

## **Christian Heipke**

Institut für Photogrammetrie und GeoInformation  
Leibniz Universität Hannover

### **“WHERE DO YOU SEE PHOTOGRAMMETRY IN 2020++?”**

Photogrammetry has seen a phenomenal development in recent years. These developments are strongly influenced by progress in information and communication technology, which can be summarized under the terms of ubiquitous imaging, UAV platforms, mobile and cloud computing, as well as advances in 3D image processing such as structure-from-motion and SLAM. Most recently, automatic object extraction has seen major improvements due to innovations in machine learning and, more particularly, in deep learning based on convolutional neural networks (CNN). Other important trends have been those to carry out more and more benchmark tests to compare and improve algorithms, and the increasing amount of easy-to-use open software packages.

These changes have had a profound impact on the theory, development and operational use of photogrammetry as well as on remote sensing and spatial information science, resulting in a large variety of new applications in areas like autonomous driving, robotics and indoor positioning. At the same time, more traditional areas like precise metrology, mapping and map updating, and all kinds of monitoring and surveillance tasks have seen significant improvements.

In the years to come we will see an even closer integration of methodologies from satellite, aerial and close range photogrammetry with those from computer vision. We will also see a further integration of different sensors (optical, hyperspectral and thermal cameras, laser scanners etc.) to form geo-sensor networks and platforms for mobile mapping and robotics applications. On a more general note, crowd sourcing and community mapping are very interesting additions to traditional data acquisition. On the processing side, we will see more and more automation for image processing, map update and monitoring tasks. Classification and, in particular, image interpretation and object extraction will significantly benefit from the developments in machine and deep learning. The need for automation is partly due to the sheer amount of data being acquired every day - think about the millions of images being uploaded to the web. Real-time processing is another trend which will become more important. Besides obstacle avoidance in autonomous driving and UAV photogrammetry, tasks such as traffic monitoring, disaster management and image processing for personal use such as pedestrian navigation and personalised location-based services, demand fast results as well.

ISPRS, as the premier international scientific society in the field, has been documenting and shaping developments in photogrammetry for the last 100 years. The society is and will remain a reliable partner to forecast and determine the future of our fascinating discipline for scientists, practitioners and educators alike.