

54th CIRP Conference on Manufacturing Systems

Deep Transfer Learning for Improved Product Quality Prediction: A Case Study of Aluminum Gravity Die Casting

Sebastian Gellrich^{a,*}, Marc-André Filz^a, Anna-Sophia Wilde^a, Thomas Beganovic^b, Alexander Mattheus^b, Tim Abraham^a, Christoph Herrmann^a

^a*Institute of Machine Tools and Production Technology, Chair of Sustainable Manufacturing and Life Cycle Engineering, Technische Universität Braunschweig, Langer Kamp 19 b, 38106 Braunschweig, Germany*

^b*Volkswagen AG, Volkswagen Group Components, Gifhorn Str. 180, 38037 Braunschweig, Germany*

* Corresponding author. Tel.: +49 531 391 65034; fax: +49 531 391 5842. E-mail address: s.gellrich@tu-braunschweig.de

Abstract

High product quality and low rejection rates are decisive for the competitiveness of manufacturing systems. Hence, manufacturing shifts towards digitalization for predicting and controlling product quality. In order to implement data-driven approaches in manufacturing successfully, sufficient model performances are necessary. Especially metal casting comes with several hurdles for data-driven approaches, like sparse and imbalanced data, a relatively high human interaction and frequent mounting events. This often leads to hardly generalizable and weak models. Within this paper, transfer learning is investigated for the quality prediction of aluminum gravity die casting to try to overcome these hurdles and create robust, accurate and data-efficient models.

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Peer-review under responsibility of the scientific committee of the 54th CIRP Conference on Manufacturing System

Keywords: Transfer Learning; Deep Learning; Quality Prediction; Virtual Quality Gates; Aluminum Gravity Die Casting
