NewsLetter

ISPRS Student Consortium

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Interview with
Dr. Myat Su Mon & Dr. Kyaw Zayar Htun

Internet of Things:
An Engineering Project from Beginning to End

Geospatial Big Data

isprs

ISPRS SC NewsLetter

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Would you like to join SC Newsletter team? Do you want to make a difference? Want to learn new skills?

SC Newsletter is at a stage where getting broader and better demands more people to be involved in the process of it's formation. That's why SC Newsletter team is looking for the following volunteers:

- More **people who would be willing to prepare articles** for existing or new rubrics,
- Designers of Newsletter

If you can help us with any of the above, please let us know!

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And also...
If you **would like to publish your research work** in the SC Newsletter send us your abstract on email written above. We will soon contact you for further information.

Dear ISPRS SC Newsletter readers,

When we are children, most of our time involves playing. But when we grow older, work substitutes for our games. But does that mean we have to forget about the pleasure we encountered while playing when we were kids? How many people in the world actually work with enjoyment and how many people work just to achieve money or to achieve better positions? We know that work brings predictable, routine and ordinary events, which can be boring and demotivating, but as well it brings experiences that are non-ordinary and carry a lot of enjoyment. In both ordinary and non-ordinary work events, finding pleasure in what we do brings many benefits such as pride, engagement, motivation and desire to do and learn more. And it is widely known that when one works in a happy state, one is more likely to carry working or learning forward than when happiness is not involved.

We should explore what brings the enjoyment in our everyday work and try to focus on these things with commitment. A person once told me: “If you are not enjoying yourself, you are probably doing something wrong”. Of course, life brings many obstacles to which this saying does not always apply, but after all, what do we have to lose?

Urša Kanjir,
ISPRS SC Chair

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JOIN US!!!

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Dr. Myat Su Mon[1] and Dr. Kyaw Zayar Htun[2]
Local Organizers of 12th ISPRS SC and WG VI/5 Summer School

[1]Assistant Director at RS and GIS Section, Planning and Statistics Division, Forest Department, Ministry of Environmental Conservation and Forestry, Myanmar; [2]Assistant Lecturer in the RS and GIS Department, Mandalay Technological University

Can you give us a brief introduction regarding your professional career and current research interests?

Dr Myat Su Mon: I finished my B.Sc. Forestry Bachelor Degree at the University of Forestry (UOF), Yezin, Myanmar in 2001 and I worked as a Demonstrator at UOF until 2010. I enrolled in the Master's Course at UOF from 2003 to March, 2006. My Master's thesis mainly focused on forest cover assessment using remote sensing and GIS.

I got my PhD from Kyushu University, Japan. My PhD dissertation title was "Monitoring and Assessment of Deforestation and Forest Degradation using Remote Sensing & GIS: Towards Sustainable Forest Management of Natural Forests in Myanmar".

The following are my research publications:

- Mon, M.S., Kajisa, T., Mizoue, N., and Yoshida, S., 2009. Factors affecting deforestation in Paunglaung watershed, Myanmar. Journal of Forest Planning 14: 7–16.
- Mon, M.S., Kajisa, T., Mizoue, N., and Yoshida, S., 2010. Monitoring deforestation and forest degradation using FCD Mapper in Bago mountain areas, Myanmar. Journal of Forest Planning 15: 63–72.
- Mon, M.S., Mizoue, N., Htun, N.Z., Kajisa, T., Yoshida, S., 2011. Estimating forest canopy density of tropical mixes deciduous vegetation using Landsat data: A comparison of three classification approaches. International Journal of Remote Sensing 33(4): 1042–1057.
- Mon, M.S., Mizoue, N., Htun, N.Z., Kajisa, T., Yoshida, S., 2012. Factors affecting deforestation and forest degradation in selectively logged production forest: a case study in Myanmar. Forest Ecology and Management 267: 190–198.

Currently I am working as Assistant Director in the RS and GIS Section, Planning and Statistics Division, Forest Department, Ministry of Environmental Conservation and Forestry, Myanmar.

I work with remote sensing and GIS applications for various forest management purposes. I am also involved in the REDD+ readiness programme of Myanmar, especially in the development of a National Forest Monitoring System.

