

# IDENTIFICATION OF BEACH FEATURES/PATTERNS THROUGH ARTIFICIAL NEURAL NETWORKS TECHNIQUES USING IKONOS DATA

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## ABSTRACT:

Evaluation of beach hydromorphological behavior and classification of beach hydroforms and hydromorphologies is a complex issue. The main objective of this study is to explore pattern recognition methods to identify coastal features/patterns. One of the best known approaches for pattern recognition is artificial neural networks (Jain et al., 2000). In this study an ANN was applied to an IKONOS-2 image in order to classify the beach features/patterns. Based on the knowledge of the coastal features (Teodoro et al., 2009), five classes were defined. The most common type of ANN used in remote sensing is the MLP which was also chosen for this study. The number of nodes in the input layer was determined by the number of input bands – the four IKONOS bands (reflectance values): blue, green, red and NIR. The output layer consisted of five binary nodes, one for each class: Sea, Suspended-Sediments, Breaking-Zone, Beach-Face and Beach. The ANNs consisted of one hidden layer, with 10 hidden nodes. The dataset was composed by 13775 pixels unequally comprising the five previously mentioned classes. The dataset was randomly divided into training (70% of each class) and validation subsets (30% of each class). Weights connecting the nodes between each layer are initially randomly assigned and adjusted during the learning process in order to minimize the global error. The maximum number of allowed iterations was 300. The ANN that had been trained with the training data was applied to the validation data. The ANN presented a very good performance, demonstrated by the results of the individual class accuracy and overall accuracy (98.5%). The ANN applied in this work have been shown to be useful in the recognition of beach features/patterns.

**TOPIC:** Remote sensing applications

**ALTERNATIVE TOPIC:** Image processing and pattern recognition