

Optimizing Cold Spray Additive Manufacturing Using Reinforcement Learning

Akshay Vaidya¹, Sinan Muftu¹, Ozan Ozdemir¹, Taskin Padir²

¹ Northeastern University, Mechanical Engineering

² Northeastern University, Electrical & Computer Engineering

Abstract:

Cold Spray is a versatile additive manufacturing process which is utilized for repair, coatings, and fabrication of large 3D geometries. However, achieving dimensional accuracy in 3D geometries remains a challenging task. In this work, we propose an off-policy Reinforcement Learning framework to find optimal spraying parameters and develop intelligent and optimized spraying strategies. Our framework represents a significant contribution to the field of cold spray additive manufacturing, providing a novel and effective approach to achieving dimensionally accurate 3D geometries. This framework opens up new avenues for research at the intersection of reinforcement learning and cold spray additive manufacturing. We present our RL environment and demonstrate its potential to improve part accuracy and process efficiency.