

Computing Midcurve with Multi-Layer and Convolutional Neural Networks

Publisher: IEEE

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Prashanth Sreenivasan ; Yogesh H. Kulkarni

All Authors



Abstract

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Abstract:

Midcurve computation: the dimension reduction of 2D thin polygon shapes to 1D curves is important for several Computer-Aided Design (CAD) and Computer-Aided Engineering (CAE) applications, particularly in finite element analysis and robot path planning. We advance the state-of-the-art by building on previous work on MidcurveNN, through two new neural architectures: a multi-layer dense network and a CNN-based architecture with skip connections. Through comparative analysis, we demonstrate that while the dense network shows limited improvements, the CNN-based architecture with skip connections achieves a tenfold reduction in average loss compared to existing methods. The proposed approach improves the quality of the generated Midcurves.

Published in:

2025 International Conference on Computational, Communication and Information Technology (ICCCIT)

Date of Conference:

07-08 February 2025

DOI:

10.1109/ICCCIT62592.2025.10928152

Date Added to IEEE Xplore:

24 March 2025

Publisher:

IEEE

ISBN Information:

Conference Location:

Indore, India

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