Abstract

The angular Instantaneous Field Of View (IFOV) of rotating mirror is constant in flying spot scanners and as a result the more area is viewed by mirror with going out of nadir condition and it will cause gradually compression of the effective pixel size at the extremities of scan line. This error is known as panoramic error that is so more sensible in sensors which have high angular Field Of View (FOV). Moderate Resolution Imaging Spectroradiometer (MODIS) sensor with high FOV (110°) has been complicated by the so-called bow-tie effect. The source of error is panoramic distortion that is exacerbated by Earth curvature. This effect causes an overlap of the satellite scan lines producing a data repetition. Bow-tie prevents reaching both real shape and area of objects especially those that are far from the nadir and can be considered as a great systematic error especially for snow maps, dust and cloud researches.

Due to lack of heeding utilization geometric source and mathematical transformations of panoramic distortion, former proposed algorithms for correction of bow-tie phenomenon were unnecessarily complicated. In this paper, a rigorous model is proposed in order to remove MODIS bowtie effect. The model is based on geometry projection of panoramic error with Earth curvature. The proposed method requires no ephemeris information and is established from the parameters of MODIS platform. The validity of the algorithm is verified by a scene including Urmia Lake in Iran. The results retrieved by the method demonstrated high both speed and
Removing Bowtie Phenomenon by Correction of Panoramic Effect in MODIS Imagery

accuracy.

References

- MODIS data, Available from: http://ladsweb.nascom.nasa.gov/data/search.html

Index Terms

Computer Science

Applied Sciences
Keywords
Bowtie effect  MODIS  panoramic error