Abstract

Porosity of hydrocarbon bearing formations is a crucial parameter for reservoir characterization, reserve estimation, planning for completion, and geomechanical and geophysical studies. Accurate determination of porosity from laboratory core analysis is highly cost, time, and people intensive. Therefore, the quest for a rapid, cost-effective, and efficient method of determining porosity is inevitable. Conventional well log data are available in all wells and provide cheap continuous information. In this study, an improved strategy was followed to formulate conventional well log data (inputs) into core porosity (output) using the genetic optimized neural network (GONN). Firstly, back-propagation (BP) algorithm, the conventional learning method of neural network, was used to extract the formulation between inputs/output data space. Then, neural network was trained through the use of genetic algorithm (GA). Comparison between BP learning and GA demonstrated the effectiveness of GONN. It was deduced that GA enforces the performance function of neural network to converge to global minimum contrary to BP which frequently traps in local minima.
- MATLAB user's guide. 2011. Fuzzy logic, Neural Network & GA and Direct Search Toolboxes, MATLAB CD-ROM, by the Mathworks, Inc.

**Index Terms**

- Computer Science
- Artificial Intelligence

**Keywords**

- Back-Propagation
- Genetic Algorithm
- Genetic Optimized Neural Network
- Core
Porosity

Conventional Well Log Data