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	authors	<ul style="list-style-type: none">Anatol MaierBenedikt LorchChristian Riess	authors	<ul style="list-style-type: none">Anatol MaierBenedikt LorchChristian Riess	DUPLICATES	13
	title	Toward Reliable Models for Authenticating Multimedia Content: Detecting Resampling Artifacts With Bayesian Neural Networks	title	Toward Reliable Models for Authenticating Multimedia Content: Detecting Resampling Artifacts With Bayesian Neural Networks		
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	id	id-537251683467159281	id	id8521418018265700915		
	abstract	In multimedia forensics, learning-based methods provide state-of-the-art performance in determining origin and authenticity of images and videos. However, most existing methods are challenged by out-of-distribution data, i.e., with characteristics that are not covered in the training set. This makes it difficult to know when to trust a model, particularly for practitioners with limited technical background. In this work, we make a first step toward redesigning forensic algorithms with a strong focus on reliability. To this end, we propose to use Bayesian neural networks (BNN), which combine the power of deep neural networks with the rigorous probabilistic formulation of a Bayesian framework. Instead of providing a point estimate like standard neural networks, BNNs provide distributions that express both the estimate and also an uncertainty range. We demonstrate the usefulness of this framework on a classical forensic task: resampling detection. The BNN yields state-of-the-art detection performance, plus excellent capabilities for detecting out-of-distribution samples. This is demonstrated for three pathologic issues in resampling detection, namely unseen resampling factors, unseen JPEG compression, and unseen resampling algorithms. We hope that this proposal spurs further research toward reliability in multimedia forensics.	abstract	In multimedia forensics, learning-based methods provide state-of-the-art performance in determining origin and authenticity of images and videos. However, most existing methods are challenged by out-of-distribution data, i.e., with characteristics that are not covered in the training set. This makes it difficult to know when to trust a model, particularly for practitioners with limited technical background. In this work, we make a first step toward redesigning forensic algorithms with a strong focus on reliability. To this end, we propose to use Bayesian neural networks (BNN), which combine the power of deep neural networks with the rigorous probabilistic formulation of a Bayesian framework. Instead of providing a point estimate like standard neural networks, BNNs provide distributions that express both the estimate and also an uncertainty range. We demonstrate the usefulness of this framework on a classical forensic task: resampling detection. The BNN yields state-of-the-art detection performance, plus excellent capabilities for detecting out-of-distribution samples. This is demonstrated for three pathologic issues in resampling detection, namely unseen resampling factors, unseen JPEG compression, and unseen resampling algorithms. We hope that this proposal spurs further research toward reliability in multimedia forensics.		
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