

Abstract

One of the important steps in automatic video surveillance system is to detect moving foreground objects. In video surveillance, a system will usually encounter with unseen objects or change of appearance due to illumination variations or viewing angle changes. An effective and efficiency video surveillance system should be able to learn to detect new object categories or adapt to environmental changes as quickly as possible. It is well known that deep learning based video surveillance requires large amount of training data and long training time. However, the availability of large annotated image dataset is limited and also such dataset is expensive to generate. Moreover, training with large dataset is slow and thus not suitable for real-time video surveillance system.

In this project, a framework is proposed for deep learning based video surveillance with little data samples using few-shot learning. The proposed framework contains a feature extractor network that learns the basic features from a rich set of base classes, and a reweighting module that uses a small number of new images from the novel classes to adjust the basic features so that they can form high level features conformed to the new classes. The proposed model provides fast adaptation to novel object classes such that the video surveillance system can learn to detect unseen objects or adapt to new environment as quick as possible using only a few data samples of the novel classes. The framework proposed in this project should benefit the video surveillance community by providing a realistic learning mechanism for real-time video surveillance