouds generated from NAIP and 3DEP are clipped, and maximum height within the plot is

calculated. Finally, post-stratification estimates of growing stock volume are performed using the point cloud height metrics generated from NAIP. This research is expected to demonstrate the cost-effective method to incorporate forest 3D information into large-scale forest inventory management.

14:00 ~ 14:30

Impact of industrial tree plantations on smallholder livestock farmers and their livelihoods in Laos

Somvang Phimmavong (National Univ. of Laos)

The Lao People's Democratic Republic (hereafter Laos) aspires to restore forest cover to 70 % by 2030, by restoring 8.2 million ha of protection forests, 4.7 million of conservation forests, 3.1 million ha of production forests, and establishing 500,000 ha of industrial tree plantation on degraded land. While some communities have been reported to receive positive benefits from the expansion of planted forest, other communities face concerns about the negative impacts on local community and environment. In 2020 we conducted household surveys with 95 respondents living in villages adjacent to Eucalyptus and rubber plantations across two provinces in Laos (Vientiane and Luangnamtha provinces in Laos). Results show that we find that villagers around industrial tree plantations (areas with 100 ha or greater industrial plantation criterion) tend to receive a significant benefit from their plantation compared to the comparison village. In addition, perception toward the effects of Eucalyptus plantation tends to differ from those toward rubber plantations. Rubber plantations are perceived to have a higher economic contribution to local people for improving their livelihoods, but Eucalyptus plantations are said to have a less negative environmental record. To avoid any potential negative impact, it is recommended that relevant authorities should consider this problem carefully, which might occur after the full establishment of the industrial plantation. A possible solution could be making efforts to create a management plan for the sustainable use of the environmental income with contributions from smallholder livestock farmers in the provinces.

14:30 ~ 16:00

Regression model with nuisance trend for longitudinal data with R

Tetsuji Tonda (Hiroshima Prefectural Univ.)

In regression model for longitudinal data, such as forest growth, it is important to model the growth behavior and to evaluate the effects of covariates. We consider the situation: primary interest is effects of covariates, time trend of growth behavior is non-negligible, but out of interest. Under this situation, we developed the method to estimate effect of covariates without modeling the shape of growth behavior. We introduce the regression model with nuisance trend with demonstration in R.

17:00 ~ 17:30

A remote sensing approach for diagnosing forest degradation

Chinsu Lin (National Chiayi Univ.)

Biomass accumulation of forests is the consequence of vegetation photosynthesis. Fluctuation of forest biomass could indicate changes of forest cover as well as the ongoing forest degradation or regeneration. Remotely sensed data are capable of sensing tree physiological and phenological events which enable us to detect spectral signals for diagnosing the status of forest health and productivity.

With multi-temporal remote sensing images, this study aimed to demonstrate the methodology of retrieving aboveground biomass (AGB) of a forest from satellite optical images as well as the temporal variation of the forest AGB stocks through inventory data and spatial reasoning technique, k-nearest neighbors (kNN). A pristine pine located in the Phillipines was selected as the example for this study. To summarize, atmospheric correction and pseudo-invariant feature normalization were first applied to derive appropriate reflectance of multi-temporal Landsat images. Then AGB stock of forest stands collected from inventory plot samples was used to derive kNN model for estimating AGB of the target pixels of the whole forest. Results showed the loss of AGB stocks in the study site is mainly caused by landslide, forest fire, and agricultural expansion, particularly the use of fire for land preparation for cropping. The pristine forest of this study site has been slightly fragmented. The AGB loss/gain of a forest parcel is negatively/positively related to the size of the parcel. Appropriate forest land zoning and community-based forest management for the surrounding non-pristine pine forest could have the benefit of mitigating the degradation of the pristine pine forest and improving the biomass stocks for better REDD achievements.