

Inter and Intra Neuronal systems for Reservoir Operation

V. RAMANI BAI
University Malaya

Modeling of the human brain is done at two levels, a macroscopic, inter-neuronal level and a microscopic, intra-neuronal level. With the former, various models have been proposed in the literature for neural networks dealing with such specific brain functions as function approximation, pattern recognition, classification and control. In modelling at a microscopic level, energy transfer across the cells without dissipation is conjectured in biological matter. This idea has led to construct models for water reservoir operation, which can assist water resources system analyst in selecting compromise strategies for water release from the reservoir. Multilayer Feed forward (BPM & BPLM) and Recurrent Neural network (RNN) models as intra and intra neuronal architectures are formed. The aim is to find a near global solution to what is typically a highly non-linear optimization problem like reservoir operation. This method is compromising between computation cost and performance and hence more suitable for these types of problems. The case study used to demonstrate the effect of the architecture and various internal parameters is that of deriving operational policy for the river Vaigai in south of Tamil Nadu in India. The training, testing and validation sets in the ANN models consisted of flow data from 1969-1993 and 1994-1997.

Keywords: Feed forward network, recurrent neural network, training, validation, optimization, neuronal systems and reservoir operation.