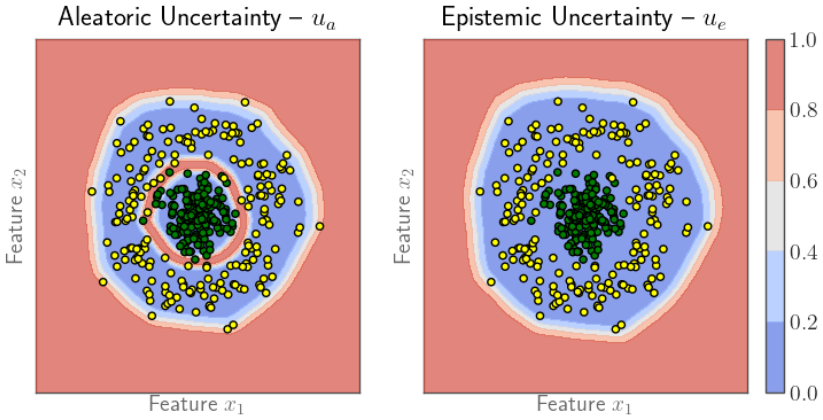
AE-DNN

Code for reproducing some key results of our ICPR 2020 paper *"Separation of Aleatoric and Epistemic Uncertainty in Deterministic Deep Neural Networks"*



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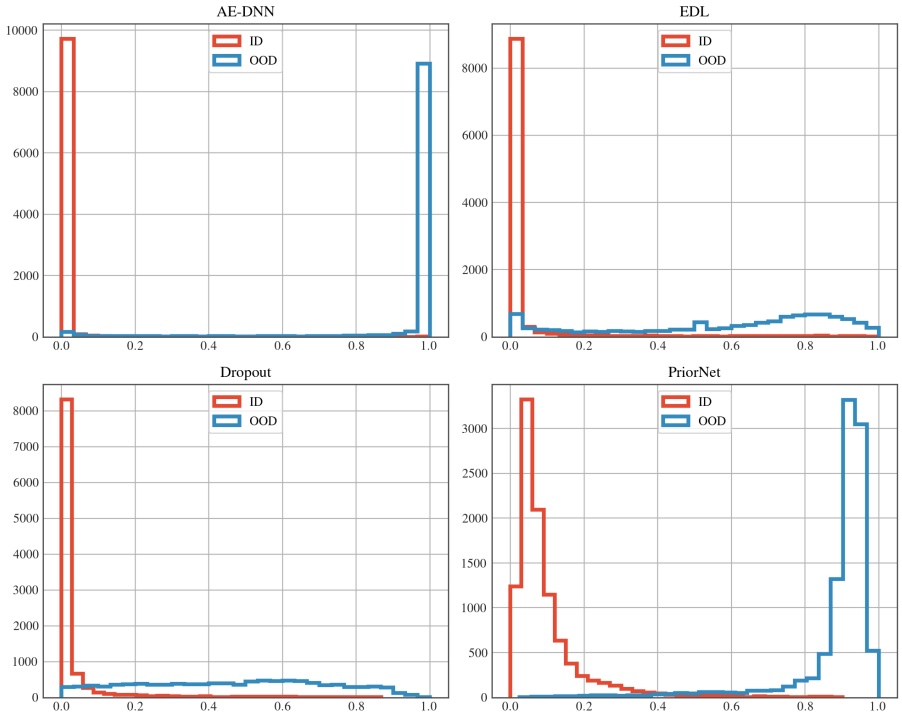
Uncertainty Histograms

