

Extracting Design Characteristics from Unsecured MTConnect Data Streams

Maxwell K. Micali

University of California, Berkeley; Laboratory for Manufacturing and Sustainability

The MTConnect Standard enables a wealth of data from production operations to be collected in a standard format for the first time, opening the flood gates for engineers and data analysts to tease apart the data and discover new ways to enhance the current state of Manufacturing Intelligence. While MTConnect was developed with the intention of enhancing intelligence and productivity, as with any stream of data, intruders and cyber attackers may be able to use that same data to enact harm or steal assets. This project explores the topic of what high-level information an intruder may be able to extract from an intercepted stream of low-level data from a machine tool equipped with MTConnect. The first phase of the project describes an approach for reconstructing unambiguous part geometries from complete MTConnect data access, and the second phase describes an approach to perform this task with only interrupted sampling of a data stream. The latter could have broader implications for algorithms to automate aspects of design. Since the potential losses resulting from the theft of classified information or valuable intellectual property are immense, the ROI of determining what an intruder can accomplish with intercepted MTConnect data is high.