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A Review of Modern Methods for Automated Interpretation of Optical Satellite Imagery for Assessing Sparse Taiga and Sub-Tundra Forests in the European part of Russia: Current Status and Prospects

Yaroslav A. Avakov

Abstract. *A concise review is presented of the current state and prospects for applying automated methods to interpret optical satellite imagery for deriving forest stand attributes under specific natural conditions — namely the sparsely stocked taiga and forest-tundra zones of European Russia. The paper addresses limitations arising from the shortage of reference data. Classical algorithms, ensemble models, and neural network architectures (including U-Net) are examined. Particular attention is given to regulatory aspects, integration with supplementary data sources (LiDAR, SAR, etc.), quality assessment, and the treatment of uncertainty in the results. The review not only catalogs algorithms and platforms but also demonstrates their practical application with regard to regional conditions. The proposed approaches are suitable for implementation in state monitoring and forest management systems.*

Key words: *automated interpretation, optical satellite imagery, sparse taiga, sub-tundra forests, machine learning, neural networks, LiDAR, radar, UAV, Sentinel-2, hyperspectral data, forest inventory, monitoring.*

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All-Russian Research Institute of Silviculture and Mechanization of Forestry, Engineer of the 1st Category of the Department of Forestry and Forest Management (Pushkino, Moscow region, Russian Federation), leniyavr@gmail.com