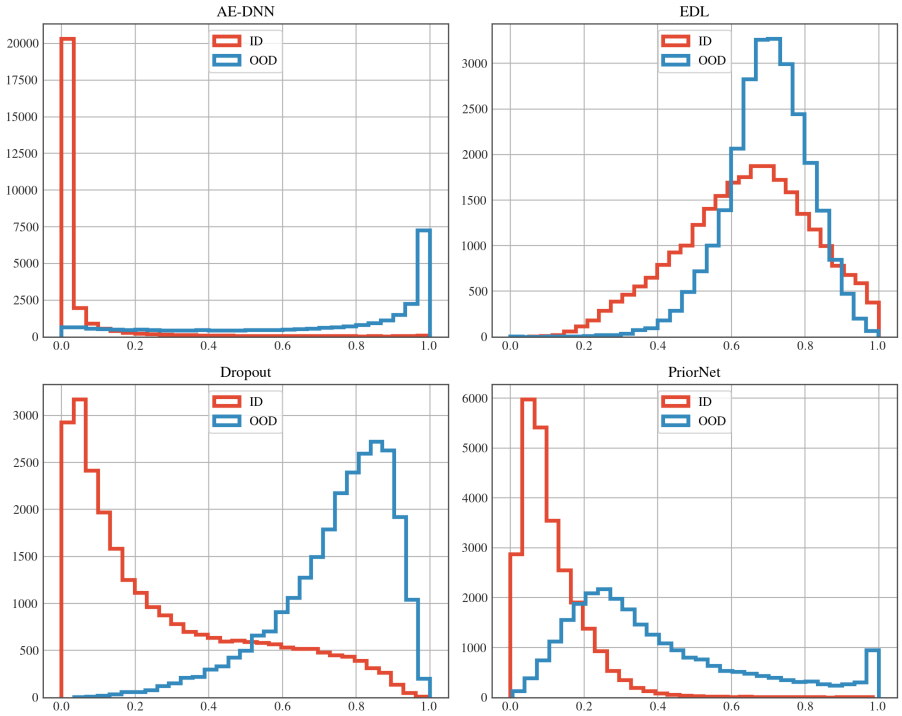
In the following plots, we can find further uncertainty histograms. In most cases, such histograms are representative only if we also evaluate corresponding in-distribution uncertainties. We show normalized uncertainty values, as well as values in logarithmic space. This makes sense, as one may not recognize tiny differences in a histogram that can be used to determine a threshold for separation.

