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## "MACHINE LEARNING IN PHOTOGRAMMETRY: WHERE ARE WE GOING?"

Machine learning has played a major role in photogrammetry and remote sensing research for decades. Many techniques like least squares regression and maximum likelihood classifiers are integral parts of commercial software packages for many years. Since the fortunate combination of powerful hardware (graphics cards), massive amounts of training data available through the internet, and minor technical improvements have led to a comeback of deep learning in 2012, we can observe a rapid expansion of research in this field. Although there is certainly a large hype around deep learning in the media (and partially in research) that should be taken with a grain of salt, this family of methods really is a treasure trove for research in our field. It offers new, exciting possibilities both, for geometric questions in photogrammetry and semantic image interpretation in remote sensing. Because deep learning tools often improve performance for many tasks significantly compared to more traditional approaches, this set of tools is of high interest for both, industry and colleagues in neighboring research disciplines. I believe this is a great chance for our field to raise awareness across disciplines of what we have to offer: accurate, semantically interpreted geo-data at large scale that can help answering many open questions in, for example, ecology, climate research, or hydrology. Due to a rich set of open source software tools that make deep learning easily accessible to a large crowd of (non-technical) researchers, new ideas can quickly be tried; colleagues new to the field can rapidly achieve good results.

Because deep learning provides relatively easy possibilities to combine image data with other sources of evidence (e.g., weather, soil), new possibilities arise for our field to escape the trap of being merely a provider of accurate, geometric data (and let others do the overall modelling and pick the low-hanging fruits). Since we traditionally have a strong technical background combined with an openness for cross-disciplinary research, this is our chance to sit in the driver seat again for novel, original research that matters to the environment and society.

Innovation thrives through cross-disciplinary research, where novel ideas emerge at the interface between fields. My hope is that deep learning offers this chance for photogrammetry and remote sensing: inspiring a new era high-impact research in our field through collaboration with our colleagues in neighboring disciplines.