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Agricultural Land Monitoring and Crop Identification Using Remote Sensing Data and Deep Learning Neural Network

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Monitoring agricultural land and the crops grown on it can significantly improve the accuracy and objectivity of information on the use of agricultural land. The paper proposes an approach that can be used to build a system for such monitoring of the state of a certain territory. Within the framework of this approach, satellite images of a given territory are processed. First, medium-resolution multispectral satellite images are requested for the spring and summer periods. The obtained images are processed and maps of the distribution of vegetation indices NDVI, SAVI, EVI and MSAVI are formed. These maps are then clustered to detect areas of vegetation. For the identified areas, higher resolution satellite images are additionally obtained, which serve as input for the deep neural network. This neural network is pre-trained to identify crops from known satellite datasets. The results of the neural network are maps of the distribution of crops grown on the territory, which are stored in a database for further analysis. During the monitoring process, satellite images are requested at regular intervals, which allows tracking the dynamics of the development of these crops from sowing to harvesting. The proposed approach allows for fairly accurate segmentation of agricultural lands and types of crops grown on them and monitoring of their changes in the monitored area.

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