Report for the Student seminar at Ram-lab Hokkaido University and visit Izumi-lab at Muroran Institute of Technology

13-15 March 2024

Edited
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Supported by

One Health One World (OHOW),
Institute of Industrial Science, The University of Tokyo, Japan
SpringGX and JAXA

Organizing Members
Prof. Wataru Takeuchi IIS, The University of Tokyo, Japan
Associate Professor Ram Avter, Hokkaido University

Report for Student seminar at Hokudai and Izumi-lab visit at Muroran

Schedule

Table 1. The schedule of the three-day student seminar in Hokkaido.

Date	Activities	Venue
2024/3/13	Flight from Haneda to Sapporo Student seminar with Dr. Ram lab at Hokudai (day 1)	Hokkaido University
2024/3/14	Student seminar with Dr. Ram lab at Hokudai (day 2)	Hokkaido University
2024/3/15	Move to Muroran Institute of Technology to visit Dr. Izumi lab at Muroran Flight from Sapporo to Haneda	Muroran Institute of Technology

Participants

Table 2. The list of participants from Takeuchi lab.

Name	Grade/ Position	Affiliation	Role
Wataru Takeuchi	Professor	Takeuchi lab, IIS	Organizer
Eiko Yoshimoto	Staff	Takeuchi lab, IIS	Organizer
Khin Myat Kyaw	Assistant professor	Takeuchi lab, IIS	Presenter
Xuan Truong Trinh	Project Researcher	Takeuchi lab, IIS	Presenter
Yang Yu	D3	Takeuchi lab, IIS	Presenter
Shoki Shimada	D2	Takeuchi lab, IIS	Presenter
Samitha Daranagama	D2	Takeuchi lab, IIS	Presenter
Arliandy Pratama	D1	Takeuchi lab, IIS	Presenter
Chihiro Naito	D1	Takeuchi lab, RCAST	Presenter
So Fumiyama	M2	Takeuchi lab, IIS	Presenter
Tomoaki Ito	M2	Takeuchi lab, IIS	Presenter
Huang Feifan	M1	Takeuchi lab, IIS	Presenter
Kim Chae Hyun	B4	Takeuchi lab, IIS	Presenter
Delgorge Didier Kai	B4	Takeuchi lab, IIS	Presenter

1. Student seminar Sessions (3/13 & 3/14)

- Overview

19 presentations from Takeuchi-lab and Ram-lab mostly focusing on remote-sensing applications on social and environmental science. Each presentation was around 15 minutes with 12 minutes talking and 3 minutes Q & A.

- Observation, Discussion, Comments

Topic	Name	Observation Discussion/Comments
Presentation sessions	Shimada	The presentation topics from both Takeuchi-lab participants, Dr. Ram, and his students were quite diverse. The talks focused on remote sensing applications on the environment, forests, and social science. Especially the talk from Mr. Hitesh Supe from Dr. Ram lab, he talked about the impacts of solar PV installation on the environment in India. I am also studying solar PV related subjects based on remote sensing, so we exchanged ideas and contact information for a potential research collaboration. It was a great opportunity for us to find new ideas regarding the remote sensing applications for achieving a sustainable society.
Presentation sessions	Samitha	The presentation sessions discussed how remote sensing techniques can help with environmental sustainability and the trade-offs between using renewable energy and agriculture. The seminar was a great opportunity for us as the students from different fields to share ideas and learn from each other. We realized the importance of collaborative approaches and innovative methodologies in addressing modern environmental challenges.
Presentation sessions	Naito	Dr. Ram and students' researches were intriguing as many of them focus on both remote sensing and social work to address the environmental and social issues, such as human-wildlife conflict, climate change impacts on the livelihood of indigenous people, disaster risks related to policies, and carbon credit projects. I believe that assessing both perspectives is important for applying the scientific research achievements to the real world with understanding the situation of stakeholders in the places. For my presentation, I received an informative comment suggesting that the presence of peat may affect the result. Taking this into consideration, I will collect information on peat in the target area and incorporate it into the analysis. Additionally, we met persons who have potential to collaborate with us in the oil palm field. We will see them in the coming conference in Malaysia.
Presentation sessions	Fumiyama	In the presentation, valuable insights were gleaned from the students of Professor Ram's lab regarding the application of remote sensing in environmental assessment. Particularly intriguing was the discussion on challenges pertaining to the practical implementation of waste emission assessment using SAR. Effectively conducting waste emission assessment by SAR necessitates the prior identification of landfill areas. To achieve this, alternative satellite data and methods such as anomaly detection may prove effective. This discussion underscores the significance of considering the combination of

