

A new land selection method for cultural heritage management: Characterization as an intelligent assessment tool

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Keywords: Land Selection, Cultural Heritage, Intelligent and Assessment Tool, Fuzzy Logic, Principal Component Analysis

Abstract

The land selection has become an important area of endeavor for the archaeologist, but for research and preservation. Unlike many other parts of the archaeological resource, however, cultural heritage belongs to many other disciplines. Interdisciplinary work at land selection encourages critical reviews of ideas or behaviors that have been taken for granted, especially in heritage management. Such reflexing might change how the cultural heritage resource explains and exploited, and it might wider the range of things that are studied by archaeological methods or emphasize the value of studying recent material culture as well as ancient.

Artificial Intelligence is an integrated part of many fields in research. In archaeology, past twenty years archaeologists have discussed the potentials of, in particular, expert systems. A new discipline, known as Environmental Informatics, which combines research fields such as Artificial Intelligence, Geographical Information Systems (GIS), modelling and Simulation, User Interfaces, etc., is emerging. An important and difficult task for this new area is to serve as a catalyst for the integration of data, information, and knowledge from various sources in the environmental sector. Many theoretical and operational

methods have been developed to identify optimal land-use allocation strategies. In general, it is possible to classify these models into single land-use allocation (SLUA) and multiple land-use allocation (MLUA) problems. SLUA models are characterized by their combinatorial nature and consideration of conflicting objectives. The land use methods which are cultural and environmentally appropriate are determined first and foremost by characteristics and location. For instance, land selection in architectural construction domain is considered as an area in land use methods, which involves commonsense knowledge of architects for cultural recognition. This is because land selection criteria are very personal and there is no theory behind how it should be done. Sometimes, there are too many redundancies in the process selection of lands. Further, functional and social parameters describe significant evidence of cultural heritage.

In this paper I present an intelligent and assessment tool in a subfield of architecture domain of land selection to come up with land

classifications as physical, functional and social events. At the initial stage commonsense knowledge in land selection is converted into a questionnaire. Removing dependencies among the questions are modeled using principal component analysis. Classification of the knowledge is processed through fuzzy logic module, which is constructed on the basis of principal components. Further explanations for classified knowledge are derived by expert system technology. The tool was tested in 10 sites, of varying cognitive abilities and diagnoses of cultural heritage. The questionnaire has been constructed with 31 questions and the principal component analyzer detected 9 principal components in filtering process.

According to the historical facts, the Velgam Rajamaha Viharaya, Trincomalee was done by king Devanampiyathissa. Later on some additions and renovations were done by the kings as Bathiya I, Agbo II, Vijayabahu I and Parakramabahu I. The most important point is this temple was that this was worshiped by both Sinhala and Tamil Buddhist. That

is one of the reasons that Velgam Vehera was not destroyed by south Indian Chola invasions in 10th century. This temple was abandoned after Anuradhapura and Polonnaruwa kingdoms, because people migrated to south part of the country. Some renovations happening nowadays and this will be become popular among the devotees coming from the other parts of Sri Lanka. Unfortunately, there is no validated tool to assess its land usage for cultural recognition. This study was designed to address this deficiency. The tool scored for Velgam Viharaya in term of physical, functional and social as 4.04432%, 60.79982% and 35.15585% respectively. This shows significant contribution of functional and social parameters respectively.

This paper outlined how Artificial Intelligence techniques have been applied to solve Environmental Issues and how these have

provided new opportunities for the design and application of Artificial Intelligence tools, namely environmental intelligent Systems. Many of these systems have been specially applied to Environmental Impact Assessment. The key to useful intelligent systems is integration. A basic concept of integration recognizes that in any given software system for real-world applications, several sources of information, more than one problem representation or model, different problem-solving techniques, and, finally, a multifaceted and problem-oriented interface ought to be. The Intelligent land assessment tool is to be a reliable assessment tool for cultural recognition in VelgamViharaya by showing significant contribution of cultural heritage parameters. This gives three-phase knowledge modeling approach for modeling commonsense knowledge in, which enables holistic approach for land selection in archaeological sites.