Intrusion detection in water distribution systems using machine learning techniques

Mabunda, N; Ramotsoela, DT; Abu Mahfouz, Adnan MI

Abstract

Water distribution systems/networks (WDS/WDN) use complex pipe networks to distribute water from reservoirs, tanks and rivers to consumers. Over the years, the water industry has deployed SCADA (Supervisory Control and Data Acquisition) systems into WDNs so that there is a uniform water balance and so that the demands of a fastgrowing world population are met optimally. These SCADA systems use standard protocols, hardware and software and thus are targeted due to their propensity to connect to institutional networks and the internet. Accurate and timeous detection of these attacks is necessary to protect critical infrastructure. Recently, Machine learning (ML) models have been initiated so that these cyber-attacks can be detected. These models can be categorized as Regression and prediction-based models, Classification-based models and Min-max based models. This paper will serve to cover the research gap in intrusion detection using machine learning, specifically in water distribution networks. This paper will aid in understanding which machine learning techniques are best suited for water distribution applications.