Supplemental Materials

1. Usefulness of the Proposed Attention Map in Testing

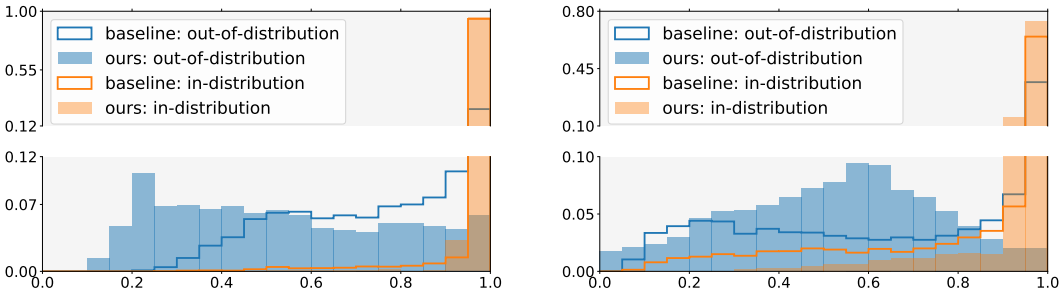
To further investigate how the performance is affected by the attention map, we now keep the attention map module at the training phase, but choose not to use it at the test. As shown in Table 1, the performance deteriorates substantially, especially on the case of using the more complex CIFAR-100 as the in-distribution dataset. This further corroborates that the proposed uncertainty-induced attention map has the ability to highlight the certain and discriminative regions of a sample. Disabling it will obviously harm the discrepancies between the confidence scores of in-distribution and OOD examples, showing the importance of using the proposed attention map at both training and testing phase.

Out-of-Distribution	DenseNet	WRN-28-10
Test Results without / with Attention Map (CIFAR-10)		
TinyImageNet	98.0 / **99.0**	96.8 / **96.8**
LSUN	99.2 / **99.5**	97.5 / **97.7**
iSUN	98.5 / **99.2**	91.5 / **94.6**
Uniform	99.5 / **100.0**	99.5 / **100.0**
Gaussian	99.8 / **100.0**	**100.0** / **100.0**
Test Results without / with Attention Map (CIFAR-100)		
TinyImageNet	90.0 / **94.9**	91.5 / **92.3**
LSUN	92.0 / **95.7**	89.4 / **90.3**
iSUN	90.7 / **95.2**	90.0 / **90.4**
Uniform	99.6 / **99.9**	99.5 / **99.7**
Gaussian	99.7 / **100.0**	99.0 / **100.0**

Table 1: The AUROC result of testing with / without the proposed attention map, in which the in-distribution datasets are CIFAR-10 and CIFAR100, while the OOD datasets are TinyImageNet, LSUN, iSUN and noise datasets.

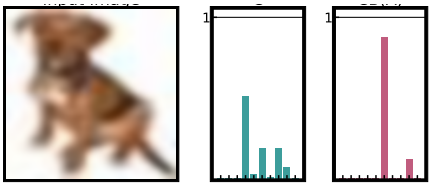
2. Effectiveness of the Proposed Attention Map

Moreover, Fig. 1 shows how the confidence scores varies on the in-distribution and OOD examples when the proposed attention map are used or not. It can be seen that the proposed uncertainty-induced attention map can increase the confidence scores for in-distribution examples, while decrease them for OOD examples, thereby enlarging the discrepancies.

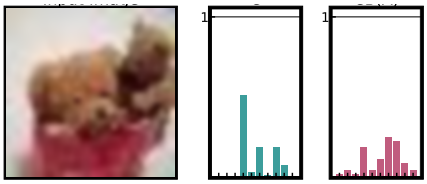


(a) CIFAR-10 (b) CIFAR-100

Figure 1: Histograms of confidence scores of in-distribution and OOD examples when the proposed uncertainty-induced attention map is used or not. The OOD dataset is TinyImageNet and the backbone network is *WRN-28-10*. Note that for better visualization, y axis is split into two parts with different scales.



(a) In-distribution Image



(b) OOD Image

Figure 2: Prediction probabilities for a specific in-distribution and OOD image. The left means only the naive classifier is used, and the right means the attention map derived from the uncertainty of discriminator is used. The in-distribution data is CIFAR-10.

Fig. 2 further illustrates how the prediction probabilities varies on a specific in-distribution and OOD example when different attention maps are used. It can be seen that without using the proposed attention map, the prediction probabilities of the in-distribution example is not sharp enough. But after using the attention map induced from the uncertainty in the discriminator, the prediction probabilities becomes sharper. The opposite is observed on the OOD example. This fully demonstrates that the proposed attention maps derived from the uncertainties in the discriminator is beneficial to the performance improvement of OOD detection.