

Topology Optimization of Electrical Machines using Generative Adversarial Network

In previous work, a Normalized Gaussian Network (NGnet) based topology optimization routine was developed for optimizing TFM rotor and PMSynRM. However, the NGnet based topology optimization involves several hyperparameters that need to be tuned through running various optimizations, which is very time-consuming.

In this work, building upon the existing optimization routine, it is proposed to establish a generative adversarial network (GAN) model for generating machine geometries for the topology optimization. This model is capable of integrating the undetermined hyperparameters of NGnet into a vector. Consequently, through a single optimization process, the optimal solution over different hyperparameters is expected to be identified.

Students profile:

- Work independently and self-motivated
- Experience and knowledge in Matlab programming
- Ideally heard EM1 and knowledge in deep learning

Working packages:

- Literature research in generative adversarial network for topology optimization
- Familiarization with the existing optimization routine, especially the geometry generation routine
- Build and train the GAN
- Implement the GAN into the current optimization routine and execute the optimization process
- Documentation and presentation

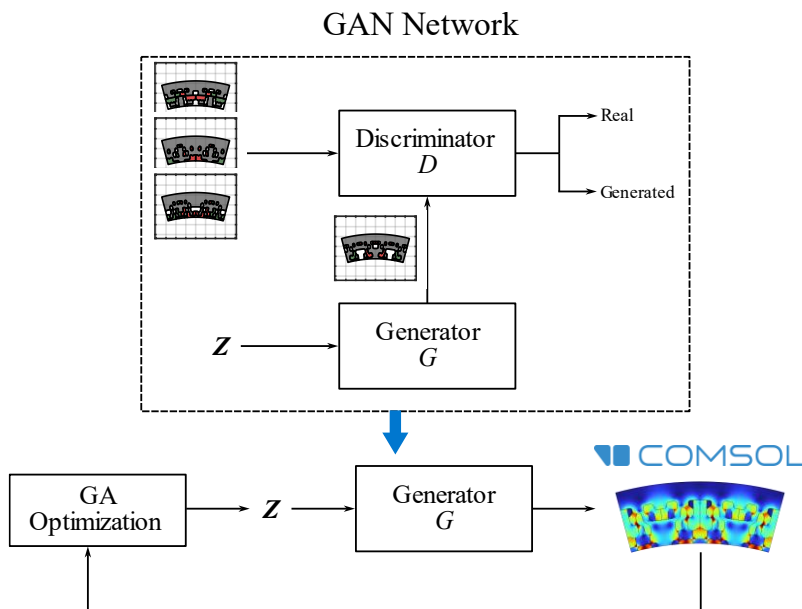


Figure 1: Generative adversarial network for topology optimization

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