

# Application of Artificial Intelligence in Road Infrastructure Management

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## SUMMARY

In order to better manage the environment, built objects and their possible deformations, the collection of three-dimensional spatial data is becoming increasingly important. In the last few years, the method of mobile laser scanning has become one of the most important methods of collecting spatial data on the surface of the terrain, as well as structures and objects on it. The data collected in this way contains a wealth of information on buildings, vegetation, streets and other urban infrastructure facilities in digital format. Mobile laser scanning systems, in addition to the laser device, often have high-resolution cameras. The result of data collection is a three-dimensional point cloud, which represents laser reflections from elements in space, as well as photographs, which have proven to be extremely useful in coloring point cloud, detecting road defects, extracting spatial entities, creating different maps and much more. It is important to emphasize here that the higher the quality of the cameras integrated into the system, the wider is the range of possibilities that photos provide.

Nowadays, there is a growing emphasis on automatic detection of objects of interest from the mentioned images. That is due to demand for automatic vehicle identification needed to control traffic, state borders, calculate payment for parking, search for stolen cars or unpaid fees, as well as for reliable identification under different lighting conditions. In addition, these methods prove to be very useful in automating the process of creating maps, ie. inventory of road infrastructure. The last decade has been characterized by an expansion of the field of artificial intelligence and machine learning. Deep learning approaches using objects detected by convolutional neural networks have significantly improved the accuracy of detection compared to traditional methods.

This paper provides an overview of existing methods for detecting road infrastructure facilities, from data obtained by mobile laser scanning. The emphasis is on recognizing objects from images,

their classification and localization. At the end of the paper are given discussion and concluding remarks that could serve future development.

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