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# RANDOM FORESTS BASED MULTIPLE CLASSIFIER SYSTEM FOR POWER-LINE SCENE CLASSIFICATION

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Abstract. The increasing use of electrical energy has yielded more necessities of electric utilities including transmission lines and electric pylons which require a real-time risk monitoring to prevent massive economical damages. Recently, Airborne Laser Scanning (ALS) has become one of primary data acquisition tool for corridor mapping due to its ability of direct 3D measurements. In particular, for power-line risk management, a rapid and accurate classification of power-line objects is an extremely important task. We propose a 3D classification method combining results obtained from multiple classifier trained with different features. As a base classifier, we employ Random Forests (RF) which is a composite descriptors consisting of a number of decision trees populated through learning with bootstrapping samples. Two different sets of features are investigated that are extracted in a point domain and a feature (i.e., line & polygon) domain. RANSAC and Minimum Description Length (MDL) are applied to create lines and a polygon in each volumetric pixel (voxel) for the line & polygon features. Two RFs are trained from the two groups of features uncorrelated by Principle Component Analysis (PCA), which results are combined for final classification. The experiment with two real datasets demonstrates that the proposed classification method shows 10% improvements in classification accuracy compared to a single classifier.

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