MetroCT

Developing advanced image reconstruction algorithms for industrial X-ray CT scanners

MANUFACTURING

Today, X-ray computed tomography (X-ray CT) is mainly known for its medical imaging applications in hospitals. Yet, the technology also has tremendous potential in industrial settings, where it can be used to study the properties of materials in a non-destructive way. That allows companies to increase their knowledge of the materials they are working with and to use those insights to improve their R&D, industrial inspection and quality control efforts.

But for demanding industrial applications, today's CT image reconstruction algorithms do not deliver the required image quality. That is why MetroCT investigated the development of advanced algorithms to support higher quality (and even dynamic) image reconstruction of materials such as diamonds, metal objects and materials that deform under stress (e.g. foam). "MetroCT has been a highly demand-driven research project," explains Jan De Beenhouwer (iMinds - University of Antwerp) who coordinated the project's research effort. "Diamcad, a partner active in the diamond sector, wanted to leverage CT technology to achieve better accuracy in the detailed study of rough stones and the actual polishing of diamonds. Huntsman, a global manufacturer of chemicals, was looking for a more thorough understanding of PU foam's behavior when being subjected to pressure; an analysis that industrial CT scans currently cannot accommodate. Finally, 3D metal printing company Melotte wanted to investigate CT scanning technology that can properly deal with metal objects."

"And then there was the time constraint," adds Jelle Vlassenbroeck (Inside Matters) who took the overall lead for the MetroCT project. "As time is money, the duration of CT scans needs to be limited — especially in 3D environments in which more data are required to accurately reconstruct an object's image."

The outcomes

- Making CT image scanning 5 to 10 times faster than today's state-of-the-art
- Algorithms that predict 10 times more accurately how a diamond should be polished
- Dynamic algorithms for an industrial setting

MetroCT Leaflet

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MetroCT (CT for Analysis, Inspection and Dimensional Metrology) is an imec.icon research project.

It ran from 01.01.2014 until 31.03.2016.

Project informatie

Industry

- Diamcad
- Huntsman
- Inside Matters
- Melotte

Research

- Centrum Wiskunde en Informatica
- IBiTech - UGent
- imec - Vision Lab - UA

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