

Gaussian Mixture Models for Securing Industrial Cyber-Physical Systems

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Modern manufacturing and service systems usually integrate many cyber-physical components within a complex network. Such cyber-physical systems have been increasingly adopted in various industrial and business applications such as logistics, smart power grid, intelligent transportation, environmental monitoring, and healthcare services. The interconnection of components offers substantial benefits for consumers and companies, but also poses a new level of cyber vulnerability towards them. We develop a Gaussian mixture model and expectation maximization based approach that can be used for automated anomaly detection and proactive response to potential cyber threats. The results from the SWaT water treatment system will be discussed.

Keywords: Gaussian mixture model, Statistical learning, Cybersecurity, Anomaly detection, Clustering.