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ACCURACY ASSESSMENT OF 3D MODEL GENERATED USING PHOTO ACQUIRED BY SMARTPHONE FOR ENGINEERING OBJECT

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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

This research paper presents a study on the use of smartphone-based photogrammetry for achieving accurate 3D modelling in the field of reverse engineering objects. The motivation for this study stems from the challenges faced in model conservation, particularly the high costs associated with traditional 3D modelling techniques. Previous methods relying on laser scanners or Lidar have proven to be expensive and require significant maintenance, making them less accessible for documenting industrial designs. To address this issue, this study explores a cost-effective alternative by leveraging smartphone-based photogrammetry. This approach, closely related to close-range photogrammetry, offers a more affordable solution compared to digital single-lens reflex (DSLR) cameras. By utilizing the computational power and advanced camera capabilities of modern smartphones, the goal is to establish the accuracy and reliability of this method in reverse engineering objects. The aim of this study is to produce a 3D model of the reverse-engineered object using the smartphone-based camera for data acquisition. Throughout the research, a series of processing steps are conducted to evaluate the feasibility of smartphone-based photogrammetry in accurately capturing the intricate details of objects for 3D modelling. As a result, the obtained outcome is a 3D model of the chosen reverse engineering object which was saltwater pump. The outcomes of this study will contribute to the development of a more accessible and cost-effective solution for preserving valuable object through reverse engineering. By providing insights into the accuracy and reliability of smartphone-based photogrammetry, we hope to pave the way for wider adoption of this technique in heritage conservation, archaeology, and other related fields.

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