

INVERSION OF OBJECT SPECTRUM CHARACTERISTICS BASED ON FUSION OF MULTISPECTRUM AND MULTIREOLUTION REMOTE SENSING IMAGES

Qiuwen ZHANG

Associate Professor, Institute of Remote Sensing and Spatial Information Science
HuaZhong University of Science and Technology
1037 Luoyu Road, Wuhan City 430074, P. R. China

Tel: (86)-27-8754-4644 Fax: (86)-27-8754-3992 E-mail: qwzhang_hust@163.com

Visiting Associate Professor, Center for Spatial Information Science, University of Tokyo
4-6-1 Komaba, Meguro-ku, Tokyo 153-8505, Japan

Tel: (81)-3-5452-6417 Fax: (81)-3-5452-6414 E-mail: qwzhang@iis.u-tokyo.ac.jp

Ryosuke SHIBASAKI

Professor, Center for Spatial Information Science, University of Tokyo
4-6-1 Komaba, Meguro-ku, Tokyo 153-8505, Japan

Tel: (81)-3-5452-6412 Fax: (81)-3-5452-6414 E-mail: shiba@skl.iis.u-tokyo.ac.jp

Cheng WANG

Professor, College of Hydropower and Information Engineering
HuaZhong University of Science and Technology
1037 Luoyu Road, Wuhan City 430074, P. R. China

Tel: (86)-27-8754-2319 Fax: (86)-27-8754-3992 E-mail: wangch@mail.hust.edu.cn

KEY WORDS: Image Fusion, Inversion, Spectrum Characteristic, Multispectrum and Multiresolution, Remote Sensing, Normalized Square Deviation(NSD)

ABSTRACT: The spectrum characteristics are theoretically essential to recognize object and identify feature information. They are usually acquired through theoretic computation or practical observation. However, the theoretic computation is a kind of running forward method which is based on the electromagnetism theory and its computation model is always complex, and the practical survey of spectrum data is not easy to be carried out because of its costs of time and expense. According to the advantages of both multispectrum and multiresolution remote sensing images, this paper proposes an inverse method to acquire the object spectrum characteristics based on the fusion of them. EOS/MODIS data is selected to be the multispectrum image because it not only has moderate spatial resolution, but also has up to 36 channels in the wavelength range of 0.4~14.4 μ m. The used multiresolution image is LandSat TM data whose spatial resolution is 30m. A new method for image fusion based on normalized square deviation(NSD) is developed to fuse these two types of remote sensing images, which improves the spatial resolution of EOS/MODIS images. So it is possible to recognize some typical objects such as large lake and forest from all the 36 channels of EOS/MODIS images. The spectrum data including the reflectivity and radiance of the lake water and forest on each channel of EOS/MODIS image which is corresponding to its wavelength are obtained respectively, and finally, their spectrum characteristics from 0.4 μ m to 14.4 μ m are acquired. It shows that the inversion method based on the fusion of multispectrum and multiresolution remote sensing images is an effective way to acquire object spectrum characteristics.