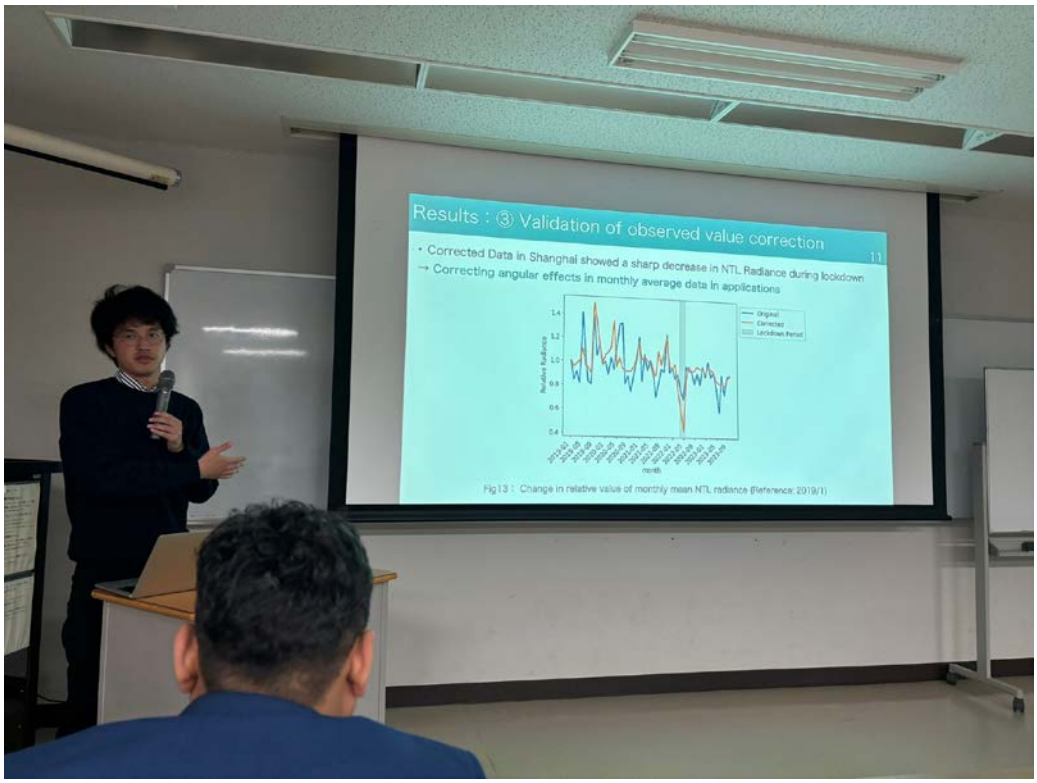
Topic	Name	Observation Discussion/Comments
		multiple data and methods in addressing complex real-world problems, making this seminar highly meaningful in broadening insights into various approaches.
	Truong	Dr. Ram Avtar's members' presentations had in-depth insights over a broad range of topics across forestry, solar energy, human-wildlife conflicts, etc. Members from two laboratories had two days of fruitful scientific discussions and exchange of ideas. The students from both sides also actively volunteered to chair the presentation sessions, which would be valuable experiences in the future. Ram Avtar: Focused on forest biomass in Southeast Asia, particularly Cambodia, using multi-sensor integration to estimate and project future biomass. His research also touched on forest management, emphasizing the conservation of forest areas, biomass, and diversity, noting that reduced biomass and diversity in the same area are concerning. He also discussed oil palm estimation and biophysical parameters related to disease and species mapping. Aishwarya: Explored human-wildlife conflicts in Africa, specifically in South Africa, Kenya, and Botswana, as part of the AJ-CORE project. She highlighted issues such as zoonotic diseases and poaching, detailing cases like crop destruction, herd loss, fishing loss, and human attacks by wildlife. Stephan: Addressed the estimation of waste dumping using remote sensing, particularly focusing on landfill sites and employing methods like SAR, differential InSAR, and Bistatic SAR to detect and measure waste dumping.
Presentation sessions	Ito	I could gain precious experience by giving a presentation about my master thesis. I paid attention to my not good points in the final defense. In addition, I could obtain valuable comments from participants from Hokkaido university. I will utilize this experience to submit my results to an international journal. I also learn many topics related to remote sensing techniques. I'm especially interested in estimating the volume of dumping by using SAR data. Currently only a few students use Interferometric SAR techniques in our lab. I could know interesting ways to use SAR technique and widen my point of view.
Presentation sessions	Chaehyun	The joint seminar with the Hokkaido university students was an enriching experience in exploring how remote sensing is utilized to

