

Collaboration and Big Data - ISPRS Geospatial Week 2017



Ian Dowman reports on the ISPRS Geospatial Week (GSW) giving a good indication of current developments in photogrammetry, remote sensing and spatial information science and the way in which this is progressing in China.

ISPRS has now established the GSW as a regular biennial event. This year it was held at Wuhan in China, hosted by LIESMARS, the geomatics centre at Wuhan University. The meeting inevitably had a Chinese flavour to it, but did demonstrate a number of interesting trends. The programme was divided into eleven workshops, each organised by one or more ISPRS working group, so although the themes of the workshops dominated there was ample opportunity for interaction between the workshop participants and for discussion on cross-cutting subjects. The workshops covered the following topics:

- Smart Cities
- Web Mapping, Geoprocessing, and Services
- Spatial Data Quality
- Indoor 3D
- Advances in SAR: Constellations, Signal processing, and Applications
- Laser Scanning
- Image and Data Fusion
- Photogrammetric 3D Reconstruction for Geo-Applications
- Spatial Data Mining and Geographical Knowledge Services
- Cryosphere and Hydrosphere for Global Change Studies

There were also a number of keynote presentations that tended to look at the big picture and cross-cutting issues; detail was covered in the workshops. It is noteworthy that of the invited speakers four were from the UK: Michael Batty from UCL talking about smart cities, Peter Atkinson from Lancaster University on 'Uncertainty in Downscaling', Bob Haining from the University of Cambridge on 'Spatial Precision and Statistical Precision' and Paul Longley, also from UCL, on big data. The selection of these speakers and their topics indicated the importance of the UK in the development of geospatial science and the range of disciplines now encompassed by geomatics.

Keynotes

The headline topics centred around big data, deep learning, and artificial intelligence (AI) and how these techniques are focused on autonomous vehicles, integrated navigation and smart cities. 3D city models are key to a really smart city and the example of Singapore was cited, where already a model with LoD2 (level of detail 2) exists, and areas with LoD3 are being mapped. Accurate and up to date data is essential for the success of autonomous vehicles but it was stressed that a lot more than good data and sensors are necessary and the concept of a 'driving brain' was introduced which involves AI and takes the mantra 'learn, remember, adapt, share' as its guiding principle. It is necessary to collect data from many different sources, to analyse that data and then share it - all in real time. It was claimed that in Singapore traffic congestion can be predicted with 90% reliability. Other aspects of smart cities discussed were the integration of indoor and outdoor data and the development of building codes in addition to postcodes.

Lawrie Jordan, Director of Imagery and Remote Sensing at Esri, took up the theme of big data and collaboration, and reported that Esri is developing a system of systems, using the cloud to solve big problems and reduce time. Esri will shortly be announcing a photogrammetry suite developed with Liesmars and the use of oblique imagery integrated into GISPro. He promised remote sensing and 3D fully integrated with GIS.

Laser Scanning

Laser scanning was covered in detail in the Laser Scanning workshop but inevitably found its way into other sessions. Deep learning is applied to extraction of DTMs from point clouds and SLAM technology was discussed for several applications, particularly for indoor mapping. Laser scanning from UAVs is another topical subject. Collecting data for BIM was also touched upon. It was noted by one speaker that data from BIM is not ideal for navigation purposes.

Radar

Synthetic Aperture Radar was a popular topic at the conference. The sessions covered a wide variety of topics including spaceborne

systems, particularly the recently launched Chinese systems, ground-based systems and processing data from Sentinel 1 for use in Copernicus with deep learning software. Applications range from deformation measurements, disaster management and urban mapping.

Earth Observation

Earth observation was mentioned frequently as satellite data is key to many applications. A keynote paper was given by Steven Ramage from The Group on Earth Observations (GEO) who set out the activities and objectives of GEO. One key principle of GEO is open data, which means a full and open exchange of data with minimum time delay and cost. GEO publishes several reports on this and other topics and also provides access to data through the portal.

Exhibition

There was an exhibition at the conference, largely populated by Chinese companies, but also including Trimble, PCI and Esri. Laser scanners, mobile mapping systems and UAVs featured strongly.

Summary

In summary it can be concluded that current developments in photogrammetry, remote sensing and spatial information science are centred on using new tools for processing and analysis such as big data processing, artificial intelligence, deep learning, data mining, now established hardware such as laser scanning, INS and SLAM to develop smart cities, autonomous vehicles, location-based services and environmental monitoring. There is also a significant interest in the accuracy and precision of data that now extends beyond geometric issues to statistical analysis of all types of data.

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