

A collaborative network of digital twins for anomaly detection applications of complex systems. Snitch Digital Twin concept

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Abstract-

This paper proposes a novel Digital Twin (DT) ecosystems. In addition to DTs, conceived as a digital representation of a physical entity, this paper proposes a new concept of DT focused on modeling connections between physical behaviors. This new DT concept is called Snitch Digital Twin (SDT). The scope of the SDT is the study of variations between behaviors and support the detection of anomalies between them. The behavior of each physical entity is characterized by three spatiotemporal features computed from each collected measurement. Behavioral anomalies are identified and quantified through modular patterns based on Support Vector Machines (OCSVM) in a case study application. The case study is based on the diagnosis of the cooling system of a power-generator

Index Terms- Anomaly detection; Digital Twins; Behavior characterization; Quantile regression; Diesel generator

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