Topic	Name	Observation Discussion/Comments
		tackle real life environmental issues. As a bachelor student who is not very familiar with remote sensing and its use in sustainability research, it was a valuable opportunity for me to get an insight on how remote sensing is applied to diverse topics such as forest conservation, agriculture, solar energy, waste dumping, biodiversity, and HWC. Not only was it an opportunity for me to learn but also a motivation for me to research more about my own thesis project. The presentation sessions in general has taught me the significance of joint seminars and research collaboration between students from different institutions.
	Arliandy	The student joint seminar aimed to facilitate interdisciplinary discussions and knowledge exchange among the University of Tokyo and Hokkaido University students and researchers interested in remote sensing applications. The agenda included presentations and interactive discussions covering various aspects of remote sensing techniques, applications, and advancements. Several sessions highlighted the use of remote sensing for environmental monitoring, such as land cover classification, vegetation analysis, air quality assessment, and disaster management. The seminar provided a valuable platform for networking and collaboration opportunities among participants from different academic backgrounds. Informal discussions and networking sessions allowed for exchanging ideas, identifying common research interests, and potential collaborations on future projects. The seminar was valuable for my research, providing insightful comments and suggestions to enhance my work.
Presentation Sessions	Didier	The joint student seminar with Hokkaido University was truly enriching. Presentations delivered by bachelor's, master's, and doctoral students spanned a wide range of topics, from renewable energy to waste management. This experience highlighted to me the endless applications of remote sensing. One presentation by a Hokkaido University student, focusing on human-wildlife conflict in African regions, was particularly intriguing, especially since I am currently researching human-wildlife conflict in Japan. The feedback I received on my presentation was valuable. It led me to consider incorporating human variables into a species distribution model to analyse human-bear interactions, recognising the significance of social factors in understanding human-bear conflicts.
	Yu	After attending the seminar jointly organized by two universities, I was inspired and learned a lot. The research topics proposed by the other laboratory not only demonstrated the innovation in scientific research but also emphasized their importance in addressing current

Topic	Name	Observation Discussion/Comments
		environmental challenges. Firstly, the topic "Estimating waste dumping statistics from remote sensing data" made me realize the potential of SAR in monitoring and managing waste. Revealing illegal dumping sites through satellite imagery could lead to more effective waste management. This research also brings to mind the potential for managing and detecting small-scale marine debris. The study on "Probable Maximum Precipitation in Nepal under a Climate Change Scenario" revealed changes in Nepal's precipitation patterns, which are crucial for preparing for future extreme weather events and mitigating potential disasters. Nepal, being deeply affected by climate change, understanding these patterns is essential for preparing for future extreme weather events and reducing potential disasters. Furthermore, the case study "Impact of Photovoltaic Solar Power Expansion on Agricultural Land and Water Resources: A Case Study of Pavagadh Solar Park, India" raised important considerations about the need to balance the development of renewable energy with the protection of agricultural land and water resources. Overall, the seminar proved the key role of remote sensing research in tackling environmental challenges. It was a valuable learning opportunity, providing me with inspiration and ideas from the innovative work of others, which I hope to integrate into my own research.
Presentation sessions	Feifan	The joint student seminar provided a comprehensive overview of various applications of remote sensing in addressing environmental issues. Dr. Ram and students from Hokkaido University presented a diverse range of topics including environment, sustainability, pollution, climate, and social issues. The focused discussions during the presentations offered new insights and ideas for listeners, particularly in how these concepts could relate to their own research areas. During the seminar, I had the opportunity to share my current research works and received valuable questions and comments. Through discussion with students from Dr. Ram's lab, we considered different methods for data analysis and exchanged approaches. This experience not only enriched my understanding of environmental research but also enhanced potential approaches for my own research topic. Overall, the seminar was a great platform for exchanging ideas and understanding.

