

Volumetric change calculation for a rock quarry using UAV photogrammetry

ABSTRACT

Nowadays, the volume calculation of rock quarry is incorrect and a slow process because it is manually conducted. To improve this performance, the use of Unmanned Aerial Vehicles (UAV) Photogrammetry shall be applied to obtain exact area mapping, volume data of rock quarry for active, non-active area and 6 total stockpiles and to verify soil profile of quarry area. The area which conducts rock excavation is known as active area whereas a non-active will be explore in the following 2 years. Meanwhile, the total 6 stockpile is the 6 different quarry rocks. The UAV is a type of photogrammetry that allow for the effective monitoring or mapping of large areas of land and existing infrastructure within a very short time compared to conventional techniques. The best of UAV is it can take the whole image of quarry area. Given that the main idea of the research presented here is to develop new applications to calculate the volume of rock quarry area. In this study, there are three main stages that need to be accomplished to get the data. The first stage is flying the UAV and capturing image at the quarry, followed by image processing and transform it into a 3D map and final stage is to calculate the volume and the determining the soil profile and contour of the quarry. To classify the materials, a DJI Phantom 4 Pro was used to fly over a quarry area in Min Fong Quarry Sdn. Bhd. This image can be transfer to pix4DMapper and Global Mapper software to produce a mapping area of quarry. Then, the calculation of the volume of rock quarry was conducted and obtain the soil profile of that study area. This observation took 2 months periodically to oversee the volumetric change in the rock quarry. The result of analysis showed that, there were differences and decreasing in the volume of rock quarry for each month.