

The background of the slide is a complex, abstract composition. It features a network of thin, light-colored lines forming a web-like structure. Overlaid on this are numerous small, colored dots in shades of green, blue, and orange. A prominent feature is a large, semi-transparent white triangle that points downwards, serving as a backdrop for the title. In the upper left corner, there is a smaller, rectangular inset showing a different data visualization with a grid of points and a highlighted path. The overall aesthetic is technical and data-driven.

# **Session 2: Mining Multi-Dimensional Associations**

# Mining Multi-Dimensional Associations

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- ❑ Single-dimensional rules (e.g., items are all in “product” dimension)
  - ❑  $\text{buys}(X, \text{“milk”}) \Rightarrow \text{buys}(X, \text{“bread”})$
- ❑ Multi-dimensional rules (i.e., items in  $\geq 2$  dimensions or predicates)
  - ❑ Inter-dimension association rules (*no repeated predicates*)
    - ❑  $\text{age}(X, \text{“18-25”}) \wedge \text{occupation}(X, \text{“student”}) \Rightarrow \text{buys}(X, \text{“coke”})$
  - ❑ Hybrid-dimension association rules (*repeated predicates*)
    - ❑  $\text{age}(X, \text{“18-25”}) \wedge \text{buys}(X, \text{“popcorn”}) \Rightarrow \text{buys}(X, \text{“coke”})$
- ❑ Attributes can be categorical or numerical
  - ❑ Categorical Attributes (e.g., *profession*, *product*: no ordering among values): Data cube for inter-dimension association
  - ❑ Quantitative Attributes: Numeric, implicit ordering among values—discretization, clustering, and gradient approaches