- Photos & caption

The group photo of the participants to the joint seminar from Takeuchi-lab (Utokyo) and Ram-lab (Hokudai).



Presentation sessions

2. Visit to Muroran Institute of Technology (3/15)

- Overview

We visited Izumi-lan at Muroran Institute of Technology to meet Dr. Izumi, who specializes in Ground-based Synthetic Aperture Radar (SAR) for assessing detailed ground deformation. We listened to the talk about GB-SAR from Dr. Izumi, and he showed us research instruments situated on the rooftop.

- Observation, Discussion, Comments

Topic	Name	Observation Discussion/Comments
	Samitha	After visiting the Muroran Institute of Technology and meeting with Assistant Professor Yuta Izumi, I gained valuable insights into the principles and applications of radar remote sensors, including Ground-based SAR (GB-SAR). During this visit, I realized the importance and potential applications of utilizing MIMO SAR techniques. Combining MIMO with drones and integrating it into IoT systems represents an innovative approach that promises to provide deeper insights and enhance our understanding of various environmental phenomena and infrastructure health monitoring
	Naito	GBInSAR monitoring showed precise measurements of house movements. I was curious about its accuracy compared to satellite-based measurements for monitoring object deformation. We also learned some interesting findings in house monitoring. Snow affected the measurements, resulting in negative changes in the signal. In addition, there was a collapsed house, while its surrounding houses were undamaged. This discrepancy was possibly explained by differences in the construction specification, such as drainage, which could vary with the age of house. Addition to monitoring residential area, GBInSAR is also being applied to landslide monitoring. Collaborating GBInSAR with spaceborne InSAR could prove effective for disaster risk prevention.
	Fumiyama	In Professor Izumi's lab, we mainly learned about GBInSAR monitoring through presentations and seeing it in action. It was fascinating because satellite remote sensing doesn't usually let you see real measurements. Also, Professor Izumi mentioned that for monitoring houses with GBInSAR, you don't need permission from homeowners as long as you have a license for the measurements. This may stand out as a difference from street-view-like photography, where privacy might be a concern.

Topic	Name	Observation Discussion/Comments
Presentation	Truong	We could learn about the development of applications of ground-based synthetic aperture radar with different devices, such as the Metasensing's FastGBSAR and the Multiple Input Multiple Output (MIMO) SAR arrays. We could also mount MIMO SAR devices on UAVs for measurements.
Experiments	Truong	We could see the ongoing experiment of observing a collapsing house in the vicinity of the university. This phenomenon stems from the degradation of the wall built on the hills, which could have been due to the loose regulations when the structures were built. In addition, snow accumulation poses a risk factor for buildings, increasing structure loads.
	Chaehyun	The visit to the Muroran Institute of Technology was a unique experience as I was able to learn about radar remote sensing technique and its application to monitoring landslides or potential danger of the damaged (tilted) house. I was particularly fascinated by the ground-based SAR and its technology to detect and measure the negligible movement of an object from a far distance. Furthermore, it was interesting to compare the data graph of a damaged house movement and amount of snow/rain.
	Pratama	The insights gained from the visit to the Izumi Lab at Muroran Institute of Technology was invaluable for my research endeavors. The exposure to cutting-edge InSAR technology and the exchange of ideas with students and researchers will clearly enrich my understanding of remote sensing applications in environmental monitoring and disaster prevention. Discussions with members of the Izumi Lab highlighted the importance of addressing real-world challenges in understanding landslides and monitoring infrastructure. During the visit, we also observed their devices, including FastGBSAR, a family of Ku-band ground-based radars for deformation monitoring designed to operate in all weather conditions. The FastGBSAR is equipped with four polarimetric channels. It produces displacement maps of large areas with sub-millimeter accuracy, capable of covering distances up to 4 km.
	Didier	Our visit to the Muroran Institute of Technology, where we met with Assistant Professor Yuta Izumi and his students, was truly enlightening. The lab tour offered a glimpse into cutting-edge equipment such as GBSAR for surface deformation monitoring, which was fascinating. The students were kind and took the time to explain their research, showcasing how their work directly contributes to local disaster prevention through the utilization of remote sensing technology. This experience underscored the

