Running Experiments

Introduction

The following document contains detailed instructions to run the experiments described in the paper. In particular, there are four sections that correspond to running the four experiments:

- MNIST Experiment
- CIFAR Experiment
- UCSD Experiment

Directory Structure

Each of the experiments has a corresponding subfolder in the root directory of the supplementary materials folder generated by unzipping the submitted file. The directory structure is the same across these folders, including the following directories:
- data: The data files needed for the experiment (Need to add from google drive, instructions below)
- scripts: The train and test python and shell scripts
- pretrained_models: The models used to yield the results reported in the experiments (Need to add from google drive, instructions below)
- models: A folder to store models generated by running the given training scripts

Pretrained Models

Due to the size constraints of the submission, a link to an anonymous google drive is provided that contains the pre-trained models for each experiment. Simply download the corresponding pretrained_models.zip file located in the directory of the provided link, unzip the folder as pretrained_models, and insert the directory into the root of the directory of the experiment you wish to run.

Data

Similar to Pretrained models, a link to an anonymous google drive is provided that contains the data for each experiment. Simply download the corresponding data.zip file located in the directory of the provided link, unzip the folder as data, and insert the directory into the root of the directory of the experiment you wish to run.

It is important to note that the data included in the data folder has been included in the NumPy format so that the experiments can be conveniently run without having to download the relevant datasets and convert them to the correct format. If you prefer to download the data directly, you can download the data and convert it to the NumPy format and replace the existing files

following the same naming convention.

Python Version and Dependencies

Each shell script installs the required dependencies. A more thorough document outlining the python version and environment is located at the root of the supplemental materials folder.

MNIST Experiment

Data

Download the data.zip from this [link](#), unzip with name data, and include it in the mnist_experiment folder.

Testing from Pretrained Models

Testing

1. Unzip the supplementary file sup_mat.zip into a folder called sup_mat. Download pretrained_models.zip file from [link](#)
3. Unzip the file to create a folder called pretrained_models
4. Within the folder sup_mat, insert pretrained_models into the root of the mnist_experiment folder
5. Change the working directory to sup_mat/mnist_experiment/scripts and run test.sh
6. The results of the experiment are present in the corresponding log file

Training and Testing from Scratch

Training

1. Unzip the supplementary file sup_mat into a folder called sup_mat. Change the working directory to sup_mat/mnist_experiment/scripts and run train.sh
   a. This shell script will train ten OLED models, corresponding to the ten anomaly detection datasets involved in the MNIST experiment as described in the paper. Accordingly, this shell script contains 10 executions of the same python script for each of the classes
   b. Training time will be upwards of 12 hours to train all of these models, if your gpu resources risk preemption after a certain amount of time, disperse the runs from each class among multiple shell script files
   c. Models are saved in the models folder

Testing

1. Change the working directory to sup_mat/mnist_experiment/scripts and run test_trained.sh
2. The results of the experiment are present in the corresponding log file

CIFAR Experiment

Data

Download the data.zip from this link, unzip with name data, and include it in the cifar_experiment folder.

Testing from Pretrained Models

Testing

1. Unzip the supplementary file sup_mat.zip into a folder called sup_mat. Download pretrained_models.zip file from link
3. Unzip the file to create a folder called pretrained_models
4. Within the folder sup_mat, insert pretrained_models into the root of the cifar_experiment folder
5. Change the working directory to sup_mat/cifar_experiment/scripts and run test.sh 6. The results of the experiment are present in the corresponding log file

Training and Testing from Scratch

Training

1. Unzip the supplementary file sup_mat into a folder called sup_mat. Change the working directory to sup_mat/cifar_experiment/scripts and run the train.sh
    a. This shell script will train ten OLED models, corresponding to the ten anomaly detection datasets involved in the CIFAR experiment as described in the paper. Accordingly, this shell script contains 10 executions of the same python script for each of the classes
    b. Training time will be upwards of 12 hours to train all of these models, if your gpu resources risk preemption after a certain amount of time, disperse the runs from each class among multiple shell script files
        c. Models are saved in the sup_mat/cifar_experiment/models folder

Testing

1. Change the working directory to sup_mat/cifar_experiment/scripts and run test_trained.sh
2. The results of the experiment are present in the corresponding log file

UCSD Experiment

Data

Download the data.zip from this [link](#), unzip with name data, and include it in the ucsd_experiment folder.

Testing from Pretrained Models

Testing

1. Unzip the supplementary file sup_mat.zip into a folder called sup_mat. Download pretrained_models.zip file from [link](#)
3. Unzip the file to create a folder called pretrained_models
4. Within the folder sup_mat/ucsd_experiment, insert pretrained_models folder 5. Change the working directory to sup_mat/ucsd_experiment/scripts and run test.sh
6. The results of the experiment are present in the corresponding log file

Training and Testing from Scratch

Training

1. Unzip the supplementary file sup_mat into a folder called sup_mat. Change the working directory to sup_mat/ucsd_experiment/scripts and run the train.sh
   a. Models are saved in the sup_mat/ucsd_experiment/models folder

Testing

1. Change the working directory to sup_mat/ucsd_experiment/scripts and run test_trained.sh
2. The results of the experiment are present in the corresponding log file