A binary Hopfield neural network

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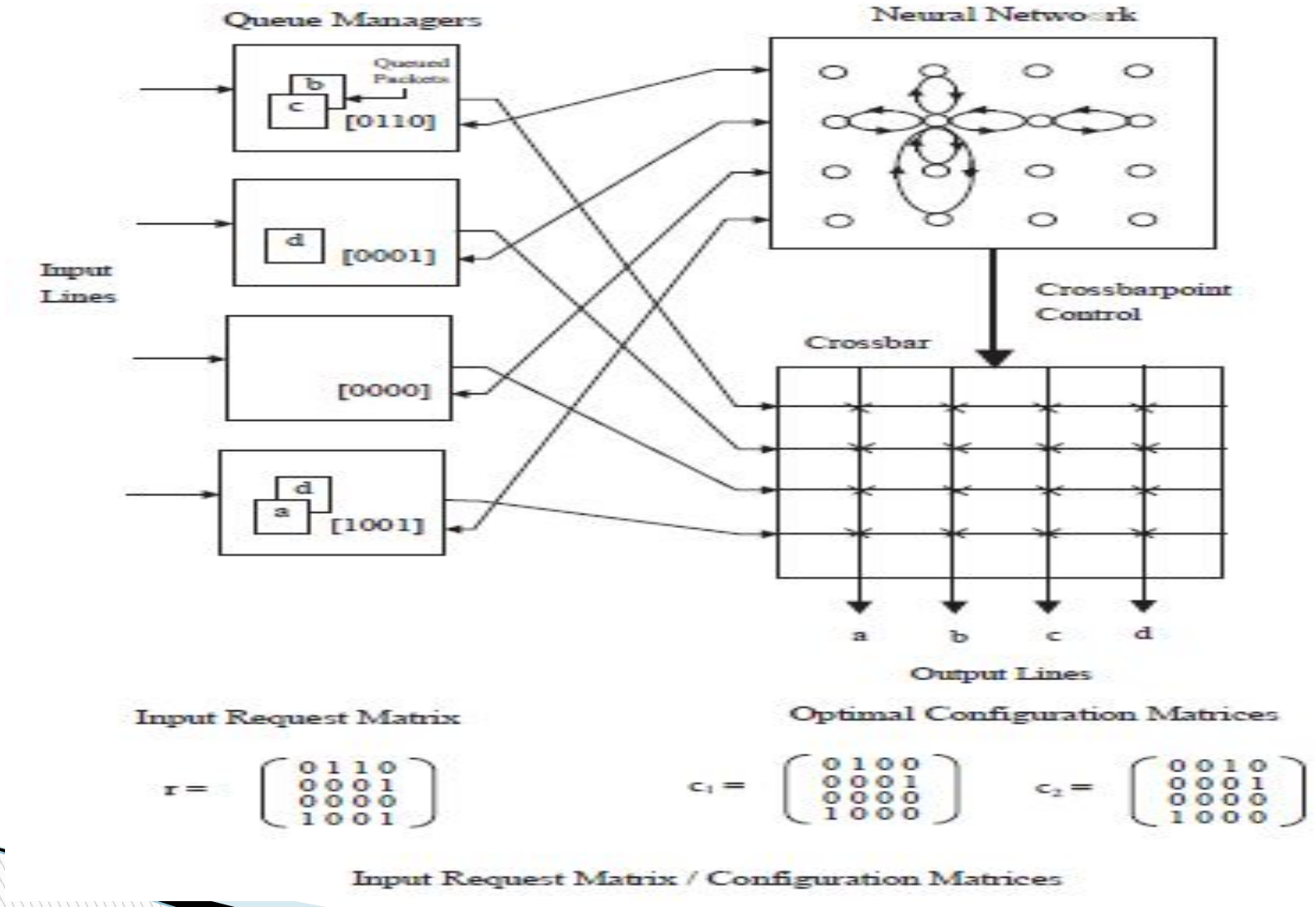
RETp-15-01

- The neural network of Hopfild is an example of a network which can be defined as dynamic system with OS at which the exit of one completely direct operation serves as an entrance of the following operation of a network

- In the 1970th years recession of interest in neural networks was observed, many researches were thrown and were supported only by few scientists.
- However by 1980th years interest in this area again arose, because of emergence of model of the recurrent artificial neural network developed by J. Hopfild.