Topic	Name	Observation Discussion/Comments
		significant impact that remote sensing technology can have on real-world applications.
	Yu	Visiting the Ground-Based Synthetic Aperture Radar (GBSAR) research laboratory was an enlightening experience that broadened my understanding of the cutting-edge technology used for monitoring and analyzing earth surface movements. The lab's focus on leveraging GBInSAR technology for various applications, from landslide monitoring to structural health assessment, truly highlighted the versatility and importance of this advanced radar system. Seeing the GBInSAR setups and the data they collect in real-time provided a tangible sense of how this technology can make a significant difference in disaster prevention and management. Learning about the precision with which GBInSAR can detect even the slightest movements, offering critical data that can be used to predict and mitigate natural disasters before they pose a threat to human lives and property, was fascinating.
	Ito	Visiting a ground-based SAR sensor is an especially interesting experience. Ground-based observation by using sensors can acquire consecutive and better spatial resolution data to observation objects. I think these kinds of ground-based observation data are very precious to validate the results of satellite-based observation data. I thought that to utilize the data from the sensor, both satellite-based and ground-based observations are important.
	Feifan	Dr. Izumi's lab focused on ground data collection techniques and equipment, which is a different experience compared to my research which uses satellites for data gathering and analysis. The presentations explained in detail the application of SAR monitoring and GB-SAR, and seeing actual monitoring equipment on site is a very interesting experience.

- Photos & caption

Group photo at Muroran Institute of Technology.

The presentation from Dr. Izumi at Muroran Institute of Technology.

The 1st Joint Student Seminar between Univ. of Hokkaido and the Univ. of Tokyo on March 13-14, 2024, at Univ. of Hokkaido

13th March: HND JAL511_10:25-CTS 12:10 airport, Sapporo station, arrived at Hokudai Campus and lunch time









Seminar started.





@D101 **Prof. W. Takeuchi** **Dr. Ram Avatar**

DAY1

	Time	name	affiliation	title
13th August 2024 **@** D101 Faculty of Environmental Earth Sciences				
Opening ceremony	15:00-15:10	Opening speech: Prof. Wataru Takeuchi, Associate Prof. Ram Avtar		
Special lecture	15:10-15:30	Hokkaido Univ.- Dr. Ram Avtar Multi-sensor Remote Sensing Techniques for Estimating Forest's Biophysical Parameters 		

1	15:30-15:45	Yu Yang D3	Utokyo	Building damage assessment of Noto 2024 earthquake with PALSAR2 
2	15:45-16:00	Deshmukh Aishwarya Avinash M1	Hokkaido	Understanding Human-Wildlife Conflict in the African Regions 
3	16:00-16:15	Arliandy Pratama D1	Utokyo	Monitoring health infrastructure by using INSAR 
Break	16:15-16:25	 		
4	16:25-16:40	Stephan Albertus Louw D2	Hokkaido	Estimating waste dumping statistics from remote sensing data 
5	16:40-16:55	Fumiyama So M2	Utokyo	Development of Imputation and Correction Methods for Satellite Nighttime Light Imagery Focusing on Angular Effects 
6	16:55-17:10	Stanley Anak Suab D3	Hokkaido	Environmental Sustainability Assessment of Tropical Forest and Plantations Landscape in Borneo using Multi-sensor Remote Sensing Technique and Geospatial Multi Criteria Decision Analysis (MCDA) 

Special lecture	17:10-17:30	UTokyo- Research Associate Myat Kyaw Khin, Infrastructure health monitoring with remote sensing https://u-tokyo-ac-jp.zoom.us/j/88979452720?pwd=TEF1RTBlM2pvN3ZwRHFNSVphTGIyZz09 by ONLINE 
		  Group photo as Day 1
Dinner		@Crazy Spice     