Normalized

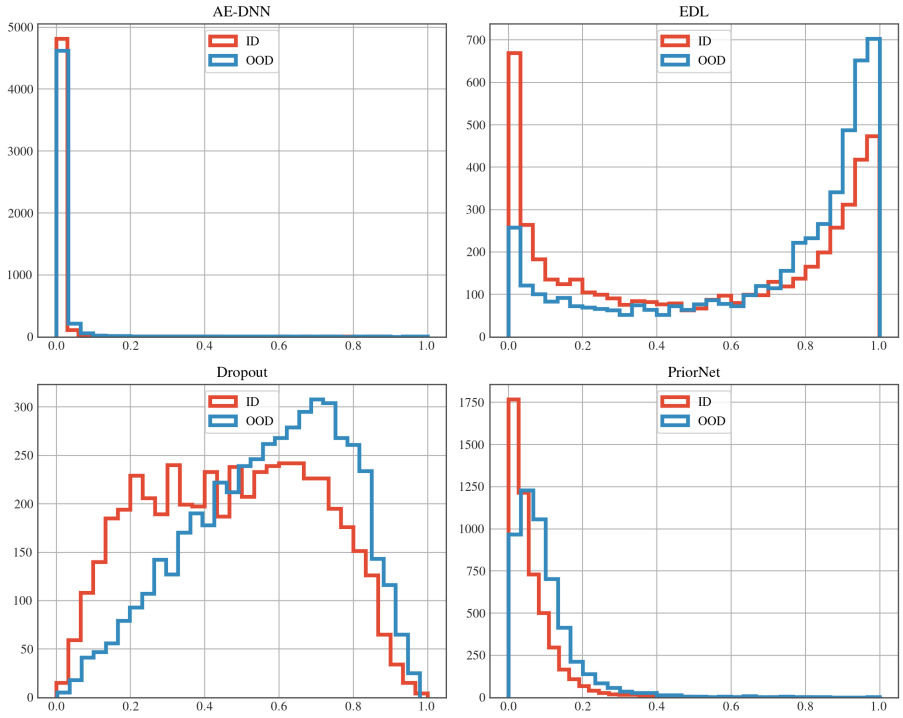
MNIST vs. NotMNIST



SVHN vs. CIFAR10

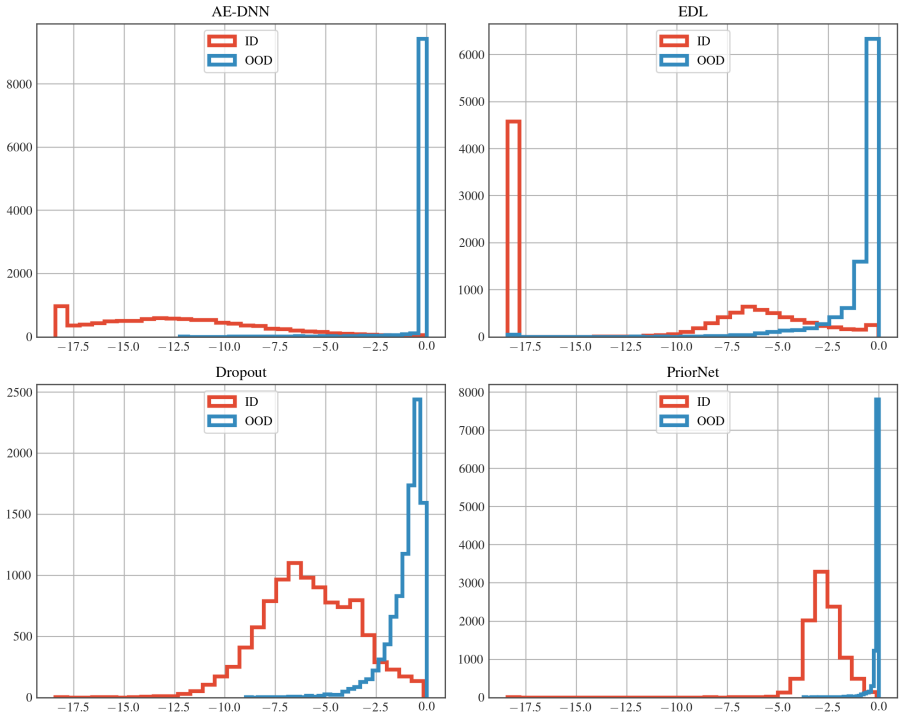


CIFAR5 vs. CIFAR5

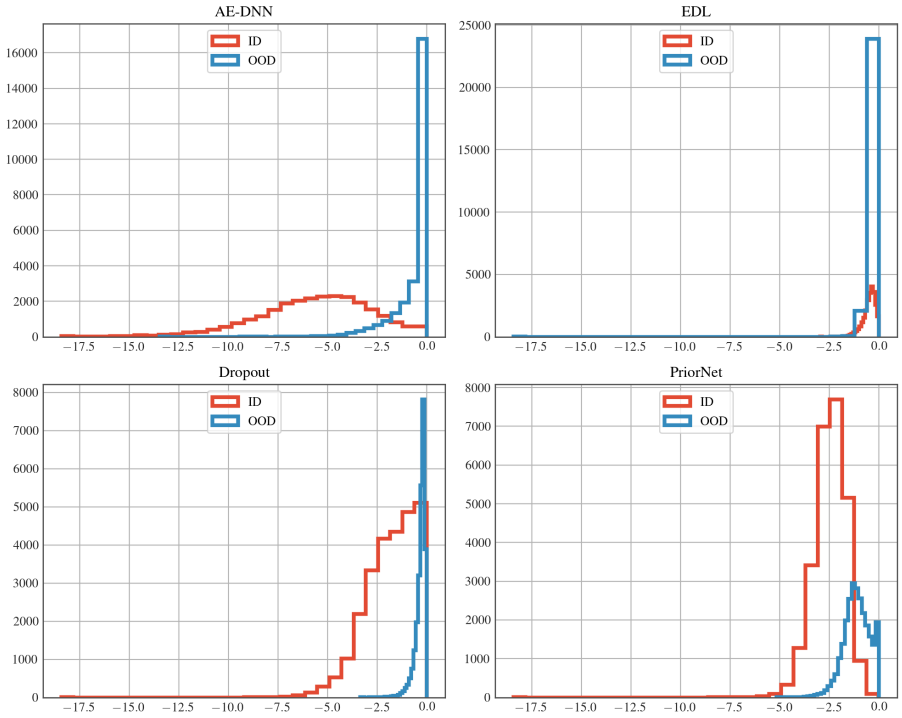


Logarithmic

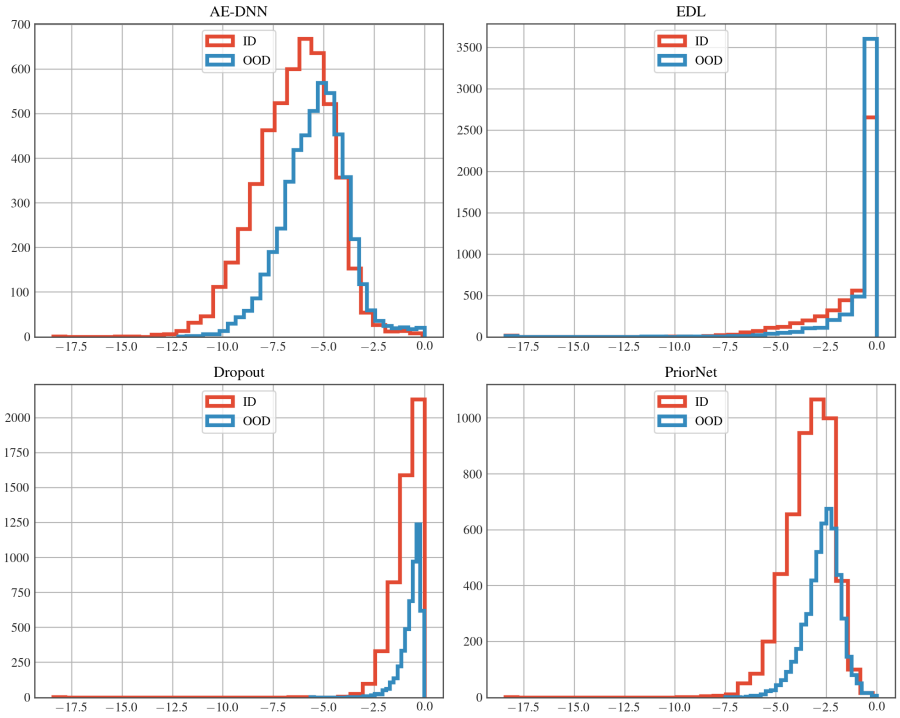
MNIST vs. NotMNIST



SVHN vs. CIFAR10



CIFAR5 vs. CIFAR5



Reproduce Results

Requirements

All requirements can be installed with:

`pip install -r requirements.txt`

For cuda support, please refer to https://pytorch.org/.

Jupyter Notebooks can be opened with the bash command `jupyter notebook`.

Experiment

Running Experiments:

All experimental configurations can be found in the config file. For hyperparameter optimization, we applied Bayesian optimization. The results are published in the paper and can be reproduced with the following command:

```
python experiment.py \
    --n_epochs 50  \
    --n_reps 5 \
    --lmb $lmb \
    --gamma $gamma \
```

```
--dropout_rate $dropout_rate \
--ood_factor $ood_factor \
--lr $lr \
--weight_decay $weight_decay \
--method_name $method_name \
--dataset $dataset \
--ood_ds $ood_ds
```

Evaluation of Experiments:

The evaluation of experiments can be obtained in this Jupyter Notebook.

Synthetic

The synthetic experiments can be found in the following Jupyter Notebooks: - Circle Example - Gaussian Distribution Example