

Title: "Integrating Coupled Dictionary Learning and Distance Preserved Probability Distribution Adaptation for Multispectral–Hyperspectral Image Collaborative Classification"

Abstract:

With the development of observation technology in remote sensing (RS), large-area multispectral (MS) images can be easily obtained. However, due to the limitation of imaging devices, only a limited range of hyperspectral (HS) images with higher spectral resolution can be obtained. This article mainly focuses on how to use limited HS images to improve the classification performance of MS images. In order to solve this problem, this article proposes an MS–HS image collaborative classification method, which integrates coupled dictionary learning and distance preserved probability distribution. First, image reconstruction based on coupled dictionary learning is performed, in which sparse representation and dictionary learning are used to generate HS images from MS images through spectral superresolution, so that the spectral features of the MS data and HS data are converted to the same feature space for feature space alignment. Second, the probability distribution is adapted, in which the marginal and conditional probabilities are adapted to further narrow the difference between the real HS data and the generated HS data. At the same time, the consistency of the data structure of the source domain before and after the mapping is maintained, so that the same class of data is more compact after the mapping and reduces the spacing within the same class. Compared with the state-of-the-art methods, this article conducts the experiments on three MS–HS RS datasets, which demonstrate the superiority of the proposed method.

Keywords:

Classification, hyperspectral (HS) image, multispectral (MS) image, probability distribution adaptation, remote sensing (RS), etc.

Reference:

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