Announcement of B. John Davies Prize for the best paper published in IJAMT in 2019

Silvia Schilgerius¹ · Andrew Y. C. Nee²

Published online: 5 January 2021

© Springer-Verlag London Ltd., part of Springer Nature 2021

The B. John Davies Prize for the best paper published in IJAMT 2019 has been awarded to Weiwen Xia, Zilun Li, Yaou Zhang, and Wansheng Zhao.

The prize recognizes exceptional articles published in IJAMT and awards authors for making an especially significant contribution. The award was named after the late B. John Davies of the University of Manchester Institute of Science and Technology (UMIST), the founding editor-in-chief of IJAMT who led the journal from its launch in 1985 until 2013.

Process

From all the papers published in 2019, 29 papers were shortlisted with editor rating above 80 in the first round. The next round selected six finalists, and each paper was carefully scrutinized by the regional editors. The following paper has received the highest vote and is recommended for the 2019 B. John Davies Prize.

Title of paper

Breakout Detection for Fast EDM Drilling by Classification of Machining State Graphs, published in International Journal of Advanced Manufacturing Technology, Volume 106, pages 1645–1656 (2020)

Authors

Weiwen Xia, Zilun Li, Yaou Zhang, Wansheng Zhao

Author affiliations

State laboratory of Mechanical System and Vibration
School of Mechanical Engineering, Shanghai Jiao Tong
University, Shanghai 200240, China

Abstract

Due to its capability of machining hard-to-cut materials as well as its high machining efficiency as compared with conventional electrical discharge machining (EDM) processes, fast electrical discharge drilling (fast EDM drilling) is widely applied in industries such as mold and die as well as aerospace components manufacturing. The breakout detection is an essential technique for hole completion judgment and back-stroke prevention. This paper presents a novel method, called classification of machining state graphs (CMSG), for online detection of breakout events. A machining state graph (MSG) is formed by the recent changing patterns of feature signals, which would change abruptly when breakout happens. Then the detection problem is solved by classification of real-time MSGs. In this paper, the feature signals were selected to be normal discharge ratio, short circuit ratio and servo feedrate of the tool electrode. The signals were pre-processed in order to improve the detection accuracy and reduce the decision lag. A classification model was built to classify MSGs. To simplify the modelling process and improve the generalization ability of the detector, a pattern recognition (PR) algorithm were adopted as the core algorithm for classification. The classification model of the detector was acquired through offline training and loaded on the start-up of the control system for online detection. Performance judgment criteria were proposed and experimental results proved the high performance of the proposed method.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

✉ Andrew Y. C. Nee
mpeneeyc@nus.edu.sg

¹ Springer Nature, Prinz Eugen-Straße 8-10, 1040 Wien, Austria

² Department of Mechanical Engineering, National University of Singapore, 9 Engineering Drive 1, Singapore 117576, Singapore