Machining process classification using PCA reduced histogram features and the support vector machine

ABSTRACT

Being able to identify machining processes that produce specific machined surfaces is crucial in modern manufacturing production. Image processing and computer vision technologies have become indispensable tools for automated identification with benefits such as reduction in inspection time and avoidance of human errors due to inconsistency and fatigue. In this paper, the Support Vector Machine (SVM) classifier with various kernels is investigated for the categorization of machined surfaces into the six machining processes of Turning, Grinding, Horizontal Milling, Vertical Milling, Lapping, and Shaping. The effectiveness of the gray-level histogram as the discriminating feature is explored. Experimental results suggest that the SVM with the linear kernel provides superior performance for a dataset consisting of 72 workpiece images.