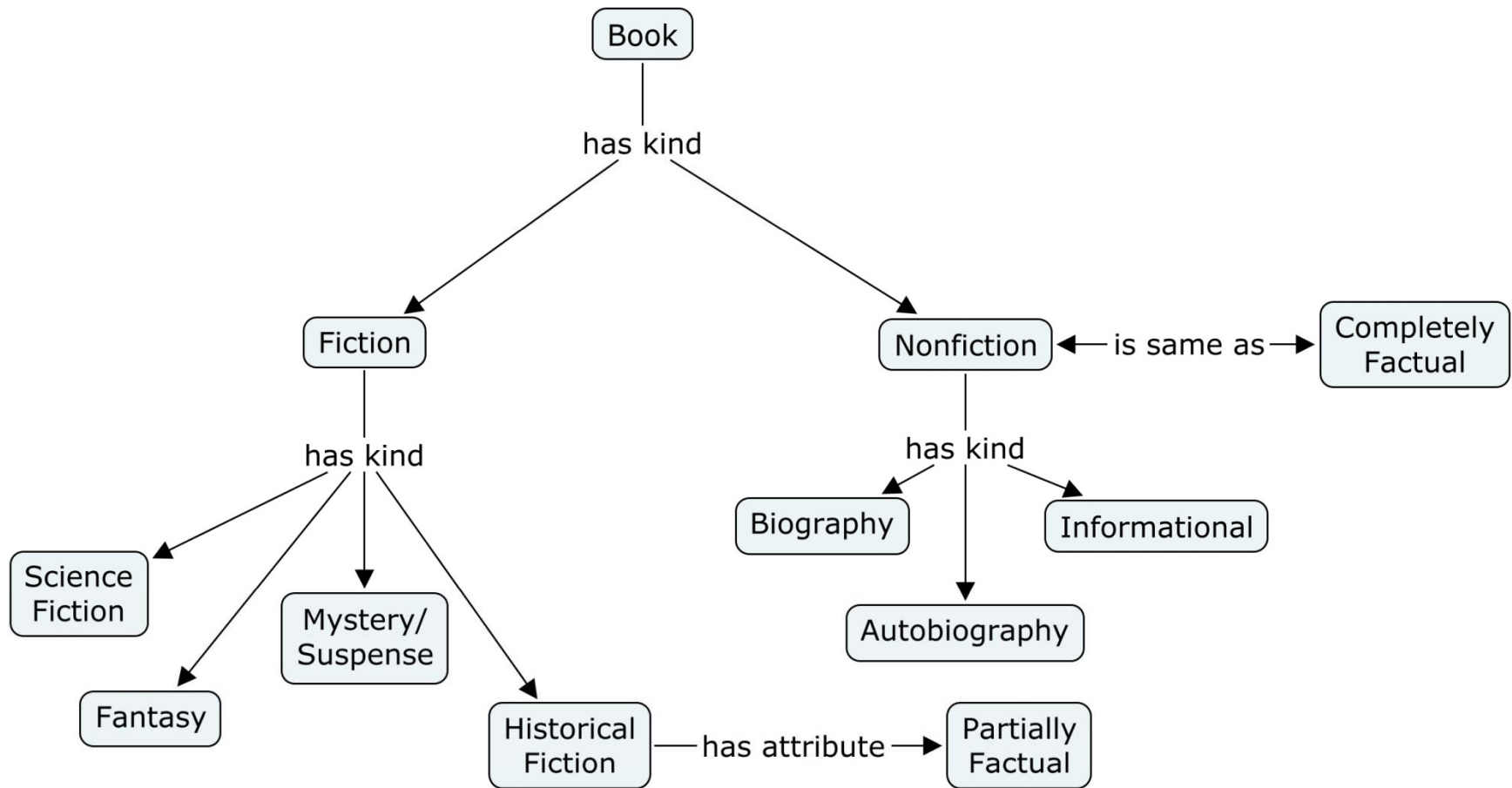# Concept Hierarchies

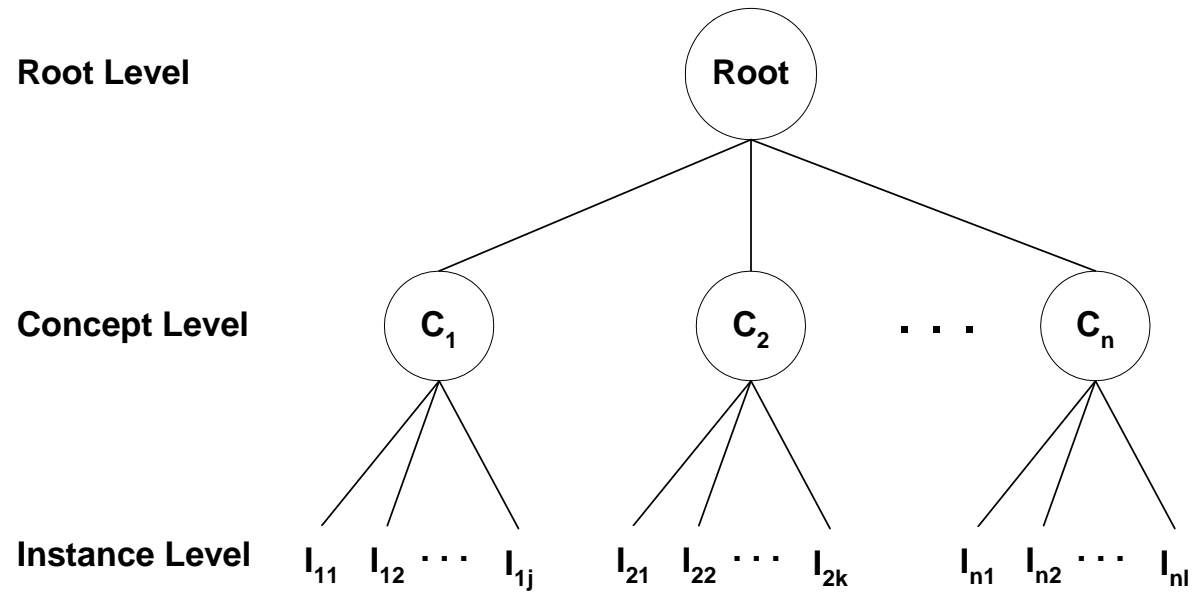By Susan L. Miertschin

What is a Concept Hierarchy?

- A way to organize concepts defined in a knowledge domain
- Multilevel organization of concepts
- Links represent relationships between two concepts
  - can be two-way (bidirectional) or one-way
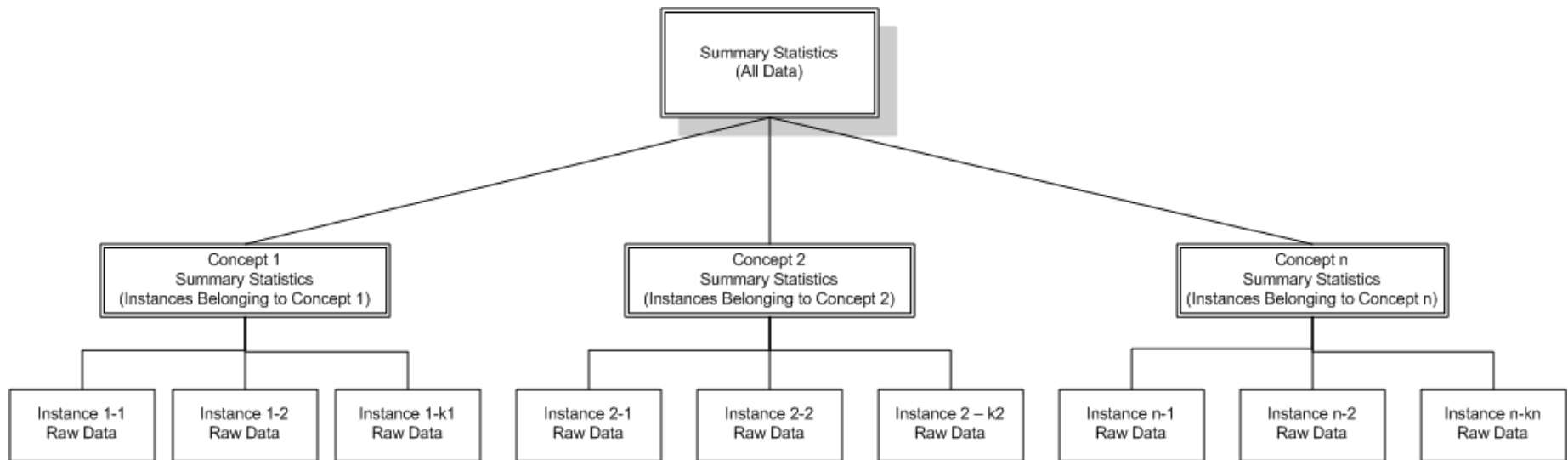
Concept Hierarchy Example -Book Genre Taxonomy

Data Mining Concept Hierarchies (ESX)

- ## Three levels
  - Root
  - Concept
  - Instance

Root Level ⬤ Root

Concept Level C_1 C_2 · · · C_n

Instance Level I_{11} I_{12} · · · I_{1j} I_{21} I_{22} · · · I_{2k} I_{n1} I_{n2} · · · I_{nl}

Concept Hierarchy Data Structure

Evaluation of Concept Hierarchy

- Class resemblance scores
  - A measure of overall similarity based on the exemplars (instances) making up each concept class
- Compute the average class resemblance (sum of all resemblances, divided by number of classes)
- Classify a new instance into a class to achieve highest (or lowest) change in average resemblance
- Supervised » classes are pre-determined
- Unsupervised » classes can be added to raise average resemblance score

Concept Hierarchies

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