

利用哨兵卫星数据进行农作物分类研究

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摘要: 近年来,随着精准农业的不断发展,农作物的精细分类是实现精准农业的重要途径。利用仅包含可见光与近红外波谱的中高分辨率的遥感影像进行农作物信息提取的识别精度有限,很难实现作物的精准识别。为提高农耕地作物信息提取的分类精度,本文以山西省太原盆地为研究区,利用高空间分辨率的 Sentinel-2 多光谱数据,结合 DEM 数字高程模型,构建光谱特征、纹理特征、遥感指数特征和地形特征四类特征变量,并对以上特征变量进行特征重要性排序,筛选最优特征。结合作物的物候信息,组合基于光谱特征、基于光谱特征+遥感指数特征、基于光谱特征+纹理特征、基于光谱特征+地形特征、基于光谱特征+遥感指数特征+纹理特征、基于光谱特征+遥感指数特征+地形特征等多种特征方案。采用随机森林算法对研究区典型农作物进行精细提取,并对比验证不同特征方案的农作物分类精度。探讨不同特征组合对农作物分类精度的影响,为精准快速地提取农作物信息提供理论基础与技术支持。对研究区农耕地变化进行分析,为耕地后备资源的开发与利用以及乡村振兴提供科学依据。

关键词: 作物分类、哨兵、特征选择、龙计划

Study on Crop Classification Using Sentinel-2 Satellite Data

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Abstract: In recent years, with the continuous development of precision agriculture, fine classification of crops is an important way to achieve precision agriculture. The identification accuracy of crop information extraction using mid-to-high resolution remote sensing images that only contain visible light and near-infrared spectra is limited, and it is difficult to achieve accurate identification of crops. In order to improve the classification accuracy of crop information extraction in farming areas, this paper takes the Taiyuan Basin in Shanxi Province as the research area, uses high spatial resolution Sentinel-2 multispectral image data, combined with digital elevation model (DEM) data to construct four types of feature variables: spectral features, texture features, remote sensing index features, and terrain features, and ranks the importance of features for the above feature variables to filter the optimal features. Combining the phenological information of crops, a variety of feature schemes are combined, which are based on spectral features, based on spectral features + remote sensing index features, based on spectral features + texture features, based on spectral features + terrain features, based on spectral features + remote sensing index features + texture features, based on spectral features + remote sensing index features + terrain features, based on spectral features + remote sensing index features + texture features + terrain features. The random forest algorithm is used to finely extract the typical crops in the study area, and the classification accuracy of different feature schemes is compared and verified. Discuss the influence of different feature combinations on the classification accuracy of crops, and provide theoretical basis and technical support for accurate and fast extraction of crop information. Analyze the changes of arable land in the study area to provide a scientific basis for the development and utilization of reserve resources of arable land and rural revitalization.

Keywords: Crop Classification; Sentinel; Feature Selection; Dragon Programme