Approve Prediction of Multisequence Learning

Multisequence Learning

In the endeavor to implement multi-sequence learning with HTM, the initial step involves encoding input data into Sparse Distributed Representations (SDRs) using a scalar encoder. These SDRs are then processed by the spatial pooler, generating sparse representations of the input sequences. Subsequently, these representations are fed into the temporal memory component for learning and prediction. This approach is highly effective for recognizing and predicting patterns across multiple input sequences.

In my project, I have introduced novel methods to enhance the Multi-sequence Learning algorithm . These methods facilitate automatic dataset retrieval from a specified location. Additionally, we've incorporated separate test data, which will be utilized for evaluating subsequences during testing. The Multi-sequence Learning algorithm operates by analyzing multiple sequences and testing subsequences for learning purposes. Once learning is finalized, the accuracy of predicted elements is computed for evaluation.

## Hierarchical Temporal Memory

The objective of HTM is to emulate the hierarchical structure and learning process of the brain. It is comprised of a network of nodes organized hierarchically, where each node corresponds to a group of neurons in the neocortex. These nodes acquire the ability to identify patterns in sensory information and generate predictions based on their prior experiences. Subsequently, the predictions are evaluated against the input data to refine the node's model and enhance its predictive precision.

As per Hawkins, the neocortex learns and makes predictions by forming a hierarchical structure of columns, each containing a set of neurons that recognize patterns in sensory input. These columns communicate with each other in a hierarchical manner, with higher-level columns representing more abstract concepts.

## Sparse Distributed Representation

In the context of HTM, SDRs are used to represent patterns of activity in the network. Each input to the network is transformed into an SDR, which is then processed by the network's hierarchy of nodes to make predictions about future input.

Hawkins and Ahmad proposed that SDRs, which are binary vectors with a small number of active bits (ones) out of a large number of total bits, are a natural way to represent sparse, distributed patterns of activity in the neocortex.