Home > Journal > Earth & Environmental Sciences > JGIS

Indexing   View Papers   Aims & Scope   Editorial Board   Guideline   Article Processing Charges

OPEN ACCESS

The Assessment and Predicting of Land Use Changes to Urban Area Using Multi-Temporal Satellite Imagery and GIS: A Case Study on Zanjan, IRAN (1984-2011)

Author(s)
Mohsen Ahadnejad Reveshty

ABSTRACT
Due to inappropriate planning and management, accelerated urban growth and tremendous loss in land, especially cropland, have become a great challenge for sustainable urban development [1]. Detection of such changes may help decision makers and planners to understand the factors in land use and land cover changes in order to take effective and useful measures. Remote sensing and GIS techniques may be used as efficient tools to detect and assess land use changes. In recent years, a considerable land use changes have occurred in the greater Zanjan area. In order to understand the type and rate of changes in this area, Landsat TM images captured in 1984 and 2011 have been selected for comparison. First, geometric correction and contrast stretch are applied. In order to detect and evaluate land use changes, image differencing, principal component analyses and Fuzzy ARTMAP classification method are applied. Finally, the results of land cover classification for three different times are compared to reveal land use changes. Then, combined Cellular Automata with Markov Chain analysis is employed to forecast of human impacts on land use change until 2020 in Zanjan area. The results of the present study disclose that about 44 percents of the total area changed their land use, e.g., changing agricultural land, orchard and bare land to settlements, construction of industrial areas and highways. The crop pattern also changes, such as orchard land to agricultural land and vice versa. The mentioned changes have occurred within last 27 years in Zanjan city and its surrounding area.

KEYWORDS
Cellular Automata, Change Detection, Forecast, Fuzzy ARTMAP, Land-Use, Urban Area

Cite this paper
M. Reveshty, "The Assessment and Predicting of Land Use Changes to Urban Area Using Multi-Temporal Satellite Imagery and GIS: A Case Study on Zanjan, IRAN (1984-2011)," *Journal of Geographic Information System*, Vol. 3 No. 4, 2011, pp. 298-305. doi: 10.4236/jgis.2011.34026.

References
[1]   J.-S. Deng, K. Wang, J. Li and Y.-H. Deng, " Urban Land Use Change Detection Using Multisensory Satellite Images," Pedosphere, Vol. 19, No. 1, 2008, pp. 96-103. doi:10.1016/S1002-0160(08) 60088-0

[2]   C. P. Lo, " Land Use Mapping of Hong Kong From Landsat Images: An Evaluation," International Journal of Remote Sensing, Vol. 2, No. 3, 1981, pp. 231-251. doi:10.1080/01431168108948359

[3]   P. A. Burrough, " Principles of Geographic Information System for Land Resource Assessment," Clarendon Press, Oxford, 1986.

[4]   F. Sunar, " An Analysis of Changes in a Multi-Data Set; a Case Study in the Ikitelli Area Istanbul Turkey," International Journal of Remote Sensing, Vol. 19, No. 2, 1998, pp. 225-235. doi:10.1080/014311698216215

[5]   A. Prakash and R. Gupta, " Land Use Mapping and Change Detection in a Coal Mining Area, a Case Study in the Jharia coalfield, India," International Journal of Remote Sensing, Vol. 19, No. 3, 1998,

pp. 391-410. doi:10.1080/014311698216053

[6]   M.   Ahadnejad, " Environmental Land Use Chang Detection and Assessment Using with Multi-Temporal Satellite Imagery," Mapasia, Bangkok, 2002.

[7]   A. Neshat, " Analysis and Evaluation Land Use and Land-Cover Changes Using Remote Sensing Data and Geographic Information Systems in Golestan Province,"   Master' s Thesis, Tarbiat Modaress University, Tehran, 2002.

[8]   T.-H. Tong Hou and M.-D. Pern, " New Shape Classifier by Using Image Projection and a Neural Network,"   International Journal of Pattern Recognition and Artificial Intelligence, Vol. 14, No. 2, 2000, pp. 225-242.

[9]   D.   Muchoney   and   J.   Williamson, " A   Gaussian   Adaptive   Resonance   Theory   Neural   Network Classification Algorithm Applied to Supervised Land Cover Mapping Using Multi Temporal vegetation Index Data,"   IEEE Transactions on Geoscience and Remote Sensing, Vol. 39, No. 9, 2001, pp. 1969-1977. doi:10.1109/36.951087

[10]   J. R. Eastman, " IDRISI Andes Tutorial," Clark Labs, Clark University, Worcester, 2006.