[Peponi, A. 2019] Combining Artificial Neural Networks and GIS Fundamentals for Coastal Erosion Prediction Modeling

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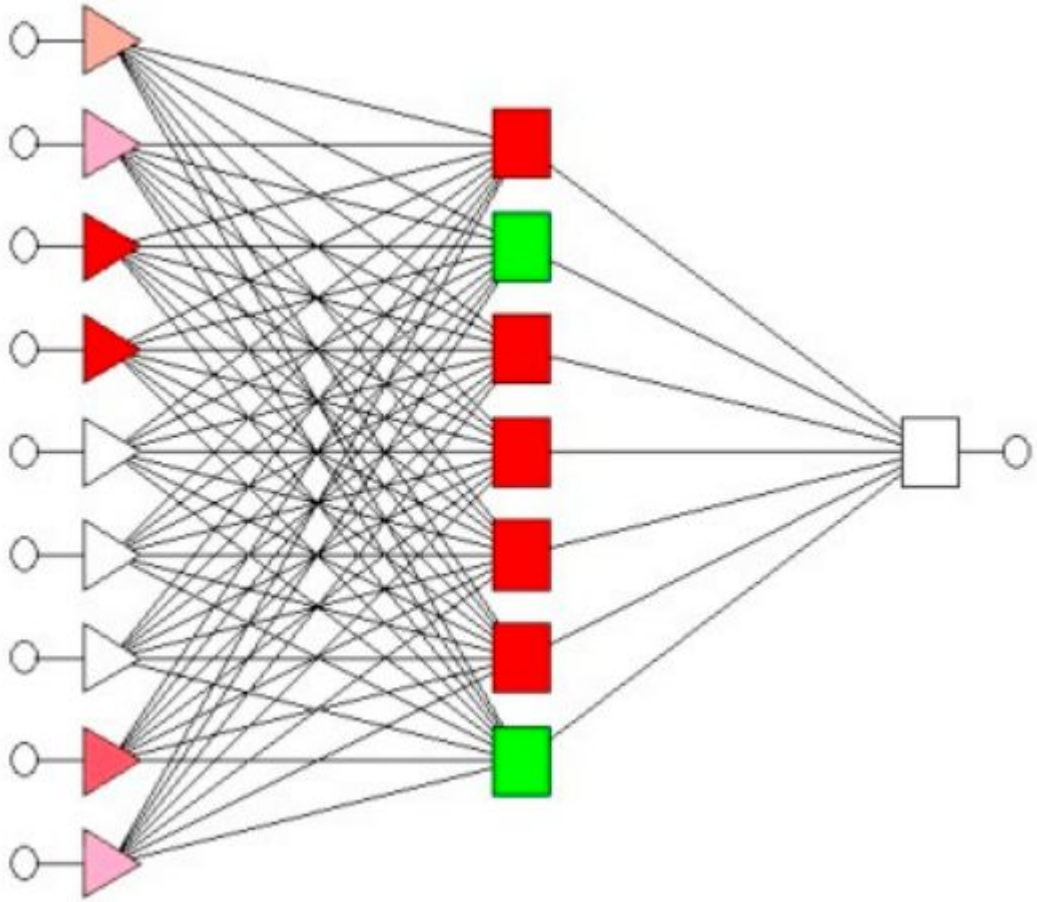
- Problem:
  World coasts, deltas, and estuaries presently support a large portion of the planet's population, ald are likely to host a growing number of inhabitants in the near future, as most of the world's cities and megacities are located in the coastal zone. Sea-level rise puts inhabitants of coastal areas into the risk of natural hazards, erosion, flooding, potable water shortage, and many others

- Data sources:
  - Social/demographic and environmental data acquired from the year 2001
  - Census data found of Portuguese National Statistical Institute (INA)
  - Satellite images
  - Corine land cover for the years 2000 and 2006

- Goal:
  Provide a robust tool combining geographic information system (GIS) and artificial neural networks (ANNs) in order to predict the areas that are more prone to erosion in the near future

- Scope:
  Understanding the relationship between the social and natural forces and forecasting future erosion trends could be a vital tool for coastal management, land-use planning, and sustainable development.

input layer hidden layer output layer



Two types of artificial neural network (ANNs) were tested: multilayer perceptron (MLP) and radial basis function network (RBF). Both were tested using large number of global parameters configurations.

The best performing was multilayer perceptron:

- Topology: 9:7:1
- Type of learning: Supervised learning
- Learning algorithm: back-propagation

MLP was trained and evaluated using least mean square algorithm.
Evaluation is based on 30% of all of the available data.