Dr. Kyaw Zayar Htun: I got my Bachelor of Science Degree (Mathematics, Hons.) from Yangon University, Yangon, Myanmar, in 1996. After that I enrolled in the Master's Course in Information Science at University of Computer Studies, Yangon, Myanmar from 1997 to 2000. My thesis title was "Computational Aspects of Game Theory". I also worked as a programmer at Asia Wealth Bank from 1999 to 2002. Then I quit my job at this private bank, and changed my career to government work as a demonstrator at the Department of Computer Science, Myanmar Aerospace Engineering University. I was very lucky and got a chance to attend the Master's Programme in Remote Sensing and GIS at Asian Institute of Technology supported by JICA in 2004. In 2007, my Minister wanted me to continue my study with a PhD in Remote Sensing and GIS at Mandalay Technological University, Mandalay, Myanmar. During this time, I also attended several training sessions in remote sensing and GIS not only in foreign countries but also locally. The following are my research publications:

- "Application of Digital Image Processing Integration with Satellite Remote Sensing and GIS in Land Use Land Cover Change and Soil Erosion" The 5th International Joint Conference on Computer Science and Software Engineering (JCSSE2008) May 7-9, 2008.
- "Application of Remote Sensing and GIS on Natural Disaster Management and Rehabitilitation" The 2nd International Conference on Geoinformation Technology for Natural Disaster Management and Rehabilitation (git4ndm) , January 30-31, 2009, Bangkok, Thailand.
- "Spatial Pattern Analysis of Land Degradation Using Satellite Remote Sensing Data and GIS in Mandalay Watershed, Central Myanmar" The 6th Annual Meeting on Asia Oceania Geosciences Society (AOGS), August 11-15, 2009, Syntec City, Singapore
- "Detecting Trend on Urban Warming Temperature in Mandalay City" The First International Conference on Science and Technology2009 (ICSE2009), Dec 4-5, 2009, Yangon, Myanmar.
- Assessment of Soil Erosion Effect on Inle Lake in Mountainous Region
- United Nations/Pakistan International Workshop on Integrated Use of Space Technologies for Food and Water Security, Islamabad, Pakistan (May 11-15, 2013)

Currently I am working as Assistant Lecturer in the RS and GIS Department, Mandalay Technological University under the Ministry of Science and Technology of Myanmar. I give lectures about basic remote sensing and GIS to PhD and Master's students in civil [engineering] and architecture. I also collaborate on many projects with ADPC, ADB, UNESCO and local organizations like the Ministry of Construction, the Ministry of Culture, Mandalay City Development Committee (MCDC), Yangon City Development Committee (YCDC) and the Ministry of Relief and Resettlement.

As the local organiser of the 12th ISPRS SC and WG VI/5 Summer School, what were the challenges you encountered while preparing for this event?

Dr Myat Su Mon: We didn't have any challenges in preparing for the event because all local organizers were working together.
Dr. Kyaw Zayar Htun: We didn't have any challenges in preparing for the event.

In your opinion, how important is the participation of students and young scientists/researchers in international events?

Dr Myat Su Mon: I am sure that the active participation of the young scientists/researchers and students is very important for our future. They are the very crucial new generation in the various positions in RS and GIS related fields.
Dr. Kyaw Zayar Htun: They are the very crucial new generation and need to share and exchange knowledge in RS and GIS related fields.

What do you think are the benefits of Summer Schools and other student-specific events to the youth and to the profession?

Dr Myat Su Mon: This is only one of the events and I hope that the students will get new ideas from the Summer Schools and also will improve their international relationships and engage in collaboration.
Dr. Kyaw Zayar Htun: It could improve not only international relations but also motivate them in future collaboration with other youth.

How important is collaboration among institutions in the field of remote sensing, photogrammetry and geospatial information sciences?

Dr Myat Su Mon: We all understand that technical and data transfer is very important among institutions. Therefore, there should be collaboration among institutions in the field of remote sensing and photogrammetry.
Dr. Kyaw Zayar Htun: Of course, collaboration among institutions is important to share and exchange knowledge.

What advice can you give to students and young professionals regarding a successful career?

Dr Myat Su Mon: I would like to suggest to all students that we have to learn as much as we can because nowadays new technologies are developed every day. We have to try our best in our position to support our world and our people.
Dr. Kyaw Zayar Htun: We should learn as much as we can because we need to know and apply new technologies which nowadays are developed every day. We must try our best to apply these new technologies and work together to support people.

