

Bachelor- / Master Thesis

Development of a Differentiable Semantic Metric for Deep Neural Networks

Prof. Dr.-Ing. Johannes Stegmaier
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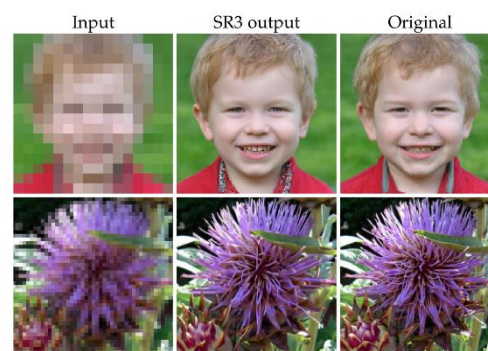
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Background

The semantic information of an image pertains to the question: 'What do I see in the image?' Comparing the semantic information between two images is a task in various areas of image processing. One example is the field of super-resolution, where low-resolution images are enhanced to high-resolution ones. Another example is the field of visual aids, where a high-resolution image needs to be displayed in a downscaled form. Traditional loss functions, such as mean squared error, often produce blurry images. Deep learning methods like diffusion models, transformers, and autoencoders can deliver better results by utilizing perceptual loss functions, for instance.



C. Saharia et. al. "Image Super-Resolution Via Iterative Refinement." IEEE TPAMI 2022

Tasks

- Investigation of Perceptual/Semantic Comparative Loss Functions
- Possibly conducting a small user study, potentially using a VR headset, to validate the results

Your Profile

- Experience with programming languages, ideally Python
- Structured approach to work
- (Optional) Experience with machine learning
- (Optional) Experience with PyTorch, Lightning, and Matplotlib
- (Optional) Experience with image processing

Interested?

Write me an E-Mail to konermann@ifb.rwth-aachen.de. In a personal conversation, we can get to know each other and, if necessary, discuss the details or **alternative research questions**.