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Using artificial neural networks to map the spatial distribution of understorey bamboo from remote sensing data

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Abstract. Understorey vegetation is a critical component of biodiversity and an essential habitat component for many wildlife species. However, compared to overstorey, information about understorey vegetation distribution is scant, available mainly over small areas or through imprecise large area maps from tedious and time-consuming field surveys. A practical approach to classifying understorey vegetation from remote sensing data is needed for more accurate habitat analyses and biodiversity estimates. As a case study, we mapped the spatial distribution of understorey bamboo in Wolong Nature Reserve (south-western China) using remote sensing data from a leaf-on or growing season. Training on a limited set of ground data and using widely available Landsat TM data as input, a nonlinear artificial neural network achieved a classification accuracy of 80% despite the presence of co-occurring mid-storey and understorey vegetation. These results suggest that the influences of understorey vegetation on remote sensing data are available to practical approaches to classifying understorey vegetation. The success here to map bamboo distribution has important implications for giant panda conservation and provides a good foundation for developing methods to map the spatial distributions of other understorey plant species.