End...

giCentre
http://www.gicentre.net/

IEEE Geoscience and Remote Sensing Society
http://www.grss-ieee.org/

RESOURCES

Free and Open Access to Sentinel Satellite Data
https://sentinel.esa.int/web/sentinel/home

Quantarctica – Free GIS Data for QGIS
http://www.quantarctica.org/downloads/

EDUCATION

Elmhurst College
http://public.elmhurst.edu/adult/gis

FREE SOFTWARE

FugroViewer 2.0
http://www.fugroviewer.com/

JOBS, CAREER OPPORTUNITIES

GeographyJobs.com
http://www.geographyjobs.com/

JOURNALS

Environmental Earth Sciences
http://www.springer.com/earth+sciences+and+geography/geology/journal/12665

TUTORIALS

LAStools tutorial
http://rapidlasso.com/category/tutorials/

eBook

Capabilities and limitations of SAR land applications
http://www.intechopen.com/books/land-applications-of-radar-remote-sensing

Geospatial Big Data – Challenges and Future Prospects

Thanasis Moysiadis
Department of Planning and Regional Development, University of Thessaly

As data has become increasingly important, so has its size. We now face the age of Big Data, which presents challenges and opportunities for international collaboration.

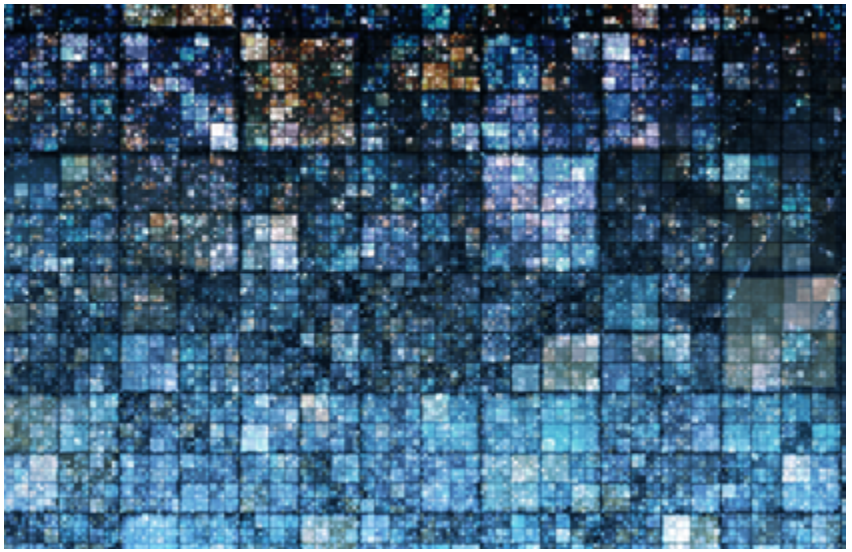
Big Data is referred to as structured and unstructured data collected from diverse sources and used as an ensemble to derive information [1]. Big Data consists of datasets that are too big to be handled efficiently by common database management systems. These datasets can range from tera to petabytes and beyond. Big Data offers the opportunity to extract information from large and complex data sources from diverse disciplines, and presents compelling reasons to embrace new scientific research methods. Big Data has huge potential and is already benefitting scientific research and discovery. It presents particularly significant challenges and notable opportunities for international research projects. Initiatives to its use aim to produce research results and information in ways that improve decision-making on critical issues for humankind and the environment [2].

To accomplish these aims requires the integration of increasingly diverse and complex datasets, the design of new forms of data collection, and the extraction and interpretation of knowledge, utilizing sophisticated statistical techniques, complex simulation models and other computationally intensive approaches [2]. The challenges and opportunities of Big Data also have significant implications for scientific data services and infrastructure providers.

Big Data has always been a major challenge in Geoinformatics. The volume of geospatial data coming from satellite remote sensing, global navigation satellite systems, aerial surveys, digital cameras, sensor networks, radar and LiDAR in various types and formats has grown exponentially; therefore geospatial databases have become inherently very large. Even though there have been advances in hardware and software for handling big data, there are still issues in handling geospatial big data efficiently and effectively. Therefore, there is a need for techniques and technologies to store, manage and compute geospatial big data [3].

