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Applying Laser Scanning and Digital Photogrammetry for Developing an Archaeological Model Structure for Old Castle in Germany

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Abstract : Documentation and assessment of conservation state of an archaeological structure is a significant procedure in any management plan. However, it has always been a challenge to apply this with a low coast and safe methodology. It is also a time-demanding procedure. Therefore, a low cost, efficient methodology for documenting the state of a structure is needed. In the scope of this research, this paper will employ digital photogrammetry and laser scanner to one of highly significant structures in Germany, The Old Castle (German: Altes Schloss). The site is well known for its unique features. However, the castle suffers from serious deterioration threats because of the environmental conditions and the absence of continuous monitoring, maintenance and repair plans. Digital photogrammetry is a generally accepted technique for the collection of 3D representations of the environment. For this reason, this image-based technique has been extensively used to produce high quality 3D models of heritage sites and historical buildings for documentation and presentation purposes. Additionally, terrestrial laser scanners are used, which directly measure 3D surface coordinates based on the run-time of reflected light pulses. These systems feature high data acquisition rates, good accuracy and high spatial data density. Despite the potential of each single approach, in this research work maximum benefit is to be expected by a combination of data from both digital cameras and terrestrial laser scanners. Within the paper, the usage, application and advantages of the technique will be investigated in terms of building high realistic 3D textured model for some parts of the old castle. The model will be used as diagnosing tool of the conservation state of the castle and monitoring mean for future changes.

Keywords : Digital photogrammetry, Terrestrial laser scanners, 3D textured model, archaeological structure
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