Computation Complexity Report

Tests Parameters

A. Number of **memory items** learned in the memory (spanning from 0 to 17).

B. Number of **possible types of elements** in a scene (spanning in 2, 4 and 6 concepts), e.g., Stop, Move, Cross, etc.

C. Number of **possible relations among elements** in a scene (spanning in 2, 4 and 6 roles), e.g., After, Before, Duration, etc.

D. Number of **elements (e.g., events)** in a scene (spanning in 5, 11, 17 and 30).

- To emulate scene with different complexity, the number of **relations** (Y) in a scene depends on D, and

  - *if C = 2 → Y = 2*(D - 1),*

  - *if C > 2 → Y = 2*(D - 1) + X,*
    where X is in [0, 2*(D-1)] chosen with a normal probability distribution.

  For instance, with C=2 and D=5 than Y=8, whereas with C=4, D=11 than Y in [20,40].

Note: In the repository the tests have been labeled with a notation "*D_A_B_C*".

Evaluation

Since the test have been made in an **incremental manner**, the results shows computation time for learning and classifying a scene in a memory with one more item at each iteration. In other words, the evaluation is for a memory with 0, 1, …, 17 items.

The results have been averaged for all tested C and D parameters, and shown with respect to different B and C, which represent the **ontology complexity**. The notation in the legends of the Figures shows the pair *<B-C>*.

The Figures shows the primary results of an average of 3 trials with **standard deviations**

- learning: STD_AVG=10,0s   STD_MIN=0,1s   STD_MAX=46,4s,

- classification: STD_AVG=16,6s   STD_MIN=0.9s   STD_MAX=3.5,3s.

Learning Time for Memory Items and Ontology Complexity
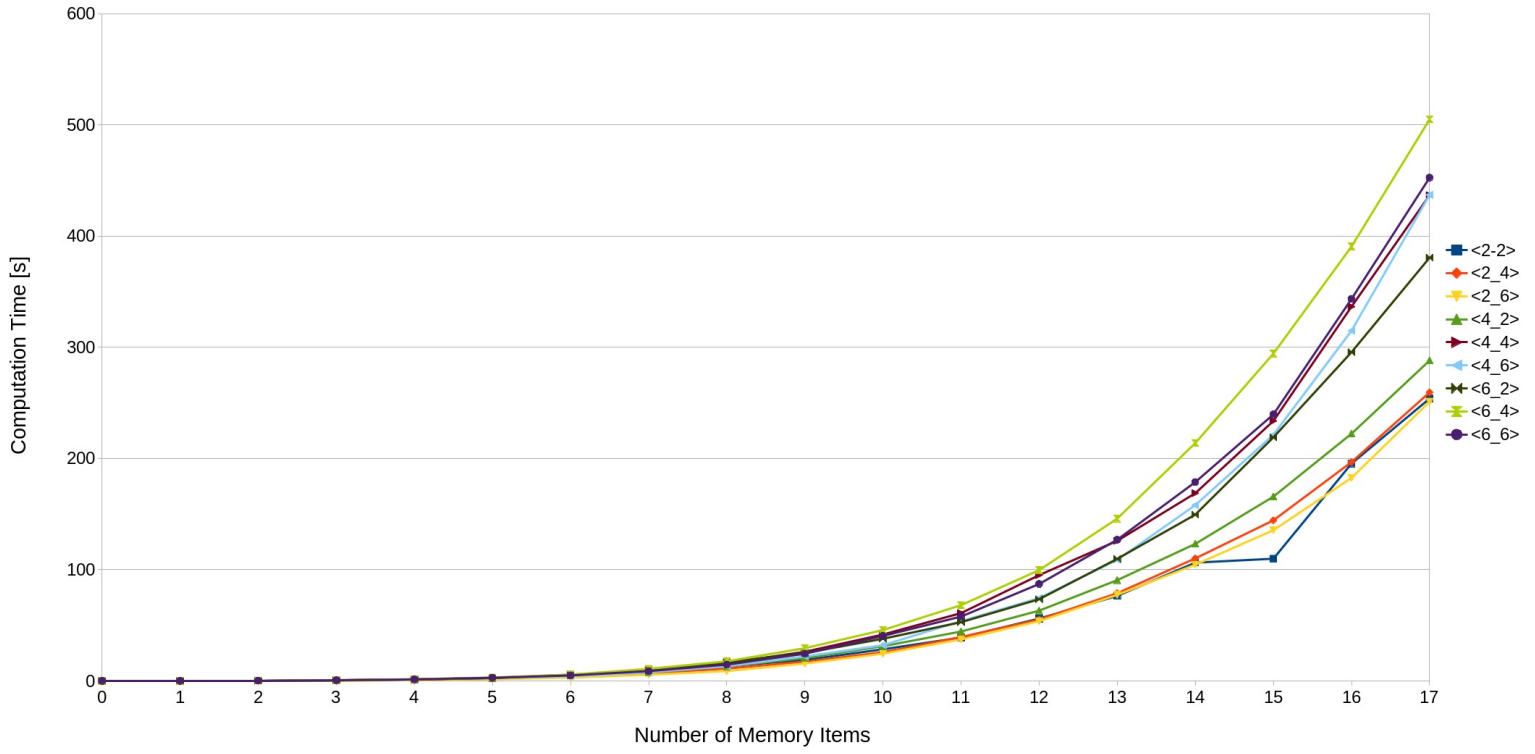
Classification Time for Memory Items and Ontology Complexity