
Spatio-Temporal Convolutional Autoencoders for Perimeter Intrusion Detection

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Abstract

In the video surveillance context, a perimeter intrusion detection system (PIDS) aims to detect the presence of an intrusion in a secured perimeter. Existing camera based approaches relies on handcrafted rules, image based classification and supervised learning. In a real world intrusion detection system, we need to learn spatio-temporal features unsupervisedly (as annotated data is very difficult to obtain) and use these features to detect intrusions. To tackle this problem, we propose to use a 3D convolutional autoencoder. It is inspired from the DeepFall paper where they use it for an unsupervised fall detection task. In this paper, we reproduce their results on the fall detection task and further extend this model to detect intrusions in a thermal intrusion dataset. We also introduce a new evaluation scheme which helps to draw essential insights from the results. Our results show that we correctly reproduce the results of fall detection task and furthermore our model show competitive performance in intrusion detection task. To our knowledge, it is the first time when a PIDS is made in a fully unsupervised manner while jointly learning the spatio-temporal features from a video-stream.

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