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RECONSTRUCTION OF 3D MODELS OF ARTEFACT USING LIDAR PHONE BASED FOR HERITAGE DOCUMENTATION

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BACHELORS IN SURVEYING SCIENCE AND GEOMATICS (HONOURS) - AP220

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Thesis submitted in fulfilment
of the requirements for the degree of
Bachelors in Surveying Science and Geomatics (Honours)

College of Built Environment, CBE.

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Under - Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

The field of cultural heritage has experienced an increasing impact from 3D image capture. Applications include documenting an object's dimensions and conservation condition, as well as archaeological artefacts, exhibiting museum sites and collections, and developing packaging, among others. The most popular methods for acquiring 3D data are laser or structured light scanning, and, furthermore, Digital Close-Range Photogrammetry (DCRP). In analysing the advantages of DCRP in comparison to scanning techniques for documenting heritage artifacts, the effectiveness of the outcomes acquired in each case is examined using Light Detection and Ranging (LiDAR) sensors from smartphones and affordable software that was tested as part of these techniques. Also highlighted is the possibility for DCRP to improve the accuracy of 3D recording. However, research related to the accuracy of LiDAR sensors from smartphones is still limited. The aim of this study is to check the LiDAR accuracy on the artefacts using the DCRP technique. To achieve this aim, the objectives of this study are to explore the potential of LiDAR smartphones and to study the dimensional measurements from the collected data to create the 3D model. The study objects are the cannonball and tombstone. The Coordinate Measuring Machine (CMM) data will be used to control X, Y, and Z measurements. To accomplish the objective, Scaniverse, Reality Capture (RC), and Cloud Compare (CC) may be used to process the 3D data. For control data, CMM will be utilized. This study can facilitate the easy documentation of artifacts and the collection of detailed data. Moreover, it may help related agencies or authorities promote the artifacts' data to the public and improve the mode of documentation of cultural heritage data.

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