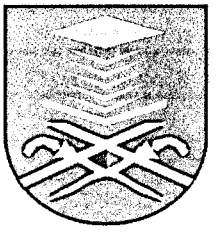

PREDICTION OF MATERIAL REMOVAL RATE AND TOOL WEAR RATE IN ELECTRICAL DISCHARGE MACHINING USING FEEDFORWARD NEURAL NETWORK

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AUTHOR DECLARATION

"I declare that this thesis is the result of my own work except the ideas and summaries which I clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in the candidature of any degree."

Signed : zaid .....

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ABSTRACT

Electrical discharge machining (EDM) is one of the widely used non-traditional machining techniques for manufacturing geometrically complex or hard material parts. The EDM process uses repeated electrical discharges between electrode and workpiece to remove material which are submerged in a dielectric medium. There are many researchers carried out investigation for improving the process performance by modeling the EDM process. Neural network (NN) is one of the most extensively used methods for prediction and modeling EDM process parameters. In this study, the prediction machining performance such as material removal rate (MRR) and tool wear rate (TWR) in EDM was conducted by using Matlab 7.6 (R2008a) NN Toolbox 6.0. The NN architecture that had been used in this project is multilayer feed forward with back propagation learning algorithm. The machining parameters, discharge current (I), pulse on time (T_{on}), and pulse off time (T_{off}) was used as input data with MRR and TWR as output data. The experimental result with various machining and output parameters in this study was referred to journal of "Modeling of electrical discharge machining process using back propagation neural network and multi-objective optimization using non-dominating sorting genetic algorithm-II" by D. Mandal et al [21]. There are 78 experimental data that are used for training and testing with different number of hidden layer and nodes. The finest NN architecture is obtained by comparing their training and testing performance. From the experiment, network with 3-10-10-2 architecture was found to be the most suitable architecture to predict the MRR and TWR. The architecture will be a model that can be used to predict the machining output; MRR and TWR with a given input; T_{on}, T_{off} and I, for C40 steel workpiece.

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