Real-time systems are critical in many domains, such as medical monitoring, flight, autonomous vehicles, weapon systems, and Industrial Control Systems (ICSs). Cyber-attacks on such systems can be devastating and affect public health, safety, economy, and national security. Detecting anomalies in such systems in real-time is vital in many use cases and is a challenging problem.

In this research, you will use a novel Hierarchical Temporal Memory (HTM) machine-learning algorithm based on a theory of how the neocortex works in the brain. We will use this neuro-inspired approach for the task of real-time anomaly detection.

The primary goal of this research is to examine new ways in which HTM can be used for real-time anomaly detection. An essential aspect of the project is to understand the strengths and weaknesses of the algorithm in different use cases, propose modifications, and implement and test the effectiveness of new ideas.
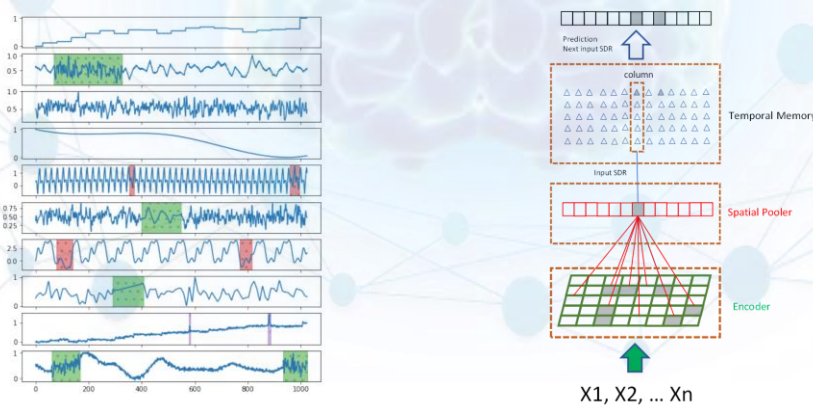
Supervisor(s): Prof. Avi Mendelson, Roman Malits

Requirements: Strong programming skills and good knowledge of Python, and Elementary course in Deep Learning (e.g. 236781)