

Home > Journal > Earth & Environmental Sciences > JGIS

[Indexing](#) [View Papers](#) [Aims & Scope](#) [Editorial Board](#) [Guideline](#) [Article Processing Charges](#)

JGIS > Vol.5 No.1, February 2013

**OPEN ACCESS**

## Road and Tunnel Extraction from SPOT Satellite Images Using Neural Networks

PDF (Size: 462KB) PP. 69-74 DOI: 10.4236/jgis.2013.51007

### Author(s)

Nima Ghasemloo, Mohammad Reza Mobasheri, Ahmad Madanchi Zare, Mehran Memar Eftekhari

### ABSTRACT

Road extraction from the satellite images can be used in producing road maps as well as managing and developing geospatial databases. In this work, the extraction of roads from SPOT satellite images using artificial neural network has been studied. Then the location of tunnel is extracted from image using digital elevation information. Also it is tried to enhance the precision of the road extraction method using spectral information as well as texture and morphology. The method was implemented on SPOT satellite images of Tabriz and Miyaneh (Iran). The results of this research indicate that it would be possible to promote the precision of road extraction by using texture and morphology in image classification using neural networks. Finally the location of tunnel was extracted by digital elevation information. Junctions of roads and mountains have high potential in locating the tunnel. For this reason, in this study, the junctions of roads and mountains were also detected and used.

### KEYWORDS

Neural Networks; Road; Classification; Texture

### Cite this paper

N. Ghasemloo, M. Reza Mobasheri, A. Madanchi Zare and M. Memar Eftekhari, "Road and Tunnel Extraction from SPOT Satellite Images Using Neural Networks," *Journal of Geographic Information System*, Vol. 5 No. 1, 2013, pp. 69-74. doi: 10.4236/jgis.2013.51007.

### References

- [1] M. Mokhtarzade, M. J. V. Zoj and H. Ebadi, " Automatic Road Extraction from High Resolution Satellite Image Using Neural Networks, Texture Analysis, Fuzzy clustering and Genetic Algorithms," The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Beijing, 2008.
- [2] K. D. Bulter, " Detection and Characteristics of Subsurface Cavities, Tunnel and Abandoned Mines," Alion Science and Technology Corporation, Vicksburg, 1996.
- [3] J. Mena, " State of the Art on Automatic Road Extraction for GIS Update: A Novel Classification," Pattern Recognition Letters, Vol. 24, No. 16, 2003, pp. 3037-3058. doi:0.1016/S0167-8655(03)00164-8
- [4] O. Williams, " Geotechnical Explorations for Tunnels and Shafts," 1997. <http://140.194.76.129/publications/eng-manuals/index.html>
- [5] W. Harvey " Planning and Site Investigation in tunneling," Premier Business Centers, Belleuve, 1996.
- [6] A. Mohammadzadeh, A. Tavakoli and M. J. V. Zoj, " Road Extraction Based on Fuzzy Logic and Mathematical Morphology from Pan-Sharpned IKONOS Images," The Photogrammetric Record, Vol. 21, No. 113, 2006, pp. 44-60. doi:0.1111/j.1477-9730.2006.00353.x
- [7] M. Mokhtarzade, H. Ebadi and M. J. V. Zoj, " Optimization of Road Detection from High-Resolution Satellite Images Using Texture Parameters in Neural Network Classifiers," Canadian Journal of

[JGIS Subscription](#)

[Most popular papers in JGIS](#)

[About JGIS News](#)

[Frequently Asked Questions](#)

[Recommend to Peers](#)

[Recommend to Library](#)

[Contact Us](#)

Downloads:	135,205
------------	---------

Visits:	287,658
---------	---------

[Sponsors, Associates, and Links >>](#)

- [8] S. Idbraim, D. Mammass, D. Aboutajdine and D. Ducrot, " An Automatic System for Urban Road Extraction from Satellite and Aerial Images," WSEAS Transactions on Signal Processing, Vol. 4, No. 10, 2008, pp. 563-572.
- [9] R. Mangala, " An Effective ANN-Based Classification System for Rural Road Extraction in Atellite Imagery," European Journal of Scientific Research, Vol. 47, No. 4, 2010, pp. 574-585.
- [10] J. Mena and J. A. Malpica, " An Automatic Method for Road Extraction in Rural and Semi-Urban Areas Starting from High Resolution Satellite Imagery," Pattern Recognition Letters, Vol. 26, No. 9, 2005, pp. 1201-1220. doi:0.1016/j.patrec.2004.11.005
- [11] D. S. Xue and D. Yin, " A Study of Tunnel Entries Automatic Recognition from Super Resolution