

International Journal of Remote Sensing >

Volume 25, 2004 - [Issue 15](#)

878 Views | 124 CrossRef citations to date | 3 Altmetric

Original Articles

Supervised image classification by MLP and RBF neural networks with and without an exhaustively defined set of classes

G. M. Foody

Pages 3091-3104 | Received 06 Dec 2000, Accepted 07 Aug 2003, Published online: 03 Jun 2010

 Cite this article <https://doi.org/10.1080/01431160310001648019>

Sample our
Geography
Journals

>> [Sign in here](#) to start your access
to the latest two volumes for 14 days



 Full Article  Figures & data  References  Citations  Metrics

 Reprints & Permissions

[Read this article](#)

[Share](#)

Abstract

The absence of assumptions about the dataset to be classified is one of the major attractions of neural networks for supervised image classification applications. Classification by a neural network does, however, make assumptions about the classes. One key assumption typically made is that the set of classes has been defined exhaustively. If this assumption is unsatisfied, cases of an untrained class will be present and commissioned into the set of trained classes to the detriment of classification accuracy. This was observed in land cover classifications derived with multi-layer perceptron (MLP) and radial basis function (RBF) neural networks in which the presence of an untrained class resulted in a ~12.5% decrease in the accuracy of crop classifications derived from airborne thematic mapper data. However, since the

RBF network partitions feature space locally rather than globally as with the MLP, it was possible to reduce the commission of atypical cases into the set of trained classes through the setting of post-classification thresholds on the RBF network's outputs. As a result it was possible to identify and exclude some cases of untrained classes from a classification with a RBF network which resulted in an increase in classification accuracy.

Acknowledgments

I am grateful for the datasets used that were provided through involvement in the European AgriSAR campaign.

Related Research Data

[Investigating feedforward neural networks with respect to the rejection of spurious patterns](#)

Source: Pattern Recognition Letters

[Neural Networks](#)

Source: Unknown Repository

[Optimization of training data required for neuro-classification](#)

Source: International Journal of Remote Sensing

[Category classification method using a self-organizing neural network](#)

Source: International Journal of Remote Sensing

[Assessing the Accuracy of Remotely Sensed Data](#)

Source: Unknown Repository

[A back-propagation neural network for mineralogical mapping from AVIRIS data](#)

Source: International Journal of Remote Sensing

[Remote Sensing Applications Which may be Addressed by Neural Networks Using Parallel Processing Technology](#)

Information for

- Authors
- R&D professionals
- Editors
- Librarians
- Societies

Opportunities

- Reprints and e-prints
- Advertising solutions
- Accelerated publication
- Corporate access solutions

Keep up to date

Register to receive personalised research and resources by email

 Sign me up



Open access

- Overview
- Open journals
- Open Select
- Dove Medical Press
- F1000Research

Help and information

- Help and contact
- Newsroom
- All journals
- Books