Research of Algorithms for Generating Point Clouds with Various Software Tools on the Example of the Monument to Bohdan Khmelnytsky

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SUMMARY

The most common methods of collecting geospatial data today are photogrammetric methods - laser scanning, leader, UAV - the result of which is a cloud of points as a source type of data for further processing, analysis and modeling. Obviously, the quality of the source cloud determines the quality of the reproduced surface of the object and depends on factors such as sensor accuracy, object complexity, shooting conditions, operator level, etc. Methods of generating point clouds based on executive surveys are implemented in various software tools, in particular, the algorithms for processing survey data SfM AgiSoft PhotoScan, RealityCapture, Pix4D, 3DF Zephyr are considered. The analysis of the effectiveness of the implemented tools was performed on the basis of a comparative analysis of the obtained point clouds from one set of UAV images of the historical monument to Bohdan Khmelnytsky in Kyiv, Ukraine. A 3D model of the monument, based on ground-based laser scanning with an accuracy of 5 mm, was used as a reference. The results of the study will ensure the effectiveness of the choice of tools for generating point clouds in the high-precision reconstruction of objects with complex shapes, such as historical and cultural monuments.