

ANALYSIS OF SPATIAL INTERPOLATION TECHNIQUES FOR DEM GENERATION USING IRS-1C DATA

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ABSTRACT

Spatial interpolation is the estimation the value of properties at unsampled sites within the area covered by existing observations. In all the different techniques of DEM (digital elevation model) generation; accuracy of generated DEM is dependent also on spatial interpolation techniques. In this research work, the study and analysis of DEM interpolation techniques are conducted.

The middle resolution satellite that has capability in acquisition of stereo images through across the track is IRS-1C. In this project, point heights were generated from IRS-1C PAN stereo data and from geodetic single frequency GPS in differential mode. Different interpolation techniques were applied on these data sets with different combination within these data sets. The interpolation techniques were applied in this research are: IDW, global polynomial, local polynomial, RBF, ordinary kriging, simple kriging, universal kriging, disjunctive kriging, ordinary cokriging, simple cokriging, universal cokriging, disjunctive cokriging. The accuracy of generated DEMs through different interpolation techniques were evaluated with ground point data collected from geodetic single frequency GPS in differential mode. Based on interpolation methods that have been used in this work, kriging interpolation techniques gave less error than other interpolation techniques. The range error of IRS-1C DEMs are between 26.28 m to 40.17 m. Interpolation method with the least error is universal kriging and interpolation method with the highest error is global polynomial. This work shows level of confidence which interpolation techniques can generate better-interpolated continuous surface.

Keywords: spatial interpolation, point heights, DEM Generation