

Applying Machine Learning to Improve Build Quality of Laser-based Additive Manufacturing

written by Lauri Moon | September 6, 2019

Join us for this webinar by the team led by Dr. Qian Wang, Professor of Mechanical Engineering, The Pennsylvania State University. This project is supported by a 2018 DCED Manufacturing PA Innovation Program Award.

Laser-based additive manufacturing (AM) processes involve a large number of process parameters that affect the final geometry, mechanical property, material microstructure, and surface roughness. Existing analytical models are often restricted by over-simplified assumptions and thus not suitable for real applications, whereas high-fidelity numerical models such as finite-element-analysis based models can be computationally expensive to be used in real-time build control.

This project proposes a machine learning approach to model the relationship between process parameters and the build geometry, by utilizing physics-based insights to define input features as well as modeling architecture. A suite of machine learning algorithms will be examined for their efficacy in model prediction. Simulated data generated from the Autodesk's Netfabb Local Simulation are mainly used for model training and testing, and experimental data will also be collected to further calibrate the model. Success of the project will help reduce the level of trial and error currently required in AM industry and thus help reduce the associated cost.