

ABSTRACT

This Thesis presents a topographic surface generalization method for the surfaces represented as a regular rectangular grid. The proposition is based on Shannon's Mathematical Theory of Communication - MTC. The application of this theory requires the identification of a data source as well as the expression of a similarity concept to be used on that data. The grid data is considered as vertical terrain sections parallel to the X and Y axes. For the purpose of the MTC these vertical terrain sections are considered to be events and thus can have probability values associated. These events are evaluated by a similarity function. In the case of presence of similarity among a pair of vertical terrain sections the communication process can be affected. The similarity value a pair of vertical terrain sections can assume is defined in $[0,1]$ interval. The presence of similarities among events implies in equivocation, that is, it can result in misunderstanding of received information. An increment in the occurrence of similarities results in increment to the equivocation value. Equivocation implies in reduction of useful information the system can transmit. In terms of topographic surface representation, the similarity function acts on the vertical terrain sections. When the difference between two altitudes of two parallel vertical terrain sections is lower than a tolerance value then these points can contribute to the similarity value of that pair of sections. The existence of similar pairs of vertical terrain sections allows to suppose that one of them can be discarded for the purpose of surface representation. The detection of similarities can be applied iteratively and the similar sections can be excluded from the data set. The result is a rectangular irregular grid data set that contains the points needed to represent the surface taking in account the criteria expressed by the similarity function. Different surfaces and different grid orientation are tested. The mean slope of the rectangular regular grid has relation to the tolerance value for similarity function. The tests showed that the iterative removing section process can be used as cartographic generalization process for rectangular regular grids.