

3D MODELLING OF KOTA KAYANG CAVE USING CLOSE  
RANGE PHOTOGRAMMETRY (CRP)

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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 Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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## ABSTRACT

This research explores the use of Close-Range Photogrammetry (CRP) method for cave mapping. CRP involves creating 3D models from overlapping photographs. The study addresses the challenges of geodetic station setup in underground environments and introduced the advantages of CRP for cave mapping. This study was conducted with the aim of promoting the use of Photogrammetry, as it has achieved numerous significant advancements in recent years and also to facilitates a better understanding of cave environments and supports decision-making in cave exploration, conservation, and scientific studies. The images of Kota Kayang's cave were taken using the DSLR camera. On the other hand, the GCP distributed in the cave were taken using the total station. These images were processed using Agisoft Metashape and RealityCapture to generate its coordinate to later then be compared to the data taken using total station. The 3D map of Kota Kayang's cave were generated as the final result. CRP enables rapid data acquisition and detailed 3D modelling, while Tacheometry provides precise measurements, especially in challenging cave conditions. The findings emphasize the factor affecting the error in cave mapping using CRP method. In conclusion, although using CRP enables swift data collection, it also brings the risk of introducing errors and diminishing the accuracy in cave mapping. It is essential to carefully consider these trade-offs and implement measures to mitigate potential inaccuracies when utilizing CRP for cave surveying and mapping applications. Additionally, incorporating complementary techniques or verification processes can help improve the overall reliability of the mapping results.

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