Photogrammetry Meets the Consumer Drone

Photogrammetry has made huge progress over the past 15 years, on both hardware and software fronts. Dedicated large-frame cameras enable increasingly high geometric and radiometric precision, capturing overlapping images to be used by software with new, tailored algorithms. Large-scale surface models with proven accuracy and high detail are produced from these images by dense image matching software, a technique which has in many cases replaced the more traditional Lidar.

Two pioneers in introducing 3D models from photogrammetry into the consumer sphere are Vexcel and Microsoft. Vexcel focused on finding the best sensor for large scale mapping and 3D modelling, while Microsoft, with its brilliant computer vision and photogrammetry researchers, focused on extracting models from overlapped images. Their alliance brought the first large-scale, publicly accessible 3D models into homes via Bing Maps. 3D maps (Google and Apple services for example) are increasingly available and of better quality. 3D surface models are also being used as part of car navigation systems, showing the increasing change and diversification of photogrammetry applications.

However, obtaining highly accurate surface models from dense image matching is still very expensive in terms of both hardware and software, and thus somewhat limited to bigger companies who update large areas every 3-5 years. This excludes applications where immediate or frequent updates of surface models are necessary, i.e. in emergency response, construction monitoring, open pit mining, and local cadastral maps, to name but a few.

Other solutions are needed in such fields, with professional and consumer drones already presenting themselves as one. The number of consumer drones used for professional applications will increase enormously in the coming year: both by businesses using consumer drones for the first time, and those expanding their existing professional drone fleet to include more consumer drones.

This has huge implications not only for hardware, but software companies as well. Rather than telling clients to improve their results through the use of better cameras and sensors, software companies will need to invest in developing better algorithms. With hundreds of millions of consumer drones on the market, there is huge potential for professional applications that do not require the highest accuracy, but still provide large savings in industry workflows. When paired with a user friendly photogrammetry software optimised to provide high-quality results despite rolling shutter cameras or hardware limitations, consumer drones will be used more and more as an indispensable part of the professional tool kit.

Dr Christoph Strecha is the CEO and founder of Pix4D, a Swiss company that develops and markets software for production of survey grade 3D models and orthomosaics from images. Strecha received his PhD from the Catholic University of Leuven (Belgium) in 2008 under the supervision of Prof Luc Van Gool for his thesis on multi-view stereo. He then worked as a post-doc and was co-chair of ISPRS Commission III/1. In 2011 he founded Pix4D.

https://www.gim-international.com/content/blog/photogrammetry-meets-the-consumer-drone