According to Dasgupta, 2013, the key to Big Data is analytics. In a normal geospatial data setup, the analysis is a set of programs, built in or written by a programmer, which operates on a structured dataset. What sets apart Big Data analytics is the additional need to analyse unstructured and structured data streams in real time. These data streams can be 10 to 100 times the speed of transactional data. In a geospatial context, these could be sensor data as well as field reports emanating from a disaster area or a battlefield [1].

Several issues related to Geospatial Big Data needs to be addressed in the future. These include the importance of using Geospatial Big Data in international projects, improving researchers' understanding of its benefits, access through specially designed infrastructures, and last but not least, policies that maximize their exploitation. The international scientific community has a responsibility to examine these issues and to use Big Data for knowledge discovery that will lead to a beneficial and sustainable environment of our planet.



Credits: http://informedinfrastructure.com/6185/gcs-geospatial-big-data-webinar-focuses-on-location-analytics

References:

1. Dasgupta, A. 2013. Big data: The future is in analytics, Geospatial World, April Issue.
2. CODATA, International Council for Science: Committee on Data for Science and Technology, 2014. Statement of Recommendations and Actions, Workshop on Big Data for International Scientific Programmes: Challenges and Opportunities, 8-9 June 2014, Beijing, China.
3. Karimi, H. (ed.), 2014. Big Data: Techniques and Technologies in Geoinformatics, CRC Press.

ENGO 500 - Internet of Things

Jeremy Steward

As part of the undergraduate Geomatics Engineering program at the University of Calgary, students are required to take what is known as the ENGO 500 Engineering Project course. This course is designed to give students the experience of working through a full engineering project from beginning to end. My group members, Ben Trodd, Alexandra Cummins, Harshini Nanduri, Kathleen Ang, and of course myself, were enrolled within the course from September 2013 to April 2014. Our project was based on the concept of the "Internet of Things," and quickly grew to win first place at the annual Capstone Design Fair that was held at the University of Calgary at the end of March 2014.

When we started the project, the entire group was caught quite off guard with the project topic we were given. Even as the team leader for the group, I had only barely heard of the "Internet of Things" (IoT) and had little clue as to how we would be able to develop a fully functioning IoT application by the end of the academic year. Soon, we saw ourselves engulfed in a side of Geomatics Engineering we had never quite seen before.

To be clear, the Internet of Things is a concept in which everyday items are all networked together, and can seamlessly communicate with one another over this common network. Naturally, the network we planned to use was the standard internet as we know it, with communications and interactions between objects being sent over HTTP. In a lot of ways, the ideas behind IoT-based applications find their origins in what's known as Web 3.0, or the semantic web. By having tons of everyday objects connected to one another, the hope is that the world can become a safer and more efficient place, since many of the rote tasks we perform everyday can be automated by connecting the physical world to our online, virtual one. Some examples of IoT-based systems on the market today are the Phillips Hue light bulbs; the NEST project that is now owned by Google; and even Apple's iBeacon, which allows you to locate and communicate with your iPhone by connecting "beacons" to everyday objects.

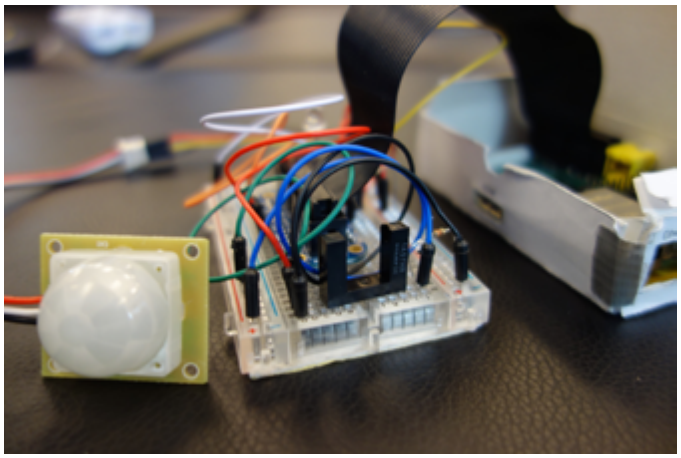
A major constraint on our project was that we were developing our application on top of the Open Geospatial Consortium's SensorThings API. Particularly, since the SensorThings API is an Open Standard (and as such all the code associated is Free Software), our application was built to help serve as a test-bed for IoT-based applications on top of the SensorThings architecture. As such, we developed the entirety of our project in an open manner, so that people interested in working with the SensorThings API in the future can have some kind of an example with which to start their own work. The project was split over two repositories on the Github site, https://github.com/ThatGeoGuy/ENGO500 and https://github.com/ThatGeoGuy/ENGO500-Webserver.