Schematic architecture of 4 x 4 crossbar control

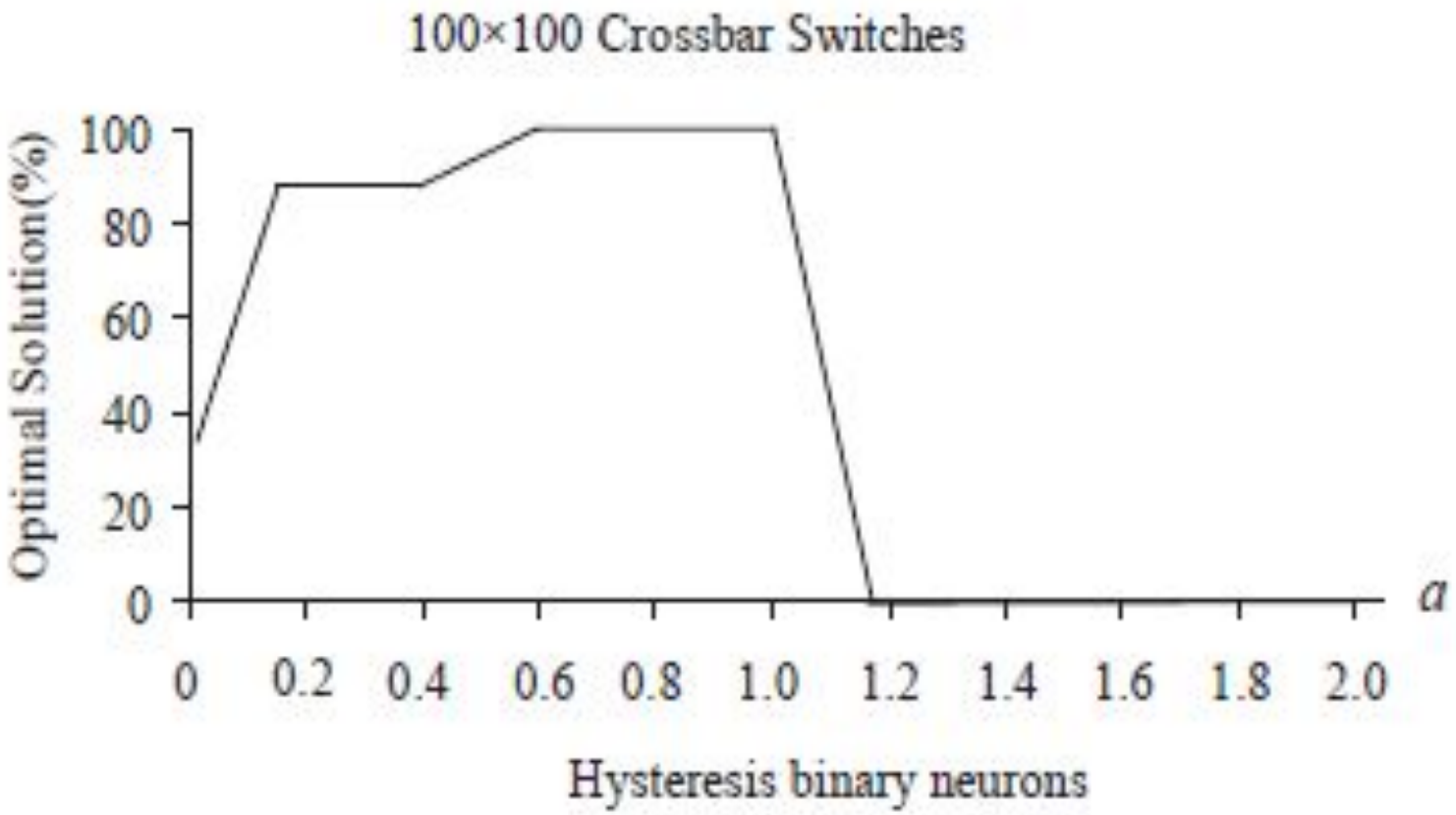


The problem of maximizing the throughput of packets through a crossbar switch is best described by referring to Fig. 1, which shows how requests to switch packets through an N x N crossbar switch can be represented by an N x N binary request matrix R [7,16]. Rows and columns of the matrix R are associated with inputs and outputs, respectively, of the crossbar switch.

A matrix element:

r_{ij} = 1 indicates that there is a request for switching at least one packet from input line i to output line j of the switch;

r_{ij} = 0 expresses no such request.



The percentage of optimal solution of the 100 x 100 crossbar switches by the Hopfield neural networks with hysteresis binary neurons

Conclusions

A hysteretic Hopfield neural network architecture for the crossbar switch problem, and showed its effectiveness by simulation experiments. The proposed architecture was based on a modified Hopfield neural network in which hysteresis binary neurons were added to improve solution quality.

Thanks for attention!