

Computer Modelling of Landscape Aesthetic Values and Visual Preferences

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Landscape evaluation

The essence of the planning process for terrains that possess outstanding aesthetic values lies in the balance between preservation and disclosure. This task is more and more difficult, because of two reasons. Firstly, the number of users and their possibilities of space exploration are increasing. Secondly, the natural resources diminish that entails predominance of the demand over the supply [1]. The precise determination of the most valuable fragments of the area is the crucial step in their conservation [2]

In order to analyse the particular landscape assets a wide range of techniques can be applied, starting with questionnaires for the lay people and ending with expert appraisements [3]. Among the second type the “qualified judges method” seems to be the most objective. In our research this approach appeared useful for the evaluation, aimed at distinguishing of factors that have positive and negative effects on the landscape perception. The first group comprises: unusualness, sublimity, persistence, abundance of planes/wings, image dynamics, rare species of flora and fauna, diversity of colours and textures, harmony of composition, objects connected with the leisure time or with local tradition and folklore, outstanding monuments and cultural edifices, motifs arousing historical associations, objects that encourage to explore local attractions, folk events and festivals, outstanding technical structures, non-visual sensations welcomed in landscape. As far as aspects lessening the overall impression are concerned, the following issues were important: industrial buildings, energetic infrastructure elements, mining areas, waste dumps,

Kistowski M., Śleszyński P., *Presja turystyczna na tle walorów krajobrazowych Polski*, [w:] *Krajobraz a turystyka*, (Tourist pressure against the background of Polish landscape values [in:] *Landscape and Tourism*) Prace Komisji Krajobrazu Kulturowego PTG, Nr.14, Sosnowiec 2010

Nohl W., *Sustainable landscape use and aesthetic perception – preliminary reflections on future landscape aesthetics*, Landscape and Urban Planning 54/2001

Osikowska W., Przetacznik J., *Percepcja i ocena estetyczna krajobrazu Krakowa*, [w:] *Walory krajobrazowe w miejscowych planach zagospodarowania przestrzennego*, (Perception and aesthetic evaluation of Cracow's landscape, [in:] *Landscape values in masterplans*, red. A. Böhm, Kraków 2008

Smardon R. C., Palmer J. F., Felleman J. P., *Foundations for Visual Project Analysis*, New York 1986

Steinitz C., *Visual evaluation models: some complicating questions regarding memorable scenes*, Landscape and Urban Planning 54/2001

The method bases on the rating formulated by experts, which comprises issues that have the positive and negative effects on the landscape perception. An attempt was made to model the factors and to work out tools that enable to distinguish the places that are the most valuable, regarding visual aspects, in order to protect them.

This approach is useful, with regard to the monitoring of the environment changes in time, when various development scenarios are examined or as an apparatus supporting the process of decision making, in different scales, from the singular edifice to urban and landscape planning.

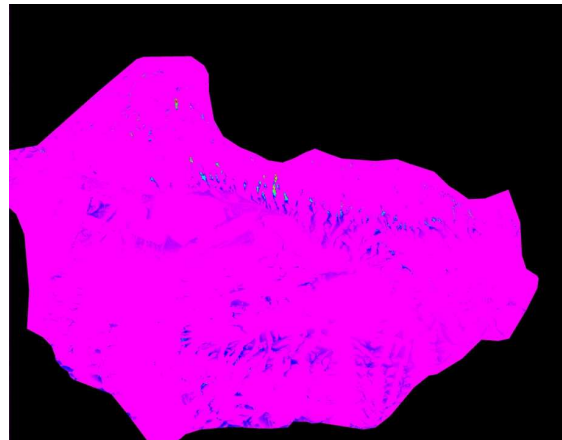
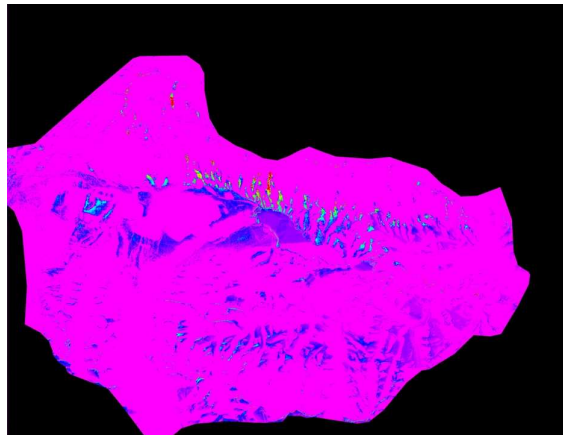
large-scale agricultural objects, dispersed development, primitive forms of engineering structures, big entertainment centres, large-scale advertisements, disharmonious buildings forms, prefabricated elements of landscape architecture, foreign species of flora and fauna, pseudo-historical arrangements out of the natural context, temporary commercial objects, big car parks, motorization in the wildland, seasonal devastations.

The rating mentioned above is subjective, to a certain degree, however, the research method is universal for all the aspects that can be digitally modelled.

Aesthetic values modelling

Three-dimensional terrain model, represented as TIN or DEM [4] constitutes the base for analyses. The attempts have been made to parameterize the elements of the rating and to represent them in visual terms. In some cases it appeared impossible, but in many visibility diagrams were useful. For example, the sublimity is directly proportional to the visibility of the outstanding scenic features (National Parks) and increases with the height of the view point; it is inversely proportional to the visibility of the dispersed development. Moreover, afforested areas should be excluded from calculations. All these variables can be included into the equation, that provide us with the objective outcome. The figure below shows the comparison between two scenarios: when the current state would be preserved, and when the plans of regional development would be realised. The loss of aesthetic values, caused by the rapid growth of built-up areas, is evident.

The method allows to conduct studies of spatial dynamics, for the positive and the negative factors, as well. Changes in time can be monitored and the best scenario for the terrain can be chosen basing on the multi-criterion analysis.



Note 1. Kistowski M., Śleszyński P., *Presja turystyczna na tle walorów krajobrazowych Polski*, [w:] *Krajobraz a turystyka*, (Tourist pressure against the background of Polish

Note 2. Nohl W., *Sustainable landscape use and aesthetic perception – preliminary reflections on future landscape aesthetics*, Landscape and Urban Planning 54/2001

Note 3. Smardon R. C., Palmer J. F., Felleman J. P., *Foundations for Visual Project Analysis*, New York 1986

Note 4. TIN – Triangulated Irregular Network, DEM – Digital Elevation Model

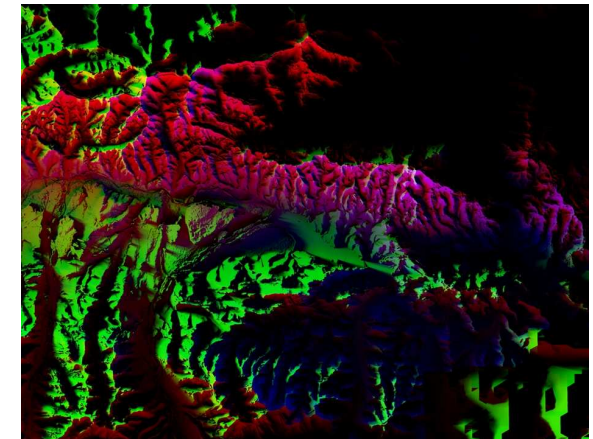


Fig. 1. Visibility diagrams of 3 National Parks in the analysed terrain, composed as colour channel RGB

Fig. 2. The sublimity - a comparison between the current state and the effect of regional planes realisation