Now, I've talked at length about the origins of the project, but it was not quite so simple for the project to jump from start to finish. Our group was given free reign over what kind of IoT-based application we wanted to build. We poured through a lot of various ideas, but ultimately we identified several key components that we needed in order to create an IoT-based system or application. These components were:

1. The "Thing" or object that was to be connected through the internet,
2. The interface with which to interact with the object or thing, and
3. Some system, which would allow both, the thing and the user-facing interface to connect and speak with one another.

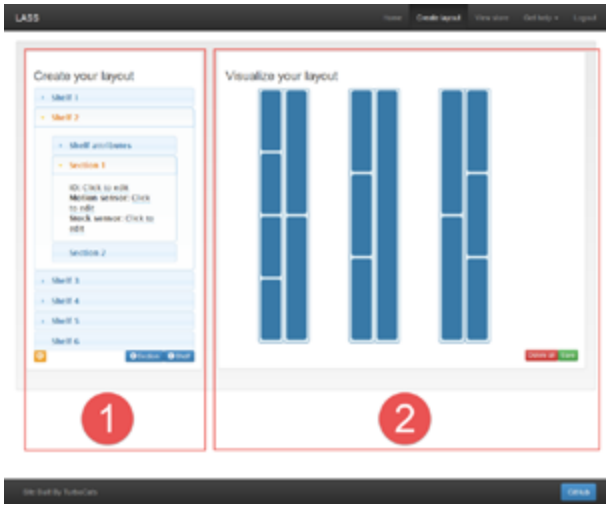
Fortunately, we had already covered our base for #3, in that we were using the SensorThings API. Ultimately, we decided that we wanted to build what we would eventually dub "LASS" - a Location Aware Shelf System. The purpose of our system was to assist retail and warehouse management, by providing a system that was capable of not only tracking stock levels of product, but also movement within any given store or aisle.

We eventually decided to split our work between the front-end development, which comprised the website and webserver details, and the back-end development, which was more involved with developing a sensor prototype so that we could test how we would ultimately use sensors in a final version of the project.



Because our group had little experience with electronics and sensor hardware, we kept our prototype fairly simple by hooking up the various components through a breadboard attached to a Raspberry Pi Model B device. With regards to sensor choice, we chose to use photo-interrupters to measure shelf stock (whether or not something obstructed the ends of the photo-interrupter) and used a pseudo-infrared motion sensor in order to track movement within the store. With a little bit of software magic in Python, we managed to get our sensors to communicate with the SensorThings API. By the time we had finished the project, we had managed to construct three fully working prototypes, which helped greatly when it came time to demonstrate our project.

I was personally more involved in the web interface aspect of the project. We played with various technologies in order to see what fit the group's needs best, and ultimately managed to develop a fairly straightforward interface with which users could log in, create a basic virtual layout of their store, and see some basic information about their shelves and products. Lots of work went into ensuring that the website was smooth and responsive, but more importantly that it seamlessly interfaced with the SensorThings API for each given store.



As a final touch, we added some basic store statistics to the default dashboard. We felt that knowing roughly how busy the store was over some period of time would be invaluable information for owners and managers. We likewise provided basic history functionality, to be able to view the history of sensor data throughout the store. We were overall quite pleased with how well received our interface was, with many recipients at the Capstone Design Fair regarding how beautiful the graphs looked.

Though our group was pleased with our results, we did have plenty of ideas on improvements that could be made to what we had created. We first want to expand our layout creator beyond the standard aisle-beside-aisle setup we started with, and even toyed with the idea of using Markov chains to track customer locations throughout the store with the PIR sensor data. We created the first iteration of our Location Aware Shelf System, and would be extremely excited for someone else to take our project farther, if possible.

