A new geocomputational algorithms for forest classification and mapping using satellite remote sensing data

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ABSTRACT

A new multivariate methodology for forest classification, inventory and mapping using satellite remote sensing data has been developed, applied and evaluated in Ireland. This methodology includes three adaptations to the Bayesian classification rule and linear discriminant analysis classifier. These adaptations are (1) that mean spectral reflectance vectors from unknown forest cover types, $\overline{Y}_i$, are classified (2) that a statistically significance reference mean vectors, $\overline{Y}_i$, are identified and (3) that a threshold probability of group membership, $P(H_k \mid \overline{Y}_i)$, be defined. The equivalence of this new methodology for classification of unknown mean spectral reflectance vectors, $\overline{Y}_i$, has been demonstrated. The mean vectors, $\overline{Y}_i$, arise after reducing the dimensionally of the original p-dimensional feature space by transformation of the "s" statistically significant eigenvector coefficients matrix, *V*, to s-dimensional feature space. Three forest species Sitka spruce (SS), Lodgepole pine (LP) and Japaness larch (JL) were discernment and classified with new multivariate methodology. The overall classification result was that 93.62% of the area of SS; 90.97% of the area of LP and 98.16% for the area or JL have probability of group membership above 0.95. Satellite remote sensing data remain a potentially important source of supplementary data in forest mapping and inventory. The classification results arising from application of the new multivariate methodology are satisfactory.

KEY WORDS: inventory, multivariate, new methodology, satellite data