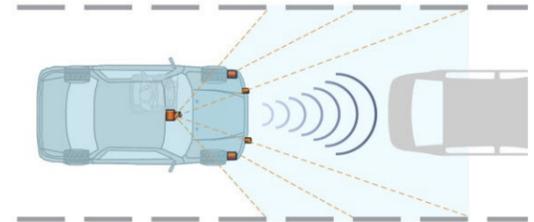


# Model-based time-distorted Contexts for efficient temporal Reasoning



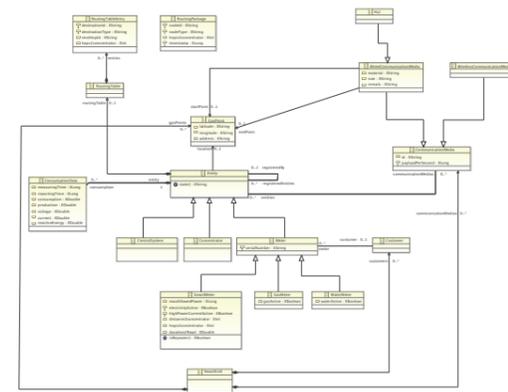
## Reasoning processes need context data

- Context data (internal state, surrounding environment)
- Intelligent systems **continuously analyze** their **context data**
- Enables to continuously **adapt themselves** to varying conditions



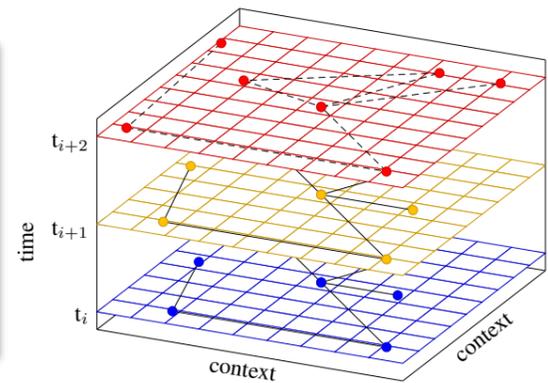
## The problem : Context models constraints

- Context models
- rapidly **change over time**, at different paces
- reasoning processes need to **analyze historical (temporal) data**  
The current **snapshot** of a context is usually **not sufficient**



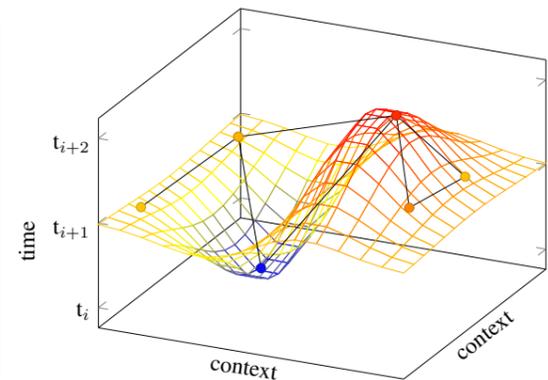
## The common approach : Snapshotting

- sampling at a very **high rate / redundancy**, vast amount of data
- hard to **analyze efficiently**
- find, extract and analyze a **relevant view** (data mining)
- very hard to do that at **runtime** (response time requirements)



## Time distorted contexts

- Specialized views, composed for specific reasoning tasks
  - elements can **evolve independently**
  - elements** from **different timestamps** in the same context
  - are **navigable** to reach elements from different times
  - automatically lookup** the right version while navigation



## Results (reasoning performance)

Scenario	Snapshotting	Time-distorted
SDP	1075.6 ms	<b>1.8 ms</b>
SWP	1088.4 ms	<b>0.8 ms</b>
LDP	180109.0 ms	<b>187.0 ms</b>
LWP	181596.1 ms	<b>157.6 ms</b>