

1. (100 points) Read the *Article.pdf* file about autoencoder (AE) under the Week 14 folder on Blackboard and write only one paragraph about it.

The article proposes an Improved AutoEncoder for unsupervised Anomaly Detection (IAEAD) method. It contains a Deep SVDD¹ loss term into the optimization objective of a convolutional autoencoder, in addition to the standard reconstruction loss. The Deep SVDD loss manipulates the feature space to make it more suitable for anomaly detection. Instead of using reconstruction error to detect anomalies, IAEAD calculates anomaly scores based on the distance between embedded feature vectors. Experiments on image datasets show that IAEAD outperforms other autoencoder methods, especially on relatively simple image datasets like MNIST² and Fashion-MNIST. The combination of autoencoder feature learning plus Deep SVDD loss guidance can achieve better anomaly detection performance.

1. Support vector data description
2. Modified National Institute of Standards and Technology