DAY 2

	Time	name	affiliation	title
14th March 2024 @ D101 Faculty of Environmental Earth Sciences				
Opening	10:00-10:10	 		
Special Lecture	10:10-10:30			Utokyo- Project Researcher Dr.Trinh Xuan Truong, Ground water table measurement with low cost device for CH4 emission mitigation (JAXA SAFE project) 
7	10:30-10:45	Huang Feifan M1	Utokyo	Impact of human activity pattern changes on air pollution variation in China 
8	10:45-11:00	Md. Alamgir Hossen Bhuiyan D2	Hokkaido	Regional ecosystem service value (ESV) assessment for sustainable development 
9	11:00-11:15	Delgorge Didier Kai B4	Utokyo	Assessment of human-bear interactions in Akita using remote sensing 
10	11:15-11:30	Shivaang Sinha D1	Hokkaido	Disaster Risk Reduction and River Basin Governance: Redefining Institutions in the Face of Fragility in Koshi Basin 

LUNCH	11:30-13:30	Café&Lab. 12:00-13:00 https://marche-cafelabo.com/    Lunchtime    With Assoc. Prof. Koji Matsumoto, Prof. Kohei Nagai		
Special Lecture	13:30-13:50	Hokkaido- Postdoctoral Fellow Dr. Nirmal Kumar, Multi-modeling approach to hydrological processes and transfer learning for building footprint extraction 		
11	13:50-14:05	Kim Chae Hyun B4	Utokyo	Malayan tapir habitat fragmentation and ecosystem 
12	14:05-14:20	Sudip Pandey D 1	Hokkaido	Estimation of probable maximum precipitation in Nepal under the climate change Scenario 
13	14:20-14:35	Ito Tomoaki M2	Utokyo	Classification of air pollution problems in Southeast and South Asia using time-series data on environment, society, and policy 
14	14:35-14:50	Shraddha Krishna Panda D1	Hokkaido	

				Integrating Sustainability Science and Indigenous Knowledge for Climate Change Adaptation in the Indian Himalayas
Break	14:50-15:00			
15	15:00-15:15	Naito Chihiro D1	Utokyo	 Sensitivity analysis of oil palm response to climate variables using satellite time series data in Malaysia
16	15:15-15:30	Hitesh Supe D	Hokkaido	 Impact of Photovoltaic Solar Power Expansion on Agricultural Land and Water Resources: A Case Study of Pavagadh Solar Park, India
17	15:30-15:45	DARANAGAMA DARANAGAMA ARACHCHIGE SAMITHA D2	Utokyo	 Ganoderma disease detection in oil palm plantations using SAR measurements
18	15:45-16:00	Rajat D	Hokkaido	 Forests Biophysical parameters estimation using PolSAR and PolInSAR techniques
19	16:00-16:15	Shimada Shoki D2	Utokyo	 Solar PV mapping and installation date estimate in Asia-pacific countries by Google Earth Engine
Comments/ Closing	16:15-16:30	closing ceremony     		

	Farwell party and night walk	          THANK YOU FOR DR. RAM and RAM'S LABORATORY MEMBERS!!

DAY 3

15th March 2024

Visited Muroran Institute of Technology: Sapporo 08:43 Hokuto No.6→10:09 Higashi-Muroran 10:53 Higashi-Muroran Nishiguchi →11:08 Koudai




lunch at campus

Collaboration seminar

1. Introduction on research activity Izumi Microwave Remote Sensing Laboratory Dr. Yuta Izumi, Assistant Professor, Muroran Institute of Technology



2. Peatland Monitoring using InSAR, Qoriantu Zahro PhD candidate, Muroran Institute of Technology
3. IMSL residential area landslide monitoring campaign using Ground-based SAR, Fathin Nurzaman, Muroran Institute of Technology
4. Introduction to research activities of Takeuchi lab., Project Researcher Dr.Trinh Xuan Truong, The University of Tokyo

Qoriantu Zahro

Fathin Nurzaman

Dr.Trinh Xuan Truong

Campus TOUR

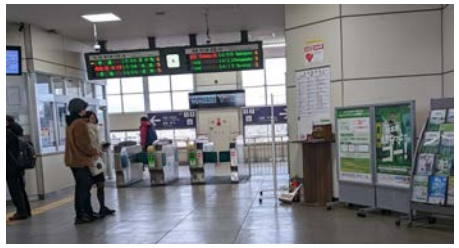








Back to Tokyo 15:03 Koudai →15:21 Higashi-Muroran Higashiguchi, Higashi-Muroran 15:58- Shin-Chitosekuko 17:02 CTS18:55-HND20:40




Photos and edited by ey