CEA-LSEA: Out-of-Distribution Detection using DNN Latent Representations Uncertainty

Description

CEA-LSEA package for Out-of-Distribution (OoD) detection using the uncertainty (entropy) from DNN latent representations. The package has been used with the following applications, the corresponding DNN architectures and datasets:

- **Simple Classification:**
  - **In-Distribution Dataset:** GTSRB
  - **Out-of-Distribution Datasets:** CIFAR10 & STL10
  - **DNN Architectures:**
    1. ResNet-18
    2. ResNet-18 with Spectral Normalization
- **Semantic Segmentation:**
  - **In-Distribution Dataset:** Woodscape & Cityscapes
  - **Out-of-Distribution Datasets:** Woodscape soiling, Woodscape-anomalies, Cityscapes-anomalies
  - **DNN Architectures:**
    1. Deeplabv3+
    2. U-Net

In all the above cases, the DNNs were slightly modified to capture *epistemic* uncertainty using the Monte-Carlo Dropout by adding a `DropBlock2D` layer.

Requirements

See `requirements.txt`

Installation

Install requirements, then in the base folder of the repo do `pip install .`

Usage

For detailed usage, check this document

Publications and Technical Reports

For more technical and implementation details, we refer the user to the following technical reports and publications:

Technical Reports:

- EC3-FA06 Run-Time Monitoring
- EC3-FA18 Run-Time Monitoring

Publications

- Out-of-Distribution Detection using Deep Neural Network Latent Space

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