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Assessment of a Machine Learning Framework for Sustainability Base

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Abstract: The Sustainability Base is a super-green, government owned building that was inspired by NASA's space exploration technology. There are thousands of sensors that are placed around the building for the purpose of automating certain processes as well as for data acquisition. The purpose of this project is to apply NuPIC, a machine learning framework based on the Cortical Learning Algorithm (CLA) to the data acquired from Sustainability Base in order to evaluate its performance metrics. First, data from the Sustainability Base will need to be analyzed in order to pick out the sensors (features) that would serve as good references for anomaly detection and adverse event prediction of the differential water pressure sensor. Then a training dataset (contains nominal values), validation dataset (contains anomalous values), and a test dataset (contains one anomaly) was constructed to use with NuPIC. The results generated by the Online Predictive Framework (OPF) of NuPIC when the test dataset is applied, will be used to evaluate its performance metrics (false alarm rate, missed detection rate, detection time).