Proceedings of SPIE

**Smart Additive Manufacturing Empowered by a Closed-Loop Machine Learning Algorithm**

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* Abstract
  + Deep CNNs to automatically detect defects in printing layers of 3D metal printers
  + 100% accuracy rate on test set
  + Enhance quality of AM manufacturing, fewer quality hiccups, limiting waste of time and materials
* Deep CNN for Computer Vision
  + DANN architecture and transfer learning technique to retrain Inception-v3 [30] model of Tensorflow platform
  + Batch gradient descent with learning rate 0.001
* Schematics of design software
  + Appears to be non-live printing as full layer is inspected in photos
  + Recognizes defects in the entire layer
* Application
  + Enhances industrial applications in aerospace industry and automotive industry
  + Serves as proof of concept for other AM machines like 3D bio-printers or polymer and liquid-based printers

Advanced Intelligent Systems (Communication)

**Automated Real-Time Detection and Prediction of Interlayer Imperfections in Additive Manufacturing Processes using Artificial Intelligence**

Zeqing Jin, Zhizhou Zhang, and Grace X Gu

* Abstract