京都大学教育研究振興財団助成事業
成　果　報　告　書

2014年8月11日

公益財団法人京都大学教育研究振興財団
会長　辻　井　昭　雄　様

所属部局・研究科: Graduate School of Engineering

職 名・学 年: 学生; D3

氏　　名　　Bhogendra Mishra

助成の種類	**平成26年度・若手研究者在外研究支援・国際研究集会発表助成**	
研究集会名	IGARSS 2014	
発表題目	SAR and optical data fusion for land use and cover change detection	
開催場所	Quebec, Canada	
渡航期間	2014年07月09日　～　2014年07月19日	
成果の概要	タイトルは「成果の概要／報告者名」として、A4版2000字程度・和文で作成し、添付して下さい。「成果の概要」以外に添付する資料　☐ 無　☐ 有(　　)	
会計報告	交付を受けた助成金額	250,000円
	使用した助成金額	250,000円
	返納すべき助成金額	0円
	助成金の使途内訳	Airticket – 148,000
		Accomodaiton and living expenses – 102,000
当財団の助成について	(今回の助成に対する感想、今後の助成に望むこと等お書き下さい。助成事業の参考にさせていただきます。)	

Report – IGARSS 2014 visit

Basic Information

Student Name: Bhogendra Mishra
Supervisor: Dr. Junichi Susaki
Affeliation: Civil and Earth Resources Engineering, Graduate School of Engineering
Laboratory: Geoinformatics
Student id: 1060-23-6788
Presented paper: SAR and optical data fusion for land use and cover change detection

Information on about event

Program: IEEE Geoscience and Remote Sensing Society Symposium 2014 and Geoscience and Remote Sensing Summer School 2014
Name of the host: IEEE Geoscience and Remote Sensing Society (GRSS)
Address of the Host: The Québec City Convention Centre
1000, boul. René-Lévesque Est Québec, (Québec) G1R 5T8
Phone: 418 644-4000
Toll-free: 888 679-4000
Contact Person of the host: Monique Bernier
Email: info@igarss2014.org.
Date and Time Period
Summer School: July 10-July 11, 2014
Symposium: July 13– July 18, 2014

GRSS summer school 2014

The summer school mainly focuses:

- to promote the state-of-the-art Remote Sensing Technology among young professionals and students,
- to strengthen young people's professional networking.

This intensive and advanced, 2-day learning event, presents best insights into most recent techniques from top international professors and researchers. Basically, different remote sensing applications using both passive and active sensors were presented during the summer school. There were eight thematic presentation included.

- Use of optical, thermal infrared, radar and hyper spectral remote sensing for geological mapping.

- An overview of of fully polarimetric PALSAR imaging in Geoscience and Remote Sensing.
- LIDAR remote sensing for forestry and hydrology.
- Earth Observation and Geophysical Application of Remote Sensing Radars.
- Towards operational use of optical remote sensing technologies - two case studies related to energy and food supply.
- Advanced techniques for retrieval of Essential Climate Variables (ECV) from remotely sensed data.
- SAR and optical imaging for snow monitoring and hydropower resources management.
- Multi-temporal remote sensing of leaf area index for modeling ecosystem productivity.

IGARSS 2014

IGARSS 2014 is one of the leading symposium to promote remote sensing technology in the World. The symposium was held on the theme entitled "Energy and or Changing Planet". Though the main theme was "Energy and or Changing Planet", it included all aspects of the applications of Remote Sensing, GIS, GPS and other related geospatial technologies and increased development of this discipline all over the world. Nearly 2000 participants were there and 1942 papers (oral and poster) were presented. My oral presentation included my research results related to the urban change mapping using optical and SAR images.

In this work, I presented a very simple but robust, synthetic aperture radar (SAR) and optical, data fusion framework for land use/cover change detection. The fusion was done with two indicators, namely the normalized difference ratio (NDR) and normalized difference vegetation index difference (NDVI difference) developed from multi-temporal SAR and optical images respectively. A statistical analysis shows that the NDR and the NDVI difference have a consistent pattern in major land use/cover change classes. Thus, based on this pattern, a fusion approach was developed without altering the behavior of NDR with different types of changes. The effectiveness of the proposed fusion approach was evaluated through the change mapping with a manual trial and error thresholding approach. The results were compared with the results obtained from the optical and SAR images independently. The improvement of the results by making use of the unique information from both, optical and SAR imagery, can be easily identified with a simple visual inspection. The accuracy assessment showed a significant improvement in overall detectability with the substantial decrease in false and missing alarms.

In the symposium, I had a very good discussion with the exports of the field in the topic and its future prospects. Some of them were very interested in the presented work and gave insightful comments to improve the work. Most of them recommended to include other indicators developed from the optical images and some of them recommend to use an ancillary dataset. Accordingly, the future work includes the incorporation of other indicators and ancillary dataset and extends the method for other applications like disaster monitoring.