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"PHOTOGRAMMETRY IN INDUSTRY: WHERE DO WE STAND?"

Fabio:
"Thomas, industrial photogrammetry is a key part in our community. Can you briefly state where we stand today?"

Thomas:
"Before we look at the presence, we should reflect the younger history. The professional use of industrial photogrammetry goes back to the mids of the 80ies with the developments of large-format metric cameras and image comparators with automatic target measurement, developed by GSI and Rollei. These systems have been used for high accurate applications in the aerospace industry mostly, with relative precisions up to 1:200,000. In the beginning of the 90ies we could observe the transition to fully digital solutions either based on still-video cameras for off-line photogrammetry, or by digital industrial cameras for the first online applications. It has to be mentioned that almost all relevant algorithms for bundle adjustment, camera modeling, target detection and outlier detection were already available."

Fabio:
"What can we learn from those developments and what are their impacts to recent technologies?"

Thomas:
"Industrial applications are still characterized by high accuracy demands, standardized verification protocols, short or real-time processing intervals, data interfaces to post-processing software or systems, high degree of automation and ease-of-use. Since the beginning, optical or photogrammetric tools are applied to speed up quality control and production processes, hence to save money in manufacturing. But this is not only a success story, as we can observe in aerospace applications, as an example: while offline-photogrammetry has replaced theodolite systems, laser trackers have replaced photogrammetry in many cases due to their higher flexibility and simpler operation. Especially the preparation of objects with a large number of targets is a draw-back of photogrammetry. In addition, special target adapters have to be used to represent the feature of interest at the workpiece."

Fabio:
"Does it mean that we need to get rid of targets in the near future?"

Thomas:
"No, I don't think so because target measurement is still the solution for highest accuracy. But we can observe a huge demand on surface and contour measurements, for instance by fringe or laser projection devices that are available now for more than 20 years. Surface scanners are now combined with standard photogrammetric procedures for real-time calibration and orientation. As an example, hybrid robot-based systems for in-line measurements are very successful now, as demonstrated with systems from suppliers like GOM, AICON, Zeiss or Mapvision. However, creating just point clouds is not sufficient, we need higher levels of object recognition, semantic segmentation and analysis methods the deal the big data that is scanned every day."

Fabio:
"What does it mean for academic research?"

Thomas:
"We must admit that the R&D departments of the above mentioned companies have an innovative power that often beats the capabilities of universities and research institutes. While companies are driven by market constraints, the research community shall focus on long-term developments, company-independent investigations and system testing, exotic applications and, last but not least, high-level education. In this respect there will be of growing need to integrate design, production technologies and quality control mechanisms with optical 3D metrology and spatial data analysis, especially in the context of Industry 4.0."

Fabio:
"Thank you very much."