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Arjon Das
arjondas@unomaha.edu

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Deep Learning-based Image Watermarking with Transform Invariant Representation Learning

Arjon Das, Graduate Student, Computer Science
Faculty Mentor: Xin Zhong

This research explores the avenue of deep learning (DL) applied to Image Watermarking. Deep learning-based Image Watermarking has proven to have great potential due to eliminating the necessity of domain knowledge. But deep learning models are susceptible to noises. As a result, the watermark extraction process with this technique still lacks robustness. The main goal of this research is to achieve robustness for the Deep Learning-based Image watermarking and extraction process by learning image transformation invariant representations. Our already proposed DL-based Audio-in-Image watermarking scheme yields high imperceptibility and minor robustness without introducing any adversarial attacks during training. We are formulating self-supervised techniques for learning the image representations which are indifferent to image transformation augmentations. We hypothesize that embedding a watermark image inside a transformation invariant cover image representation will render high robustness on the watermark extraction process. Furthermore, our resulting self-supervised learning architecture can be applied to other downstream computer vision tasks like classification, detection, and instance segmentation.