

A Novel Peak Detection Algorithm Used in the Study of Machining Chip Segmentation

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Abstract

Studying how metal deforms and flows as parts are machined yield important insights into the metal cutting process. Improvements in high-speed digital imaging and image processing software promise to improve our understanding of the tool-workpiece interface and verify the accuracy of finite element modeling simulations. This will ultimately enable industry to improve machining processes and make parts faster at less cost. This report describes the design and results of an automated system to estimate chip segmentation frequency. High-speed images of machining chips are combined with displacement vector mapping and processing. As part of the displacement vector map processing, a novel peak detection algorithm using an inflection list was developed which minimizes a priori assumptions and yields information used in sensitivity analysis. However, further work is needed before an uncertainty analysis may be completed.

Keywords: machining chip segmentation, high-speed video, vector map, peak detection.