Application of AI Tools to the Inventory of Technical and Transportation Infrastructure Based on UAV Data

Paulina Zachar, Wojciech Ostrowski, Konrad Sosnowicz, Radosław Palak and Krzysztof Bakuła (Poland)

Key words: Geoinformation/GI; Photogrammetry; Artificial Intelligence; Machine Learning; CNN; UAV; Object Detection

SUMMARY

The dynamic development of artificial intelligence (AI) technologies, including deep machine learning methods, has contributed to the fact that these solutions have been widely applied in the field of photogrammetry and remote sensing. Recent years have also been marked by the development of techniques for acquiring spatial data from unmanned aerial vehicles (UAVs). The photogrammetric data obtained in this way can be processed and applied in the process of inventory and modelling of technical and transport infrastructure objects with the use of deep machine learning algorithms.

The development and research work in this project which is carried out in cooperation with SkySnap company is aimed at elaboration and deploying in the production process innovative services that allow managing an investment at every stage of its functioning. The project develops a methodology based on machine learning (precisely convolutional neural networks) using photogrammetric products in the recognition of corridor objects in the field of transport and energy (i.a. traction masts, streetlamps, sleepers).

In this study, a methodology was developed to acquire photogrammetric data from a drone (including images and point clouds) closely related to the input data requirements for neural networks. The process of preparing datasets for training neural network models was automated. Tools were created to use data from completed projects. This approach proved to be optimal in terms of efficiency and processing speed.

First experiments were related to detection of rail sleepers on orthophotomap, for which accuracy of trained network was over 90%. The research is still being developed with more objects of interest and other approaches.

Application of AI Tools to the Inventory of Technical and Transportation Infrastructure Based on UAV Data (11691)
Paulina Zachar, Wojciech Ostrowski, Konrad Sosnowicz, Radosław Palak and Krzysztof Bakuła (Poland)

FIG Congress 2022
Volunteering for the future - Geospatial excellence for a better living
Warsaw, Poland, 11–15 September 2022