

Information-based Mobile Sensor Behavior Classification for Anomaly Detection

Sasha M. McKee¹, Osama Haddadin² and Kam K. Leang^{1,*}

¹*Department of Mechanical Engineering and Robotics Center
University of Utah, Salt Lake City, UT 84112 USA*

²*L3-Harris, Salt Lake City, UT 84112 USA*

**Corresponding author (kam.k.leang@utah.edu)*

Abstract: This work presents a novel approach to classify the behavior of mobile sensors with the specific focus of detecting anomalous mobile sensor activity. In recent years, especially with the development of the Internet of Things (IoT), anomaly, or outlier, detection problems have become a key area for research in areas such as network security, system health monitoring, and navigation and obstacle avoidance in mobile systems such as factory-floor robots or autonomous vehicles. Mutual information is used to encode and quantify the expected behavior of a mobile sensor to identify the presence of anomalies. This technique benefits from straightforward implementation, and the concept can be extrapolated to other sensor measurements to create more robust detection schemes. Simulations are presented using measured data from a wireless sensor network to demonstrate application of the method. Results show that mobile sensor behavior that fall outside of a specific regime can be detected and systematically quantified.

Keywords: Information theory, mutual information, anomaly detection
