
Interval and Placement Effects on Topographic Data: Using Viewshed Analysis as An Example

David W. S. Wong

Geography & Earth Science, George Mason University
Fairfax, VA 22030, USA

Abstract

This paper explores the sensitivity of analytical results using contours as the topographic data. In visualizing the topography of a landscape using contours, the two parameters under investigation are the size of the contour interval and the base contour chosen. Different contour intervals will generate different descriptions of the landscape. This is labeled as the interval effect. Choosing different base contours to compile the contour database can produce different landscape characteristics. This is called the placement effect. Using viewshed analysis in GIS as an application example, this paper assesses the interval effect and placement effect systematically based upon two study areas in northern Virginia, US. Contour data of 5-foot interval were resampled to derive data of different intervals and of different base contours. In general, larger contour intervals overestimate visible areas but visible locations are not consistently visible with increasing intervals. Results from using different base contours do not exhibit identifiable patterns, but the placement effect can truncate the edge of the landscape by excluding low lying areas. Finally, a probability viewshed approach is suggested to handle the two effects in analyzing contour data. This paper demonstrates that expert and novice users alike using contour data for topographical analysis have to realize that the result is only one of many possible outcomes and this issue is independent of GIS software adopted.
