WAN NUR AMIRAH BINTI WAN ISMAIL BACHELOR OF SURVEYING SCIENCE AND GEOMATICS (HONOURS) JULY 2024

THREE DIMENSIONAL MODELLING OF CRIME SCENE USING SPHERICAL LENS

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Thesis submitted to the Universiti Teknologi MARA Malaysia
in partial fulfilment for the award of the degree of the
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DECLARATION

I declare that the work on this project/dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA (UiTM). This project/dissertation is original and it is the result of my work, unless otherwise indicated or acknowledged as referenced work.

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ABSTRACT

Crime scene investigation (CSI), involves collecting, preserving, documenting and analyzing evidence found at the crime scene. The evidence is usually collected either using manual or digital measurement methods such as terrestrial laser scanners (TLS). TLS allows the crime scene to be digitalized into a computer representation of a 3D model, hence eliminating missing evidence due to human error where the digital crime scene can be revisited anytime instead of limited time of the actual scene. However, the use of TLS is costing, and requires expert to operate the instruments as well as to construct the 3D model. As a low-cost alternative, the 3D model can be generated using image-based modeling from overlapped imagery acquired from a digital camera. Cameras with a spherical lens capable of collecting 360° scene images thus have the potential to be used to acquire crime scene data and construct the 3D rapidly. The acquired image can be processed using the structure-from-motion (SfM) photogrammetry technique. However, there are limited study utilize the method for crime scene applications. Hence, the aim of this study is to analyze the capability of a spherical lens in constructing a 3D model using the SfM photogrammetry technique for crime scene application. The objectives of this study are to construct the 3D model of a simulated crime scene and analyze the accuracy of the generated 3D model by comparing it to the 3D model generated by the TLS point cloud. The study will expect to have a similar quality 3D model from a spherical lens camera and aid the authority in enhancing the evidence collection in the future.

KEY WORDS : CSI, TLS, 3D Model, SfM Software, 360 Camera, Point Clouds

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