

# A FUZZY-LOGIC TRAINED NEURAL NETWORK APPROACH FOR MACHINE SCHEDULE OPTIMIZATION

**D. KAVITHA<sup>1</sup>, K. G. DHARANI<sup>2</sup> & M. PRIYADARSINI<sup>3</sup>**

Assistant Professors, Department of E.C.E., M.V.J College of Engineering, Bangalore, India

## **ABSTRACT**

The competitive manufacturing global scenario today needs multi-job, multi-machine and multi criterion shop floor machine scheduling concept for higher production. Achieving key performance measures is important for the successful operation of the manufacturing systems, which are complex and dynamic in nature. To have a closer look at real-world problems, neural network concept becomes its solutions. The problem discussed in this research involves N jobs and M processors. The objective is to find a schedule which assigns N jobs to M processors in such a way that the performance measures are optimized. Dispatching rules are usually applied dynamically to schedule jobs in manufacturing systems.

Workflow balancing on a shop floor helps to remove bottlenecks present in the manufacturing system. Workflow refers to the total time during which the work centers are busy. Earlier researchers have not specified the method for jobs to be executed in parallel in order to balance the workflow to each machine. In parallel machine scheduling there are m machines to which n jobs are to be assigned based on different priority strategies. The procedure is based on the idea of workload balancing and on balancing the workload among machines. Different priority strategies are followed for the selection of jobs. 8 different strategies are considered, namely random (**RANDOM**), shortest processing time (**SPT**), longest processing time (**LPT**), most work remaining (**MWKR**), least work remaining (**LWKR**), first come first serve (**FCFS**) and last come first serve (**LCFS**) for the selection of jobs for workflow balancing. The relative percentage of imbalance (**RPI**) is adopted among the parallel machines to evaluate the performance of these strategies in a standard manufacturing environment using neural network.

This paper discusses the application of neural network to solve a identical parallel machine scheduling. The developed neural network model predicts the optimal solutions for any set of problem instances. This paper uses the Back propagation and Delta rule based approach for training the neural network. The neural network approach is quite effective and efficient for selecting the best strategies and their optimal sequence for a given scheduling problem.

**KEYWORDS:** Neural Network, Fuzzy Logic, Machine Scheduling, Dispatching Rules