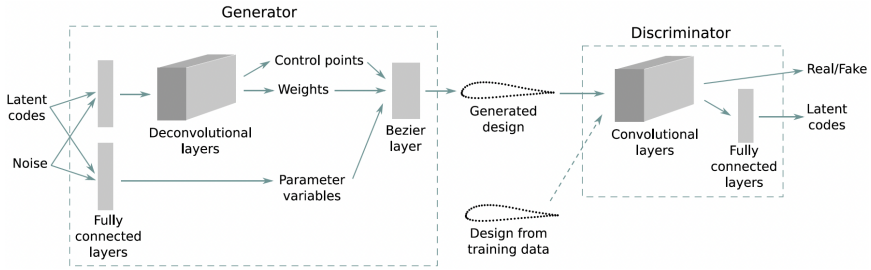
Technische Universität Braunschweig

Master Thesis: Deep Learning Techniques for Airfoil Shape Parameterization - Generative Adversarial Networks

November 27, 2023



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Summary

Geometric parameterization of aerodynamic bodies is one of the key areas of research in sustainable aviation. An effective parameterization technique provides a large design exploration space as a function of a limited number of design variables. Deep learning architectures such as Generative Adversarial Networks (GANs) can be used for the compression of data from an original high-dimensional space to a low-dimensional latent space. The latent space can subsequently be used to define and vary the airfoil geometries with a minimal number of parameters. The aim of this student project is to explore the capabilities of GANs for parameterizing transonic airfoil shapes and consequently develop a GAN-based neural network for transonic airfoil parameterization.

Requirements

1. Strong knowledge in applied mathematics. Experience in machine learning/deep learning is beneficial.
2. Experience with Python programming (knowledge of Tensorflow or PyTorch is a plus).
3. Fluency in spoken and written English.

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