Available online at www.CivileJournal.org

Civil Engineering Journal

Vol. 6, No. 3, March, 2020

Integration the Low Cost Camera Images with the Google Earth Dataset to Create a 3D Model

Marwa Mohammed Bori [a], Zahraa Ezzulddin Hussein [a*]

[a] *Department of Survey Engineering, University of Baghdad 10071, Baghdad, Iraq.*

Received 26 October 2019; Accepted 21 January 2020

Abstract

As known Close range photogrammetry represents one of the most techniques to create precise 3D model. Metric camera, digital camera, and Laser scanning can be exploited for the photogrammetry with variety level of cost that may be high. In this study, the cost level is taken in to consideration to achieve balance between the cost and the obtained accuracy. This study aims to detect potential of low cost tools for creating 3D model in terms of obtained accuracy and details and comparing it with corresponding studies. Smart phone camera is the most available for everyone; this gave the motivation for use in this study. In addition, Google Earth was used to integrate the 3D model produced from all sides including the roof. Then, two different types of the mobile camera were used in addition to the DSLR camera (Digital Single Lens Reflex) for comparison and analysis purposes. Thus, this research gave flexibility in work and low cost resulting from replacement the metric camera with the smart camera and the unmanned aerial vehicle (UAV) with Google Earth data. Mechanism of the work can be summarized in four steps. Firstly, photogrammetry planning to determine suitable baselines from object and location of targets that measured using GPS and Total station devices. Secondly, collect images using close range photogrammetry technique. Thirdly, processing step to create the 3D model and integrated with Google Earth images using the Agi Photoscan software. Finally, Comparative and evaluation stage to derive the accuracy and quality of the model obtained from this study using statistical analysis method. Regarding this Study, University of Baghdad, central library was selected as the case study. The results of this paper show that the low cost 3D model resulted from integrating phone and Google Earth images gave suitable result with mean accuracy level reached to about less than 5 meters compared with DSLR camera result, this may be used for several applications such as culture heritage and architecture documentation.

Keywords: 3D Model; DSLR Camera; Smart Phone; UAV; Agi PhotoScan.

1. Introduction

Close range photogrammetry represents one of the most accurate and low cost technique used for 3D documentation. In photogrammetry, there are many techniques that deal with images to get 2D information used one image also use two images or more to obtain 3D model. It could not get the 3D information from the video or still camera directly without the software to process the image and create model of the area captured. The camera has possibility to get 2D information with high quality images [1]. The incensement possibility of the modern phone in technique drove the collect these phones in group called "smart phone", this led to the question if this group capable to use it as a low cost camera in photogrammetry [2]. There is several purpose of the 3D information, the first one is to show the design in 3D space that can assessment of the surface also determine the cost, value, area and test the feasibility of the building. Many years age photogrammetry extraction measurement with high accuracy by dealing

* Corresponding author: zahraa_azeldeen@coeng.uobaghdad.edu.iq

http://dx.doi.org/10.28991/cej-2020-03091482