

# Adaptive one-class classifier ensembles for anomaly detection

**Program:** Ph.D. in Engineering

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## **Project Description:**

The design of intrusion detection systems is a very challenging task in practice. Basically the goal of these surveillance systems is to monitoring activities in an environment, and to classify them as normal event or anomalies. The fundamental problem here is the lack of a priori knowledge about the nature of anomalies, which increase the difficulty of designing robust intrusion detectors.

One-class problems are well known in the area of pattern recognition. In this context, most of the reference data is available for modeling the class of normal events, and very few or no samples are available for the modeling anomalies. In practice, the interaction with an operator is mandatory in order to confirm the nature of the decision made by the surveillance system (e.g. the detection of a real intrusion or the event is a false alarm).

The goal of this project is the study of new and robust strategies for the design of adaptive and human-centric surveillance system based on one-class classifier ensembles. Proposed methods should be flexible enough to be use with all type of generative classifiers like HMMs, GMMs, 1c-SVMs, etc. The performance of the proposed strategies will be evaluated on synthetic and real-world data extracted from like anomaly detection based on system calls, sensor networks and video cameras.

## **Contact :**

- Prof. Robert Sabourin ([robert.sabourin@etsmtl.ca](mailto:robert.sabourin@etsmtl.ca)).
- Prof Éric Granger ([eric.granger@etsmtl.ca](mailto:eric.granger@etsmtl.ca)).