

基于特征波段的SPOT-5卫星影像耕地信息自动提取的方法研究

Decision tree algorithm of automatically extracting farmland information from SPOT-5 images based on characteristic bands

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中文摘要:

首先分析了SPOT-5卫星影像中植被和其它主要背景地物的光谱特征,发现利用原有波段难以提取复杂的植被信息,同时植被信息中的耕地(水田和旱地)和园地所有波段上都有重叠很难区分。因此考虑到植被信息的复杂性和波段信息的不足以及研究区内地势平坦,该文提出了利用植被特征波段:加和比值植被指数(PRVI)和归一化植被指数(NDVI)作为新的波段融入原始影像中,在增加有效信息量的同时运用简单决策树模型提取耕地信息,并参照最新的航测数据进行了精度评价。结果表明,该方法的总体提取效果较好,能够在快速、准确提取植被信息的基础上,进一步区分旱地和水田,并且去除容易混淆的园地。与常规的监督分类方法相比都有很大的提高,只是在耕地和园地交界处有误判现象。

英文摘要:

Farmland protection is crucial for China's sustainable development. Extraction of farmland information from remotely sensed images is significant for surveying, planning and protecting farmland, especially for basic farmland. In this paper, taking Tongxiang county as a case study area, SPOT-5 images collected on August, 2002 were used. The approach to extraction was discussed. First, the spectral characteristics of farmland and other five land-use types in this area were analyzed to find the possibility of extracting farmland from the background. The results show it is difficult to distinguish farmland information from background on the SPOT-5 images because of complexity of spectrum and lack of band information. Second, taking those into account, characteristic bands for farmland extraction were proposed and merged into SPOT-5 images in order to increase spectral information and, at the same time, improve the separability. Third, a simple model of decision tree was applied to extract farmland information. Finally, the results were checked by visual and statistical accuracy assessment. The results suggest that the model based on characteristic bands is simple and effective, and the accuracy by the model is much higher than that by the supervised classification method. However, some pixels in the neighborhood area between farmland and mulberry were misjudged. The landscape type (other farmland) was mostly isolated and influenced by human activities to a high extent.

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