Earth observation for sustainable development and security: Materials of

reports of the 6th Ukrainian Conference GEO-UA (2018, Kyiv) - P. 45-46

National Ukrainian cloud-based service for automatic crop classification within GEOESSENTIAL project

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Crop classification is one of the most important tasks for many remote sensing applications. Nowadays many countries are moving to operational agricultural monitoring that requires early season crop classification and mapping as well as assessment of crop state and conditions. The classification results are an important source of information both for monitoring of agricultural crops and for monitoring the state of the environment. During the EPA-Planet project, this information is used to calculate essential variables for the state of the Land, Water and Energy resources, as well as for the calculation of SDG's indicators for goals: "2:Zero Hunger", "11:Sustainable Cities and Communities" and "15:Life on Land". Using freely available optical and SAR data from Sentinel-1 and Sentinel-2 as well as Landsat-8 are very helpful for solving this task, because they allow using dense time series as input information for classification with different machine learning algorithms [1], improving the accuracy of prediction. This technology leads us to the next problem - Big Data problem, especially for countries with large territories which should be solved with high performance computational techniques [2]. We developed cloud-based national service for automatic satellite image processing and classification “CropZoom”, which makes it possible to obtain crop classification map for the whole territory of Ukraine and is applicable for the purpose GEOESSENTIAL project in ERA-PLANET. Our solution solves Big Data problems by implementation of satellite data processing and classification algorithms in cloud environment of Amazon Web Services. The main advantages of such implementation are as follows: (i) fast access to the data, which are stored in the same cloud storage and avoiding data downloading stage; (ii) scalability of the classification process, which gives us the opportunity to parallel the processing and classification of images to the required number of installations. With this approach, several classification algorithms are applied, as our own Deep Learning Neural Network classifier [3] and open source Sen2Agri system [4] and use the system for crop classification in Ukraine within World Bank project and other countries of Eurasia for decision making support.

References

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