

Subject: Using convolutional artificial neural networks for the prediction of the geometric shape of weldseams

Contact:

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Type of Thesis:

Bachelorthesis	x	Experiments	x
Projectthesis	x	Konstruktion	
Minithesis		Theoretical	
Masterthesis	x	Literaturerecherche	x

Department:

Mechanical Engineering / Computer Science

Begin: now

Qualifications: Basic knowledge in material science

Topic / scope of tasks:

For the prediction of the geometric shape of weldseams usually thermomechanical structural simulation based on the FEM method is used. Although the results are highly precise if the model was set up correctly, the required computational power as well as the prediction time are way too high for a practical implementation. Machinelearning algorithms and artificial neural networks in particular are able to compute and interpret process data very fast once they are trained properly. This leads to the basic idea to use machine learning for special simple welding prediction tasks.

Goal of the thesis is to construct a generative adversary neural network to predict the shape of weldseams, based on the welding parameters.

You will get to know the robotic MAG-Welding process, used for joining and additive manufacturing as well as machine learning algorithms for image processing (CANNs und GANs).

Depending of the type of thesis (MA/BA) you will be doing practical welding experiments to generate the training data as well as programming work to construct, train and test your network.

Please feel free to come by or call me, if you are interested in the topic.

