A review: Use of evolutionary algorithm for optimisation of machining parameters

Nor Atiqah Zolpakar[a], Mohd Fuad Yasak[b] & Sunil Pathak[c]
[a] Faculty of Mechanical and Automative Engineering Technology, Universiti Malaysia Pahang, Pekan, 26600, Pahang, Malaysia
[b] Faculty of Engineering Technology, Universiti Tun Hussein Onn Malaysia, Pagoh, 84600, Johor, Malaysia
[c] HiLase Centre, Institute of Physics, Czech Academy of Sciences, Za Radnici 828, Dolni Brezany, 25241, Czech Republic

ABSTRACT
Optimisation of machining parameters is crucial to ensure higher productivity and optimum outcomes in machining processes. By optimising machining parameters, a particular machining process can produce better machining outcomes within equivalent resources. This paper reviews past studies to achieve the desired outputs; minimum surface roughness (SR), highest material removal rate (MRR), lowest production cost, and the shortest production time of machining processes and various optimisation attempts in terms of varying parameters that affect the outcomes. The review deliberates the optimisation methods employed and analyses the performance discussing the relevant parameters that must have been considered by past researchers. To date, most studies have been focusing on optimising conventional machining processes such as turning, milling, and drilling. Optimisation works have been performed parametrically, experimentally, and numerically, where discrete variations of the parameters are investigated, while others are remained constant. Lately, evolutionary algorithm, statistical approaches such as genetic algorithm (GA), particle swarm optimisation (PSO), and cuckoo search algorithm (CSA) have been utilised in simultaneous optimisation of the parameters of the desired outputs and its great potential in optimising machining processes is recognisable.

KEYWORDS
Machining process; Machining parameters; Optimisation; Evolutionary algorithm