

Optimization of 3D Printing Parameters Using Machine Learning to Enhance Mechanical Properties in Fused Deposition Modeling (FDM) Technology

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Abstract : Additive manufacturing, commonly known as 3D printing, has revolutionized modern manufacturing by enabling the agile creation of complex objects. However, challenges persist in the consistency and quality of printed parts, particularly in their mechanical properties. This study focuses on addressing these challenges through the optimization of printing parameters in FDM technology, using Machine Learning techniques. Our aim is to improve the mechanical properties of printed objects by optimizing parameters such as speed, temperature, and orientation. We implement a methodology that combines experimental data collection with Machine Learning algorithms to identify relationships between printing parameters and mechanical properties. The results demonstrate the potential of this methodology to enhance the quality and consistency of 3D printed products, with significant applications across various industrial fields. This research not only advances understanding of additive manufacturing but also opens new avenues for practical implementation in industrial settings.

Keywords : 3D printing, additive manufacturing, machine learning, mechanical properties

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