SAR STEREO-MAPPING BASED ON DEM

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ABSTRACT:

In the western region of China, Synthetic Aperture Radar images have been used in extraction of topographic maps. Stereo mapping with stereoscopic image pair is very useful for extraction of feature elements (roads, buildings and other surface features) from SAR image. The basis of stereo-mapping is stereoscopic image pair, of which the vertical parallax must be removed, and the horizontal parallax reserved. This paper presents a method of generating SAR stereoscopic image pair based on Digital Elevation Model, which is used in stereo-mapping. First of all, orientation of SAR image must be completed; then according to DEM, stereoscopic image can be generated through image re-sampling along the range direction from original image. The vertical parallax will be removed, when re-sampling, and the horizontal parallax will be reconstructed with central projection or slant-range projection. There are two ways to generate stereoscopic images from single original image or two different original images. The two images generated from single original image are called mono-source pair. The two images generated from the two different images are called dual-source pair. Experiment is done in this paper with high-resolution space-borne SAR images. Mono-source and dual-source stereoscopic image pairs are generated with central and slant-range projection, and feature elements of topographic map are extracted with the image pairs in the experiment. It proves that the method above is feasible.

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