

Accurate Three Dimensional Indoor Mapping Using Terrestrial Laser Scanning And CAD Software

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Abstract: Indoor mapping is a technique to show the structure inside a building. An indoor map that presented in 3D formats can give user much useful information. 3D indoor mapping not only provide the dimension of the indoor space but also the feature inside the room via 3D visualisation. This study focuses on 3D indoor mapping using Terrestrial Laser Scanning (TLS) technique and CAD software. FARO laser scanner Photon 120/20 was used for scanning the study area (i.e. classrooms), with the total of 8 scan stations. All the scanned point cloud data were registered using FARO scene software, and then exported into AutoCAD 2011 for processing and 3D modelling using the point cloud plug-in and tools within AutoCAD. Consequently, the generated 3D model was exported into Autodesk 3Ds Max to produce more detailed 3D visualisation and walk-through animation. For dimensional verification, selected measurement of the classrooms and features inside the classrooms were taken using distometer, FARO scene and AutoCAD. Comparison of measurement between distometer and point cloud in Faro Scene shows RMS agreement within 2cm to 3cm. Moreover, comparison between distometer and 3D model in AutoCAD shows slightly bigger RMS, possibly due to digitizing and processing errors. Hence, TLS technique has great potential for accurate 3D indoor mapping and applications, such as asset documentation and management.

Keyword : 3D modelling, Indoor mapping, Terrestrial laser scanning, Point cloud