One of the great things about the state of Internet of Things applications today is that it is pretty much a wild west. With a little effort, almost any good idea can go a long way and become a big hit. One of the hopes for our project was that it would help the evolution and proliferation of the SensorThings API so that new developers might have an easier time starting new projects using the service. One of the great things we discovered while working on the project was not only how good the developer tools are for prototyping projects, but also the sheer number of different tools and frameworks available that make building big apps easy for amateur developers. I certainly cannot predict the future, but I am hopeful that the Internet of Things will make our lives better if we use it to empower our daily lives.

End...

Myanmar: The Golden Land

Daniel dela Torre, Sheryl Rose Reyes

The Golden Land is an emerging and exciting destination in Southeast Asia, marked by scenic natural resources and a rich, multi-ethnic culture. Myanmar, also known as Burma, was formerly a British colony for more than a century and achieved independence in 1948. Today, it is a country of more than 50 million people of different cultural groups. It is a largely agricultural economy and a significant source of valuable minerals such as pearls, rubies, jade and sapphires. Oil and gas also have large offshore deposits. Buddhist temples and monasteries abound in the country, where half a million monks reside. The country has a tropical monsoonal climate, experiencing a rainy summer season from June to September and a cool winter season from December to April. Its terrain is marked by hills and mountain ranges in the east, north and west, with a valley forming the central regions. With reforms in the government and a new capital in Nay Pyi Taw (the former capital is the historic Rangoon), Myanmar is experiencing renewed economic development and international participation.

The 35th Asian Conference on Remote Sensing (ACRS 2014) will be held in Nay Pyi Taw, Myanmar. This year's theme is "Sensing for Integration of Societies" – encouraging researchers in the field of remote sensing to find innovative ways of using scientific research and advanced technology to help emerging societies and communities in Asia. The conference is organized by the ACRS Local Organizing Committee of Myanmar and the Asian Association on Remote Sensing (AARS). This conference continues the legacy of gathering students, teachers, professors, professionals, researchers, scientists, inventors, policy makers and business people in the field of remote sensing and associated disciplines to present their most recent findings and exchange information with friends and colleagues in the region.

The ACRS Local Organizing Committee of Myanmar is also organizing the 12th ISPRS Student Consortium and WG VI/5 Summer School at the University of Forestry in Yezin near Nay Pyi Taw. This Summer School's theme is "Geospatial Technologies for Environmental Management and Monitoring." The Summer School aims to gather students and young scientists to attend a week-long study focusing on the most recent advances in remote sensing. The Summer School also provides a great opportunity for the next generation of researchers to expand their networks, attend social gatherings and establish connections with professionals and experts in the field of remote sensing.

ACRS 2014 will be held from October 27-31, 2014. The Summer School will be held right after the conference, from November 1-5, 2014.

12th ISPRS Student Consortium and WG VI/5 Summer School
Yezin, Nay Pyi Taw, Myanmar, 1-5 November 2014
For more info visit: http://www.acrs2014.com/summer_school

Workshop of Photogrammetry, Remote Sensing and Laser Scanning
Telč, Czech Republic, 3-5 November 2014
For more info visit: http://lfgm.fsv.cvut.cz/?cap=&zal=408&lang=en

1st ISPRS International Conference on Geospatial Information Research
Tehran, Iran, 15-17 November 2014
For more info visit: *http://giresearch.ut.ac.ir/*

ISPRS Symposium - Sustaining Land Imaging: UAVs to Satellites
Denver, USA, 17-20 November 2014
For more info visit: *http://www.isprs.org/2014tc1symposium/*

Pacific Islands GIS&RS User Conference
Suva, Fiji Islands, 25-27 November 2014
For more info visit: *http://picgisrs.appspot.com/*

Mobile Laser Scanning Technology Workshop
Freiburg, Germany, 26-27 November 2014
For more info visit: *http://www.ipm.fraunhofer.de/en/tradefairs-events/molas-workshop-2014.html*

EuroSDR 3DSIG and ISPRS WGs III/4 & II/2
Southampton, UK, 26-28 November 2014
For more info visit: *http://3dsig.eventbrite.co.uk*

ISPRS Symposium: Operational RS Applications
Hyderabad, India, 9-12 December 2014
For more info visit: *http://www.nrsc.gov.in/isprs/2014tc8symposium.html*

Workshop on Spatial Big Data Mining and Visualization
Shenzhen, China, 14-17 December 2014
For more info visit: *http://icdm2014.sfu.ca/home.html*

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