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## **Application of deep learning computer vision models in security and surveillance**

This lecture presents various computer vision tasks and the application of deep learning models in the field of security and surveillance. On the example of images taken by drone during search and rescue operations and thermal images of the protected area, models for image classification, object detection and tracking, and activity recognition are analyzed. Those models were developed to help human crews search the area more easily and quickly and find a lost person or detect a person who found himself in an area without authorization.

The lecture will also provide basic information about neural networks and convolutional deep neural networks and present several experiments from the data collection and preparation phase together with the basic principles of transfer learning, to the selection of appropriate state-of-the-art deep neural network models, which are further trained and fine-tuned for task of interest, up to the evaluation and explanation of the results. Computer vision models are based on images that are used to train the model, and in the case of drone images, they are images taken from a different perspective than standard sets of images, and the objects of interest are tiny, and in the case of IR images, they have completely different characteristics, so this should be considered when training the model.

In the conclusion, open questions and challenges in the application of deep learning methods in the field of surveillance and security will be discussed.