AN INTELLIGENT SYSTEM FOR LAND SELECTION IN ARCHAEOLOGICAL SITES

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ABSTRACT

Site selection depends on several independent criteria such as physical, functional and social. Thus, in addition to the GIS applications, one of thematic-criteria evaluation (MCE) methods has to be integrated for the achievement of an optimal result through site selection process. These methods can be evaluated as a major tool to assist decision makers, which divide the decision problems into smaller understandable parts, analyze each part separately and then integrate the parts in a logical manner. 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 has emerged, known as Environmental Informatics, which combines research fields such as Artificial Intelligence. Further, functional and social parameters describe significant evidence of cultural heritage in archaeological sites. This paper presents an intelligent land assessment tool in a sub field 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. 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.

Keywords: Land selection, Cultural heritage, intelligent system, Fuzzy logic, Principal component analysis