CxSOM

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1 Introduction

The `CxSOM` software suite enables to model consensus based multi-SOMs, explored in the BISCUIT team of teh Loria lab.

The current documentation is at work, and mainly technical stuff are reported here. See the README at the package root for an introduction, as well as examples.

2 The model

The computation enabled by `CxSOM` consists of successively updating data, keeping trace of the data values in history files.

2.1 Data instances (DI)

The elementary piece of data handled in `CxSOM` is called a *data instance* (*DI*). Each of the computed DIs ends as a record in a file, once it has been computed.

DIs are denoted by a triplet $[T,\ X,\ t]$, that reads as "the instance of variable X hosted by the timeline T at the time instant t of that specific timeline". Only elementary $[T,\ X,\ t]$ DIs matter, the concepts of *variable*, *timeline* and *time instant* only serve for describing the computation.

Each DIs is a value that is stored in a file once definitively computed. A value has a type, that can be:

- `Scalar`: A floating point value, usually in $[0, 1]$.
- `Pos1D`: A value in $[0, 1]$ corresponding to a position in a 1D map.
- `Pos2D`: A value in $[0, 1]^2$ corresponding to a position in a 2D map.

- `Array=`n: A value in $\mathbb{R}^n$, usually $[0,\ 1]^n,\ n \in \mathbb{N}^\star$.
- `Map1D<`$\mathcal{X}$`>=`n: A 1D map of type $\mathcal{X}$, i.e. a value in $\mathcal{X}^n,\ n \in \mathbb{N}^\star$.
- `Map2D<`$\mathcal{X}$`>=`n: A 2D squared map of type $\mathcal{X}$, i.e. a value in $(\mathcal{X}^n)^n,\ n \in \mathbb{N}^\star$.

where type $\mathcal{X} \in \{$`Scalar`, `Pos1D`, `Pos2D`, `Array=`$k\}$.

In `CxSOM`, the type is associated to a variable, i.e. all the $[T,\ X,\ \bullet]$ are DIs with the same type.

Every DI is also doted with a status variable $\langle [T,\ X,\ t] \rangle \in \{$`busy`, `ready`$\}$:

- `ready`: The computation of the value of the DI is definitively done. The DI value will not change anymore.
- `busy`: The definitive value of the DI is still to be determined.

More generally, in the following, $\langle x \rangle$ reads as "the status of x".