Abstract:

Anomaly detection aims to discover data which differ from the norm in a semantically meaningful manner. The task is difficult as anomalies are rare and unexpected. Perhaps the most challenging aspect is its subjective nature: a sample can be an important anomaly to one person and an uninteresting statistical outlier to another. While the task has been studied for decades, deep learning methods have recently brought substantial gains, particularly for image anomaly detection. In this talk, I will present the hypothesis that anomaly detection requires strong representations of data and simple density estimators. This paradigm will be substantiated by our state-of-the-art results from a large number of modalities including: images, point clouds, video, time-series. The success of representation-based anomaly detection and the task's subjective nature, makes it paramount to develop user-guided representations. I will therefore describe our preliminary approach that uses a new representation disentanglement technique for guiding representations in anomaly detection. I will conclude by describing the outstanding challenges for representations in anomaly detection.